Final Stage 2 Site Investigation Report

Block 29 Section 41 Lyneham

50519072



Prepared for

EPSDD

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Cardno

Contact Information

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 4, 2 Constitution Ave
Canberra ACT 2601
Australia

www.cardno.com
Phone +61 2 6112 4500

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Author(s):

Name Farrah Dane Reyes
Job title: Graduate Engineer

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Approved By:

Name: John Sutcliffe
Job title: Senior Project Manager

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Executive Summary

Cardno was engaged by EPSDD Urban Projects to prepare a Stage 2 Site Investigation Report for Block 29, Section 41 Lyneham ACT (the subject site). The purpose of this site investigation is to assess the site's suitability for a proposed residential development. The site is currently zoned RZ1: Suburban in the Territory Plan.

The proposed development area of the subject site is listed as 2,359m^2 on the ACTMapi Database and is located on Wattle Street, Lyneham.

For assessing the opportunities and constraints that would affect future development, a demonstration housing residential development has been selected as the highest demand, greatest yield usage, based on an understanding of the ACT Government's development intent. The proposed development scenario is indicative only, further detailed site investigations, architectural floor plans and a review of all statutory documents are required should the site warrant further review.

Key Site Risks and Recommendations:

Hazardous Materials

Risk Description: Based on the results of a contaminated land search undertaken as part of the Environmental Preliminary Site Investigation, the building and nearby storage sheds were listed as areas of environmental concern (AEC3). Based on the age of the building / structures the report suggests a potential for Asbestos Containing Materials (ACM) within the structures.

Risk: **High**

Recommendation: It is suggested that an intrusive hazardous material survey be completed prior to any demolition.

Refer to **Section 5.2** for further information

Sewerage

Risk Description: An existing trunk sewer main transects the block and will need to be relocated to unencumber future development. ICON Water has indicated that given the flat grade of the existing sewer, the existing DN375 will need to be replaced with a DN450 main. The cost of these works will be borne by the developer. The subject site is currently serviced by a sewer tie located on the southern boundary. The capacity of the proposed sewer tie may not be sufficient for the sewer loading from the proposed development, and needs to be verified once the final development scenario is known.

Risk: **High**

Recommendation: Remove the existing DN375 trunk sewer main located within the subject site. Provision of a realigned DN450 trunk sewer main around the north block boundary and connect to the existing DN450 sewer trunk at the intersection of Wattle Street and Scrivener St. Confirm the capacity of the existing sewer tie for the site. ICON Water in principle support has been gained for these works.

Refer to **Sections 4.8** and **6.5** for further information.

Driveway

Risk Description: The site is currently serviced by an existing 'Type R' driveway. The proposed development would require provision of a new HD2 type driveway. Depending on the ultimate layout of the development, the citing of this driveway may impact upon existing service ties.

Risk: **Medium**

Recommendation: Further consultation with TCCS is recommended to confirm the type and location of the driveway once the final development scenario is known.

Refer to **Sections 4.3** and **6.2** for further information.

Water Supply

Risk Description: The current water supply does not comply with the ACT firefighting standards for the site. The fire hydrants are located at approximately 100m spacing along watermain on Wattle Street however F5 fire risk sites require hydrants spaced at 60m.

Risk: **Medium**

Recommendation: Based in the current development scenario, one (1) additional 80mm spring fire hydrant will need to be installed on Wattle Street to comply with the relevant standards. If the proposed development changes the provisions for firefighting flows should be reviewed.

Refer to **Sections 4.7** and **6.4** for further information.

Flood

Risk Description: Sullivan's Creek is located in close proximity to the subject site. The current flood mapping depicted on ACTMapi demonstrates that the subject site is not within the 1% AEP flood level. However, the flood limit is shown to abut the existing retaining wall on the northern and eastern boundaries of the site, hence any modification to existing retaining walls on site may create a site flooding issue which does not presently exist. The existing 1% AEP flood height adjacent to the site is approximately 568.00 based on ACTMapi and site survey data.

Risk: **Low**

Recommendation: Although the subject site is not within the 1% AEP (Q100) flood level, due to its proximity to major overland flow paths and Sullivans Creek, basement car parking is not recommended for this site. Any modifications to the existing retaining walls on site will require further flooding analysis.

Refer to **Sections 4.5** and **6.6** for further information

Trees

Risk Description: The tree survey undertaken on the site identified four regulated trees. Each of the trees was determined to be of low quality and environmental value.

Risk: **Low**

Recommendation: Consultation with EPSDD Conservator of Flora and Fauna is advised prior to working in close proximity or proposing to remove any existing trees to allow for maximising developable area. The trees do not pose a significant risk to the future developability of the block.

Refer to **Sections 4.16** and **5.2** for further information.

Stormwater - Infrastructure

Risk Description: Site inspections have identified multiple plantation sumps across the site. It has been assumed that the sumps have capacity to manage flows generated by the existing site.

Risk: **Low**

Recommendation: Confirm that the existing stormwater infrastructure has capacity to manage the stormwater flows generated once the ultimate development layout is finalised.

Refer to **Sections 4.9** and **6.6** for further information.

Traffic Conditions

Risk Description: The subject site is within the traffic catchment of a road network that is predicted to experience high level of congestion according to the TCCS Strategic Model EMME. TCCS may require contributions from new developments in the area to fund future road network upgrades.

Risk: **Low**

Recommendation: Further communication with TCCS – Roads ACT is recommended to determine the necessity of a complete Traffic Impact Assessment, and to obtain information on any planned road upgrade works in the near future.

Refer to **Sections 4.2** and **6.1** for further information.

Parking

Risk Description: The client has requested the parking assessment be based on the provision of 35 spaces. This is lower than what is currently required for this type of development. It has been noted through discussions with the client that as the proposed development is for demonstration housing, lower traffic generation rates may be applicable. This will need to be confirmed through discussions with TCCS.

Risk: **Low**

Recommendation: Review the sites capacity for provision of parking as an integrated assessment once the ultimate development layout has been finalised.

Refer to **Sections 4.10** and **6.6** for further information.

Stormwater - Overland Flows

Risk Description: Block 29 Section 41 Lyneham's area is approximately 2,359m^2 and the average fall is 1% over a distance of approximately 63m from north to south. Overland flow from the subject site are assumed to be contained and collected by the stormwater infrastructure on site.

Risk: **Low**

Recommendation: Ensure that the ultimate development considers and maintains the existing overland flow paths.

Refer to **Sections 4.10** and **6.6** for further information.

Electrical

Risk Description: The subject site is currently serviced by an overhead electrical connection. A new electrical service tie may be provided with additional costs and coordination with Evoenergy. The capacity of the existing electrical network may not be sufficient for the demand from the proposed development, and needs to be verified once the final development scenario is known.

Risk: **Low**

Recommendation: Confirm the existing electrical infrastructure's alignment and size. Undertake maximum demand estimation upon confirmation of the final proposed development in accordance with AS3000:2007 and provide to Evoenergy for the electrical masterplan. For a proposed development of a four storey complex containing 45 dwellings, advice from Evoenergy is that a low voltage supply can be considered under an application for electricity network connection.

Refer to **Sections 4.13** and **6.7** for further information.

Telecommunications

Risk Description: The subject site is connected to a Telstra Service, depending on the proposed development, the existing cables may be required to relocated incurring additional costs.

Risk: **Low**

Recommendation: For network connection upgrade or relocations, the provider Network Integrity Group would need to be consulted.

Refer to **Sections 4.14** and **6.8** for further information.

Gas

Risk Description: The subject site is not shown as connected to a gas service. A new gas service tie may be required for the proposed development from the gas main located within the northern verge of Wattle Street.

Risk: **Low**

Recommendation: Jemena has advised that the subject site can be supplied from the existing DN40mm (210kPa) network. Should gas service be required following realisation of the final proposed development, the developer is recommended to liaise with Jemena to determine gas infrastructure extensions or upgrades required.

Refer to **Sections 4.15** and **6.9** for further information.

Contamination

Risk Description: Based on the results of a contaminated land search undertaken as part of the Environmental Preliminary Site Investigation, the site was previously used as a depot facility where fuel storage and vehicle maintenance activities may have been undertaken. Three (3) areas of environmental concern (AEC) were identified from the site visit and desktop study which may present a contamination risk that could compromise the suitability of the site for the land uses permitted under RZ1: Suburban zone. Contaminants of potential concern are associated with imported fill (AEC1), vehicle leaks and spills (AEC2) and storage of machinery and/or chemicals (AEC3).

Risk: **Low**

Recommendation: Based on advice provided within the Detailed Site Investigation Report undertaken by Lanterra Consulting, the site, from a contamination perspective, is deemed suitable for uses permitted under the RZ1: Suburban zone. This report has endorsement from the Environment Protection Authority based on the compliance with certain conditions.

Refer to **Section 5.2** and **5.3** for further information.

This site investigation report is for information only. Buyers are required to undertake their own assessments of the site prior to forwarding a Development Application with EPSDD.

Table of Contents

Executive Summary 3
Key Site Risks and Recommendations: 3
1 Introduction 10
2 Investigation Scope 12
3 Proposed Development 13
4 Existing Services and Constraints 14
4.1 General 14
4.2 Traffic Conditions 14
4.3 Driveway and Pedestrian Access 14
4.4 Parking Capacity 15
4.5 Flood Risk 16
4.6 Bushfire Risk 16
4.7 Potable Water 16
4.8 Sewer 17
4.9 Stormwater Infrastructure 18
4.10 Stormwater Catchment and Overland Flows 18
4.11 Heritage 18
4.12 Geotechnical 19
4.13 Electrical and Streetlighting 19
4.14 Telecommunication 19
4.15 Gas 19
4.16 Trees 19
5 Specialist Investigations 20
5.1 Preliminary Environmental Site Investigation 20
5.2 Detailed Environmental Site Investigation 21
5.3 Environmental Protection Authority Endorsement of Site Assessment Report – Block 29 Section 41 Lyneham Canberra Central 21
5.4 Tree Survey and Assessment 21
6 Proposed Site Services 23
6.1 Preliminary Traffic Impact Assessment 23
6.2 Driveway and Pedestrian Access 28
6.3 Parking 29
6.4 Potable Water 30
6.5 Sewerage 31
6.6 Stormwater Drainage 32
6.7 Electrical 32
6.8 Telecommunications 32
6.9 Gas 32
7 Opinion of Probable Cost 34

8 Risk Assessment and Recommendations 35
8.1 Risk Assessment 35
8.2 Recommendations 38

Appendices

Appendix A Site Servicing Drawings
Appendix B DBYD & Correspondence
Appendix C Site Photos
Appendix D Engineering Calculations
Appendix E Specialist investigations
Appendix F Stamped Prescribed Conditions
Appendix G Icon Water – In Principle Support
Appendix H Survey Plan

Tables

Table 3-1 Proposed Development Scenario 13
Table 4-1 Available Water Pressure DN150 Wattle Street 17
Table 5-1 Tree Assessment information 22
Table 6-1 High Density Residential Flat Buildings (Source: RTA) 23
Table 6-2 High Density Residential Flat Buildings (Source: RTA) 23
Table 6-3 Traffic Impact Assessment 25
Table 6-4 ICON Water / AS3500.1 Water Supply Calculations 30
Table 6-5 ICON Water Sewer Calculations 31
Table 6-6 TCCS Design Standards - Stormwater Calculations 32
Table 7-1 Opinion of Cost for Developer Funded Off-Site Works 34
Table 8-1 Risk Matrix 35
Table 8-2 Qualitative Measures of Likelihood or Frequency 35
Table 8-3 Qualitative Measures of Impact – Consequence Severity 35
Table 8-4 Site Risk Assessment 36
Table 8-5 Table of Recommendations 38

Figures

Figure 1-1 Aerial View of the Site (2019 photography) 10
Figure 1-2 Land Use Zoning of the Subject Site 11
Figure 4-1 Vehicular and Pedestrian Access 15
Figure 4-2 1% AEP Flood Level. 16
Figure 4-3 Stormwater Catchment Plan 18
Figure 5-1 Location of Assessed Trees 22
Figure 6-1 Traffic generated due to development. 24

Figure 6-2 Driveway requirements (Source: TCCS Standard Drawing No. DS5-02 Driveways) 29
Figure 6-3 Gas DBYD 33

1 Introduction

Cardno has been engaged by EPSDD Urban Projects to prepare a Stage 2 Site Investigation Report for Block 29, Section 41 Lyneham.

It is noted that through the development of this Site Investigation Report, the block number of the subject site changed from Block 14 Section 41 to Block 29 Section 41. All information within this report has been updated to reflect these changes, however the site servicing drawings (Appendix A), DBYD (Appendix B), engineering calculations (Appendix D), and specialist investigations (Appendix E) use the old block number. This presents no material change and the outcomes and recommendations remain relevant to the redefined Block 29.

The subject site is located on Wattle Street, Lyneham. The total land area of the subject site is listed as 2,359m^2 on the ACTMapi Database. The subject site is currently zoned as RZ1: Suburban.

This report identifies the opportunities, constraints, existing and required site services for the proposed development detailed in **Section 3.**

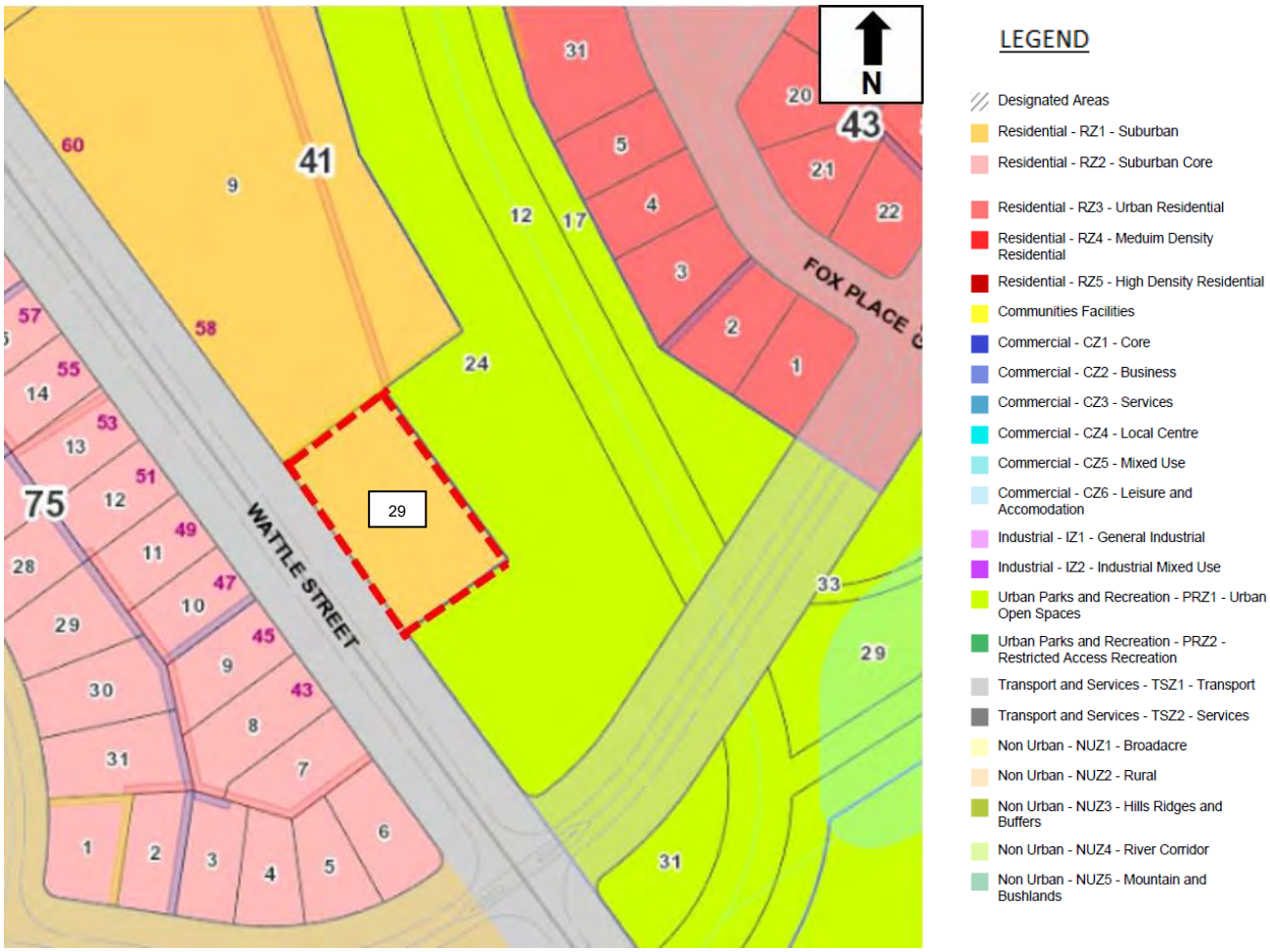
A detailed scope of works undertaken as part of this report as agreed with the EPSDD Urban Project Team is listed in **Section 2**.

Refer to **Figure 1-1** below for an aerial image of the subject site (outlined by red dashed boundaries). Refer to **Figure 1-2** for detailed land use zoning.

Figure 1-1 Aerial View of the Site (2019 photography)



Figure 1-2 Land Use Zoning of the Subject Site



2 Investigation Scope

This report has been undertaken in accordance with the scope of services detailed below.

A preliminary risk assessment and advice in terms of feasibility of the site's developability has been completed within this SIR, focusing on risks, scope of further investigation including specialist studies and qualitative advice on opinion of cost to unencumber and adequately service the subject site.

Subsequent to the findings of the preliminary risk assessment, a detailed site investigation of the following scope has been completed:

- Introduction
  - Background of project;
  - Aerial Photograph figure;
  - Site zoning and locality figure;
  - Proposed Development description and site yields based on information provided by EPSDD;
- Specialist Investigations, including:
  - Site Survey;
  - Tree survey and assessment;
  - Intrusive Hazmat survey (deferred due to access limitations);
  - Phase one Environmental Assessment;
  - Phase two Environmental Assessment.
- Existing Services and Constraints (Based on Dial Before You Dig Plans, ACTMAPI and engineering experience):
  - Ecological (Significant Species, Tree etc.);
  - Traffic (Adjacent roads brief review from ACT EMME Strategic Transport Model);
  - Driveway and Pedestrian access;
  - Parking (Aerial Imagery, number of spots available and territory plan constraints);
  - Flood (ACTMAPI and/or EPSDD Flood Modelling Information);
  - Bushfire (ACTMAPI);
  - Water (DBYD);
  - Sewer (DBYD);
  - Stormwater (TCCS Stormwater Database);
  - Heritage (ACTMAPI);
  - Other potential constraints identified;
  - Electrical;
  - Communications;
  - Gas.
- Proposed / future site services, access points/upgrades to suit the proposed development (shown on a simple landscape page within the report);
- Authority Correspondence based on proposed development and service;
- Preliminary Opinion of Cost for works to adequately service the site (Subject to change following complete investigation);
- Recommendations:
  - Further specialist investigations;
  - Further construction/demolition/remediation works.

3 Proposed Development

The following appreciation of the proposed development is based on the correspondence with EPSDD 27th March 2019.

According to the Territory Plan, the current land use zoning for Block 29, Section 41, Lyneham is RZ1: Suburban. A review of the Territory Plan indicates that the proposed high-density residential development on the site would require a Territory Plan Amendment.

Permissible development types on the subject site after finalisation of the Territory Plan Variation include:

- Ancillary use
- Boarding house
- Community activity centre
- Consolidation
- Demolition
- Development specified as additional merit track development in a suburb precinct code for land shown on the relevant suburb precinct map
- Emergency services facility
- Guest house
- Health Facility
- Home business
- Minor road, minor use
- Motel
- Multi-unit housing (limited to 2-storey)
- Parkland
- Residential Care Accommodation
- Retirement Village
- Sign
- Single dwelling housing (where not exempt development or code track assessable)
- Secondary residence
- Subdivision
- Supportive housing
- Temporary use
- Varying a lease (where not prohibited, code track or impact track assessable)

For assessing the opportunities and constraints that would affect future development, a four-storey residential demonstration housing development with a typical mixture of apartment sizes and bedroom configurations has been selected. This is based on our understanding of the ACT Government's development intent.

The development will compromise of a four storey residential development with 45 dwellings and 35 carparks. Refer to **Table 3-1** for further details on the proposed development**.** It is noted that the parking rates for the proposed development have been provided by the client. The parking rates provided are not in compliance with the current standards for high density developments and may be subject to further approvals from TCCS and other relevant ACT Government entities.

The following development scenario is indicative only, more detailed site investigation, architectural floor plans and review of all statutory documents are required should the site warrant further review.

Table 3-1 Proposed Development Scenario

Location	Dwelling / Apts (Four Storey)	Block Area	Parking
Block 29 Section 41 Lyneham	45	2,359m^2	35

4 Existing Services and Constraints

4.1 General

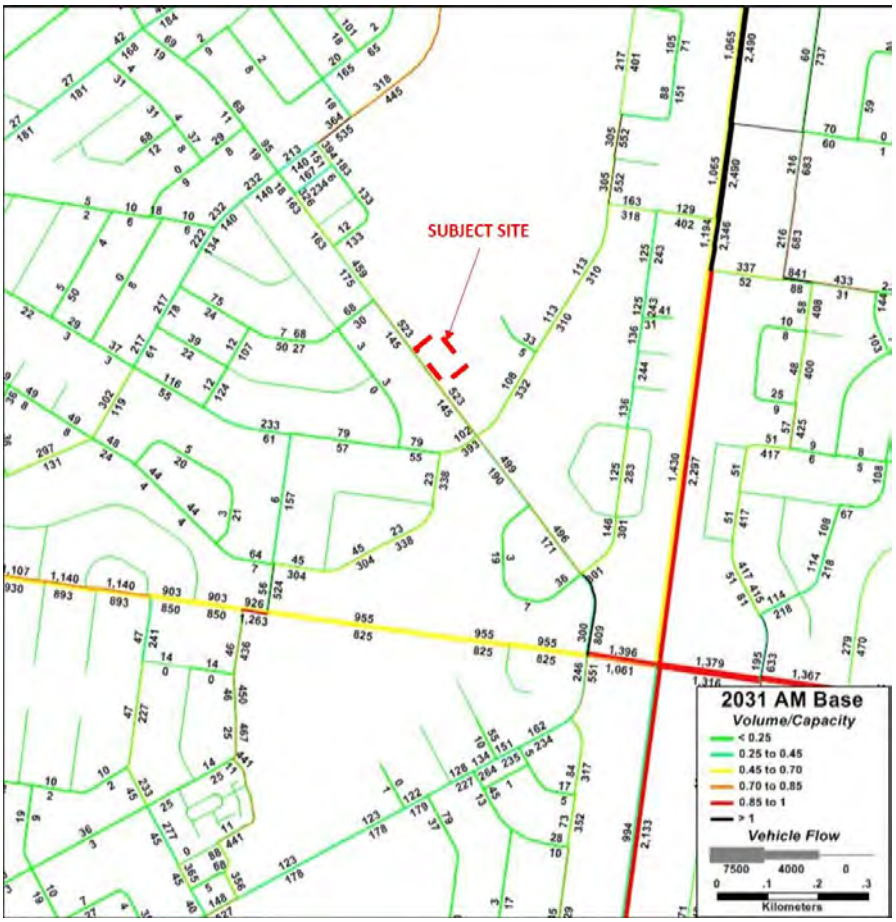
Within this section, a detailed summary of the existing services and constraints information has been compiled and summarised for the subject site. The detailed analysis includes TCCS Transport Strategic Model EMME SCATs Traffic Data, Dial Before You Dig (DBYD) enquiries, ACTMapi, TCCS Stormwater Database, WAE records and correspondence with service authorities.

4.2 Traffic Conditions

The main vehicular access to the subject site is to be provided via Wattle Street. Based on the ACT Road Hierarchy Map and Estate Development Code (EDC), Major Collector Roads have capacity of up to 6000 vpd. An assessment of current midblock traffic volumes produced from TCCS's Transport Strategic EMME Model indicates that during the 2031 AM peak hour, the road network immediately surrounding the subject site is operating with a low level of congestion (0.25<V/C<0.45). However, it is noted that Wattle Street, between De Burg St and MacArthur Avenue is operating at high level of congestion (V/C >1). A further assessment of traffic behaviour has been undertaken in **Section 6.1.**

Refer to **Figure 5-1** for existing levels of traffic congestion as extracted from TCCS Strategic Transport Model.

Figure 5-1 Expected 2031 AM Peak Hour Traffic Volumes and Congestion Rates



4.3 Driveway and Pedestrian Access

Block 29, Section 41, Lyneham gains vehicular access via Wattle Street from an existing 'Type R' driveway located on the sites southern boundary.

Depending on the final function, layout and orientation of the proposed development, a new HD2 driveway may be required for the subject site.

Investigation and liaison with TCCS as to the allowable location will be required upon realisation of the proposed development layout and access point. Refer to **Figure 4-1** for existing site access location.

Currently, pedestrian access to the subject site is available via a 1.2m wide footpath along the northern verge of Wattle Street. Investigation of the requirement for extension / modification / demolition of existing footpath infrastructure will be required upon realisation of the proposed development. However, preliminary assessment suggests that the site is suitably serviced by pedestrian infrastructure.

Refer to **Figure 4-1** for existing pedestrian service infrastructure.

Figure 4-1 Vehicular and Pedestrian Access



4.4 Parking Capacity

The subject site currently has informal off-street parking facilities suitable for its current use. At the advice of the client, 35 car spaces have been proposed for the ultimate development. Further parking demand versus capacity analysis in accordance with ACT Parking and Vehicular Access General Code has been undertaken in **Section 6.3**.

4.5 Flood Risk

The current flood mapping listed on ACTMapi demonstrates that the subject site is not within the 1% AEP flood level. However, northern and eastern boundaries of the subject site are in close proximity to the 1% AEP flood level, Refer to **Figure 4-2** below. It is noted that the 1% AEP flood abuts the existing retaining walls on the north-eastern and south-eastern boundaries. Any alterations to these existing retaining walls may create a flooding impact which does not currently exist. Further, given the proximity of the site to the flood line, basement level car parking is not recommended for this site.

Figure 4-2 1% AEP Flood Level.



4.6 Bushfire Risk

The current bushfire mapping listed on ACTMapi demonstrates that the subject site is not within a Bushfire Prone Area.

4.7 Potable Water

The existing water supply information has been compiled from Dial Before You Dig information and initial advice from ICON Water, which includes the following:

- Block 29, Section 41, Lyneham is currently serviced by a DN150 water tie from Wattle Street to the north-western corner of the subject site;
- A DN150 watermain is located within the northern verge of Wattle Street;
- The fire risk category for medium density housing such as the proposed development is F5, requiring 45L/s water flow at 10m head from the network during peak demand, with 60 m hydrant spacing along the watermain (ICON Water Supply and Sewerage Standards). The fire hydrants are located at approximately 100m spacing along watermain. A new DN80 spring fire hydrant is to be provided on Wattle Street ensure the water supply network has sufficient capacity for firefighting;
- Available pressures at the abovementioned DN150 watermain has been provided by ICON Water in **Table 5-1**;

Table 4-1 Available Water Pressure DN150 Wattle Street

Description	Head (m)
Wattle Street Elevation (m)	
Max Static Pressure (m)	86
Min Pressure @ Peak Demand	45
Min Pressure @ Peak Demand + 10 L/s (m)	43
Min Pressure @ Peak Demand + 20 L/s (m)	42
Min Pressure @ Peak Demand + 30 L/s (m)	40
Min Pressure @ Peak Demand + 40 L/s (m)	39
Min Pressure @ Peak Demand + 50 L/s (m)	36
Min Pressure @ Peak Demand + 60 L/s (m)	34

Reference is made to Drawing 50519072-SIR-ES within **Appendix A**, detailing existing water supply in close proximity to the subject site.

4.8 Sewer

The existing sewer service information has been compiled from Dial Before You Dig information and initial advice from ICON Water, which includes:

- Block 29, Section 41, Lyneham is currently serviced by a sewer tie from the western verge of Wattle Street. The size of this sewer tie is unknown, however it is assumed to be a minimum DN100 based on Icon Water's requirements. The size and grade of the existing tie will need to be confirmed upon realisation of the ultimate development;
- A DN375 sewer trunk main is located within the western verge of Wattle Street.
- A separate DN375 sewer trunk main is located within the middle of Block 29. This DN375 trunk sewer main extends from the northern corner of the block to the southern block boundary and continues towards the Wattle Street / Goodwin Street intersection.

Reference is made to Drawing 50519072—SIR-ES within **Appendix A,** detailing existing sewer supply in close proximity to the subject site. It is likely that any redevelopment on the site would necessitate the relocation of this main. Preliminary discussions with ICON Water have resolved that relocation of the main around the site is feasible, but due to the loss in grade resulting from the realignment, the proposed main would need to be upgraded to DN450.

4.9 Stormwater Infrastructure

The following key stormwater infrastructure has been compiled from the TCCS Drainage Network Database and observations during the site inspection.

- A DN225 stormwater main is located at the front of the subject site within the eastern verge of Wattle Street and continues west away from the subject site;
- Two stormwater sumps are located within the eastern and western verges of the Wattle Street at the front of the subject site;
- Two plantation sumps in the eastern and western corners drain the existing site.

Reference is made to Drawing 50519072-SIR-ES within **Appendix A**, detailing existing stormwater services for the subject site.

4.10 Stormwater Catchment and Overland Flows

Block 29, Section 41, Lyneham is graded such that the area of the block is contained in two catchments. The Southern Catchment is approximately 200 m^2 and drains towards Wattle Street. The two catchment's combined area is approximately 2,359m^2 and the overall average fall is 1% west to east. Upstream overland flows are assumed to be contained and collected by Kerb and Gutter along Wattle Street and directed into the abovementioned DN225 stormwater main. Overland flows from the site are directed into the adjacent Sullivans Creek. Refer to **Figure 4-3** for the existing stormwater catchment and overland flow paths.

Figure 4-3 Stormwater Catchment Plan



4.11 Heritage

The current heritage mapping listed on ACTMapi indicates that the subject site is not within or in close proximity to areas of heritage significance.

4.12 Geotechnical

Geotechnical investigations are to be amalgamated with the detailed environmental assessment to reduce the impact on the existing tenant. Desktop assessment suggests that there are no significant geotechnical constraints present which would be likely to affect the developability of the site.

4.13 Electrical and Streetlighting

The following electrical and street lighting infrastructure information was compiled from DBYD information and initial advice from Evoenergy.

- The existing building within Block 29, Section 41 Lyneham is connected by an overhead electrical service line located within the southern corner of the subject site;
- An overhead high voltage electrical cable is located within the northern verge of Wattle Street;
- A streetlight network is located within the southern verge of Wattle Street;
- There are no electrical substations within 100m of the subject site.

Reference is made to Drawing 50519072-SIR-ES within **Appendix A,** detailing existing electrical supply in close proximity to the subject site.

4.14 Telecommunication

The following telecommunication infrastructure information has been compiled from Dial Before You Dig (DBYD) information and initial advice from relevant service providers.

4.14.1 Telstra

- The subject site is connected to Telstra Service, a 35mm PVC conduit (P35) containing a 50 pair copper cable, connected to a B pit is located within the front of the property.
- Telstra cables are located within the southern verge of Wattle Street

4.14.2 NBN

- NBN cables are located within the southern verge of Wattle Street.

4.14.3 Transact

- Transact cables are located within the southern verge of Wattle Street.

Refer to Drawing 50519072-ES within **Appendix A** for details of existing telecommunications service and **Appendix B** for DBYD information / service authority correspondence.

4.15 Gas

The following natural gas supply information was compiled from DBYD information:

- The subject site is not shown as being connected to a gas service;
- DN40 (210kPa) gas mains are located within the northern and southern verges of Wattle Street.

Refer to Drawing 50519072-SIR-ES within **Appendix A** for details of existing Gas service.

4.16 Trees

Block 29, Section 41, Lyneham does not contain any registered trees listed on the ACT Tree database available through ACTMapi.

However, upon review of aerial photography of the subject site, there are several potentially regulated mature trees. The current proposed development scenario is likely to require removal of some existing trees.

Consultation with EPSDD Conservator of Flora and Fauna is advised prior to working in close proximity or proposing to remove any existing trees to allow for maximising developable area.

5 Specialist Investigations

5.1 Preliminary Environmental Site Investigation

Lanterra Consulting Pty Ltd were engaged by Cardno (ACT/NSW) to undertake a preliminary (Phase 1) environmental site investigation (PSI) of Block 29, Section 41, Lyneham. The objective of the PSI was to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

The following scope of work was completed to meet the project objectives:

- Review aerial photographs that are available of the site to assist with identifying previous land uses;
- Review of the results of an ACT Environment Protection Authority (EPA) contaminated sites search to understand any known contamination issues that may be on record;
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology;
- A search of the WorkSafe ACT Dangerous Goods Database for the storage of dangerous goods on the site;
- Conduct a site visit to understand the layout of the site and assess whether there is any obvious visual or olfactory indicators of contamination on the site;
- Prepare a preliminary site investigation report for submission to Cardno.

A review of the PSI for Block 29, Section 41, Lyneham produced by Lanterra, dated 08/08/2019, has identified the following:

- A site visit was undertaken on Block 29, Section 41, Lyneham on Friday 28 June 2019 by a suitably qualified environmental scientist from Lanterra;
- Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility and fuel storage and vehicle maintenance activities may have been undertaken;
- Three (3) areas of environmental concern (AEC) were identified from the site visit and desktop study which may present a contamination risk that could compromise the suitability of the site for the land uses permitted under RZ1: Suburban zone. These include the following:
    - **AEC 1:** Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.
    - **AEC 2:** The central gravelled open area is also an area of concern, given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.
    - **AEC 3:** Given the former use of the site as a depot, the area that houses the building with the roller garage door on the south-western side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

Contaminants of potential concern which may be present on the site as a result of the use of the site include:

- Contaminants associated with imported fill (AEC1), which may include Total Recoverable Hydrocarbons (TRH); Benzene, Toluene, Ethylbenzene, Xylenes (BTEX); Polycyclic Aromatic Hydrocarbons (PAH); Organochlorine and organphosphate pesticides (OCP/OPP); Polychlorinated Biphenyls (PCB); Phenols; Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Contaminants associated with vehicle leaks and spills (AEC2), which may include TRH; BTEX; PAH; and lead;
- Contaminants associated with the storage of machinery and or chemicals (AEC3), which may include TRH, BTEX, PAH, OCP/OPP, Phenols and Heavy Metals.

Based on the age of the building, it is noted that asbestos containing materials (ACM) may have been used as construction materials and a hazardous material survey should be completed prior to any demolition.

At present there is insufficient information to assess the suitability of the site for the land uses permitted under the RZ1: Suburban zone and a detailed site investigation would be required to assess the suitability of the site.

The exact historical use of the site is unclear and it was formerly used as a depot and activities that may introduce contamination onto the site may have been undertaken.

Based on this, Lanterra recommends that a detailed site investigation is completed to assess whether the contaminants of potential concern are present, and the site may be suitable for the land uses permitted under the RZ1 Suburban zone.

5.2 Detailed Environmental Site Investigation

Following on from the Preliminary Site Investigation (PSI) report recommendations mentioned above in **Section 5.1**, Cardno engaged Lanterra Consulting to conduct a Detailed Site Investigation (DSI) within Block 29 Section 41 Lyneham.

The objective of the DSI was to assess the sites suitability from a contamination perspective for lands uses permitted under the ACT Territory Plan's RZ1: Suburban zone.

The DSI report illustrates findings based off laboratory results of soil samples taken from eight (8) boreholes within the site in locations initially identified as areas of environmental concern (AEC) in the above PSI. The results indicate that selected contaminants of potential concern were below the adopted *'National Environment Protection (Assessment of Site Contamination) Measure 1999'* for standard residential properties.

Based on these results the DSI report considers the site suitable from a contamination perspective for the land uses permitted under the RZ1: Suburban Zone and as a precaution recommends the implementation of an Unexpected Finds Protocol (UFP) prior to the commencement of any development work.

5.3 Environmental Protection Authority Endorsement of Site Assessment Report – Block 29 Section 41 Lyneham Canberra Central

This letter of endorsement confirms the findings relating to the Detailed Site Investigation of Block 29, Section 41 Lyneham dated 17 December 2019 as true. The authority endorses the statement *"suitable from a contamination perspective for the uses permitted under the RZ1: Suburban zone"* subject to the following conditions:

- Implementation of an Unexpected Finds Protocol (UFP) by a suitably qualified environmental consultant;
- All soil subject to disposal must be assessed in accordance with the authority's Information Sheet 4 – Requirements for the reuse and disposal of contaminated soils in the ACT;
- No soil is to be disposed from the site without the Authority's approval.

5.4 Tree Survey and Assessment

Spacelab were engaged by Cardno to undertake a tree assessment of the subject site in August 2019 which identified and classified the trees within the proposed development areas.

The assessment consisted of an estimation of tree height, canopy diameter, measured trunk circumference at approximately one meter above the ground level, identification of the tree species and an assessment of the tree's general health. The Tree Survey and Assessment Report identified four (4) regulated trees within the subject site, all of which are of low quality.

Refer to **Figure 5-1** and **Table 5-1** for locations and details of the assessed trees within the subject site.

Figure 5-1 Location of Assessed Trees

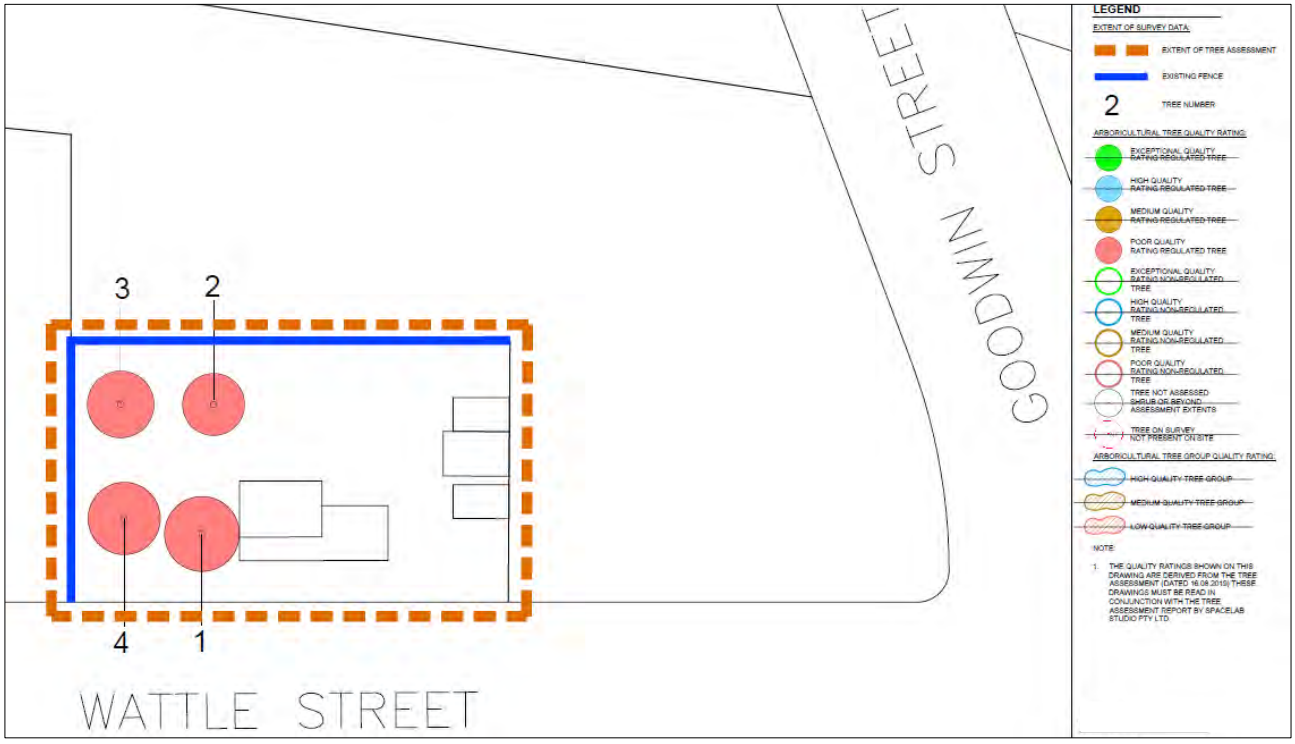


Table 5-1 Tree Assessment information

Tree Number	Botanical Name	Height (m)	Trunk Circumference (mm)	Number of Trunks	Canopy Diameter (m)	General Health (E,G,F,P)	Structural Defects / Decay (Y/N)	Past Damage / Disturbance (Y/N)	Disease Infestation (Y/N)	Tree Quality (P, M, H, E)	Regulated (Y/N) or TCCS tree (	Comments
1	Liquidambar	11	1800	1	15	P	N	Y	N	P	Y	Dieback and dead branches.
2	Platanus acerifolia	13	1500	1	12	P	N	N	N	P	Y	Dieback and small dead branches throughout canopy.
3	Platanus acerifolia	13	1500	1	15	P	N	N	N	P	Y	Dieback, large dead branches.
4	Platanus acerifolia	14	1700	1	8	P	N	N	N	P	Y	Large dead branches, epicormic growth.

6 Proposed Site Services

6.1 Preliminary Traffic Impact Assessment

The proposed residential development will generate additional traffic volume to local roads. As such, it is prudent to investigate the potential impact to the neighbouring road network.

The RTA Guide to Traffic Generating Developments (October 2002) Section 3.3 provides projected generation rates for residential developments. Section 5.4.3 defines a high-density residential building as *"a multi-level building containing 20 or more dwellings*". Section 3.3.3 of the guide provides traffic generation rates for High Density residential flat buildings in terms of daily vehicle trips per dwelling. The figures provided below have been assessed based on the planner's recommendation of 35 car spaces. It is to be noted that this is non-conformant with the current ACT parking requirements for high density residential developments.

Table 6-1 High Density Residential Flat Buildings (Source: RTA)

Dwelling Type	Daily Vehicle Trips	Weekday peak hour vehicle trips
Metropolitan Regional (CBD) Centres	Not available	0.24
Metropolitan Sub Regional Centre	Not Available	0.29

The Estate Development Code (May 2018) (Notes supporting Table 1A) stipulates that a rate of 6 vehicle trips per dwelling per day for multi-unit development is to be considered when calculating the total traffic generation.

The traffic generation rates in **Table 6-1** provides an insight to the daily traffic volumes for the proposed development. The higher daily traffic generation of 0.29 VPD has been adopted in traffic generation calculations for the subject site as shown in **Table 6-2.** The vehicle trips entering/egressing the development have been accounted for during both the morning peak (7:00 am – 9:00 am) and afternoon peak (4:00 pm – 6:00 pm) period. Hence, the value of 14 vehicle trips per peak hour has been assumed for the daily traffic generation volume from the proposed development **(Table 6-2).**

Table 6-2 High Density Residential Flat Buildings (Source: RTA)

Type	Units	Weekday peak hour vehicle trips	Total vehicle trips per hour
Residential	45	0.29	14

Data on the existing and future traffic conditions surrounding the site has been provided by TCCS SCATS data and Strategic Model EMME. The EMME Model provides AM peak traffic data and estimates traffic volume, traffic growth and traffic congestion based on the surrounding land uses and population. Capacities of the adjacent road network by road classifications are provided in the ACT Estate Development Code (May 2018). In order to assess the provided AM peak values in terms of vpd, TCCS Design Standard 6 – Pavement Design, Section 6.4.3 specifies that peak hour volumes may be adapted to Annual Average Daily Traffic (AADT) by assuming that the peak hour volume is representative of approximately 10-12% of the AADT. For this study, a value of 10% will be adopted.

It has been assumed that 90% of total traffic generation from the proposed development of Block 29, Section 41, Lyneham will utilise Wattle Street and travel southbound towards City and South Canberra. The remaining 10% of total traffic has been assumed to travel northbound towards Gungahlin.

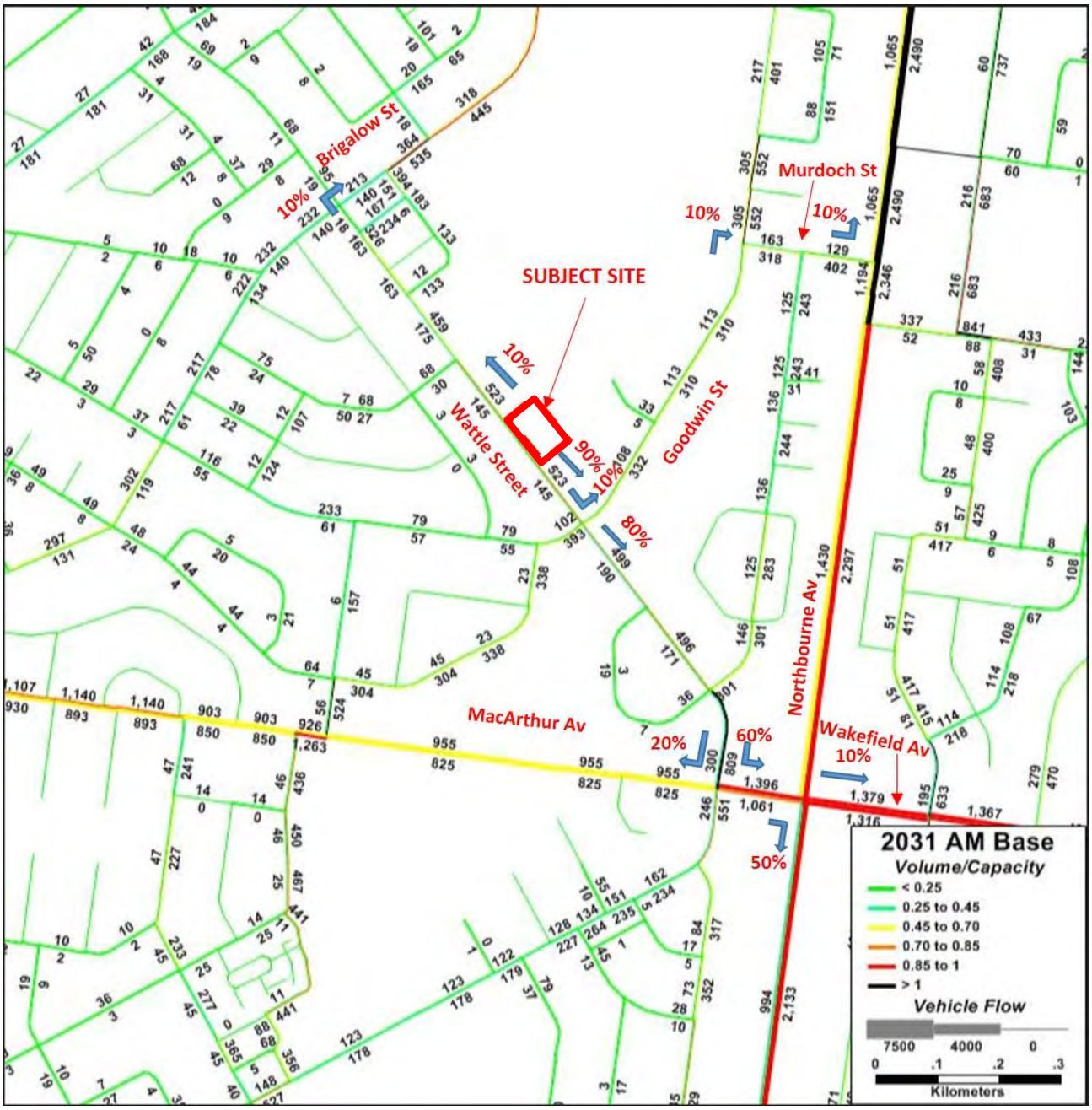
Of the 10% traffic travelling northbound towards Gungahlin, it is assumed all 10% of the traffic will turn right on Brigalow Street and utilise Gungahlin Drive to travel to Gungahlin and North Canberra.

Of the 90% traffic travelling southbound on Wattle Street, it is assumed that 80% of the traffic will continue towards MacArthur Avenue while 20% will turn right and travel towards Caswell Drive/Gungahlin drive for an end destination of South Canberra. For the 60% of traffic turning left at MacArthur Avenue from Wattle Street, it is assumed that 50% turn right on Northbourne Avenue and 10% continue on Wakefield Avenue.

Of the 90% traffic travelling southbound on Wattle Street, it is anticipated that 10% of traffic will turn left on Goodwin Street. All 10% of the traffic is assumed to turn right on Murdoch Street and then turn left on Northbourne Avenue, heading towards northern Canberra.

Refer to **Figure 6-1**

Figure 6-1 Traffic generated due to development.



A summary of the current classification and capacity of the neighbourhood roads and the expected impact of the development is provided in Table 6-3 below.

Table 6-3 Traffic Impact Assessment

Road	Street Capacity	ACT Code Classification	Traffic Volumes (AADT)	Total Development Traffic Generation(vpd)	Traffic + Development
Wattle Street (Northbound) - Current	3001-6000	Major Collector Road	990	2	992
Wattle Street (Southbound) - Current	3001-6000	Major Collector Road	4880	13	4893
Wattle Street (Northbound) – 2031	3001-6000	Major Collector Road	1450	2	1452
Wattle Street (Southbound) - 2031	3001-6000	Major Collector Road	5230	13	5243
Brigalow Street (Northbound) – Current	3001-6000	Major Collector Road	2000	2	2002
Brigalow Street (Northbound) - 2031	3001-6000	Major Collector Road	2130	2	2032
Goodwin Street (Northbound) – Current	1001-3000	Minor Collector Road	820	2	822
Goodwin Street (Northbound) – 2031	1001-3000	Minor Collector Road	1080	2	1082
Murdoch Street (Eastbound) - Current	1001-3000	Minor Collector Road	1550	2	1552
Murdoch Street (Eastbound) – 2031	1001-3000	Minor Collector Road	1630	2	1632
Northbourne Av (Northbound, from Murdoch St) – Current	6000+	Arterial Road	9770	2	9772
Northbourne Av (Northbound, from Murdoch St) – 2031	6000+	Arterial Road	10650	2	10652

MacArthur Avenue (Westbound) – Current	6000+	Arterial Road	7180	3	7183
MacArthur Avenue (Eastbound, towards Northbourne Avenue) – Current	6000+	Arterial Road	11280	11	11291
MacArthur Avenue (Westbound) – 2031	6000+	Arterial Road	8250	3	8253
MacArthur Avenue (Eastbound, towards Northbourne Avenue) – 2031	6000+	Arterial Road	13960	11	13971
Wakefield Avenue (Eastbound) - Current	6000+	Arterial Road	12530	2	12532
Wakefield Avenue (Eastbound) – 2031	6000+	Arterial Road	13790	2	13792
Northbourne Av (Southbound, from MacArthur Av) – Current	6000+	Arterial Road	20070	9	20079
Northbourne Av (Southbound, from MacArthur Av) – 2031	6000+	Arterial Road	21330	9	21339
Brigalow Street and Wattle Street - Current		Major Collector	4820	2	4822
Brigalow Street and Wattle Street - 2031		Major Collector	4850	2	4852
Wattle Street and Scrivener Street - Current		Major Collector/ Minor Collector	9590	13	9603
Wattle Street and Scrivener Street - 2031		Major Collector/ Minor Collector	11480	13	11493

Wattle Street and Macarthur Avenue - Current		Major Collector/ Arterial Road	23560	13	23573
Wattle Street and Macarthur Avenue – 2031		Major Collector/ Arterial Road	30730	13	30743

The traffic analysis was completed for the current and projected year 2031 peak hour AM traffic volumes at the Wattle Street, Brigalow Street, Goodwin Street, Murdoch Street, Northbourne Avenue, MacArthur Avenue, Wakefield Avenue as well as intersections based on EMME data provided by TCCS. Cardno Undertook the traffic assessment to evaluate the existing road (lane) capacity, existing intersection performance, post development road (lane) capacity and post development intersection performance.

6.1.2 Existing Road (Lane) Capacity.

The results of the traffic investigation indicate that the current and projected year 2031 traffic volumes from the following lanes are within their road capacity specified by the Estate Development Code.

- Wattle Street (Northbound)
- Wattle Street (Southbound)
- Brigalow Street (Northbound)
- Goodwin Street (Northbound)
- Murdoch Street (East bound)
- Northbourne Avenue (Northbound, from Murdoch St)
- MacArthur Avenue (Westbound)
- MacArthur Avenue (Eastbound, towards Northbourne Avenue)
- Wakefield Avenue (Eastbound)
- Northbourne Av (Southbound, from MacArthur Av)

6.1.3 Existing Intersection Performance.

The EMME data for the year 2031 scenario suggests that intersections immediately adjacent to the subject site are operating at a good Level of Service (LoS), including:

- The Brigalow Street and Wattle Street intersection with LoS of B, suggesting good service with acceptable delays and spare capacity.
- The Wattle Street and Scrivener Street intersection with LoS of B, suggesting good service with acceptable delays and spare capacity.

The congestion level at the intersection of Wattle Street and Macarthur Avenue however is predicted to become (0.85<Volume/Capacity<1) in the current and year 2031, providing a LoS of E to F. It should be noted that the Wattle Street/Macarthur Avenue intersection is expected to offer limited level of service due to the high volume of traffic predicted, even without the proposed development.

6.1.4 Post Development Road Lane Capacity.

The results of the traffic investigation indicate that the post-development traffic volumes in the current and year 2031 from the following lanes are within their road capacity specified by the Estate Development Code.

- Wattle Street (Northbound);
- Wattle Street (Southbound);
- Brigalow Street (Northbound);
- Goodwin Street (Northbound);
- Murdoch Street (Eastbound);

- Northbourne Avenue (Northbound, from Murdoch St);
- MacArthur Avenue (Westbound);
- MacArthur Avenue (Eastbound, towards Northbourne Avenue);
- Wakefield Avenue (Eastbound);
- Northbourne Av (Southbound, from MacArthur Av).

6.1.5 Post Development Intersection Performance

The EMME data for the year 2031 scenario suggests that the intersection of Wattle Street, Brigalow Street is expected to be operating with a LoS of B without the proposed development. The additional traffic volume generated by the proposed development is proportionately very low, suggesting minor impact on the intersection performance.

Similarly, the intersection of Wattle Street, Scrivener Street is expected to be operating with a LoS of B without the proposed development. The additional traffic volume generated by the proposed development is proportionately very low, suggesting negligable impact on the intersection performance.

Also, the EMME data for the year 2031 scenario suggests that the intersection of Wattle Street and MacArthur Avenue is expected to be operating with a LoS of F without the proposed development. The additional traffic volume generated by the proposed development is proportionately very low, suggesting negligable impact on the intersection performance.

6.2 Driveway and Pedestrian Access

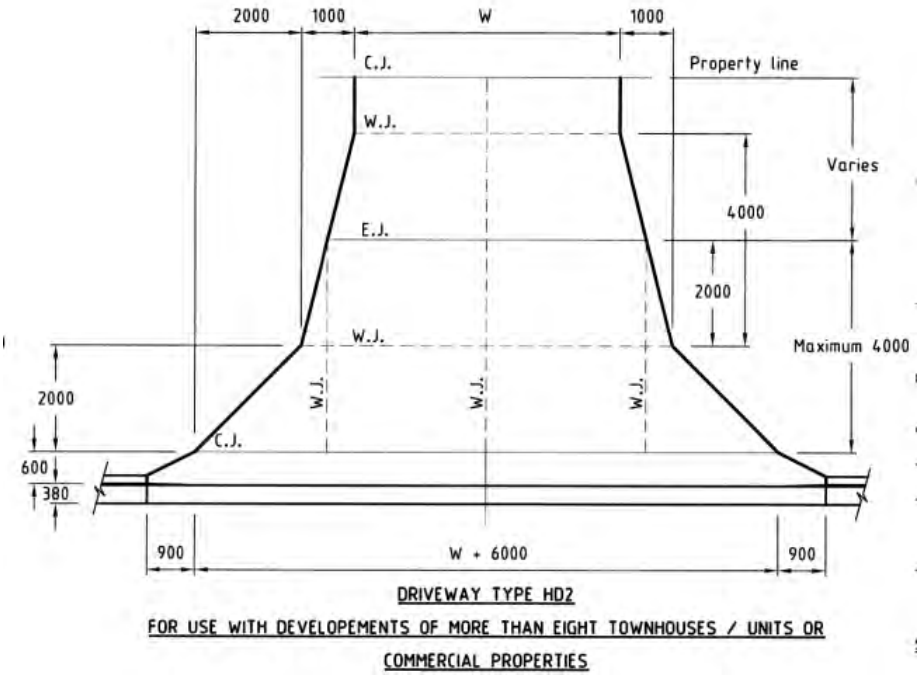
The proposed development will utilise Wattle Street for vehicular access. Based on the proposed development yield and subject to ultimate development; in accordance with TCCS Standard Drawing DS5-02, one (1) new HD2 Type driveway, for use with developments of more than eight townhouses / units or commercial properties will need to be provided. Refer to **Figure 4-1** and **Figure 6-2** for driveway requirements.

It is noted that the existing site is currently serviced by an HD1 type driveway. Modification or replacement of this existing driveway will need to be coordinated between the client and the ultimate developer. It is noted that the existing driveway is flanked on either side by the existing sewer tie (south) and the existing water tie (north). Any modification of the existing driveway will need to consider the relocation of at least one of these ties. Coordination with TCCS is also recommended upon realisation of the proposed development.

Currently, pedestrian access to Block 29 Section 41 Lyneham is available via a 1.2m wide footpath within the northern verge of Wattle Street.

Investigation of the requirement for extension / modification / demolition of existing footpath infrastructure will be required upon realisation of the proposed development. Refer to **Figure 4-1** for existing pedestrian service infrastructure.

Figure 6-2 Driveway requirements (Source: TCCS Standard Drawing No. DS5-02 Driveways)



The ACT Waste Development Control Code indicates that for multi-unit residential developments more than 10 units or commercial developments, waste and recycling collection shall be through hoppers on-site at an agreed collection point. Collection of the onsite waste requires the allowance for unobstructed on site access by collection vehicles. The design vehicle for this type of development is a 12.5 metre truck (unless advised otherwise by the waste collection authority). ACT No Waste / TCCS will also need to be consulted for the location and design of facilities for waste receptacles if the site is proposed to be publicly serviced. The waste management plan of the proposed development shall comply with *Section 2.3 of the ACT Waste Development Control Code.*

The development will also be required to comply with ACT emergency vehicle access requirements however, it is not expected at this stage that these requirements will form any significant planning constraints.

6.3 Parking

The client has advised that the proposed development will provide thirty-five (35) car parking spaces. It is to be noted, this is not compliant with the current ACT parking requirements for high density residential developments. It is understood that as the proposed development is for demonstration housing, provisions for lower parking rates may be considered. This departure from the current parking standards will need to be confirmed with TCCS once the ultimate development layout has been finalised.

Prospective developers should be aware that additional carparks on the periphery of the subject site are for public use only, and any future land owner shall hold no rights or exclusive use of such assets. Public car parks cannot be leased or otherwise reserved for any one specific land use or user. Public car parking is maintained by the ACT Government and any changes to parking layout, configuration or otherwise may be made at their discretion.

Any development undertaken on the subject site will need to comply with the parking and vehicular access requirements at the time, unless special provisions for the site have been granted by the appropriate authority. Prospective developers are encouraged to seek advice from a suitably qualified person to determine the requirements for provision of off-street parking facilities once the ultimate development is known.

It is noted that the proposed development will not include provisions of basement level car parking. If basement level car parking is proposed in the ultimate development, further analysis of flooding, groundwater and site specific constraints will be warranted.

6.4 Potable Water

Cardno has undertaken calculations for potable water supply to the subject site based on *ICON Water Supply Standards STP-SPE-G-012 Supplement to WSA 03-2011-3.1 Water Supply Code of Australia and AS 3500.1* Plumbing and Drainage Part 1: Water Services *Australian Standards.*

The probable simultaneous demand (PSD) for the residential dwellings within the proposed development was determined from the formula provided with *Table 3.2.3* of *AS3500* as shown below:

$Q = 0.03n + 0.4554\sqrt{n}$,
Where,
Q = flow rate (PSD) in L/s;
n = number of dwellings.

Therefore, the PSD adopted for the residential dwellings is 4.41 L/s.

The index length for the site was conservatively estimated as the length from the meter to the furthest point in the block. The size of the water tie required to adequately service the site was determined from *Table C1 of AS3500 Part 1*. The calculation of the potable water demand for the proposed development is summarised in **Table 6-4**.

Table 6-4 ICON Water / AS3500.1 Water Supply Calculations

Description	Value
Available Minimum Pressure at Main @ Peak Demand (m)	45
RL of Point at Furthest Index Length (Existing surface contours) (AHD) (m)	578
RL of Main (m)	568
Head Loss (m)	9.009
Available Head (30m req. by Icon Water) (m)	35
Probable Simultaneous Demand (L/s)	4.41
Index Length (m)	74
Required Potable Water Pipe Size	DN80
Capacity of Required Tie (L/s)	12.54

Therefore, to service the proposed development on the subject site in accordance with *AS3500,* and *ICON Water* requirements, a new DN80 water tie is required to be connected to a water meter from the existing DN150 watermain located within the northern verge of Wattle Street.

In accordance with the *STD-SPE-G-012 WSA-03-Water-Supply-Code-Supplement to WSA 03-2011-3.1 Water Supply Code of Australia, Table IW.3 – ICON Water*, the minimum pressure during peak demands for domestic development exceeding two storeys is 30 metres of head. This is the minimum pressure necessary over the highest point of the developed block. Based on the available pressures provided **Table 5-1**, the minimum, pressure available during peak demand is 35 metre, which is in excess of the standard 30 metre pressure head requirement.

Refer to Drawing 50519072_PS within **Appendix A** for details of the proposed potable water service, **Appendix B** for DBYD information / service authority correspondence and **Appendix C** for potable water calculations.

6.5 Sewerage

To provide an understanding of the sewerage requirements, Cardno has undertaken an analysis of the proposed development's sewer demand in accordance with ICON Water Supply and Sewerage Standards and AS 3500.2 Sanitary Plumbing and Drainage Australian Standard.

Using the STD-SPE-G-011 WSA-03-Water-Supply-Code-Supplement to WSA 03-2011-3.1 Gravity Sewerage Code of Australia, Table IW.1 – ICON Water Standards and Guidelines, calculations to determine the size required for the service tie were completed for the proposed development outlined in **Section 3**.

The sewer loading calculation results are provided in **Table 6-5** .

Table 6-5 ICON Water Sewer Calculations

Description	Block 29
Development Category	High Density
EP / dwelling	2.0
Equivalent Population	90
Average Dry Weather Flow (L/s)	0.188
Proposed GFA (m^2)	2,359
Peak Dry Weather Flow (L/s)	0.697
Ground Water Inflow(L/s)	0.01
Rainfall Dependent Inflow (L/s)	1.227
Peak Wet Weather Flow (L/s)	1.934
Required Pipe Size	DN100
Required Pipe Capacity at 1% Grade (L/s)	6.10

The above calculations show that the proposed development could be adequately serviced by a DN100 sewer tie for Block 29 at the minimum 1% grade. Confirm the size of existing tie, Retain if DN100. If the existing tie is not feasible upgrade to a DN100 at 1% grade at the developers cost.

A DN375 trunk sewer main is located within Block 29 Section 41 Lyneham. The trunk sewer main is servicing existing establishments within the vicinity. ICONB Water has confirmed that realignment of the DN375 trunk sewer main would be required to achieve the proposed development. A DN450 trunk sewer main should be constructed and continue adjacent to the northern boundary of the block. The DN450 trunk sewer main will then connect to the existing sewer network. The grading of main is approximately 0.3% from north to south however a survey of the trunk sewer main is advised in order to confirm the invert and overt heights.

Refer to Drawing 50519072-SIR-PS within **Appendix A** for more details on proposed sewerage service, **Appendix B** for DBYD information / service authority correspondence and **Appendix C** for sewerage calculations.

6.6 Stormwater Drainage

The proposed development scenarios have been assessed in accordance with the TCCS Design Standards for Stormwater. The development site has been designated to the requirements of the 'Urban Neighbourhood Development' and assessed for the 10 year ARI in accordance with Table 1.2 - Minor System Design ARI within TCCS Standards.

Table 6-6 TCCS Design Standards - Stormwater Calculations

Description	Block 29
Design ARI	10
Catchment Area (Ha)	0.2359
Impervious Area %	60%
Impervious Area Time of Concentration Tc (min)	16.00
Pervious Area Time of Concentration Tc (min)	48.01
Impervious Area Rainfall Intensity (mm/hr)	74
Previous Area Rainfall Intensity (mm/hr)	41.30
Estimated Flow, Q (L/s)	32.31
Required Tie Size (at 1% grade)	DN225

Provision of a DN225 stormwater tie at a minimum grade of 1%, which simulates the site gradient, is recommended to service Block 29. Subject to the final development layout, the existing stormwater infrastructure servicing the site is capable of servicing the proposed development.

Refer to Drawing 50519072-SIR-PS within **Appendix A** for details of proposed stormwater service and **Appendix C** for stormwater calculations.

6.7 Electrical

The advice from Evoenergy is a low voltage supply can be considered for the proposed development under an application for electricity network connection.

Refer to **Appendix B** for DBYD information / service authority correspondence.

6.8 Telecommunications

The following telecommunication infrastructure information has been compiled from Dial Before You Dig (DBYD) information and initial advice from relevant service providers.

6.8.1 Telstra

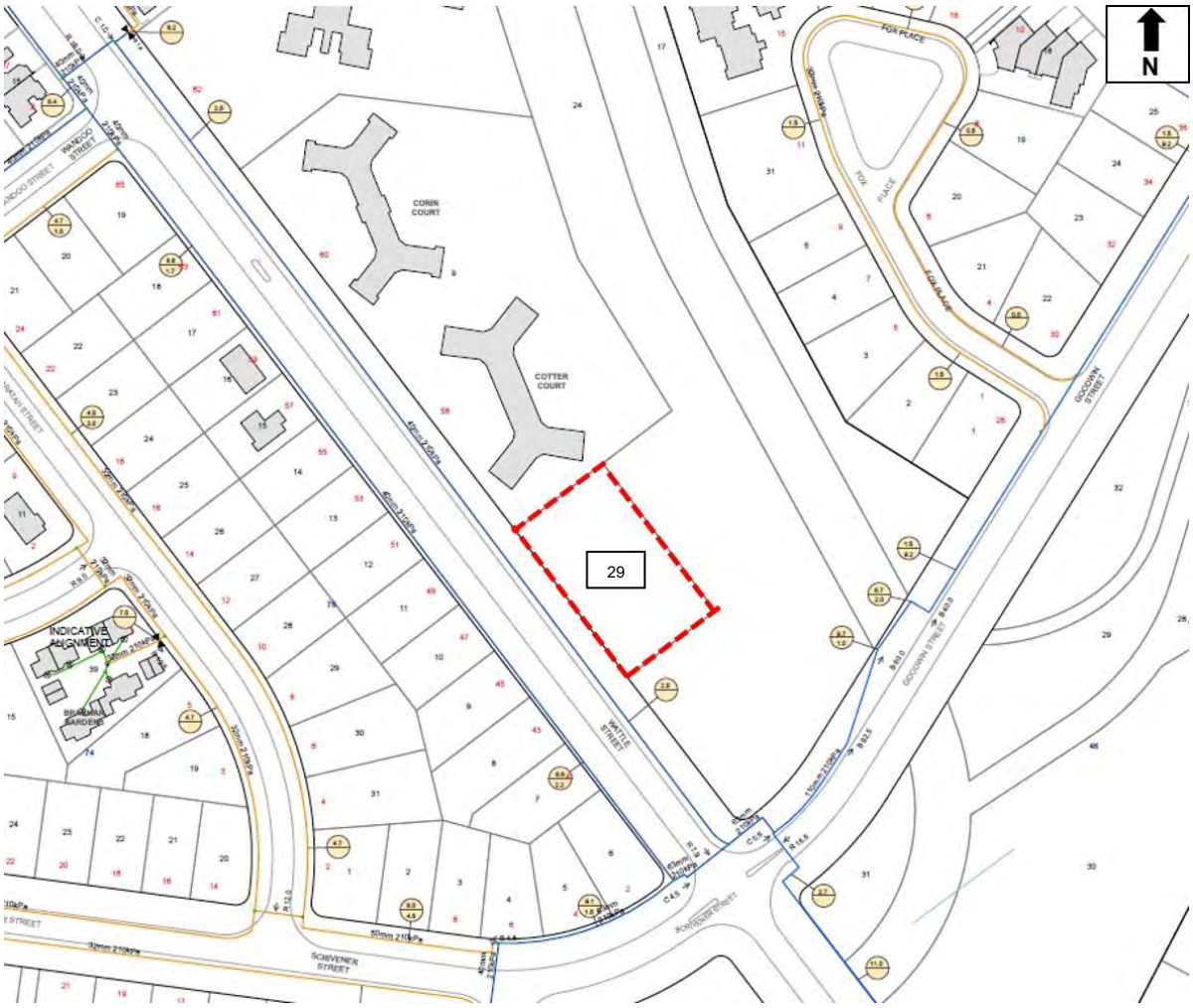
Telstra has advised that the subject site is within the NBN network area. Telstra would be able to provide a high-speed data service via fibre if required. There is network capacity opposite the development in Wattle Street. For network connection upgrade or relocations, contact the provider Network Integrity Group. Maintenance of existing and proposed Telstra Network would require 24hour access to network plant.

Refer to Drawing 50519072-SIR-ES within **Appendix A** for details of existing telecommunications service and **Appendix B** for DBYD information / service authority correspondence.

6.9 Gas

Jemena has advised that the subject site can be supplied from the existing DN40mm (210kPa) network as shown on gas DBYD figure below. The existing gas network has sufficient capacity for developments of the type and size specified. The sites can be connected with long or short gas services across Wattle Street.

Figure 6-3 Gas DBYD



Refer to Drawing 50519072-SIR-ES within **Appendix A** for details of existing gas service and **Appendix B** for DBYD information / service authority correspondence.

7 Opinion of Probable Cost

The following works have been determined as a minimum to adequately provide site servicing to the subject site. The proposed works are indicative only and are subject to change during additional investigations and detailed design.

Costings below include fees associated with design, approvals, superintendence, incidentals and works by the service authority.

Further investigations of other site constraints and prolonged detailed design development may further increase the costs associated with the development of the site.

Table 7-1 Opinion of Cost for Developer Funded Off-Site Works

Item	Probable Cost (Inc. all contingencies)
1. Sewer Main Augmentation Design and project management Construction works as specified	 $ 48,000.00 $ 472,200.00
2. Potable Water Proposed 80mm hydrant.	$ 10,000.00
Total (Inc. GST)	**$ 530,200.00**

8 Risk Assessment and Recommendations

8.1 Risk Assessment

The following table of constraints was prepared for Block 29 of Section 41 Lyneham based on the site services and constraints identified in **Sections 5 & 6** of this report.

Table 8-1 Risk Matrix

Consequence	Insignificant	Minor	Moderate	Major	Severe
Likelihood					
Remote	Insignificant	Insignificant	Low	Low	Medium
Unlikely	Insignificant	Low	Low	Medium	Medium
Possible	Low	Low	Medium	Medium	High
Likely	Low	Medium	Medium	High	High
Almost Certain	Medium	Medium	High	High	Extreme

Table 8-2 Qualitative Measures of Likelihood or Frequency

Scale	Criteria to be used to establish rating
Almost Certain	Will occur. Circumstances or situations are likely to arise often throughout the planning / project period in which provide the opportunity for crystallisation of risk. Expect frequent, regular occurrences.
Likely	Likely to occur more than once in the planning period but not an 'everyday' occurrence. Preconditions will arise at times throughout the period.
Possible	Likely to occur at least once but not expected to occur much more than this in the planning period.
Unlikely	Not likely to occur in the planning period. A small, but remote chance of occurrence due to circumstances/situations that could arise.
Remote	Would only occur in highly exceptional circumstances that are unlikely to exist in any planning period. Extremely remote chance of occurrence in planning period. 'Once in a lifetime' event.

Table 8-3 Qualitative Measures of Impact – Consequence Severity

Impact	Consequence Criteria
Severe	Near impossible to develop subject site and expected development viability is very low. E.g. Significant PTWL Habitat, Major floodway within site etc. Requires comprehensive development viability analysis and specialist input.
Major	Very difficult to develop subject site and expected development viability is low, will involve significant investigations, very expensive major service relocations, many registered trees of excellent health etc. Requires development viability analysis and specialist input as required.
Moderate	Challenging to develop subject site, expected development viability is adequate, will involve further investigations, costly service relocations, many registered trees of excellent health etc. Specialist input as required
Minor	Relatively simple challenges to develop site, expected development viability is good. Minor upgrades to existing services are required to develop site,
Insignificant	No challenges or risk to program in developing site.

Table 8-4 Site Risk Assessment

Probable Constraints	Description	Allocated Risk Rating
Hazardous Materials	Based on the results of a contaminated land search undertaken as part of the Environmental Preliminary Site Investigation, the building and nearby storage sheds were listed as areas of environmental concern (AEC3). Based on the age of the building / structures the report suggests a potential for Asbestos Containing Materials (ACM) within the structures.	**High**
Sewerage	The subject site is currently transected by a DN375 trunk sewer main which will need to be relocated. ICON Water have provided preliminary advice suggesting that the size of the realigned main would need to be increased to DN450 to offset a required softening of the grade. This work is considered feasible and has ICON Waters in-principle support.	**High**
Driveway	Provision of a new HD2 type driveway may be required for the ultimate development. The site is however already serviced by an 'Type R' driveway. If an upgraded driveway is required, relocation of either the existing sewer or water tie will be required. Consultation with service authorities may be required in order to locate existing services, resulting in additional delay in timeframe.	**Medium**
Water Supply	The current water supply does not comply with the ACT firefighting standards for the site. The fire hydrants are located at approximately 100m spacing along watermain on Wattle Street however F5 fire risk sites require hydrants spaced at 60m.	**Medium**
Trees	Block 29, Section 41, Lyneham does not contain any registered trees listed on the ACT Tree database available through ACTMapi. However, upon review of aerial photography of the subject site, there are several potentially regulated mature trees on the subject site which could be regulated and impact the proposed development. This risk will be updated upon receipt of the tree assessment.	**Medium**
Flood	Sullivan's Creek is located in close proximity to the subject site. The current flood mapping depicted on ACTMapi demonstrates that the subject site is not within the 1% AEP flood level. However, the flood limit is shown to abut the existing retaining wall on the northern and eastern boundaries of the site, hence any modification to existing retaining walls on site may create a site flooding issue which does not presently exist. The existing 1% AEP flood height adjacent to the site is approximately 568.00 based on ACTMapi and site survey data.	**Low**
Stormwater - Infrastructure	Site inspections have identified multiple plantation sumps across the site. It has been assumed that the sumps have capacity to manage flows generated by the existing site.	**Low**
Traffic Conditions	The subject site is within the traffic catchment of a road network that is predicted to experience high level of congestion according to the TCCS Strategic Model EMME, during 2031 AM Peak hour. TCCS may require contributions from new developments in the area to fund future road network upgrades.	**Low**
Parking	The client has requested the parking assessment be based on the provision of 35 spaces. This is lower than what is currently required for this type of development. It has been noted through discussions with the client that as the proposed development is for demonstration housing, lower traffic generation rates may be applicable. This will need to be confirmed through discussions with TCCS.	**Low**

Stormwater - Overland Flows	Block 29 Section 41 Lyneham's area is approximately 2359m2 and the average fall is 1% over a distance of approximately 63m from north to south. Overland flow from the subject site are assumed to be contained and collected by Sullivans Creek adjacent.	**Low**
Electrical	The subject site is currently serviced by an overhead electrical connection. A new electrical service tie may be provided with additional costs and coordination with Evoenergy. The capacity of the existing electrical network may not be sufficient for the demand from the proposed development, and needs to be verified once the final development scenario is known	**Low**
Telecommunications	The subject site is connected to Telstra Service, depending on proposed development the existing cables may be required to relocated incurring additional costs.	**Low**
Gas	The subject site is not shown as connected to a gas service. A new gas service tie may be required for the proposed development from the gas main located within the northern verge of Wattle Street.	**Low**
Contamination	Based on the recommendations from the results of a contaminated land search undertaken as part of the Environmental Preliminary Site Investigation, a Detailed Site Investigation (DSI) was undertaken. The results from this DSI confirm that the suggested contaminants are below the adopted *'National Environment Protection (Assessment of Site Contamination) Measure 1999'* for standard residential properties. Based on these results the DSI report considers the site suitable from a contamination perspective for the land uses permitted under the RZ1: Suburban Zone and as a precaution recommends the implementation of an Unexpected Finds Protocol (UFP) prior to the commencement of any development work.	**Low**

8.2 Recommendations

The proposed development of a residential described in **Section 3** has been assessed for its viability and feasibility based on opportunity and constraints from a civil engineering perspective. It was found the proposed development could be unencumbered and serviced through appropriate engineering design. A summary of the recommendations and the necessary actions required for the proposed development are listed in **Table 8-5** below.

Table 8-5 Table of Recommendations

Considerations	Recommendation
Flood	• Although the subject site is not within the 1% AEP (Q100) flood level, due to its proximity to major overland flow paths and Sullivans Creek, basement car parking is not recommended for this site. Any modifications to the existing retaining walls should be accompanied by additional flooding assessments. Refer to **Section 4.5** for further information.
Hazardous Materials	• It is suggested that an intrusive hazardous material survey be completed prior to any demolition. Refer to **Section 5.1** for further information.
Sewerage	• Remove the existing DN375 trunk sewer main located within Block 29 Section 41 Lyneham. • Realign a new DN450 trunk sewer main around the north and east block boundary. Refer to **Sections 4.8** and **6.5** for further information.
Driveway	• Provision of a new HD2 type driveway may be required for the ultimate development. If an upgraded driveway is required, relocation of either the existing sewer or water tie will be required. Refer to **Sections 4.3** and **6.2** for further information.
Water Supply	• The installation of one (1) additional fire hydrant on Wattle Street will be required to meet the F5 firefighting standard. Refer to **Sections 4.7** and **6.4** for further information.
Trees	• The recommendations of this report shall be updated following receipt of the tree assessment. Refer to **Sections 4.16** for further information.
Stormwater – Infrastructure	• Review the capacity of the existing plantation sumps on site following the finalisation of the development layout. Refer to **Sections 4.9** and **6.6** for further information.
Traffic Conditions	• Further consultation with TCCS – Roads ACT is recommended to determine any planned road network upgrade in the area to improve the pre-existing traffic congestion issues. Refer to **Sections 4.2** and **6.1**for further information.
Stormwater - Overland Flows	• Ensure that the proposed development preserves existing overland flow paths. Refer to **Section 4.10** and **6.6** for further information.
Electrical	• Confirm the existing electrical infrastructure's alignment and size. • Undertake maximum demand estimation upon confirmation of the final proposed development in accordance with AS3000:2007 and provide to Evoenergy for the electrical masterplan. • For proposed development of four storey 45 dwellings a low voltage supply can be considered will be considered under an application for electricity network connection Refer to **Section 4.13** and **6.7** for further information.

Telecommunications	• The subject site is connected to Telstra Service and the subject site is within the NBN network area. • Telstra would however be able to provide a high speed data service via fibre if required. There is network capacity opposite the development in Wattle St. • For network connection upgrade or relocations, contact the provider Network Integrity Group. Refer to **Sections 4.14** and **6.8** for further information.
Parking	• Further consultation with TCCS is required to confirm the suitability of the site for departures from the current parking rates required for such developments. Refer to **Sections 4.14** and **6.83** for further information.
Gas	• Jemena has advised that the subject site can be supplied from the existing DN40mm (210kPa) network. • Should gas service be required following realisation of the final proposed development, the developer is recommended to liaise with Jemena to determine gas infrastructure, extension, upgradesd required. Refer to **Sections 4.15** and **6.9** for further information.
Contamination	• Implementation of an Unexpected Finds Protocol (UFP) by an suitably qualified environmental consultant; • All soil subject to disposal must be assessed in accordance with the authority's Information Sheet 4 – Requirements for the reuse and disposal of contaminated soils in the ACT; • No soil is to be disposed from the site without the Authority's approval.

APPENDIX

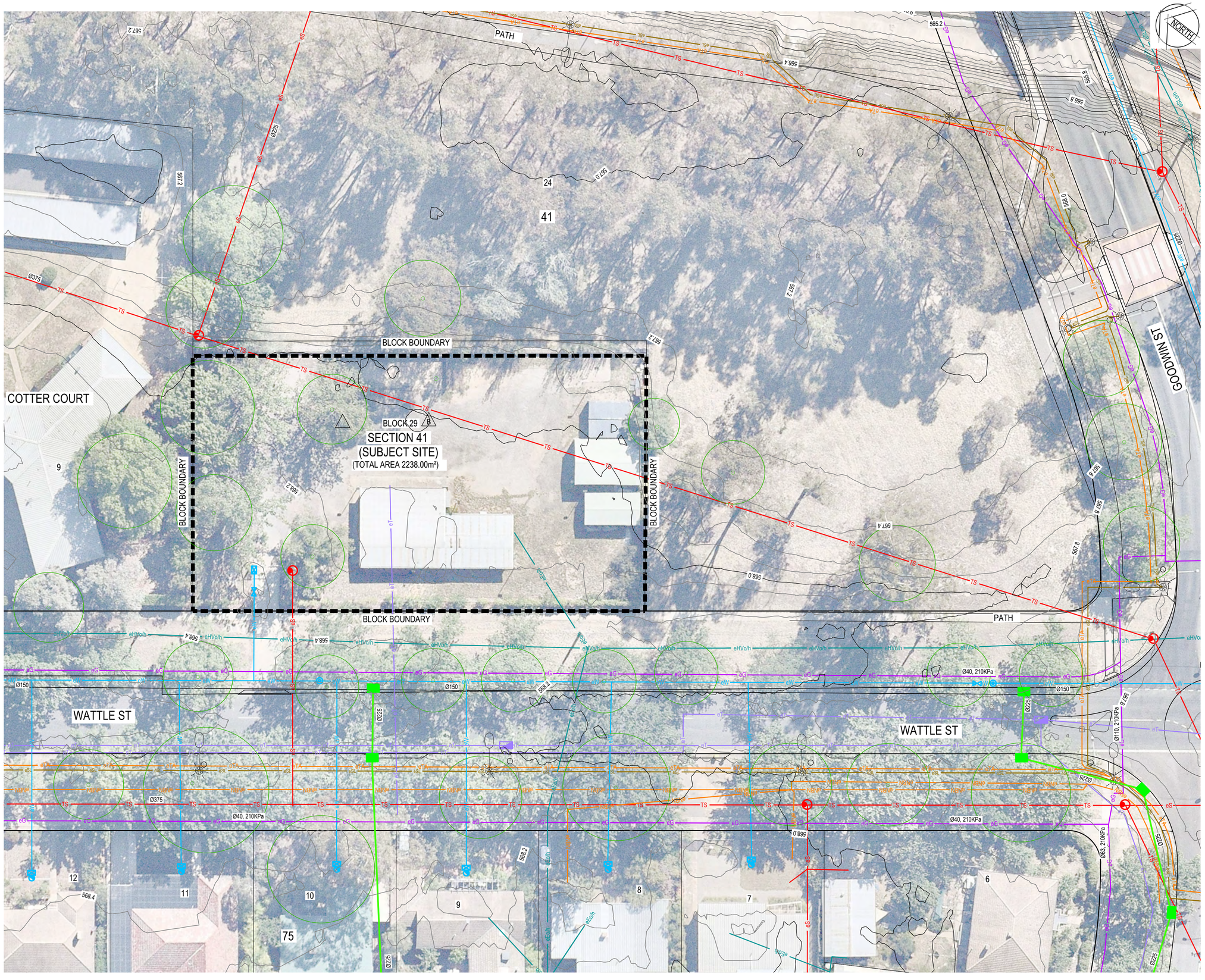
A

SITE SERVICING DRAWINGS

DATE PLOTTED: 11 February 2021 10:43 AM BY: - JOHN SUTCLIFFE

XREFs: URB_LYNE_X-TCD-156-XD; URB_OCON; X_CONTOUR LYNE

CAD File: \\cardno.corp\global\AU\NSW\Directory\Structure\Projects\505\FY19\072_BLOCK 14 SEC 41 LYNEHAM STAGE 1 SIR\Drawings\BUILD\50519072-SIR-ES.dwg



LEGEND

BLOCK BOUNDARY/ AREA OF WORK

EXISTING

- eS — SEWER / SEWER MANHOLE
- TS — TRUNK SEWER MAIN
- eSW — STORMWATER PIPE / SW MANHOLE / STORMWATER SUMP
- eW — FH — WATER / METER PIT / GATE VALVE / DOUBLE AIR VALVE / FIRE HYDRANT
- eSL — ELECTRICAL U/G (STREET LIGHT)
- eHVo/h — ELECTRICAL OVER HEAD HIGH VOLTAGE
- eEo/h — ELECTRICAL O/H (SERVICE LINE)
- eSLo/h — OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- eT — TELSTRA / ACCESS CHAMBER / PILLAR
- eO — OPTUS / COMMUNICATION PIT
- eG — GAS / REDUCER / VALVE / END CAP
- eiiNET — EXISTING iiNET
- eTA — EXISTING TRANSACT
- eNBN — EXISTING NBN
- TREE (INDICATIVE LOCATION)

EXISTING SERVICE INFORMATION SHOWN ON PLANS DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE, BASED ON DIAL BEFORE YOU DIG AND TRANSPORT CANBERRA AND CITY SERVICES (TCCS) STORMWATER DATABASE. THE PRESENCE OF AN EXISTING SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION, PRIOR TO THE COMMENCEMENT OF ANY WORKS AND THE RELEVANT UTILITY PLANS OBTAINED FROM DIAL BEFORE YOU DIG. CAUTION SHOULD BE EXERCISED WHEN WORKING WITHIN THE VICINITY OF ALL EXISTING SERVICES .

0 5 10 15 20 25m

SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd
B	10/02/2021	UPDATE BLOCK NUMBER	JS	GZ	JPS
A	26/03/2019	DRAFT REPORT	JS	GZ	JPS

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Level 2, 14 Wormald Street
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Tel: 02 6112 4500 Fax: 02 6112 4599
Web: www.cardno.com.au

	Date
Drawn GH	26/03/2019
Checked JS	26/03/2019
Designed GZ	26/03/2019
Verified JPS	26/03/2019
Approved JPS	26/03/2019

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Client: ACT GOVERNMENT-EPSDD

Project: SITE INVESTIGATION REPORT
BLOCK 29 SECTION 41 LYNEHAM ACT

Title: EXISTING SERVICES PLAN

Status: FOR INFORMATION ONLY
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AHD		Scale	Size
		1:250m	A1

Drawing Number: 50519072-SIR-ES

Revision: B

DATE PLOTTED: 11 February 2021 10:42 AM BY: . JOHN SUTCLIFFE



LEGEND

- BLOCK BOUNDARY/ AREA OF WORK
- TO BE DEMOLISHED

EXISTING

- eS — SEWER / SEWER MANHOLE
- TS — TRUNK SEWER MAIN
- eSW — STORMWATER PIPE / SW MANHOLE / STORMWATER SUMP
- eW — FH — WATER / METER PIT / GATE VALVE / DOUBLE AIR VALVE / FIRE HYDRANT
- eSL — ELECTRICAL U/G (STREET LIGHT)
- eHVo/h — ELECTRICAL OVER HEAD HIGH VOLTAGE
- eEo/h — ELECTRICAL O/H (SERVICE LINE)
- eSLo/h — OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- eT — TELSTRA / ACCESS CHAMBER / PILLAR
- eO — OPTUS / COMMUNICATION PIT
- eG — GAS / REDUCER / VALVE / END CAP
- eiiNET — EXISTING iiNET
- eTA — EXISTING TRANSACT
- eNBN — EXISTING NBN
- TREE (INDICATIVE LOCATION)

PROPOSED

- TS — TRUNK SEWER
- SW — STORMWATER
- HYDRANT

EXISTING SERVICE INFORMATION SHOWN ON PLANS DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE, BASED ON DIAL BEFORE YOU DIG AND TRANSPORT CANBERRA AND CITY SERVICES (TCCS) STORMWATER DATABASE. THE PRESENCE OF AN EXISTING SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION, PRIOR TO THE COMMENCEMENT OF ANY WORKS AND THE RELEVANT UTILITY PLANS OBTAINED FROM DIAL BEFORE YOU DIG. CAUTION SHOULD BE EXERCISED WHEN WORKING WITHIN THE VICINITY OF ALL EXISTING SERVICES .

0 5 10 15 20 25m

SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
B	10/02/2021	UPDATED BLOCK NUMBER	FDR	GZ	JS
A	12/04/2019	DRAFT REPORT	JS	GZ	JPS

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Drawn	GH	Date 12/04/2019
Checked	JS	Date 12/04/2019
Designed	GZ	Date 12/04/2019
Verified	JPS	Date 12/04/2019
Approved	JPS	12/04/2019

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Client: ACT GOVERNMENT-EPSDD

Project: SITE INVESTIGATION REPORT
BLOCK 14 SECTION 41 LYNEHAM ACT

Title: PROPOSED SERVICES PLAN

Status: FOR INFORMATION ONLY
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AHD		Scale	Size
		1:250m	A1

Drawing Number: 50519072-SIR-PS

Revision: B

XREF's: X_50519072-SIR-ES; URB_LYNE; URB_OCON
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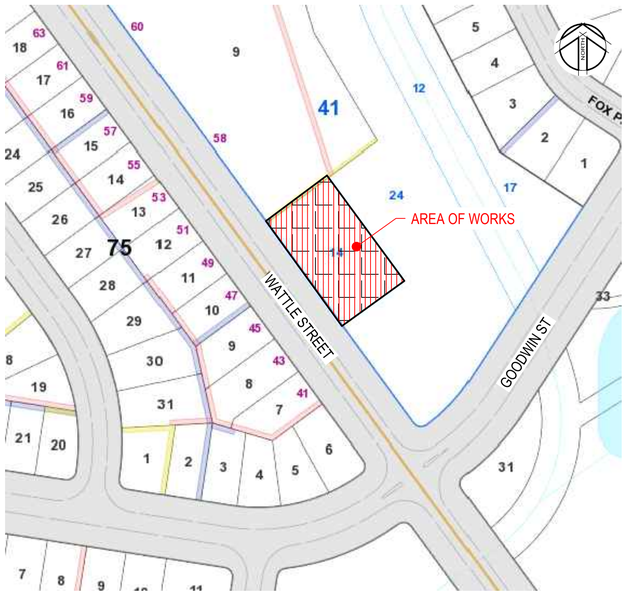
ACT Government
Environment, Planning and Sustainable Development

SITE DEMOLITION AND SEWER AUGMENTATION

BLOCK 14, SECTION 41, LYNEHAM, ACT

COVER SHEET, DRAWING LIST AND LOCALITY PLAN

Jan - 20



LOCALITY PLAN
NTS

SCHEDULE OF DRAWINGS	
DRAWING No.	DESCRIPTION
50519087-100	COVER SHEET, DRAWING LIST AND LOCALITY PLAN Jun-19
50519087-105	GENERAL NOTES AND LEGEND
50519087-110	GENERAL ARRANGEMENT PLAN
50517054-115	DEMOLITION PLAN
50517054-116	SEWER PLAN
50517054-117	LONG SECTION
50519087-120	EROSION AND SEDIMENT CONTROLL PLAN SHEET 1 OF 2
50519087-121	EROSION AND SEDIMENT CONTROLL NOTES SHEET 2 OF 2
50519087-125	TREE MANAGEMENT PLAN
50519087-130	WASTE MANAGEMENT PLAN

DATE PLOTTED: 9 January 2020 11:54 AM BY : JOHN SUTCLIFFE
CAD File: N:\Projects\505\FY19\087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-100-CS.dwg

50519087-100
Drawing Number

2
Revision

DATE PLOTTED: 9 January 2020 3:31 PM BY - JOHN SUTCLIFFE

LEGEND

EXISTING	TO BE DEMOLISHED (LEFT INSITU)	PROPOSED	DESCRIPTION
eS			SEWER / SEWER MANHOLE
TS	TS	TS	TRUNK SEWER MAIN
eSW			STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
eW FH			WATER / METER PIT / GATE VALVE FIRE HYDRANT
eSL			ELECTRICAL U/G (STREET LIGHT)
eHVo/h			ELECTRICAL OVER HEAD HIGH VOLTAGE
eEo/h			ELECTRICAL O/H (SERVICE LINE)
eSLo/h			ELECTRICAL OVERHEAD (STREET LIGHT)
			ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
eT			TELSTRA / ACCESS CHAMBER / PILLAR
eO			OPTUS / COMMUNICATION PIT
eG			GAS / REDUCER / VALVE / END CAP
eiiNET			iiNET
eTA			TRANSACT
eNBN			NBN
			1.8m WIRE FENCE
			TREE
568			EXISTING MAJOR CONTOUR
			EXISTING MINOR CONTOUR
			EXISTING WATER FILLING STATION
			EXISTING RETAINING WALL
			EXISTING 1.2m HIGH BLOCK WALL
			EXISTING HARDSTAND (TOTAL AREA=1079.1m²)
			EXISTING BUILDING / GARAGE / CONTAINERS

GENERAL NOTES

1. ALL CONSTRUCTION WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION.
2. THE LOCATION OF EXISTING SERVICES ARE SHOWN IN THEIR APPROXIMATE LOCATION ONLY. PRIOR TO ANY DEMOLITION, EXCAVATION, OR CONSTRUCTION ON SITE, THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND VERIFY THE LOCATION OF ALL UNDERGROUND SERVICES ON THE SITE AND OBTAIN NECESSARY CLEARANCES.
3. SURFACES WHICH LIE OUTSIDE THE GENERAL LIMITS OF LANDSCAPING AND RESTORATION WHICH ARE DISTURBED DURING THE CONSTRUCTION OF THE WORKS SHALL BE RESTORED BY THE CONTRACTOR, AT CONTRACTOR'S EXPENSE, TO AT LEAST THEIR PRE-CONSTRUCTION CONDITION. THESE SURFACES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, PAVEMENTS, PAVING, GRASSING, LANDSCAPING ETC.
4. ALL LEVELS SHOWN ARE FINISHED LEVELS PROVIDED IN THIS CONTRACT. THE CONTRACTOR SHALL ALLOW FOR THE THICKNESS OF ALL FINISHED SURFACES.
5. THE COMPACTION REQUIREMENTS FOR EARTHWORKS ARE NOMINATED IN THE SPECIFICATION.

REFERENCE DRAWINGS

FOR STANDARD REFERENCE DRAWINGS REFER TO,

1. ACT GOVERNMENT - URBAN SERVICES - DESIGN STANDARDS FOR URBAN INFRASTRUCTURE STANDARD DRAWINGS.
2. ICON WATER SUPPLY AND SEWERAGE DESIGN STANDARDS.

EROSION & SEDIMENT CONTROL NOTES

1. CONSTRUCTION AND DEVELOPMENT WORKS MUST BE IN ACCORDANCE WITH "ENVIRONMENTAL PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT, MARCH 2011"
2. FOR EROSION AND SEDIMENT CONTROL CONCEPT NOTES AND LEGEND REFER DRG No 50519087-120
3. FOR EROSION AND SEDIMENT CONTROL CONCEPT PLAN REFER DRG No's 50519087-121

DEMOLITION NOTES

1. ALL WORKS TO BE CONDUCTED AS PER THE ACT DEMOLITION CODE OF PRACTICE MARCH 2015, ALL RELEVANT SAFETY AND LEGISLATED REQUIREMENTS INCLUDING AUSTRALIAN STANDARD AS2601 'DEMOLITION OF STRUCTURES' AND AS REFERRED IN THE PROJECT SCOPE.
2. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE WORK HEALTH & SAFETY ACT 2011, WHICH REQUIRES EMPLOYERS TO ENSURE THE HEALTH, SAFETY AND WELFARE OF ALL THEIR EMPLOYEES AND PERSONS IN THE VICINITY OF THE WORK SITE.
   ALL MATERIAL TO BE DISPOSED OF AT ACT WASTE MANAGEMENT FACILITIES.
3. DISCONNECTION OF SERVICES TO THE SITE SHALL BE CARRIED OUT BEFORE THE COMMENCEMENT OF ANY DEMOLITION WORKS AND SHALL INCLUDE ALL REQUIRED COORDINATION WITH THE RELEVANT AUTHORITY, SCHEDULING OF DISCONNECTION AND RESOURCES BASED ON DISCUSSIONS AND DATES PROVIDED BY THE RELEVANT AUTHORITY AND SIGN-OFF FROM THE RELEVANT SERVICE AUTHORITY.
4. APPROPRIATE ACT LICENSED CONTRACTOR'S MUST BE ENGAGED FOR THE ACCESSMENT, REMOVAL, TRANSPORT AND DISPOSAL OF ALL HAZARDOUS MATERIALS FOUND ON THE SITE.
5. ALL HAZARDOUS MATERIAL FOUND ON THE SITE MUST BE DISPOSED OF TO A FACILITY LAWFULLY LICENSED/AUTHORISED TO ACCEPT HAZARDOUS WATSE.
6. ALL ACM'S AND HAZMATS MUST FIRST BE REMOVED FROM THE AREA TO BE DEMOLISHED IN ACCORDANCE WITH THE CONTRACT AND EPA GUIDELINES. CLEARANCE CERTIFICATES FOR EACH PARTICULAR AREA FROM THE CONTRACTOR'S 'A' CLASS LICENSED ASBESTOS ASSESSOR ARE TO BE PROVIDED TO THE CLIENT'S ENVIRONMENTAL CONSULTANT PRIOR TO COMMENCEMENT OF DEMOLITION WORKS IN EACH PARTICULAR AREA.
7. DEMOLITION OF STRUCTURES WITHIN TREE PROTECTION ZONES (TPZ) ARE TO BE DONE IN ACCORDANCE WITH THE LMPP AND TMPP AND IN ACCORDANCE WITH TREE PROTECTION UNIT REQUIREMENTS OR ANY OTHER RELEVANT GUIDELINES, STANDARDS, CODES, ACTS, AND REGULATIONS THAT MAY APPLY.
8. THE CONTRACTOR SHALL ARRANGE FOR THE WORK TO BE INSPECTED BY THE PAP AT THE HOLD POINTS AS PER THE ACT STANDARD SPECIFICATION.
9. THE CONTRACTOR SHALL GIVE NOT LESS THAN TWENTY FOUR HOURS NOTICE WHEN REQUESTING AN INSPECTION OF DEMOLITION HOLD POINTS.
10. REMOVAL AND VALIDATION OF THE REMAINING UNDERGROUND STORAGE TANKS AND ASSOCIATED INFRASTRUCTURE, SHALL BE IN ACCORDANCE WITH THE ACT EPA INFORMATION SHEET 1, INFORMATION SHEET 3 AND THE CONTAMINATED SITES ENVIRONMENT PROTECTION POLICY 2009.
    THIS SHALL INCLUDE :
    - THE THREE (3 OFF) EXISTING UNDERGROUND STORAGE TANKS.
    - VENT LINES AND REMOTE FILL POINTS
    - FURL SUPPLY AND RETURN PIPES FOR EACH TANK.

Rev.	Date	Description	Des.	Verif.	Appd.
2	6/12/2019	PRELIMINERY	GH	JS	JS
1	2/07/2019	PRELIMINERY	GH	JS	JS

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Symonston ACT 2609
Tel: 02 6112 4500 Fax: 02 6112 4599
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		Date
Drawn	GH	18/06/2019
Checked	RG	18/06/2019
Designed	JS	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: GENERAL NOTES AND LEGEND

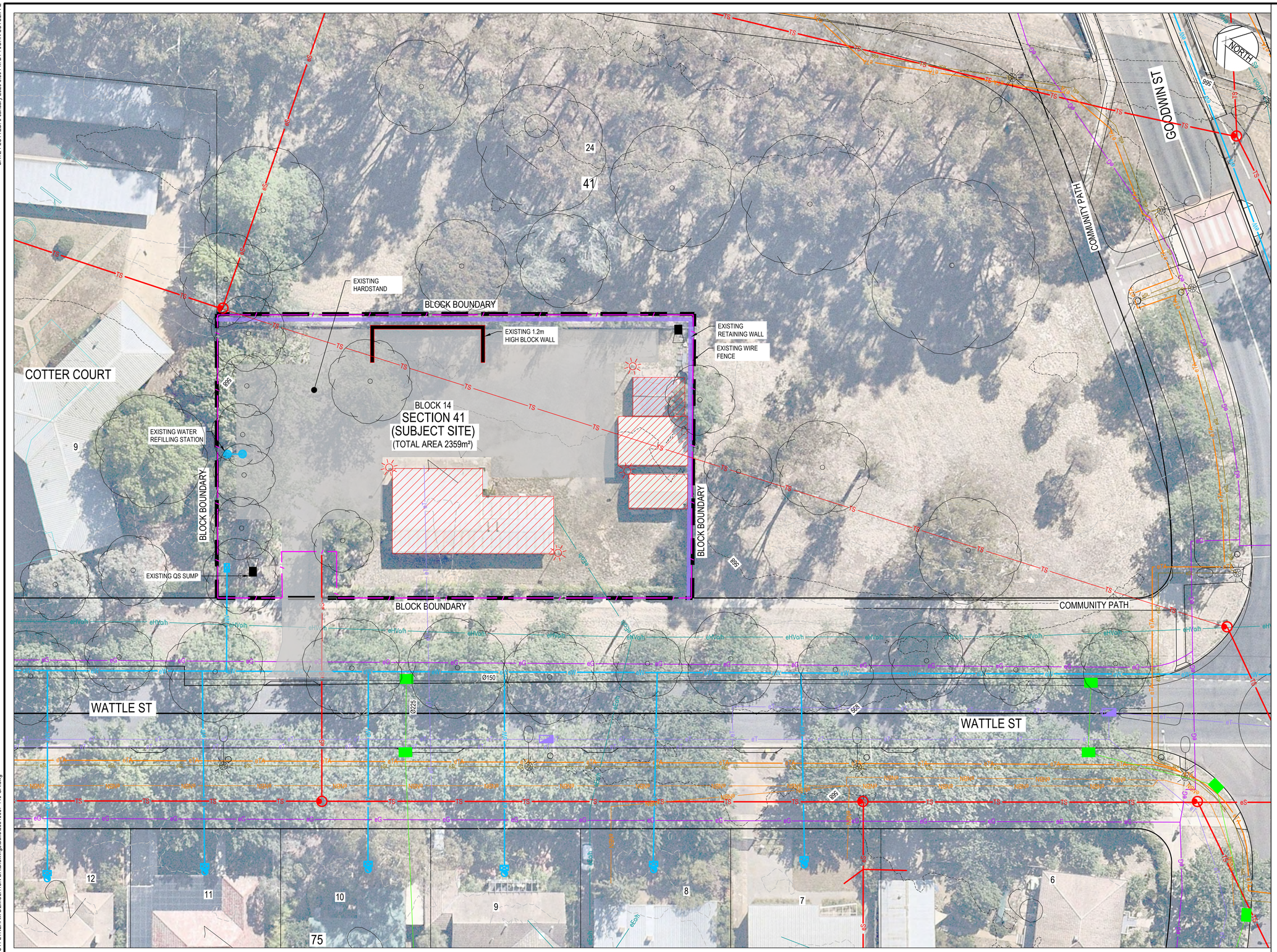
Status: PRELIMINARY
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Datum	Date	Scale	Size
AHD	6/18/2019		A1

Drawing Number: 50519087-105
Revision: 2

XREFs:
CAD File: N:\Projects\505\FY19\087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-105-GNL.dwg

DATE PLOTTED: 9 January 2020 3:30 PM BY - JOHN SUTCLIFFE



LEGEND

BLOCK BOUNDARY

EXISTING

- SEWER / SEWER MANHOLE
- TRUNK SEWER MAIN
- STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
- WATER / METER PIT / GATE VALVE DOUBLE AIR VALVE / FIRE HYDRANT
- ELECTRICAL U/G (STREET LIGHT)
- ELECTRICAL OVER HEAD HIGH VOLTAGE
- ELECTRICAL O/H (SERVICE LINE)
- OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- TELSTRA / ACCESS CHAMBER / PILLAR
- OPTUS / COMMUNICATION PIT
- GAS / REDUCER / VALVE / END CAP
- EXISTING iiNET
- EXISTING TRANSACT
- EXISTING NBN
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL
- EXISTING 1.2m HIGH BLOCK WALL
- EXISTING HARDSTAND (TOTAL AREA=1079.1m²)
- EXISTING BUILDING / GARAGE / CONTAINERS
- EXISTING WATER FILLING STATION
- EXISTING TREES (INDICATIVE LOCATION)

0 5 10 15 20 25m
SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	6/12/2019	PRELIMINARY	GH	JS	JS
1	2/07/2019	PRELIMINARY	GH	JS	JS

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Symonston ACT 2609
Tel: 02 6112 4500 Fax: 02 6112 4599
Web: www.cardno.com.au

Drawn	GH	Date 18/06/2019
Checked	RG	Date 18/06/2019
Designed	JS	Date 18/06/2019
Verified	JS	Date 18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: GENERAL ARRANGEMENT PLAN

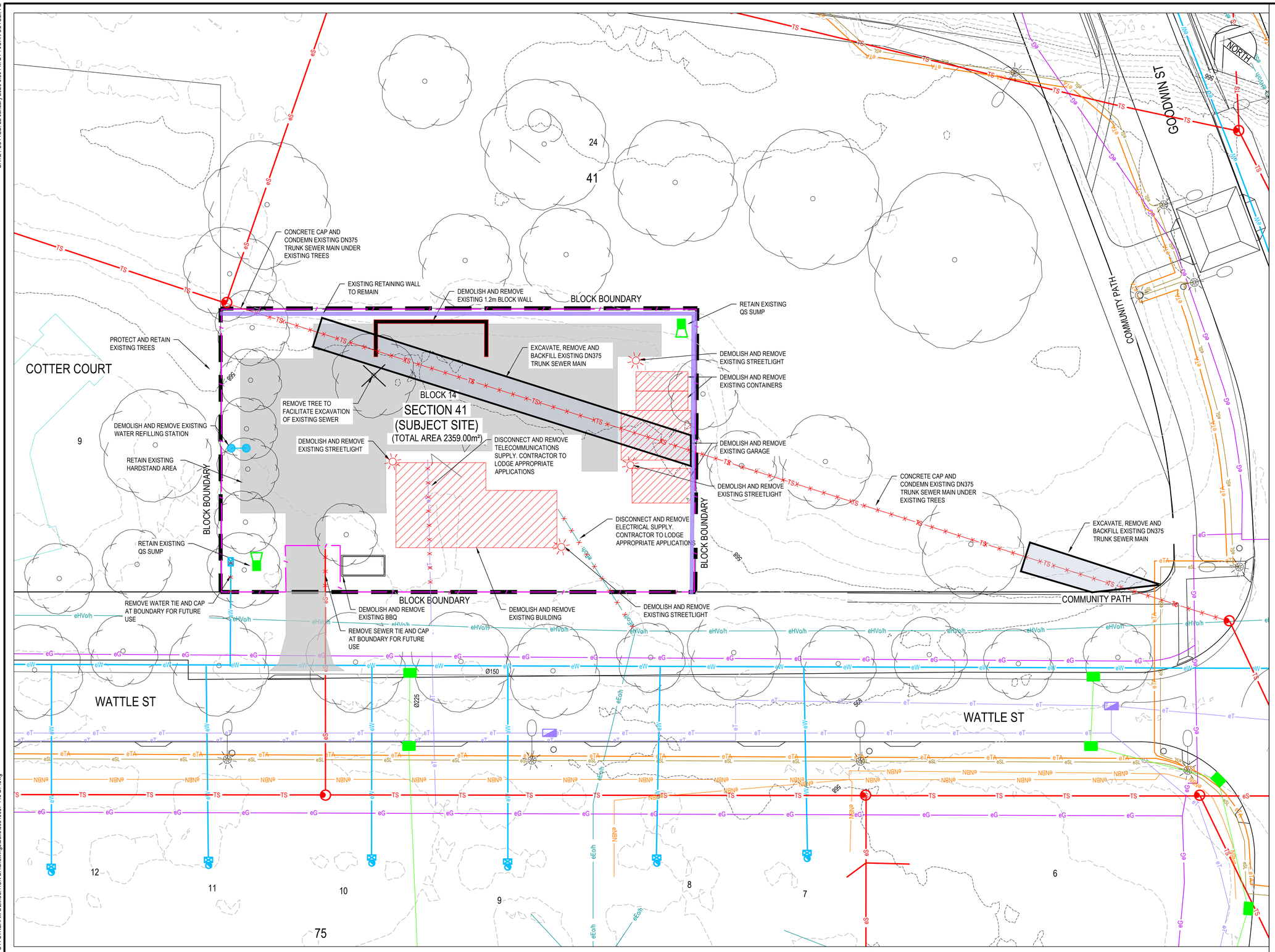
Status: PRELIMINARY
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Datum	Date	Scale	Size
AHD	6/12/2019	1:250m	A1

Drawing Number: 50519087-110
Revision: 2

XREFs: URB_LYNE: URB_OCON; X-TCD-156-XD; AERIAL-LYNEHAM; Existing Cont; X_50519072-SIR-ES; X-Trees
CAD File: N:\Projects\50\5\FY19\087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-110-GA.dwg

DATE PLOTTED: 22 January 2020 5:30 PM BY - JOHN SUTCLIFFE



LEGEND

BLOCK BOUNDARY

EXISTING

- SEWER / SEWER MANHOLE
- TRUNK SEWER MAIN
- STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
- WATER / METER PIT / GATE VALVE DOUBLE AIR VALVE / FIRE HYDRANT
- ELECTRICAL U/G (STREET LIGHT)
- ELECTRICAL OVER HEAD HIGH VOLTAGE
- ELECTRICAL O/H (SERVICE LINE)
- OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- TELSTRA / ACCESS CHAMBER / PILLAR
- OPTUS / COMMUNICATION PIT
- GAS / REDUCER / VALVE / END CAP
- EXISTING iiNET
- EXISTING TRANSACT
- EXISTING NBN
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL

DEMOLISH

- TRUNK SEWER MAIN (CONCRETE CAP AND CONDEMN)
- TRUNK SEWER MAIN (EXHUME)
- SEWER
- STREELIGHT
- OVERHEAD ELECTRICAL
- TELECOMMUNICATIONS
- BUILDING / GARAGE / CONTAINERS
- WATER FILLING STATION
- 1.2m HIGH BLOCK WALL
- STREET LIGHT
- BBQ

0 5 10 15 20 25m

SCALE 1:250 @A1

XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD; Existing Cont; X-Trees; AERIAL-LYNEHAM; X_50519072-SIR-ES

CAD File: N:\Projects\505\PY\19087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-115-DP.dwg

Rev.	Date	Description	Des.	Verif.	Appd.
2	6/12/2019	PRELIMINERY	GH	JS	JS
1	2/07/2019	PRELIMINERY	GH	JS	JS

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Level 2, 14 Wormald Street
Symonston ACT 2609
Tel: 02 6112 4500 Fax: 02 6112 4599
Web: www.cardno.com.au

		Date
Drawn	GH	18/06/2019
Checked	RG	18/06/2019
Designed	JS	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD

Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT

Title: DEMOLITION PLAN

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Date	Scale	Size
AHD	6/18/2019	1:250m	A1

Drawing Number: 50519087-115

Revision: 2

DATE PLOTTED: 9 January 2020 1:54 PM BY : JOHN SUTCLIFFE

BLOCK 24
SECTION 41
(URBAN OPEN SPACE)

BLOCK 14
SECTION 41
(SUBJECT SITE)
(TOTAL AREA 2359m²)

COTTER COURT

WATTLE ST

WATTLE ST

COMMUNITY PATH

GOODWIN ST

HUSKISSON

564.250
450 -'2'
63.3 m
- %
564.200

01-1

EXISTING MANHOLE

PROPOSED Ø450 SEWER

PROPOSED MANHOLE

564.050
450 -'2'
63.3 m
0.27 %
564.000

2

PROPOSED Ø450 SEWER

563.850
450 -'2'
81 m
0.24 %
563.800

3

REINSTATE EXISTING CONCRETE FOOTPATH FOLLOWING COMPLETION OF WORKS.

EXISTING MANHOLE

TS

Ø150

Ø225

12 11 10 9 8 7 6

75

LEGEND

TS — PROPOSED TRUNK SEWER

568 — EXISTING CONTOURS

EXISTING TREE

0 5 10 15 20 25m
SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
1	5/12/2019	PRELIMINARY	GH	JS	JS

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Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: SEWER PLAN AND LONG SECTION

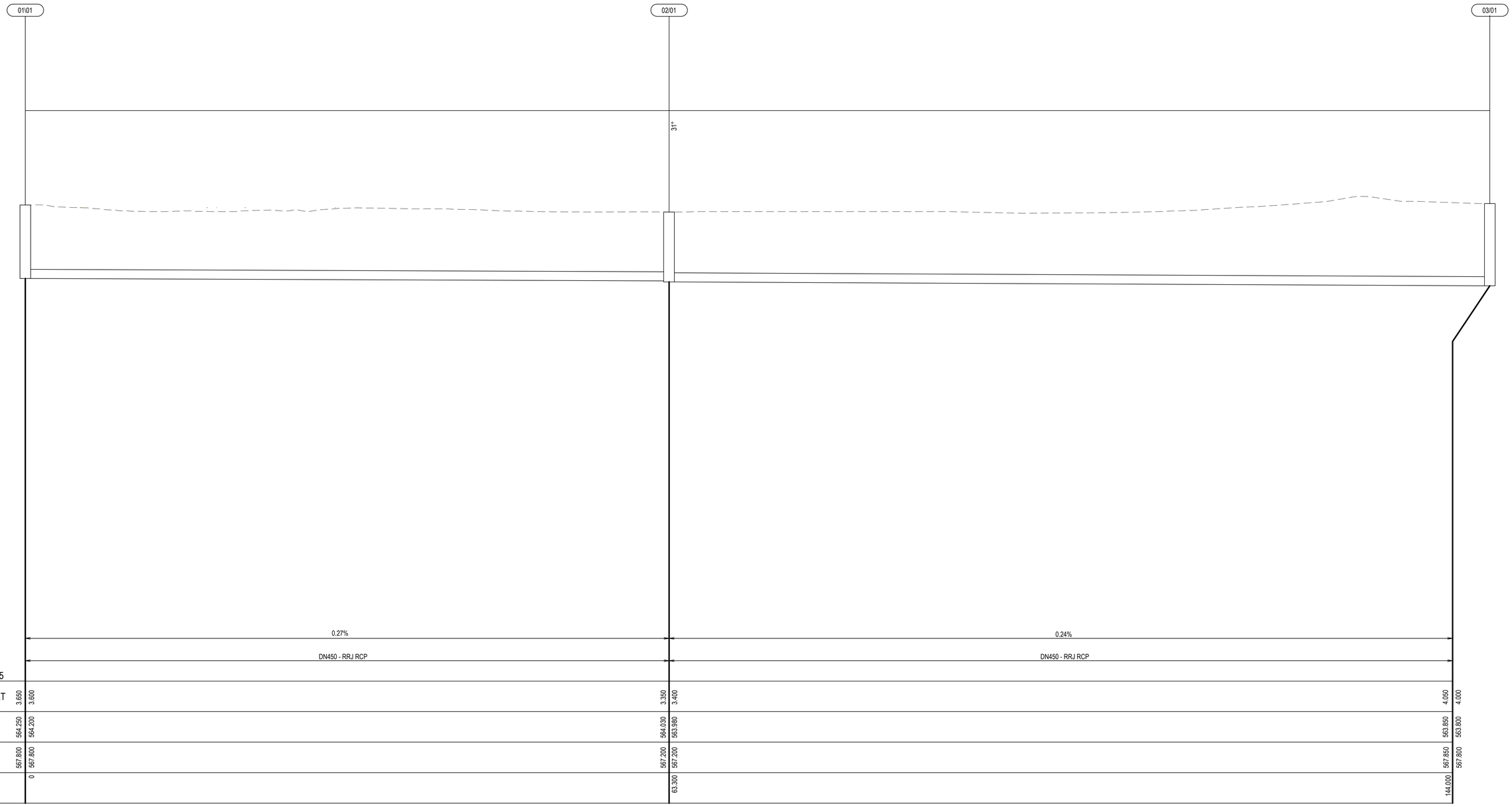
Status: PRELIMINARY
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Datum	Date	Scale	Size
AHD	6/18/2019	1:250m	A1

Drawing Number: 50519087-116
Revision: 1

XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD; Existing Cont; X-Trees; X_50519072-SIR-ES; X-ALIGNMENT
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DATE PLOTTED: 9 January 2020 1:54 PM BY: . JOHN SUTCLIFFE



GRADE		0.27%	0.24%
DIAMETER		DN450 - RRJ RCP	DN450 - RRJ RCP
DATUM RL 540.55			
DEPTH TO INVERT	3.650	3.600 … 3.350	3.400 … 4.050
INVERT LEVELS	564.250	564.200 … 564.030	563.980 … 563.850
F.S. LEVELS	567.800	567.800 … 567.200	567.200 … 567.850
PIPE CHAINAGE	0	63.300	144.000
			567.800
			563.800
			4.000

PROPOSED TRUNK SEWER LONG SECTION

SCALE: H 1:200 V 1:100

Rev.	Date	Description	Des.	Verif.	Appd.
1	5/12/2019	PRELIMINARY	GH	JS	JS

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Client: ACT GOVERNMENT - EPSDD

Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT

Title: SEWER PLAN AND LONG SECTION

Status: PRELIMINARY
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Datum	Date	Scale	Size
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Drawing Number: 50519087-117

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XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD. Existing Cont; X-Trees; X_50519072-SIR-ES; X-ALIGNMENT
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DATE PLOTTED: 9 January 2020 2:51 PM BY : JOHN SUTCLIFFE

GENERAL NOTES

1. TOTAL SITE AREA = 2359 m^2
2. EXISTING AVERAGE SITE GRADE = 1.25%
3. HOURS OF OPERATION = 7.00am TO 5.00pm, MONDAY TO FRIDAY. SATURDAY WORK TO BE APPROVED BY PRINCIPAL'S AUTHORISED PERSON (PAP)
4. NOMINATED PROJECT MANAGER/SUPERINTENDANT'S REPRESENTATIVE/SITE FOREMAN = TBC
5. ORIGIN OF IMPORTED SOIL:
   VENM FILL
   CANBERRA SAND AND GRAVEL
   CANBERRA CONCRETE RECYCLERS
   BORAL QUARRIES
   ACT RECYCLING
6. STORMWATER INLETS SHALL BE PREVENTED FROM ACCEPTING SEDIMENT THROUGH THE APPLICATION OF STRAW BALE DROP INLET SEDIMENT TRAPS.
7. BLOCK HYDRAULICS SERVICE TRENCHES TO BE BACKFILLED, GRASSED AND MULCHED WITHIN THE TIME SPECIFIED IN THE LICENSE.
8. THE CONTRACTOR SHALL PROGRAM WORKS SO THAT DISTURBED AREAS ARE PROGRESSIVELY RESTORED BY TEMPORARY GRASSING AND MULCHING ON AN AREA BY AREA BASIS DURING THE CONTRACT PERIOD.
9. THE CONTRACTOR SHALL LIMIT MOVEMENT OF VEHICLES AND PLANT TO APPROVED PARKING AREAS AND ACCESS ROUTES OR TO AREAS WHERE EXCAVATION OR FILL IS REQUIRED BY THE DRAWINGS. FINAL TRIMMING AT THE END OF CONTRACT IS PROHIBITED.
10. PLACE STRAW BALES OR SANDBAGS AROUND DRAINAGE SUMPS AT LOW POINTS AND OTHER KEY DRAINAGE LOCATIONS AS REQUIRED.
11. THESE DRAWINGS TYPIFY ONLY EROSION CONTROL PRINCIPLES REQUIRED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN AND SUBMIT DETAILS OF PROPOSED EROSION CONTROL MEASURES IN ACCORDANCE WITH SECTION 2.03 OF THE BASIC SPECIFICATION. IT CAN BE ANTICIPATED THAT ALL NECESSARY CONTROL MEASURES INCLUDED IN 2.03.1 WILL BE REQUIRED.
12. MEASURES REQUIRED FOR CONFIRMING WITH THE A.C.T. WATER POLLUTION ACT ARE SET OUT IN THE ACT STANDARD SPECIFICATION CLAUSE 2.03.
13. POLLUTION CONTROL METHODS SHALL ALSO BE DESIGNED IN ACCORDANCE WITH THE "ENVIRONMENTAL PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT", 2011.
14. INSTALL SILT FENCES AROUND ALL SUMPS AND MH'S AND MAINTAIN DURING ENTIRE CONSTRUCTION PERIOD UNTIL THE SITE IS FULLY GRASSED AND STABILISED.
15. SEDIMENT PONDS ARE TO BE LEFT IN PLACE UNTIL THE SITE IS FULLY GRASSED AND STABILISED.
16. ALL SUB SOIL DRAINS ARE TO BE CONNECTED TO DIVERSION DRAINS AND DISCHARGE INTO SEDIMENT PONDS.
17. ALL AREAS OF SITE BEYOND EARTHWORKS AND DRAINAGE WORK LIMITS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE REINSTATED IMMEDIATELY AT CONTRACTOR'S EXPENSE.
18. PERMANENT STABILISATION OF SITE IS TO BE ESTABLISHED BEFORE COMPLETION CAN BE AUTHORISED.
19. ALL STRAW BALES TO BE WRAPPED IN GEOTEXTILE FABRIC.

EROSION CONTROL NOTES

1. THE MEASURES SHOWN ON THE DRAWING ARE CONCEPTUAL DESIGN GUIDELINES BASED ON "ENVIRONMENTAL PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT", 2011. ALL EROSION AND SEDIMENT MEASURES SHALL BE REMOVED AT THE COMPLETION OF THE PROJECT ONLY, AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN, INSTALL AND MAINTAIN MEASURES IN ACCORDANCE WITH ENVIRONMENTAL PROTECTION AUTHORITY.
2. THE CONTRACTOR SHALL PROVIDE DRAWING AND DETAILS TO THE ENVIRONMENT PROTECTION UNIT 'ENVIRONMENT A.C.T.' FOR APPROVAL PRIOR TO COMMENCING WORKS.
3. THE CONTRACTOR SHALL ENSURE THAT ADEQUATE MEASURES FOR THE SUPPRESSION OF DUST AND NOISE ARE TAKEN AT ALL TIMES DURING CONSTRUCTION WORK. KEEP ROAD PAVEMENTS, CYCLEPATHS AND FOOTPATHS CLEAR OF DIRT, MUD AND OTHER DEBRIS AT ALL TIMES.
4. FOLLOWING CONSTRUCTION, PROVIDE FILTER ROLLS TO ALL NEW SUMPS UNTIL THE CATCHMENT AREAS ARE ESTABLISHED. PROVIDE FILTER ROLLS AND HAY BALE PROTECTION TO ALL EXISTING SUMPS AROUND THE CONSTRUCTION SITE.
5. STRAW BALES MUST BE PLACED AT SUITABLE INTERVALS ALONG SWALES & CUT-OFF DRAINS.
6. SILT FENCE SHALL BE PLACED AROUND ANY STOCKPILES.
7. SILT FENCE SHALL BE ADJUSTED AROUND STOCKPILES OR SPOIL AREAS IF REQUIRED.
8. PLACE STRAW BALES OR SANDBAGS AROUND DRAINAGE SUMPS AT LOW POINTS AND OTHER KEY DRAINAGE LOCATIONS AS REQUIRED.
9. INSTALL SILT FENCES AROUND ALL SUMPS AND MANHOLES AND MAINTAIN DURING ENTIRE CONSTRUCTION PERIOD UNTIL THE SITE IS FULLY GRASSED AND STABILISED.
10. SEDIMENT PONDS ARE TO BE LEFT IN PLACE UNTIL THE SITE IS FULLY GRASSED AND STABILISED.
11. THE SEDIMENT RETENTION POND SHALL BE MONITORED AND MAINTAINED ON A DAILY BASIS THROUGHOUT THE CONSTRUCTION PERIOD.
12. WATER SHALL BE CHEMICALLY DOSED WITH GYPSUM TO ACCELERATE THE SETTLEMENT OF SUSPENDED SOILS AND DISCHARGED WHEN IT IS ABOVE 20% OF THE PONDS FULL CAPACITY, AT A RATE OF 320MG PER CUBIC METER.

SITE COMPOUND NOTES

1. DIMENSIONS SHOWN ARE MINIMUM ONLY. THE CONTRACTOR SHALL CONSTRUCT THE FACILITY TO A SIZE THAT WILL PERFORM IN A MANNER WHICH SATISFIES THE REQUIREMENTS OF THE CONTRACT.
2. STABILISED CONSTRUCTION ENTRANCE/EXIT STONE - CRUSHED STONE 50mm TO 75mm NOMINAL SIZE ON HIGH STRENGTH GEOTEXTILE FABRIC.
3. WASHING DOWN OF WHEELS AND BODY SURFACES OF ALL VEHICLES AND PLANT LEAVING THE SITE TO PREVENT THE CARRIAGE OF SEDIMENT ONTO STREETS IS REQUIRED.
4. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ADJACENT ROADS AND STREETS. THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE ENTRANCE WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEARANCE OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO ROADS MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR.
5. DIVERT RUNOFF AWAY FROM ACCESS POINT.

DUST MANAGEMENT NOTES

WHERE BUILDING WORK GENERATES DUST, ALL REASONABLE AND PRACTICABLE MEASURES SHOULD BE TAKEN TO MINIMISE THAT DUST. THIS CAN OFTEN BE ACHIEVED BY:

1. RETAIN EXISTING VEGETATION WHERE POSSIBLE;
2. STRIPPING AREAS PROGRESSIVELY AND ONLY WHERE IT IS NECESSARY FOR WORKS TO OCCUR;
3. EMPLOYING STABILISING METHODS SUCH AS MATTING, GRASSING OR MULCH;
4. DAMPENING THE GROUND WITH A LIGHT WATER SPRAY (CONTACT ENVIRONMENT ACT FOR REQUIREMENTS DURING EXTREME DROUGHT CONDITIONS);
5. ROUGHENING SURFACE OF EXPOSED SOIL;
6. COVERING STOCKPILES AND LOCATING THEM WHERE THEY ARE PROTECTED FROM THE WIND;
7. RESTRICTING VEHICLE MOVEMENTS;
8. COVERING THE LOAD WHEN TRANSPORTING MATERIAL;
9. CONSTRUCTING WIND BREAKS SUCH AS WIND FENCES IN ACCORDANCE WITH THE BLUE BOOK;
10. A WATER CART OR SUFFICIENT WATER SPRAYS SHALL BE MADE AVAILABLE AT ALL TIMES IN ADVERSE CONDITIONS WHEN DUST CANNOT BE ADEQUATELY CONTROLLED WHEN WORKS AREA BEING UNDERTAKEN, WORKS WILL CEASE IN THESE AREAS UNTIL CONDITIONS IMPROVE;
11. WATER SHALL BE APPLIED TO SUPPRESS DUST FROM OPEN EARTHWORKS AS WELL AS UNPROTECTED STOCKPILES;
12. AREAS OF COMPLETED EARTHWORKS SHALL BE PROGRESSIVELY REHABILITATED WITH DRYLAND GRASS AND FENCED OFF AS SOON AS PRACTICABLE TO PREVENT FURTHER EROSION;
13. THE CONTRACTOR IS TO CONTACT THE WATER RESOURCES UNIT TO OBTAIN AN EXEMPTION TO USE NON-POTABLE WATER FROM ON OR OFF THE SITE IF REQUIRED;

NOISE

ENSURE ALL BUILDING WORK THAT GENERATES NOISE IS CONDUCTED WITHIN THE TIME PERIODS DETAILED IN SCHEDULE 2 OF THE ENVIRONMENTAL PROTECTION REGULATIONS 2005.

BUILDING WORK DETAILS	MONDAY TO SATURDAY	SUNDAY AND PUBLIC HOLIDAYS
INDUSTRIAL, CITY AND TOWN CENTRE AREAS	6AM TO 8PM	6AM TO 8PM
ANY OTHER AREA WHEN WORK COMPLETED WITHIN 2 WEEKS	7AM TO 6PM	8AM TO 8PM
ANY OTHER AREA WHEN WORK NOT COMPLETED WITHIN 2 WEEKS	7AM TO 6PM	BUILDING WORK MUST NOT EXCEED NOISE STANDARD

IN ADDITION:

1. SCHEDULE NOISY ACTIVITIES FOR THE LEAST SENSITIVE TIMES OF THE DAY SUCH AS MID-MORNING AND MID AFTERNOON.
2. SELECT MACHINERY THAT PRODUCE LESS NOISE; AND
3. ENSURE MACHINERY IS WELL MAINTAINED.

DISPOSAL OF SPOIL

BEFORE DISPOSAL OF SPOIL OFFSITE, THE FOLLOWING INFORMATION MUST BE PROVIDED TO ENVIRONMENT ACT:

1. WHERE THE SPOIL WILL ORIGINATE FROM;
2. WHO IS DISPOSING OF THE SPOIL;
3. WHERE THE SPOIL WILL BE TAKEN;
4. THE AMOUNT OF SPOIL TO BE TAKEN AWAY;
5. DESCRIPTION OF THE TYPE OF SPOIL TAKEN AWAY;
6. DETAILS OF HOW RECORDS WILL BE KEPT; AND
7. TIMEFRAME TO COMPLETE WORKS TO THE SATISFACTION OF ENVIRONMENT ACT.

SPOIL MAY BE TAKEN TO AN APPROVED LANDFILL SITE WITHOUT APPROVAL. HOWEVER, IF THE SPOIL IS TAKEN TO AN AREA OTHER THAN APPROVED LANDFILL SITE, ENSURE THE ACCEPTOR OF THE SPOIL IS AWARE OF THE REQUIREMENTS SETOUT IN SECTION 8.2 OF THE ENVIRONMENT PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT.

FIRE

BURNING OF WASTE MATERIALS ON THE SITE, SUCH AS PLASTICS, CHEMICALS OR WOOD THAT MAY BE PAINTED, CHEMICALLY TREATED OF CONTAMINATED WITH CHEMICALS IS ILLEGAL. A FIRE MAY BE PERMITTED FOR HEATING PURPOSES PROVIDED IT IS IN A BRAZER OR CONSTRUCTED FIREPLACE. ONLY SEASONED, UNTREATED TIMBER CAN BE BURNT FOR HEATING PURPOSES.

MAINTENANCE SCHEDULE

MONTHLY:

1. TURN OVER STABILISED CONSTRUCTION ENTRY MATERIAL AND REVIEW WHEN REQUIRED.

WEEKLY:

2. CHECK AND REINSTATE SILT CONTROL FENCES

DAILY:

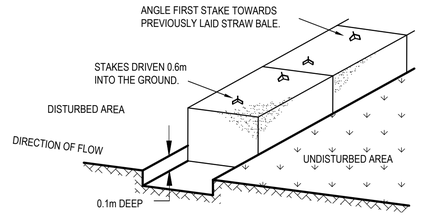
3. SWEEP AND REMOVE DIRT AND ANY OTHER BUILDING MATERIAL FROM GUTTERS, FOOTPATHS OR ROADWAYS ADJACENT TO THE SITE BY CLOSE OF BUSINESS AND OR PRIOR TO RAIN AND WHEN REQUIRED. ALL NECESSARY STEPS SHOULD BE TAKEN THAT ARE PRACTICAL AND REASONABLE TO MINIMISE DUST POLLUTION ON LAND DEVELOPMENT AND CONSTRUCTION SITE.

DURING/AFTER WET WEATHER:

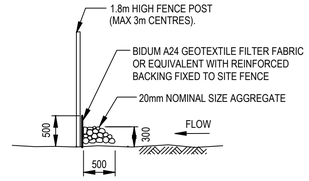
4. LIMIT CONSTRUCTION VEHICLE ACCESS TO SITE DURING AND IMMEDIATELY FOLLOWING WET WEATHER.

SEDIMENT CONTROL NOTES

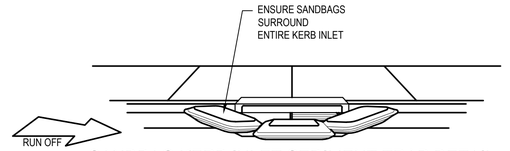
1. PROVIDE KERBSIDE FILTER ROLL TO EXISTING SUMPS WHERE INDICATED, REFER TO GIVEN DETAIL.
2. KERBSIDE FILTER ROLLS TO BE REMOVED, CLEANED AND REINSTATED ON A WEEKLY BASIS AT A MINIMUM. TRAPPED SEDIMENT ABOUT SUMPS ALSO TO BE REMOVED. CLEANING IS ALSO TO TAKE PLACE IMMEDIATELY AFTER PERIODS OF RAINFALL DURING CONSTRUCTION.
3. THE SITE FOREMAN IS TO CONTACT ENVIRONMENT ACT (132281) TO ARRANGE A SITE INSPECTION AND ENDORSEMENT OF SEDIMENT AND EROSION CONTROL MEASURES PRIOR TO WORKS COMMENCING.
4. THE SITE FOREMAN IS TO CONTACT ENVIRONMENT ACT (132281) TO DISCUSS ANY PROPOSED MAJOR CHANGES TO SEDIMENT AND EROSION CONTROLS ON SITE PRIOR TO IMPLEMENTING THE CHANGES.
5. THE SITE FOREMAN WILL ENSURE CONTRACTORS ACCESS AND EXIT THE SITE USING ONLY ENVIRONMENT ACT APPROVED STABILISING ACCESS/EXIT POINTS AS DETAILED ON ENDORSED SEDIMENT AND EROSION CONTROL PLANS.



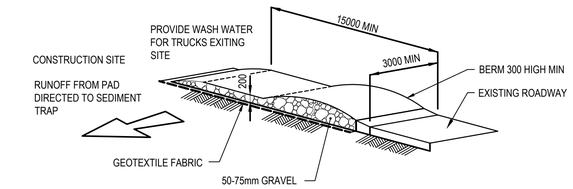
HAYBALE SEDIMENT BARRIER
N.T.S.



SILT FENCE DETAIL (A / C1051)
NTS



SANDBAG KERB INLET SEDIMENT TRAP DETAIL (B / C1051)
NTS



TEMPORARY CONSTRUCTION EXIT
NTS

0 5 10 15 20 25m
SCALE 1:250 @A1

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Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: EROSION AND SEDIMENT CONTROLL NOTES
SHEET 1 OF 2

Status: PRELIMINARY
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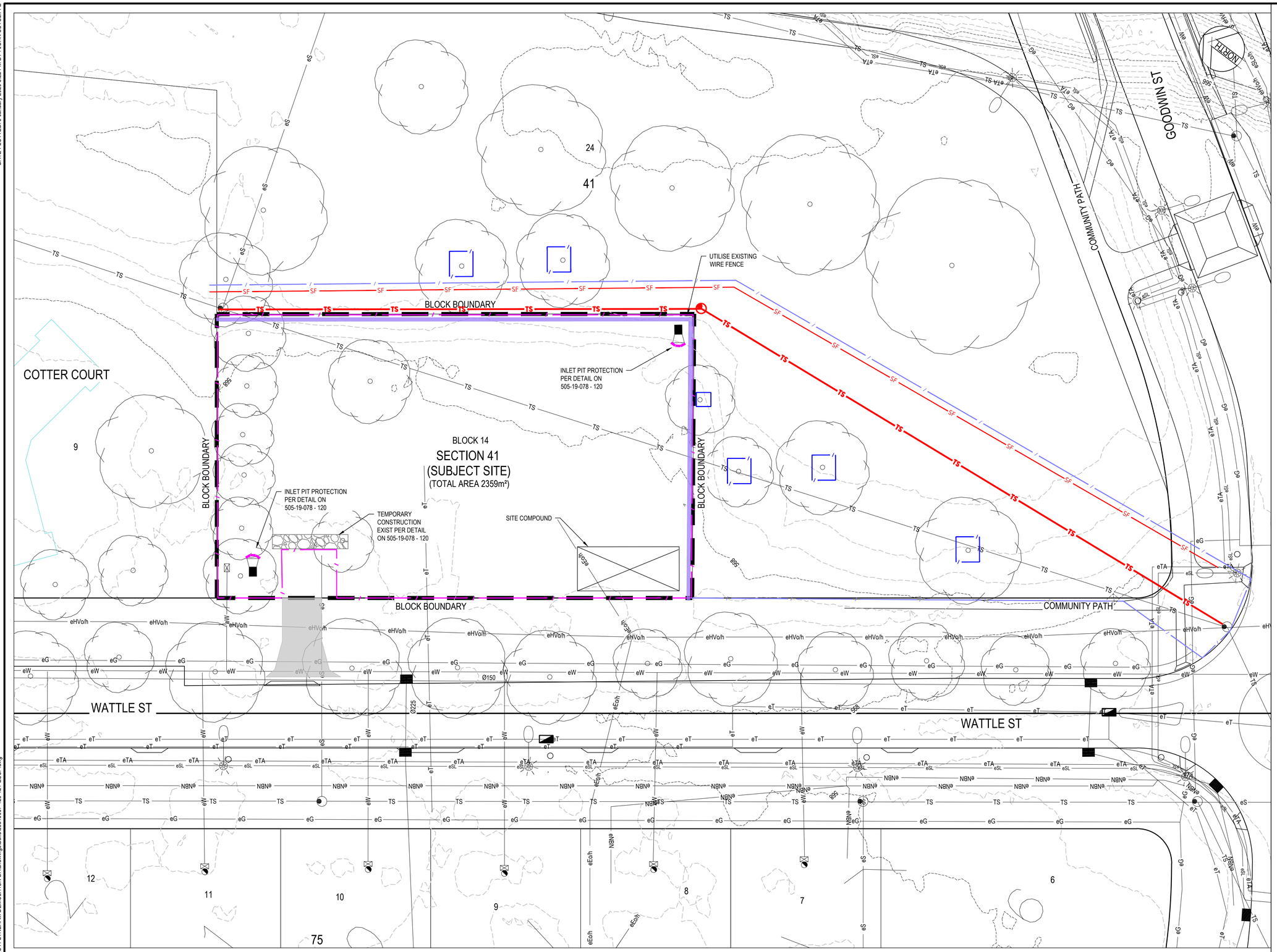
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AHD	6/12/2019		A1

Drawing Number: 50519087-120
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CAD File: N:\Projects\505\FY19\087. B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-120-121-ESCP.dwg



LEGEND

- BLOCK BOUNDARY
- EXISTING 1.8m WIRE FENCE
- WIRE FENCE
- SLIT FENCE
- 1.8m HIGH TEMPORARY CHAIN MESH TREE PROTECTION FENCE
- EXISTING RETAINING WALL
- GABION MATTRESS
- SEDIMENT TRAP AROUND ALL PITS REFER DETAILS DRG 50519087-120
- EXISTING CONTOURS
- EXISTING TREE

0 5 10 15 20 25m
SCALE 1:250 @A1

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		Date
Drawn	GH	18/06/2019
Checked	RG	18/06/2019
Designed	JS	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

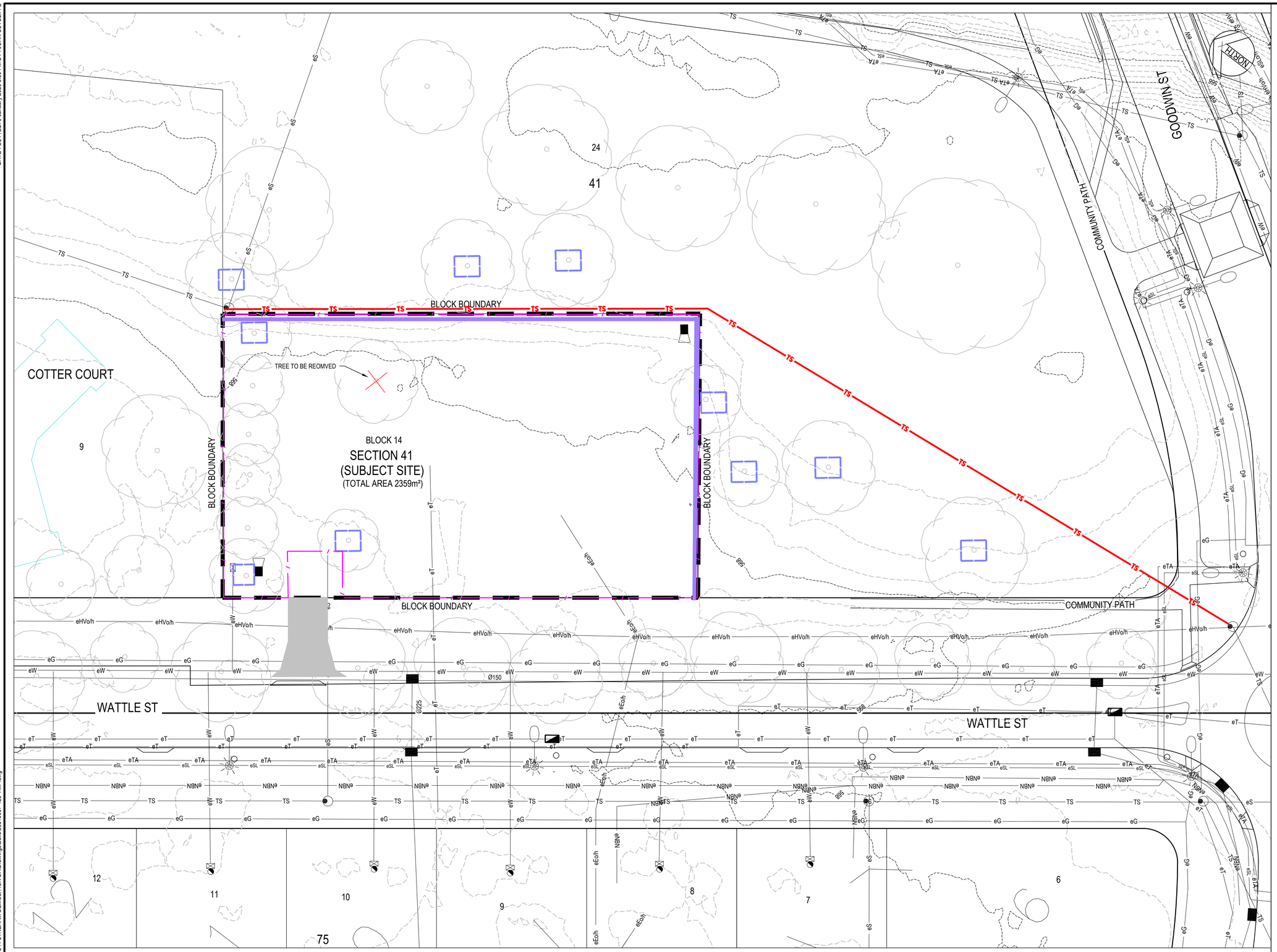
Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: EROSION AND SEDIMENT CONTROLL PLAN
SHEET 2 OF 2

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Date	Scale	Size
AHD	6/12/2019	1:250m	A1

Drawing Number: 50519087-121
Revision: 2

DATE PLOTTED: 9 January 2020 3:30 PM BY - JOHN SUTCLIFFE



LEGEND

- BLOCK BOUNDARY
- EXISTING 1.8m WIRE FENCE
- 1.8m HIGH TEMPORARY CHAIN MESH TREE PROTECTION FENCE
- EXISTING RETAINING WALL
- EXISTING CONTOURS
- EXISTING TREE

0 5 10 15 20 25m

SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	6/12/2019	PRELIMINARY	GH	JS	JS
1	2/07/2019	PRELIMINARY	GH	JS	JS

ACT Government
Environment, Planning and Sustainable Development

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Cardno (NSW/ACT) Pty Ltd | ABN 95 001 145 035
Level 2, 14 Wormald Street
Symonston ACT 2609
Tel: 02 6112 4500 Fax: 02 6112 4599
Web: www.cardno.com.au

		Date
Drawn	GH	18/06/2019
Checked	RG	18/06/2019
Designed	JS	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: TREE MANAGEMENT PLAN

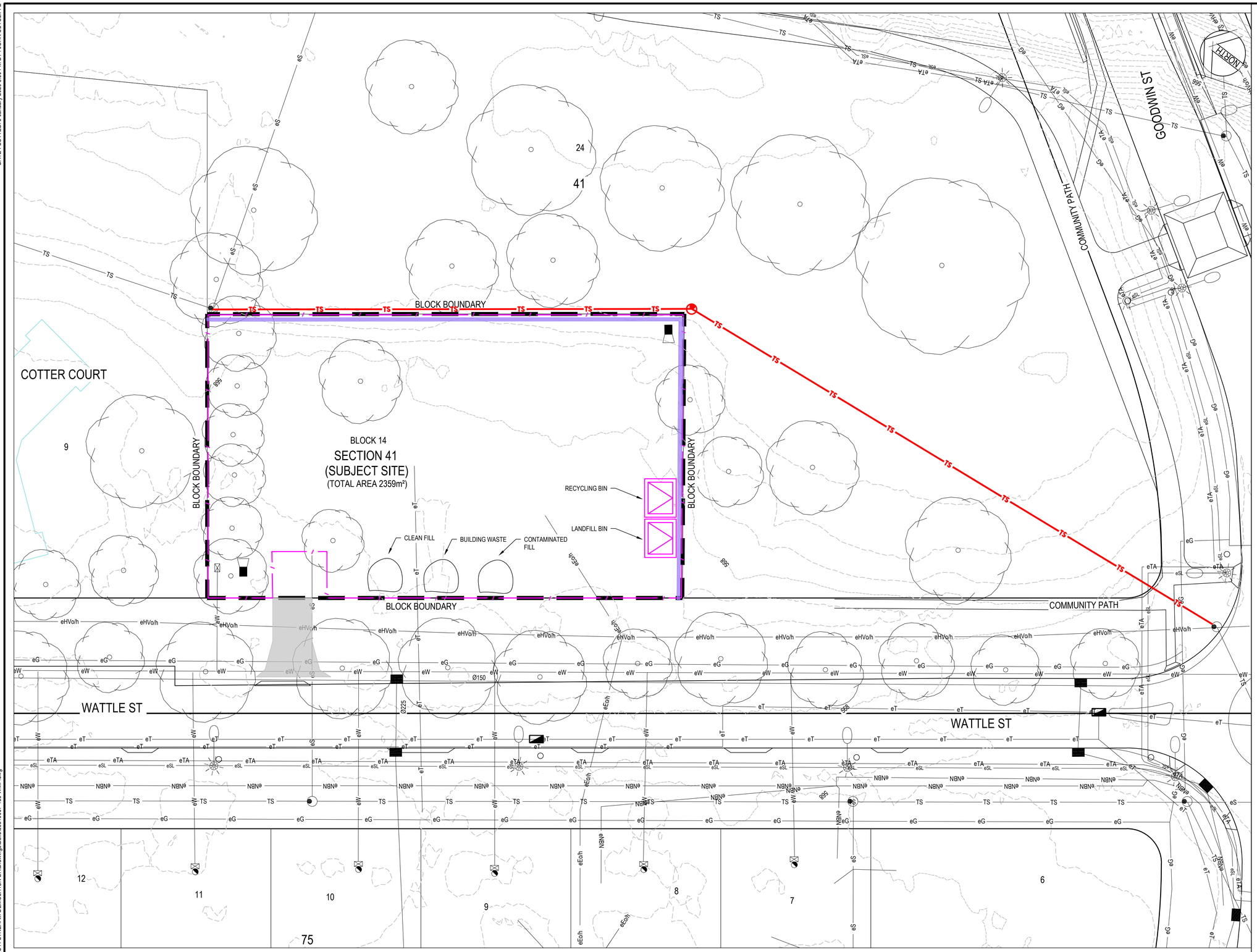
Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Date	Scale	Size
AHD	6/12/2019	1:250m	A1

Drawing Number: 50519087-125
Revision: 2

XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD; Existing Cont; X-Trees; X_50519072-SIR-ES
CAD File: N:\Projects\505\FY19\087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-125-TMP.dwg

DATE PLOTTED: 9 January 2020 3:30 PM BY - JOHN SUTCLIFFE



LEGEND

- BLOCK BOUNDARY
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL
- EXISTING CONTOURS
- LANDFILL / RECYCLE BIN
- STOCKPILING AREA
- EXISTING TREE

WASTE MANAGEMENT PLAN NOTES

THE FOLLOWING KEY POINTS IS GUIDE FOR A DEMOLITION CONTRACTOR TO UNDERTAKE A WASTE MANAGEMENT PLAN.

01-DEMOLITION:

a) PLANNING

- CONDUCT A SITE INSPECTION TO IDENTIFY POTENTIAL WASTE AND RECYCLING ITEMS.
- CONTACT WASTE AND RECYCLING SERVICE PROVIDERS TO ASSESS SITE CONTENTS.
- IDENTIFY AREAS FOR ON SITE WASTE AND RECYCLING THAT WILL FACILITATE THE REQUIREMENTS OF THE SALVAGE CONTRACTORS AND DON'T MIX LOADS.

b) DIRTY FILL

- SENT TO CANBERRRA SAND AND GRAVEL (62415945) TO BE RECYCLED.

c) CLEAN FILL

- SENT TO GUNGAHLIN LANDSCAPE SUPPLIES (KAMBAH YARD) TO BE CLEANED AND IMPROVED AND RESOLD AS LANDSCAPE TOPSOIL MATERIALS.

d) CONCRETE

- SENT TO CANBERRA CONCRETE RECYCLERS (62497427) TO BE CLEANED, CRUSHED AND REUSED AS ROAD BASE OR CONCRETE AGGREGATE.

e) METAL

- COLLECTED BY EZY SCRAP SERVICES (1800 553 753) TO BE RECYCLED.

f) BRICKS

- SENT TO CANBERRA CONCRETE RECYCLERS (62497427) TO BE CLEANED, CRUSHED AND REUSED AS ROAD BASE OR CONCRETE AGGREGATE.

g) GREEN WASTE

- SENT TO CORKHILL BROS (6239 72 00) TO BE MULCHED AND REUSED IN LANDSCAPE PRODUCTS.

h) WINDOWS

- TO BE COLLECTED BY HANDYMANS TRADING POST (62804036) AND RESOLD AS SECOND HAND BUILDING MATERIALS.

i) DOORS

- TO BE COLLECTED BY HANDYMANS TRADING POST (62804036) AND RESOLD AS SECOND HAND BUILDING MATERIALS.

j) TIMBER

- TO BE COLLECTED BY HANDYMANS TRADING POST (62804036) AND RESOLD AS SECOND HAND BUILDING MATERIALS.
- SENT TO CORKHILL BROS (6239 72 00) TO BE RECYCLED

02 - WASTE BINS:

- PROVIDE SEPARATE WASTE BINS ONSITE. ONE FOR RECYCLING AND ONE FOR WASTE. IDENTIFY BIN PURPOSE CLEARLY.

a) LANDFILL BIN

- TO BE COLLECTED BY CAPITAL WASTE SKIPS (62844443) AND DISPOSED OF IN LANDFILL.

b) RECYCLING BIN

- TO BE COLLECTED BY CAPITAL WASTE SKIPS (62844443) AND SEPARATED FOR RECYCLING PURPOSES.

0 5 10 15 20 25m

SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	6/12/2019	PRELIMINARY	GH	JS	JS
1	2/07/2019	PRELIMINARY	GH	JS	JS

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		Date
Drawn	GH	18/06/2019
Checked	RG	18/06/2019
Designed	JS	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SITE DEMOLITION
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: WASTE MANAGEMENT PLAN

Status: PRELIMINARY
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Datum	Date	Scale	Size
AHD	6/12/2019	1:250m	A1

Drawing Number: 50519087-130
Revision: 2

XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD; Existing Cont; X-Trees; AERIAL-LYNEHAM; X_50519072-SIR-ES
CAD File: N:\Projects\50\5FY\19\087_B14 S41 LYNEHAM DEMOLITION DA\Drawings\Build\50519087-130-WMP.dwg

APPENDIX

B

DBYD & CORRESPONDENCE

From: Allen, Craig
To: Rakulan Ganeshananthan
Cc: Hydraulic Asset Acceptance; John Samoty
Subject: RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 17 Apr 2019 17:25]
Date: Wednesday, 17 April 2019 5:06:36 PM
Attachments: image002.png
image003.png
image004.png
image005.png
image007.png
image008.png

Hi Rakulan,

Icon Water have recently developed a water model for the City/North Canberra incorporating more detailed analysis of peak hour demand. The output of this model are provided below. I trust this addresses your enquiry.



The following assumptions are used for the analysis:

1. ***The pressure is calculated with service reservoirs at half capacity and an allowance for reservoir outlet losses of 1.5 m.***

2. ***Detailed North Canberra Peak Flow timing percentages and WSSS flow rates were considered in this analysis.***

3. ***The model contains identified unlined mains.***

Location as marked above	Wattle Street (Elevation = 568m)
Max Static Pressure (m)	86
Min Pr @ Peak Demand	45
Min Pr @ Peak Demand + 10 L/s (m)	43
Min Pr @ Peak Demand + 20 L/s (m)	42
Min Pr @ Peak Demand + 30 L/s (m)	40

Min Pr @ Peak Demand + 40 L/s (m)	39
Min Pr @ Peak Demand + 50 L/s (m)	36
Min Pr @ Peak Demand + 60 L/s (m)	34

Disclaimer
1. The above water supply pressure information ("Information") has been calculated using data provided by third parties and/ or Icon Water, which is then subject to mathematical modelling. The modelling endeavours to take into account future water demand patterns and future infrastructure development of adjoining areas.
2. You acknowledge the scope for errors in the data used by Icon Water in determining the Information.
3. Whilst Icon Water has used reasonable endeavours in determining the Information, Icon Water does not make any warranty as to its accuracy.
4. Icon Water accepts no liability for loss or liability arising from reliance on the Information.

Kind Regards,

Craig Allen
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Tuesday, 9 April 2019 9:04 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Cc: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>; John Samoty <john.samoty@cardno.com.au>
Subject: RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham

Hi Craig,

For a proposed development of four stories and 45 dwellings, the subject site area is 0.2359ha. As per STD-SPE-G-012 WSA-03-Water-Supply-Code-Supplement – Table IW.1, group housing duplex's max hourly rate is 1.5l/s.net ha (Peak hour – 100% of max hourly rate) and therefore peak hourly demand is 0.35385 l/s. Can we please confirm the pressures in the table you have provided below has the correct head pressure drop at peak demand from the static head? We are asking the question as it appears that there is insufficient pressure in the system to meet peak demand requirement. If the data below is still valid for our calculated demand, what are our options to enable the proposed development?

Kind Regards,
Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

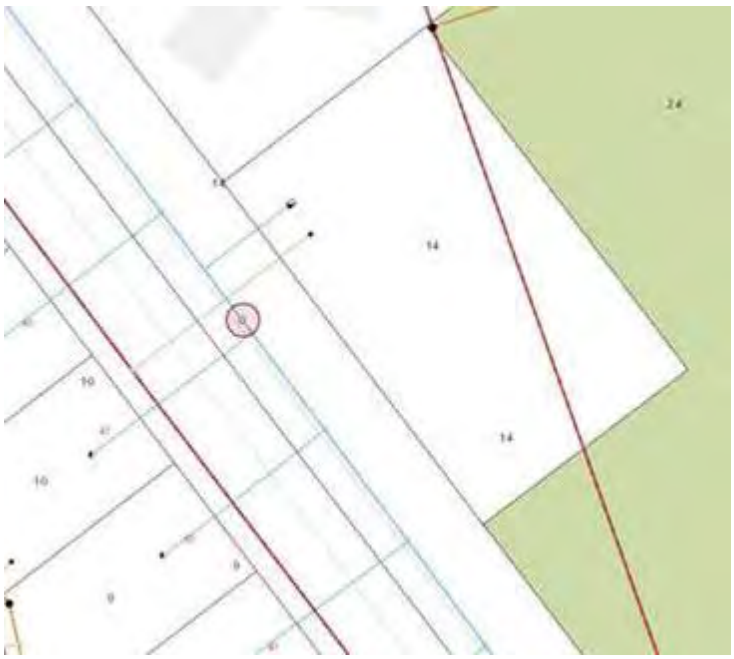
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From: Allen, Craig <Craig.Allen@iconwater.com.au>
Sent: Monday, 8 April 2019 1:39 PM
To: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Cc: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 08 Apr 2019 14:31]

Hi Rakulan,

Please find below pressure enquiry for the location shown circled in red below. Also please be aware of the Icon Water Building Approval Guides when considering development in close proximity to the DN375 trunk sewer through the site.



The following assumptions are used for the analysis:

1. ***The pressure is calculated with service reservoirs at half capacity and an allowance for reservoir outlet losses of 1.5 m.***
2. ***AWSSS design peak flow is considered in this analysis.***
3. ***The model contains identified unlined mains.***

Location as marked above	Wattle Street (Elevation = 568m)
Max Static Pressure (m)	78
Min Pr @ Peak Demand	27
Min Pr @ Peak Demand + 10 L/s (m)	25
Min Pr @ Peak Demand + 20 L/s (m)	24
Min Pr @ Peak Demand + 30 L/s (m)	22
Min Pr @ Peak Demand + 40 L/s (m)	20
Min Pr @ Peak Demand + 50 L/s (m)	17
Min Pr @ Peak Demand + 60 L/s (m)	14

Disclaimer
1. The above water supply pressure information ("Information") has been calculated using data provided by third parties and/ or Icon Water, which is then subject to mathematical modelling. The modelling endeavours to take into account future water demand patterns and future infrastructure development of adjoining areas.
2. You acknowledge the scope for errors in the data used by Icon Water in determining the Information.
3. Whilst Icon Water has used reasonable endeavours in determining the Information, Icon Water does not make any warranty as to its accuracy.
4. Icon Water accepts no liability for loss or liability arising from reliance on the Information.

Kind Regards,

Craig Allen
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Monday, 1 April 2019 5:43 PM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: Re: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham

Good Afternoon,

Cardno has been engaged by EPSDD to prepare a Site Investigation Report (SIR) for a proposed development on Block 14, Section 41 Lyneham.

As such we would like to submit a pressure inquiry at the location indicated on the attached DBYD Plan. Please also refer to the image below for the extent of the subject site.



Thank you for your assistance with this matter. If you have any queries please do not hesitate to contact me.

Have a nice day.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com
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From:	Balberona, Justinieta
To:	Rakulan Ganeshananthan
Cc:	John Samoty; John Sutcliffe; Wyatt, Tim
Subject:	RE: Request for EMME Modelling - Block 14 Section 41 Lyneham [SEC=UNCLASSIFIED] [Filed 09 Apr 2019 16:11]
Date:	Tuesday, 9 April 2019 4:10:55 PM
Attachments:	image002.png image003.png image004.png image005.png 20190409_CSTM_2016_2031_Lyneham B14 S41.zip

Good afternoon Rakulan

As requested, please refer to the attached zipped file for the CSTM plots showing the AM and PM peak hour traffic volumes around Lyneham Block 14 Section 41 and corresponding turn volumes at the three specified intersections in the 2016 and 3031 base model scenarios.

The forecast traffic volumes were derived from the CSTM that was recalibrated based on the 2016 demographic and traffic conditions. The CSTM is a strategic transport model and as such, may not reflect the intersection configuration including the turn volumes in more detail.

Please note that the model simulates the AM and PM peak traffic based on assumptions including land use (population, employment, retail space and enrolments), road network (traffic, public transport and bicycle) and other transport cost parameters (parking, fuel and bus fare) for the designated model years. For reference, the land-use assumptions for the transport zones around the area are also included in the zipped file.

Happy to discuss further. Apologies again for the delay in responding.

Best regards
Justinieta

Justinieta Balberona | Manager, Canberra Strategic Transport Model | Transport Planning and Policy
Phone: 02 6207 5539 | Email: justinieta.balberona@act.gov.au
City Operations, Planning and Policy | Place Coordination and Planning | Transport Canberra and City Services | ACT Government
496 Northbourne Ave, DICKSON | GPO Box 158 Canberra ACT 2601 | www.act.gov.au

Connected services for the people of Canberra

From: Rakulan Ganeshananthan [mailto:rakulan.ganeshananthan@cardno.com.au]
Sent: Tuesday, 9 April 2019 9:40 AM
To: Balberona, Justinieta <Justinieta.Balberona@act.gov.au>
Cc: John Samoty <john.samoty@cardno.com.au>; John Sutcliffe <john.sutcliffe@cardno.com.au>
Subject: RE: Request for EMME Modelling - Block 14 Section 41 Lyneham

Hi Justinieta,

Touching base to see the request below, Can you please provide an update?

Have a good day.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com
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From: Rakulan Ganeshananthan
Sent: Tuesday, 2 April 2019 8:18 AM
To: Balberona, Justinieta <Justinieta.Balberona@act.gov.au>
Cc: John Samoty <john.samoty@cardno.com.au>
Subject: Request for EMME Modelling - Block 14 Section 41 Lyneham

Hi Justinieta,

Please disregard the previous request. Can we please replace one of the intersections with the following.
Wattle Street and Scrivener Street

The updated intersection are as follows:

The three points of intersections are listed below and kindly refer to the image;

- Brigalow Street and Wattle Street
- Wattle Street and Macarthur Avenue
- Wattle Street and Scrivener Street



Thank you very much for your assistance with this request,

If you have any questions, please do not hesitate to contact me.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com
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From: Rakulan Ganeshananthan
Sent: Monday, 1 April 2019 4:28 PM
To: Balberona, Justinieta <Justinieta.Balberona@act.gov.au>
Cc: John Sutcliffe <john.sutcliffe@cardno.com.au>; John Samoty <John.Samoty@cardno.com.au>
Subject: Request for EMME Modelling - Block 14 Section 41 Lyneham

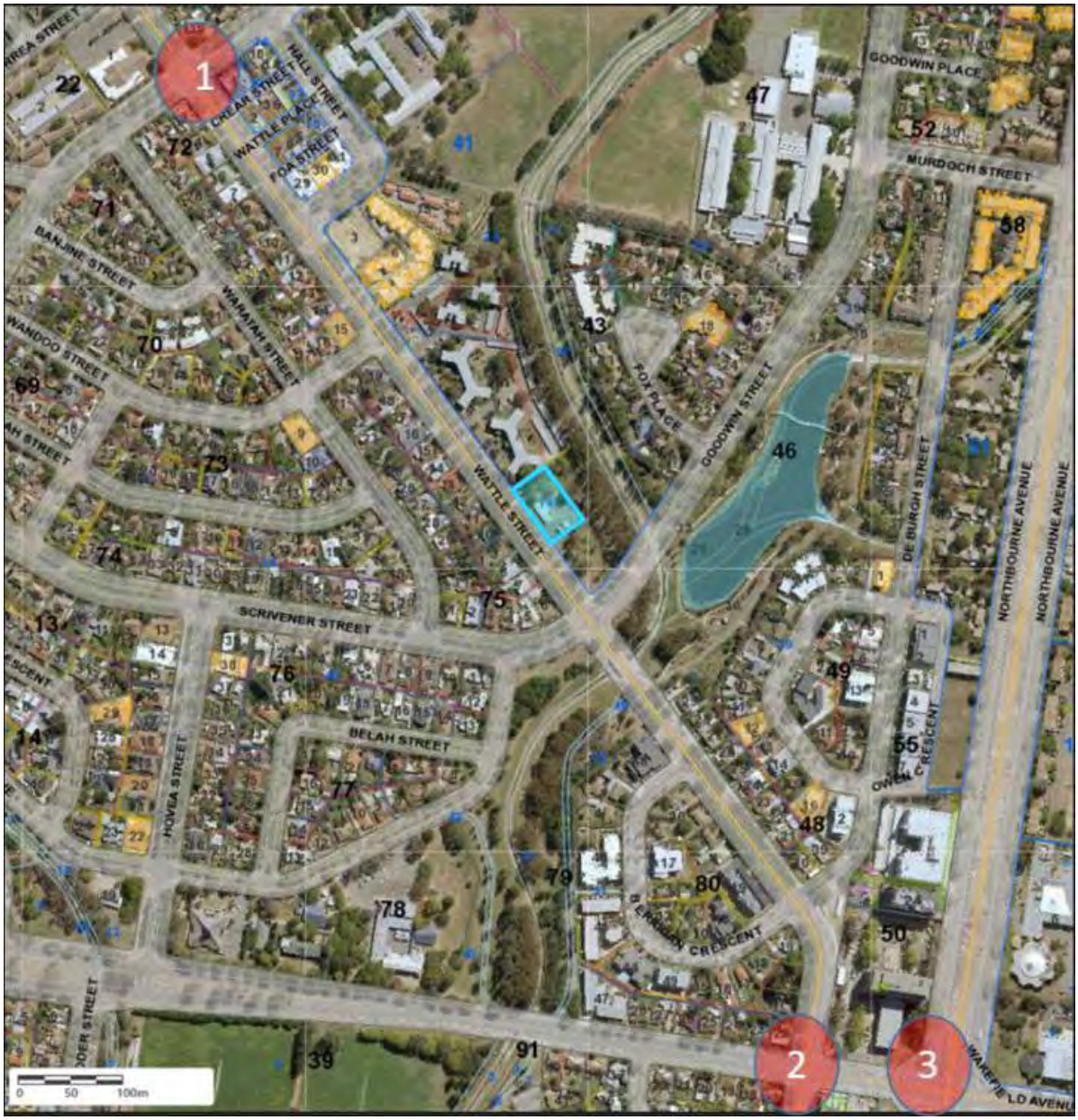
Good Afternoon Justinieta,

Cardno has been engaged by EPSDD to conduct a Site Investigation in response to proposed developments on Block 14 Section 41 Lyneham.

As such can you please provide EMME data for the area indicated below at a similar scale? Could you please provide AM and PM peak data for both the Current and 2031 models?

The three points of intersections are listed below and kindly refer to the image;

- Brigalow Street/Wattle Street
- Wattle Street/Macarthur Avenue
- Northbourne Avenue/Wakefield Avenue



Thank you very much for your assistance with this request,

If you have any questions, please do not hesitate to contact me.

Kind Regards,

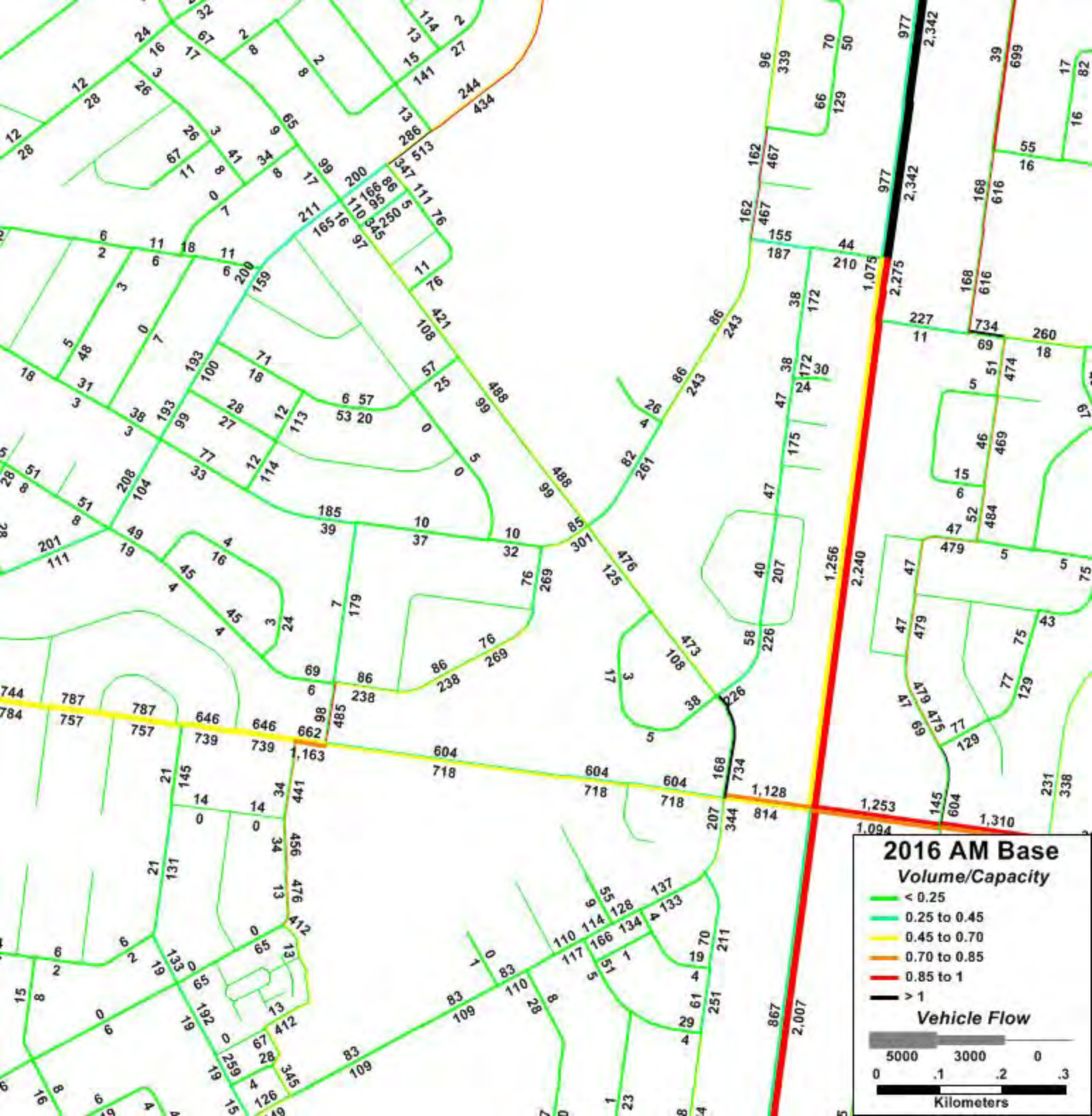
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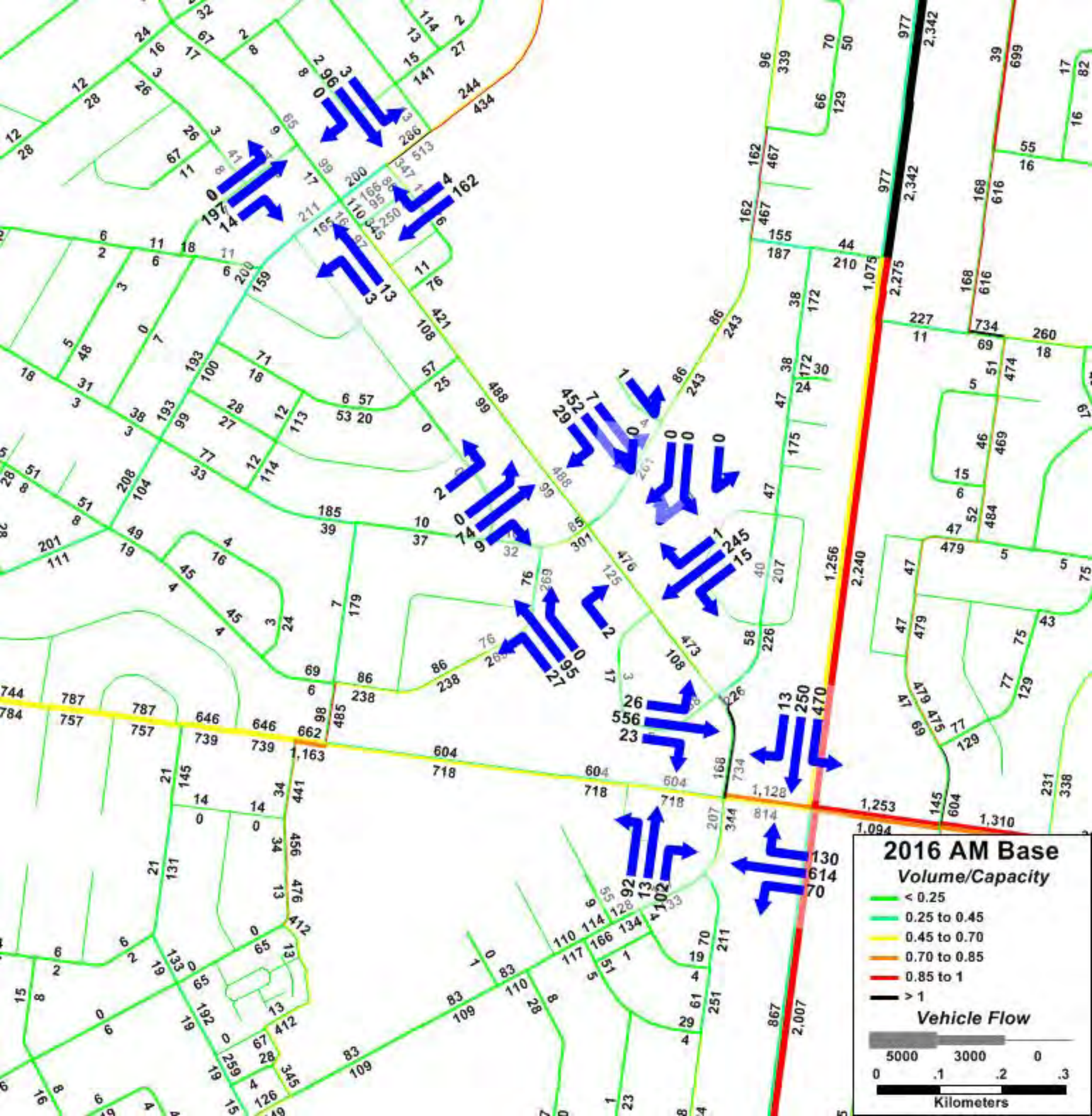
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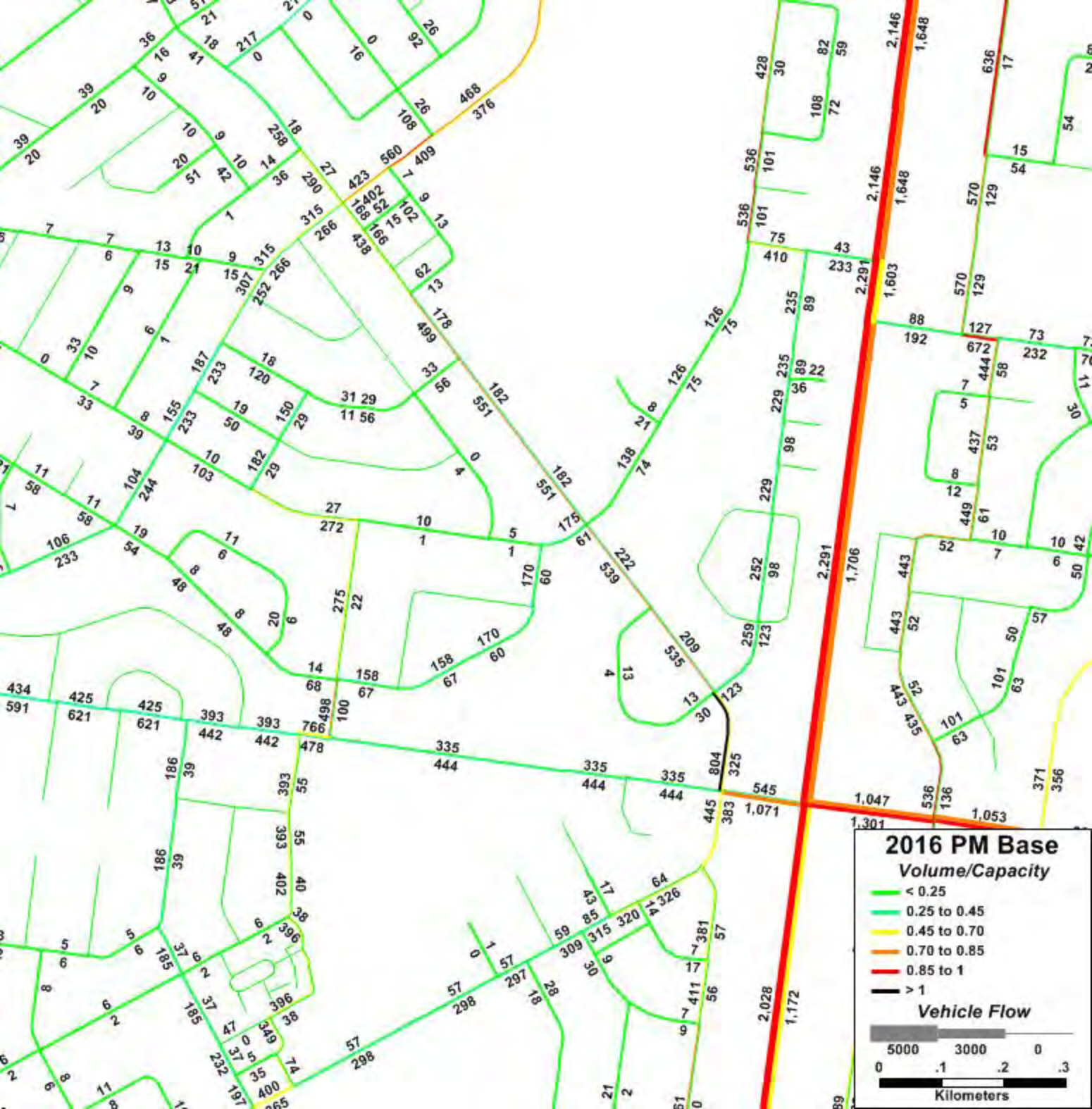
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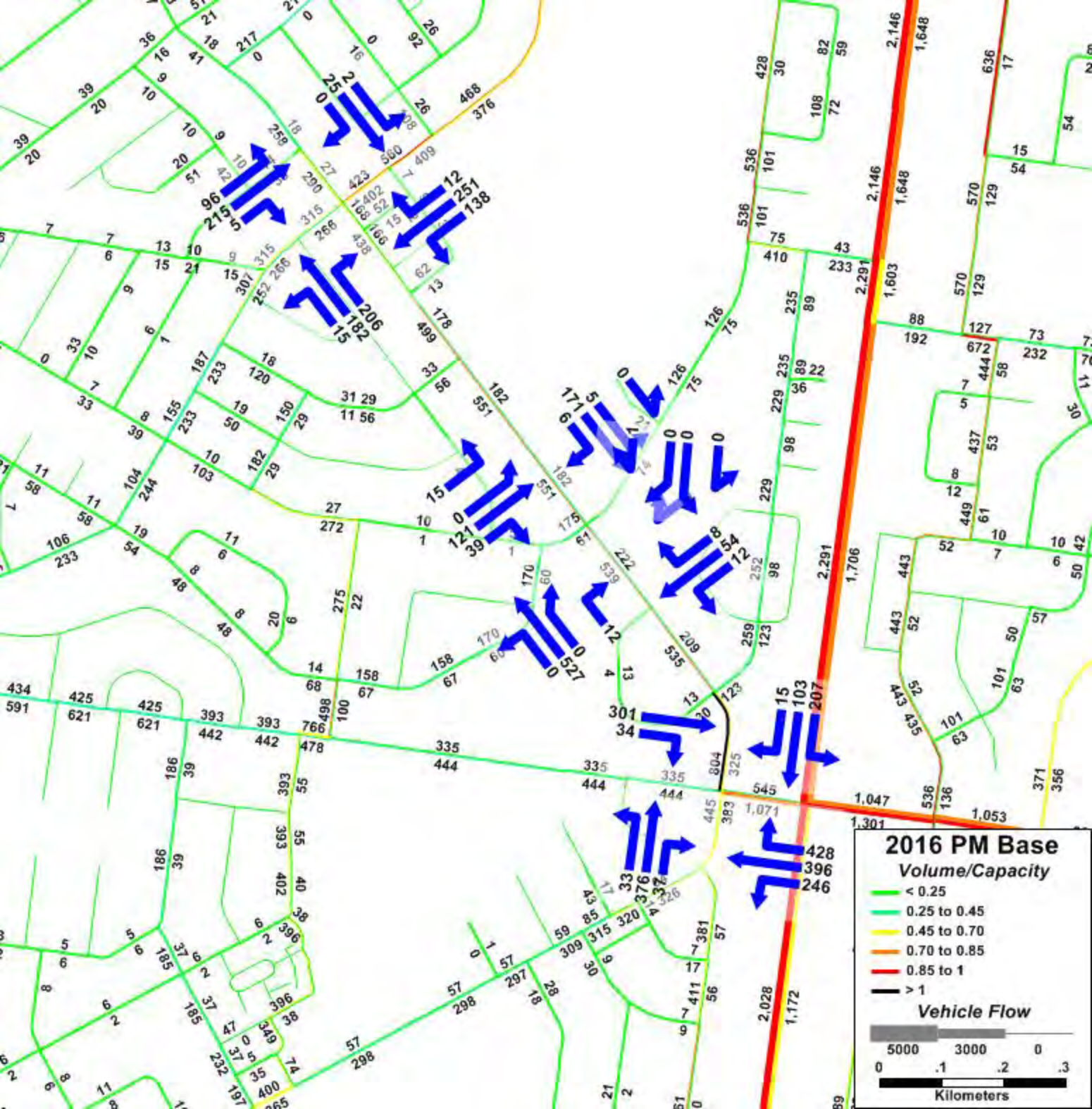
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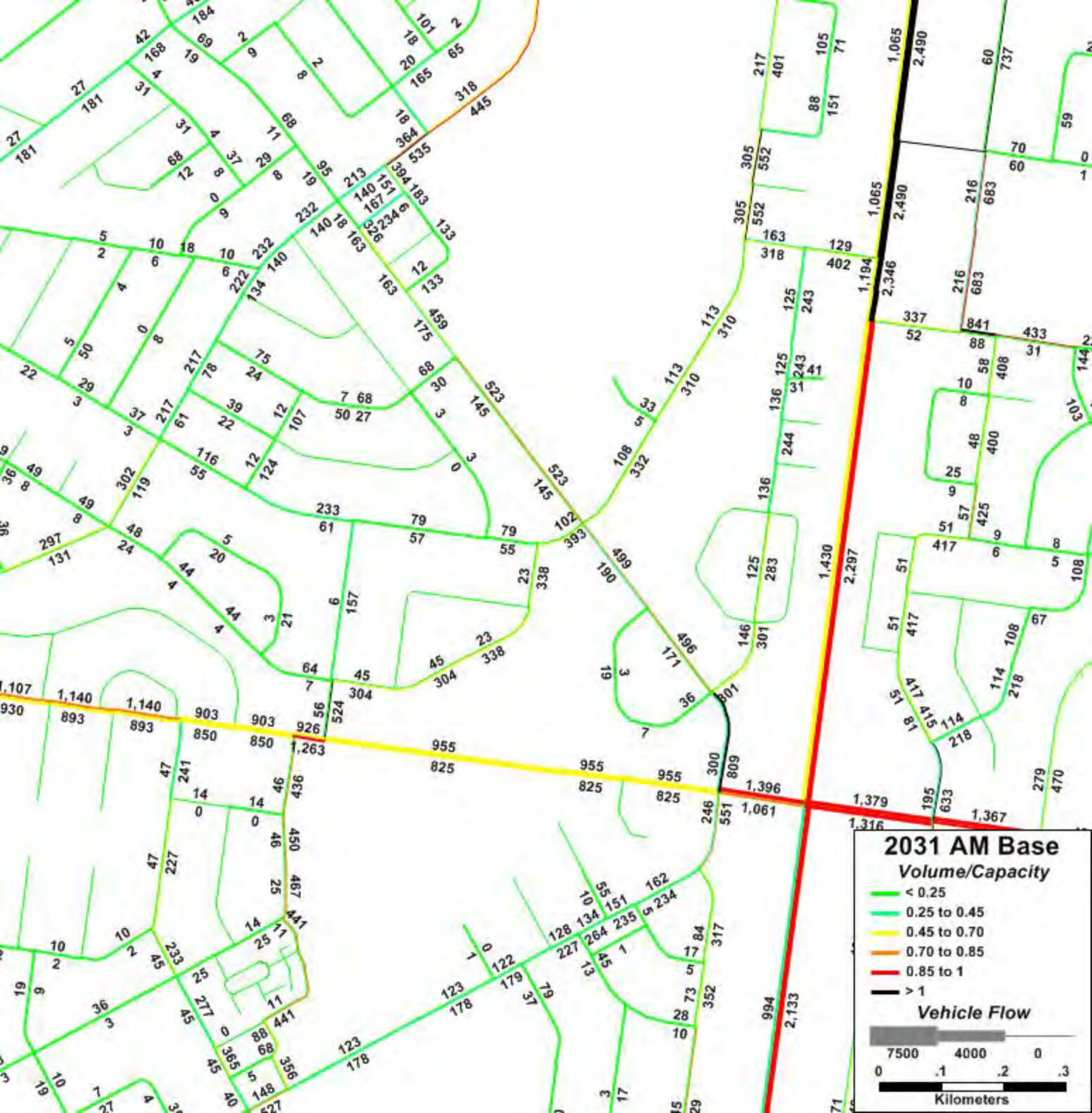
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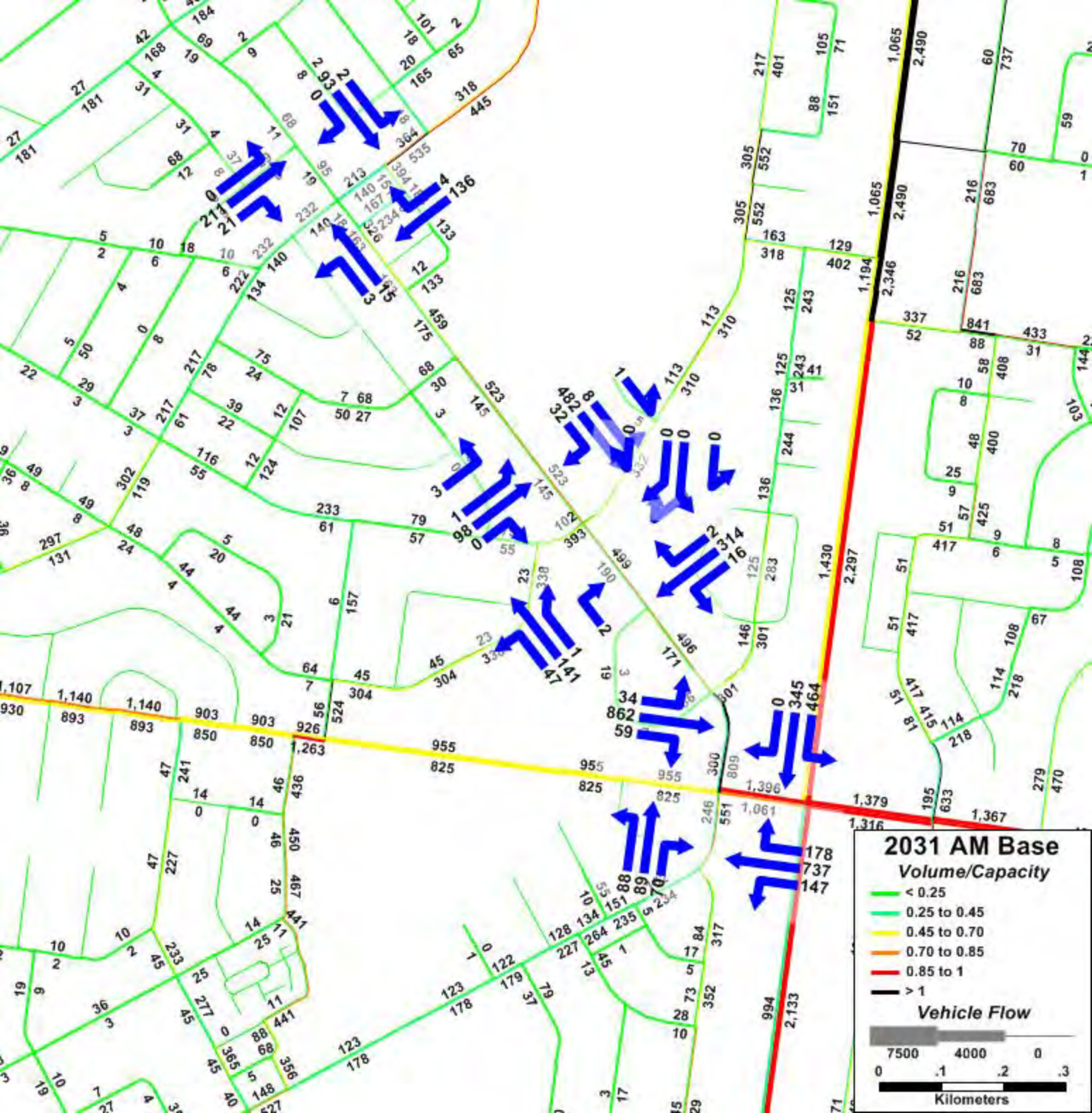

2016 AM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers

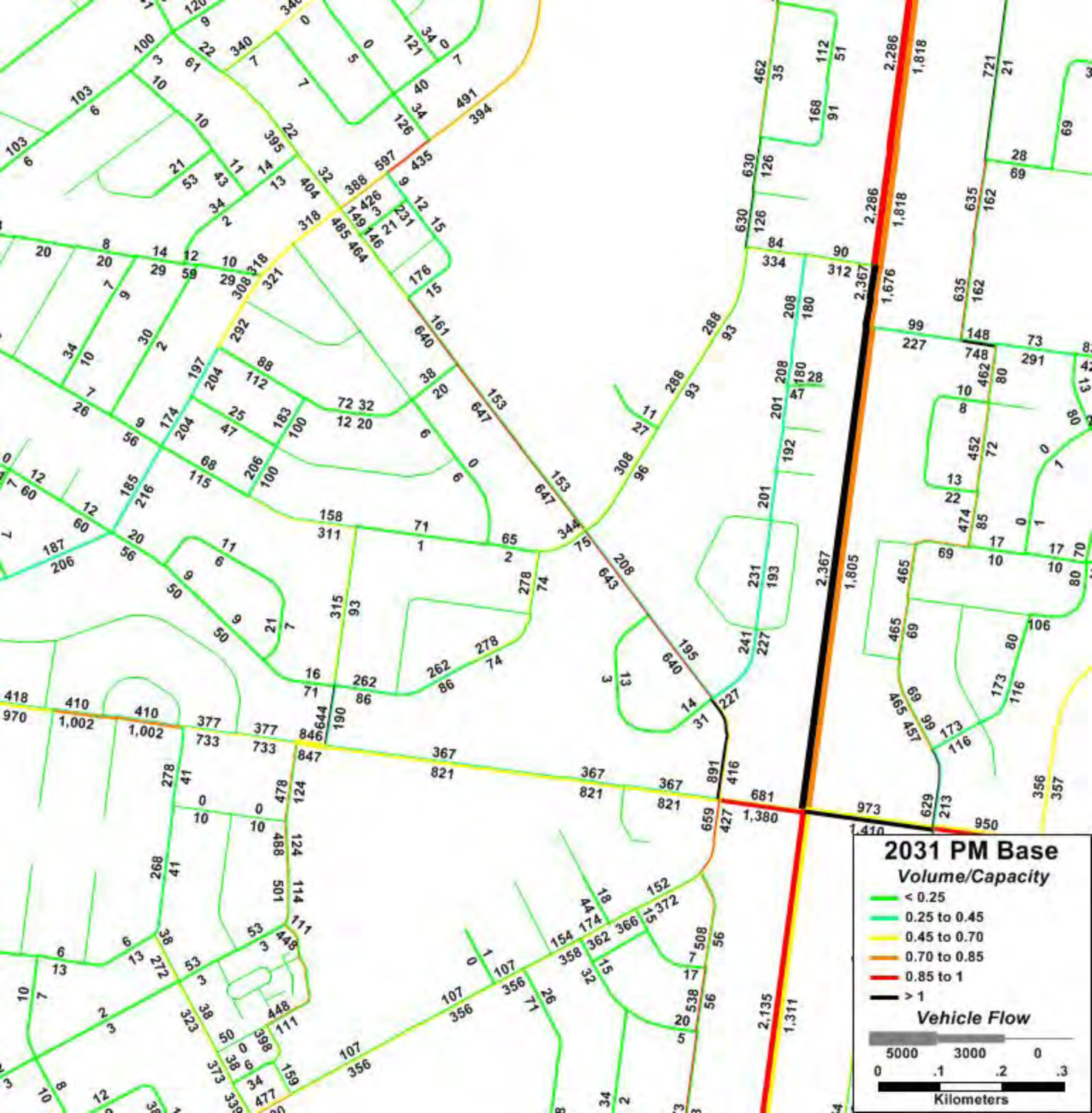

2016 AM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers

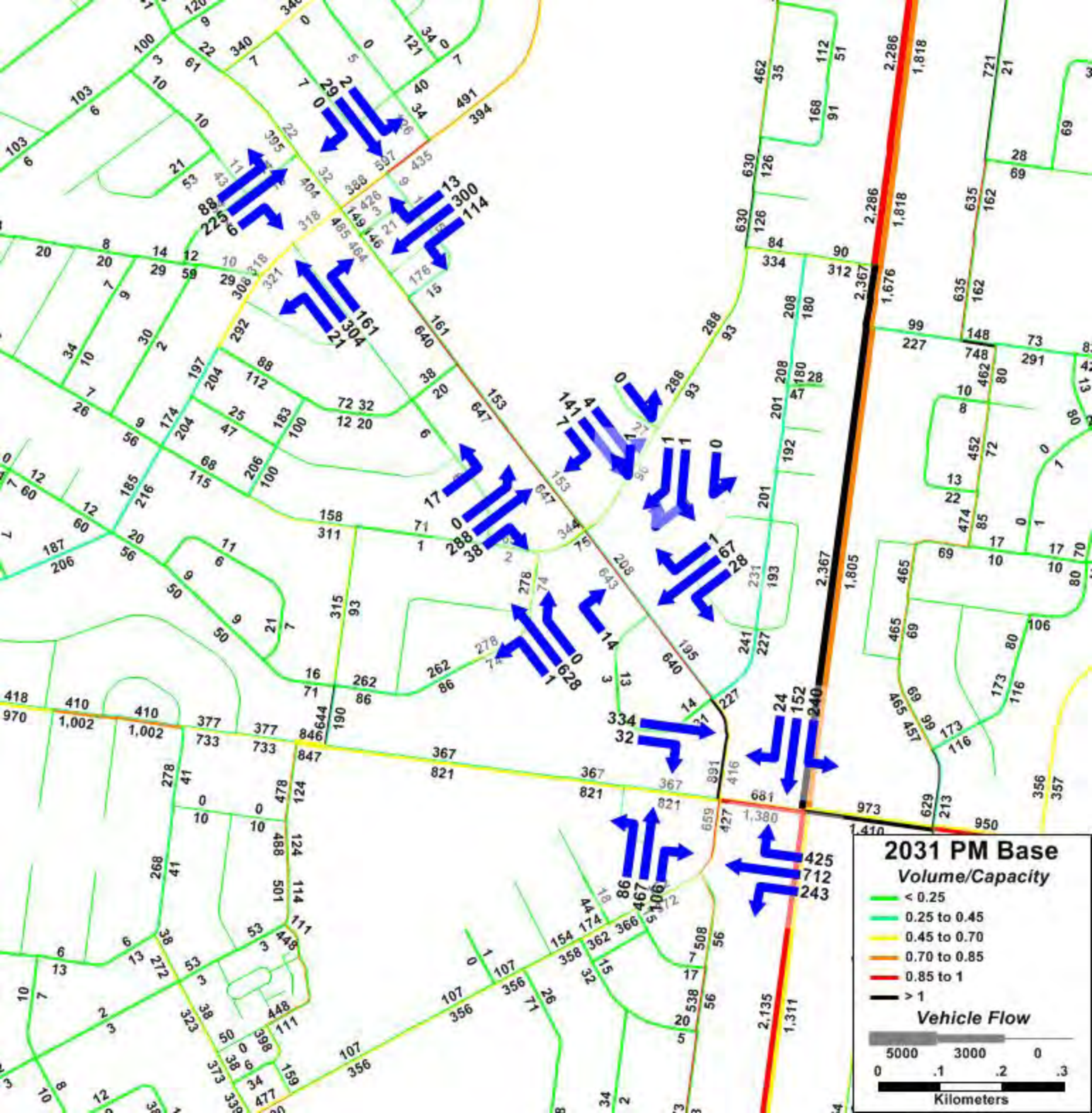

2016 PM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers

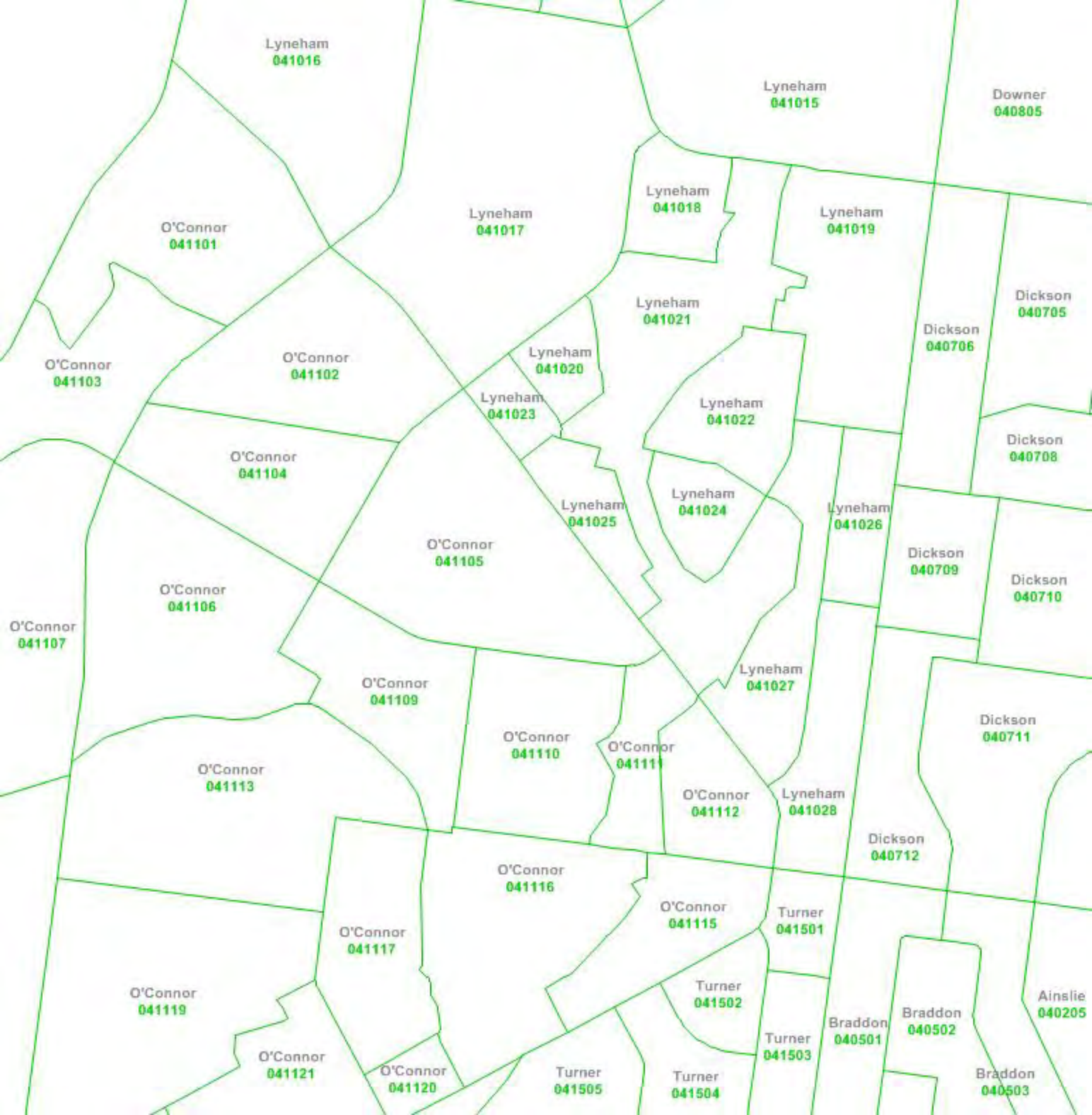

2016 PM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers


2031 AM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
7500
4000
0
0
.1
.2
.3
Kilometers


2031 AM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
7500
4000
0
0
.1
.2
.3
Kilometers


2031 PM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers


2031 PM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000
3000
0
0
.1
.2
.3
Kilometers


Lyneham
041016
Lyneham
041015
Downer
040805
Lyneham
041018
Lyneham
041019
Lyneham
041017
O'Connor
041101
Lyneham
041021
Dickson
040705
Dickson
040706
O'Connor
041103
O'Connor
041102
Lyneham
041020
Lyneham
041023
Lyneham
041022
Dickson
040708
O'Connor
041104
Lyneham
041025
Lyneham
041024
Lyneham
041026
Dickson
040709
Dickson
040710
O'Connor
041105
O'Connor
041106
O'Connor
041107
Lyneham
041027
O'Connor
041109
Dickson
040711
O'Connor
041110
O'Connor
041111
O'Connor
041113
O'Connor
041112
Lyneham
041028
Dickson
040712
O'Connor
041116
O'Connor
041115
Turner
041501
O'Connor
041117
Turner
041502
Ainslie
040205
O'Connor
041119
Braddon
040501
Braddon
040502
Turner
041503
O'Connor
041121
O'Connor
041120
Turner
041505
Turner
041504
Braddon
040503

From:	Allen, Craig
To:	Rakulan Ganeshananthan
Cc:	Hydraulic Asset Acceptance; John Samoty
Subject:	RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 09 Apr 2019 11:22]
Date:	Tuesday, 9 April 2019 11:20:56 AM
Attachments:	image007.png image008.png image010.png image012.png image013.png image014.png

Hi Rakulan,

I've forwarded your enquiry onto our modelling team to seek advice on the peak demand output of the model and will keep you posted.

Kind Regards,

Craig Allen
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

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From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Tuesday, 9 April 2019 9:04 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Cc: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>; John Samoty <john.samoty@cardno.com.au>
Subject: RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham

Hi Craig,

For a proposed development of four stories and 45 dwellings, the subject site area is 0.2359ha. As per STD-SPE-G-012 WSA-03-Water-Supply-Code-Supplement – Table IW.1, group housing duplex's max hourly rate is 1.5l/s.net ha (Peak hour – 100% of max hourly rate) and therefore peak hourly demand is 0.35385 l/s. Can we please confirm the pressures in the table you have provided below has the correct head pressure drop at peak demand from the static head? We are asking the question as it appears that there is insufficient pressure in the system to meet peak demand requirement. If the data below is still valid for our calculated demand, what are our options to enable the proposed development?

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com

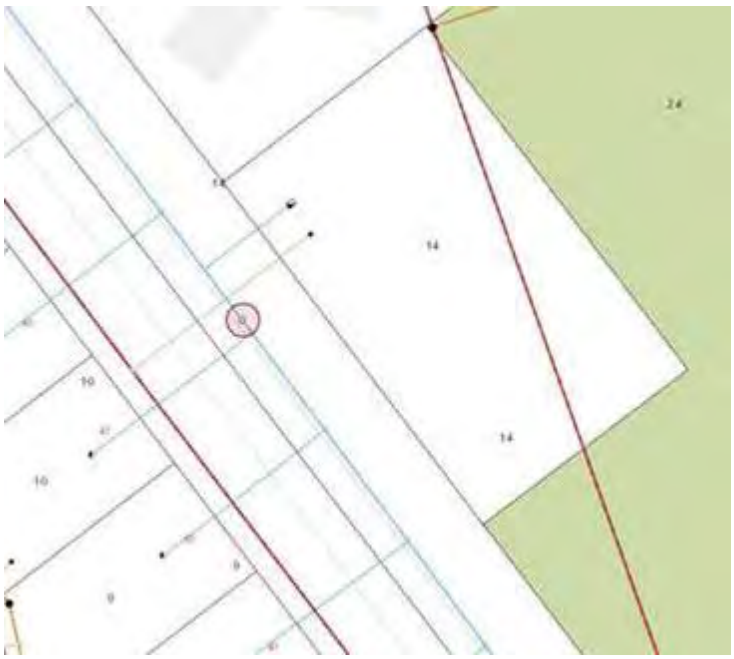
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From: Allen, Craig <Craig.Allen@iconwater.com.au>
Sent: Monday, 8 April 2019 1:39 PM
To: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Cc: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: RE: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 08 Apr 2019 14:31]

Hi Rakulan,

Please find below pressure enquiry for the location shown circled in red below. Also please be aware of the Icon Water Building Approval Guides when considering development in close proximity to the DN375 trunk sewer through the site.



The following assumptions are used for the analysis:

1. ***The pressure is calculated with service reservoirs at half capacity and an allowance for reservoir outlet losses of 1.5 m.***
2. ***AWSSS design peak flow is considered in this analysis.***
3. ***The model contains identified unlined mains.***

Location as marked above	Wattle Street (Elevation = 568m)
Max Static Pressure (m)	78

Min Pr @ Peak Demand	27
Min Pr @ Peak Demand + 10 L/s (m)	25
Min Pr @ Peak Demand + 20 L/s (m)	24
Min Pr @ Peak Demand + 30 L/s (m)	22
Min Pr @ Peak Demand + 40 L/s (m)	20
Min Pr @ Peak Demand + 50 L/s (m)	17
Min Pr @ Peak Demand + 60 L/s (m)	14

Disclaimer
1. The above water supply pressure information ("Information") has been calculated using data provided by third parties and/ or Icon Water, which is then subject to mathematical modelling. The modelling endeavours to take into account future water demand patterns and future infrastructure development of adjoining areas.
2. You acknowledge the scope for errors in the data used by Icon Water in determining the Information.
3. Whilst Icon Water has used reasonable endeavours in determining the Information, Icon Water does not make any warranty as to its accuracy.
4. Icon Water accepts no liability for loss or liability arising from reliance on the Information.

Kind Regards,

Craig Allen
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

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From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Monday, 1 April 2019 5:43 PM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: Re: ICON Water Service Capacity Advice - Block 14 Section 41 Lyneham

Good Afternoon,

Cardno has been engaged by EPSDD to prepare a Site Investigation Report (SIR) for a proposed development on Block 14, Section 41 Lyneham.

As such we would like to submit a pressure inquiry at the location indicated on the attached DBYD Plan. Please also refer to the image below for the extent of the subject site.



Thank you for your assistance with this matter. If you have any queries please do not hesitate to contact me.

Have a nice day.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com
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From: Geo Spatial Info
To: Rakulan Ganeshananthan
Subject: RE: ICON Water WAE Information Request - Block 14, Section 41 Lyneham [Filed 05 Apr 2019 17:14]
Date: Friday, 5 April 2019 5:05:37 PM
Attachments: image003.png
image004.png
image005.png
image006.png
image007.png
image008.png
Lyneham_S41blk14.pdf

Rakulan

Information as requested. You will note that there is a 375mm sewer trunk main bisecting the block.

Regards

Kieran

Kieran O'Shannassy
Asset Information Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 61806056
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Tuesday, 2 April 2019 8:35 AM
To: Geo Spatial Info <geospatialinfo@iconwater.com.au>
Subject: ICON Water WAE Information Request - Block 14, Section 41 Lyneham

Good Morning,

Cardno has been engaged by EPSDD to prepare a Site Investigation Report (SIR) for a proposed development on Block 14, Section 41 Lyneham.

As such we require WAE information of ICON Water assets for the following sites. Please refer to the image below, 'Red Dashed Lines' represent the subject site's boundaries.

Can you please provide WAE information?



Thank you for the assistance with this matter. If you have any queries please do not hesitate to contact me.
Have a nice day.
Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Cardno

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

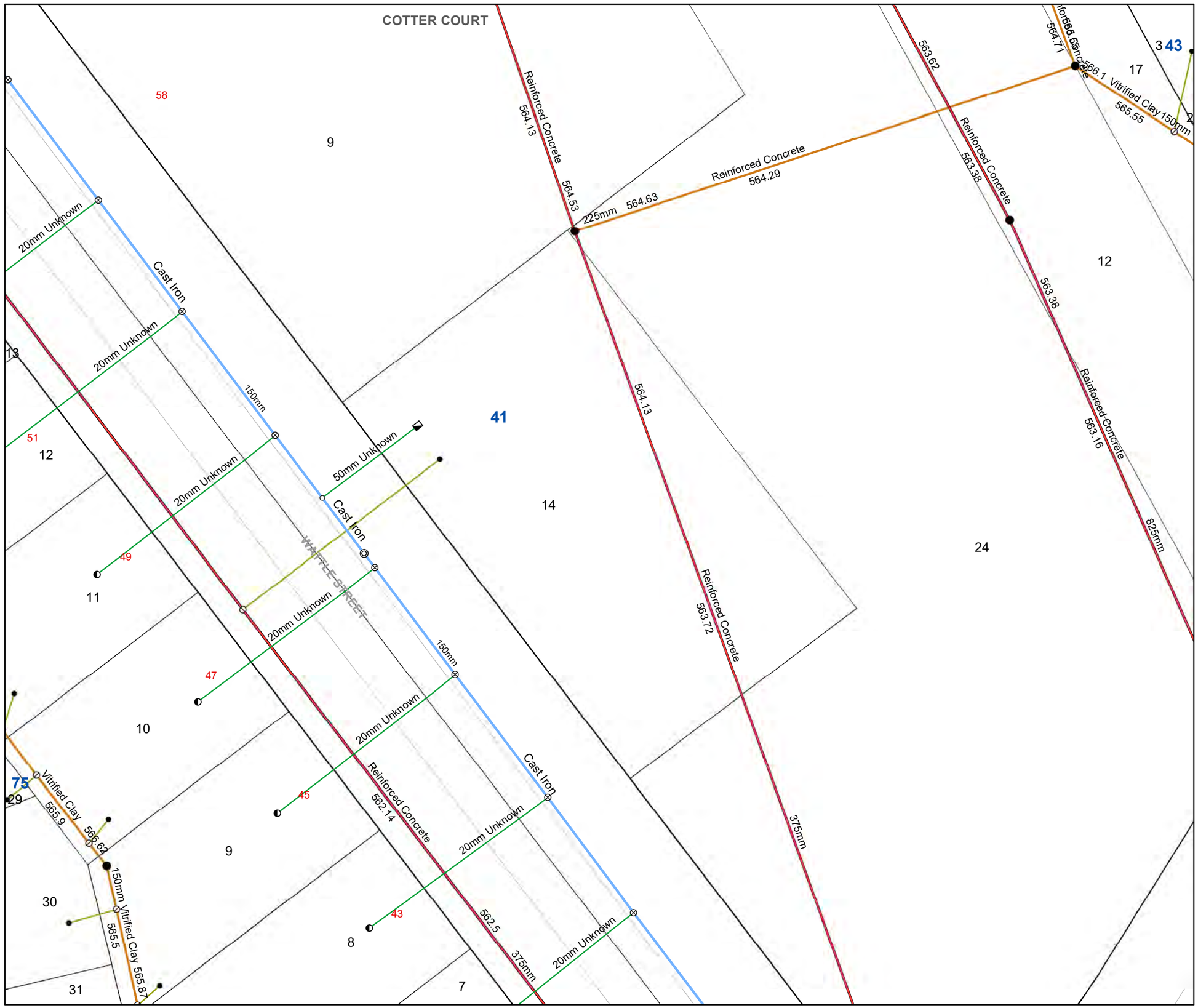
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Icon Water Water Network

LYNEHAM
SECTION 41 BLOCK 41

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completeness of the information
is provided. No liability
for any loss or damage arising
from the use of this information
will be accepted.
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& Sustainable Development
Directorate.
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NSW Cadastre © Land and
Property Information
(A division of the Department of
Finance and Services) 2019.

N
W E
S

1 centimeter = 5 meters

1:500

0 3.5 7 14 21 28 M

icon WATER

ArcMap Template: T:\Mapping\ArcMAPTemplates\Water\WaterA3Landscape.mxd

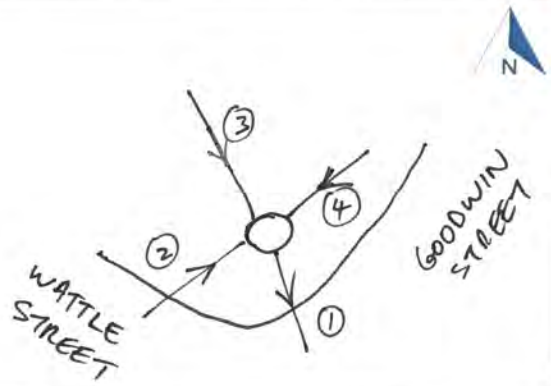
Cardno
Shaping the Future

SW/SEWER BOOKING SHEET

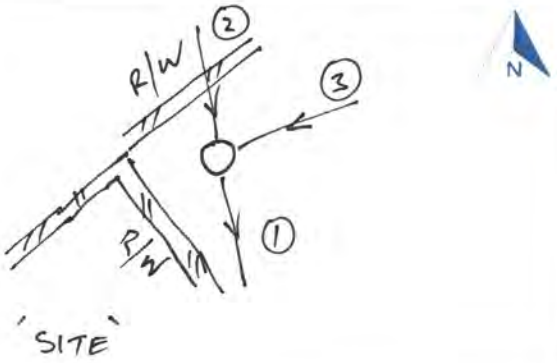
PROJECT: 50519072

DATE: 17/10/2019

PIT No.	1	SERVICE	SEWER	PIT TYPE	SMH
PIPE No.	US or DS END OF PIPE	INVERT	DIAMETER	DIRECTION (MAGNETIC)	DIAGRAM
1	US	4.02	ϕ450	185°	
2	DS	≈3.8	ϕ150	≈230°	
3	DS	4.00	ϕ450	330°	
4	DS	UNKNOWN	UNKNOWN	60°	
	DS				
	DS				



PIT No.	2	SERVICE	SEWER	PIT TYPE	SMH
PIPE No.	US or DS END OF PIPE	INVERT	DIAMETER	DIRECTION (MAGNETIC)	DIAGRAM
1	US	3.60	ϕ450	150°	
2	DS	3.58	ϕ450	330°	
3	DS	≈3.5	ϕ225	40°	
	DS				
	DS				
	DS				



PIT No.		SERVICE		PIT TYPE	
PIPE No.	US or DS END OF PIPE	INVERT	DIAMETER	DIRECTION (MAGNETIC)	DIAGRAM
	US				
	DS				
	DS				
	DS				
	DS				
	DS				



FIELD PARTY: CL

SHEET 1 OF 1

PIT TYPES: QS, QS+, R, 2R, 3R, 4R, SWMH (SW MANHOLE), SMH (SEWER MANHOLE)

NOTE: FIRST PIPE RECORD IS DOWNSTREAM PIPE, WHICH IS UPSTREAM (US) END

≈ = APPROXIMATE

From:	Network Connection Advice
To:	Rakulan Ganeshananthan
Subject:	RE: Request for Electrical Service Capacity Advice - Block 14 Section 41 Lyneham
Date:	Wednesday, 3 April 2019 1:25:14 PM
Attachments:	image002.png image003.png image004.png image005.png

Hi Rakulan,

Thank you for below email. As the development information is indicative only, I can confirm that the LV supply up to 45 units will be considered under an application for electricity network connection or alteration.

Further advice can be provided at the detail design stage of the development.

Regards

Kedar

From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Wednesday, 3 April 2019 12:18 PM
To: Network Connection Advice <Network.ConnectionAdvice@evoenergy.com.au>
Subject: RE: Request for Electrical Service Capacity Advice - Block 14 Section 41 Lyneham

Hi Kedar,

Thank you for the quick response.

The proposed development is indicative only and is subject to change, as the site investigation is a study of opportunities and constraints. The proposed development for time being is considered to be 45 dwellings and full context of development is yet to be detailed. Can we base it on similar developments which evo energy services.

Thank you for your help with this requests.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Cardno

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

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From: Network Connection Advice <Network.ConnectionAdvice@evoenergy.com.au>
Sent: Wednesday, 3 April 2019 9:58 AM
To: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Subject: RE: Request for Electrical Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 03 Apr 2019 11:07]

Hi Rakulan,

Thank you for below email. Could you please provide breakdown of 45 dwellings (single/two or three bedroom) and below information please so I can come back to you asap, thank you

- Electrical maximum demand as per AS/NZS 3000:2007 (Table C1 if Residential)
- Basement carpark area
- Details of Hot Water System – Gas or Electric Instantaneous type?
- Details of Embedded Generation/PV Solar Installations if any

Regards

Kedar

From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Tuesday, 2 April 2019 3:41 PM
To: Network Connection Advice <Network.ConnectionAdvice@evoenergy.com.au>
Subject: Request for Electrical Service Capacity Advice - Block 14 Section 41 Lyneham

Good Afternoon Kedar,
I'm writing to request preliminary electrical service capacity advice for a proposed four storey, 45 dwelling, residential development on Block 14 Section 41 Lyneham (Wattle Street, Lyneham).

Please refer to the images below for site location and attached DBYD.



As part of this investigation, we are required to propose site servicing and identify any constraints.

Could you please confirm the following information in regards to the above:

- &#0;. Whether there is capacity in the existing Evoenergy's network to service the proposed development, noting a maximum demand estimation was not able to be completed, would you please provide advice based on similar developments currently serviced by Evonergy?
- &#0;. Spare capacity at the most likely service connection point
- &#0;. Preliminary connection strategy (route, locations, method etc)
- &#0;. Electrical infrastructure requirements/constraints for the site

Thank you for your help with this requests.
Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Cardno

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

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From: Steve Donnelly
To: Rakulan Ganeshananthan
Subject: RE: Request for Gas Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 03 Apr 2019 09:11]
Date: Wednesday, 3 April 2019 9:09:22 AM
Attachments: image001.png
image011.png
image012.png
image013.png
image014.png

Hi Rakulan

The existing 40mm PE (210kPa) gas main in Wattle Street has sufficient capacity to supply a development of the proposed type and size. The new building can be connected from any point along the main passing the block.

Regards

Steve Donnelly
Network Development Manager
Jemena
Unit 1, 5-7 Johns Place, Hume, ACT 2620
(02) 6192 6270 | 0427 401 803
steve.donnelly@jemena.com.au | www.jemena.com.au

Jemena
bringing energy to life



From: Rakulan Ganeshananthan <rakulan.ganeshananthan@cardno.com.au>
Sent: Tuesday, 2 April 2019 4:14 PM
To: Steve Donnelly <Steve.Donnelly@jemena.com.au>
Subject: Request for Gas Service Capacity Advice - Block 14 Section 41 Lyneham

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Good Afternoon Steve,

Cardno has been engaged by EPSDD to prepare a Site Investigation Report (SIR) for a proposed development of four storey 45 dwellings on Block 14 Section 41 Lyneham, (Wattle Street Lyneham ACT). I'm writing to request preliminary Gas service capacity advice for the subject site.

Please refer to the image below for the site location and the attached DBYD enquiry.



As part of this investigation we are required to propose site servicing and identify any constraints.

Could you please confirm the following information in regard to the above:

- Whether there is capacity to service the proposed development
- Preliminary connection strategy (route, locations, method etc)
- Gas infrastructure requirements/constraints for the site

Thank you for your help with this requests.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER
CARDNO

Cardno

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

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****

From:	Weir, Glenn R
To:	Rakulan Ganeshananthan
Subject:	RE: Request for Telstra Service Capacity Advice - Block 14 Section 41 Lyneham [Filed 03 Apr 2019 14:56]
Date:	Wednesday, 3 April 2019 2:46:18 PM
Attachments:	image004.png image005.png image006.png image007.png

Hi Rakulan

Please see the answers to your questions below.

- Can a Telstra connection be provided to the subject site?
- Please note that that this development falls within an NBN area. Telstra would however be able to provide a high speed data service via fibre if required.
- Is there capacity in the existing Telstra network?
- There is network capacity opposite the development in Wattle St.
- Any requirements for network connection upgrade or relocation.
- Telstra would require a leadin conduit coming from Wattle St for our exclusive use to connect a high speed data service.

  You would need to deal with our Network Integrity group for any required plant relocations, contact details below.

  New project requests can be lodged with 1800 810 443 or on-line via https://say.telstra.com.au/customer/general/forms/request-asset-relocation-or-commercial-works

  Damage to Telstra property must be reported to 132 203 or on-line viahttps://say.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment

  Dial 1100 Before You Dig Network Integrity: Working with the civil construction industry to prevent damage to Telstra's underground assets

- Any requirements for the maintenance of existing and proposed Telstra network.
- Telstra would require 24 Hr access to network plant for maintenance purposes.

Regards
Glenn Weir
Fundamental Planning NSW/ACT – Planner
Access & Network Facilities Engineering
Networks & IT, Telstra
P 02 8576 9797 | E Glenn.R.Weir@team.telstra.com | W www.telstra.com

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sender of its incorrect delivery, and then delete both it and your reply.

From: Rakulan Ganeshananthan [mailto:rakulan.ganeshananthan@cardno.com.au]
Sent: Tuesday, 2 April 2019 4:00 PM
To: ! Access Planning NSW/ACT <F1107974@team.telstra.com>
Cc: Weir, Glenn R <Glenn.R.Weir@team.telstra.com>
Subject: Request for Telstra Service Capacity Advice - Block 14 Section 41 Lyneham

Good Afternoon,

Cardno has been engaged by EPSDD to prepare a Site Investigation Report (SIR) for a proposed development of four storey 45 dwellings residential development on Block 14 Section 41, Lyneham (Wattle Street, Lyneham ACT). I'm writing to request preliminary Telstra service capacity advice for the subject site.

Please refer to the image below for site location and attached DBYD.



As part of this investigation, we are required to propose site servicing and identify any constraints.

Could you please confirm the following information in regard to the above:

- Is the current Telstra connection for the subject site sufficient?
- Is there capacity in the existing Telstra network?
- Any requirements for network connection upgrade or relocation.
- Any requirements for the maintenance of existing and proposed Telstra network.

Thank you for your help with this requests.

Kind Regards,

Rakulan Ganeshananthan
GRADUATE ENGINEER

CARDNO

Phone Direct +61 2 6112 4509
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email rakulan.ganeshananthan@cardno.com.au Web www.cardno.com
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Job No 15953565

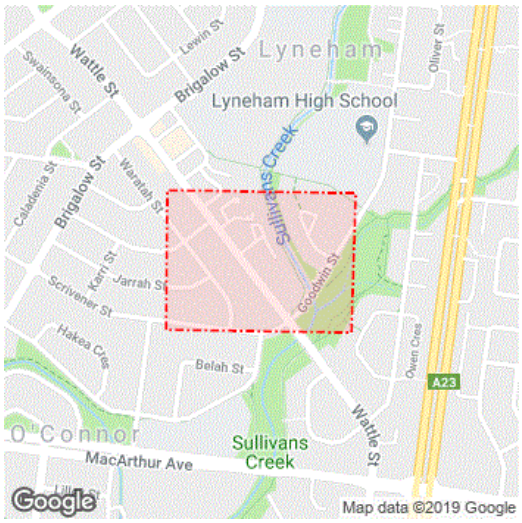
Phone: 1100
www.1100.com.au

Caller Details

Contact:	Mr Andrew Grisinger	**Caller Id:**	1925996	**Phone:**	0488375355
Company:	Cardno	**Mobile:**	Not Supplied	**Fax:**	Not Supplied
Address:	Level 2 14 Wormald Street Symonston ACT 2609	**Email:**	andrew.grisinger2@cardno.com.au		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.



User Reference: B14 S41 Lyneham
Working on Behalf of: Private

Enquiry Date:	Start Date:	End Date:
19/03/2019	21/03/2019	31/03/2019

Address:
Scrivener Street
O'Connor ACT 2602

Job Purpose:	Onsite Activity:
Excavation	Mechanical Excavation
Location of Workplace:	**Location in Road:**
Private Property	Not Supplied

- Check the location of the dig site is correct. If not submit a new enquiry.
- If the scope of works change, or plan validity dates expire, resubmit your enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:
Not Supplied

Your Responsibilities and Duty of Care

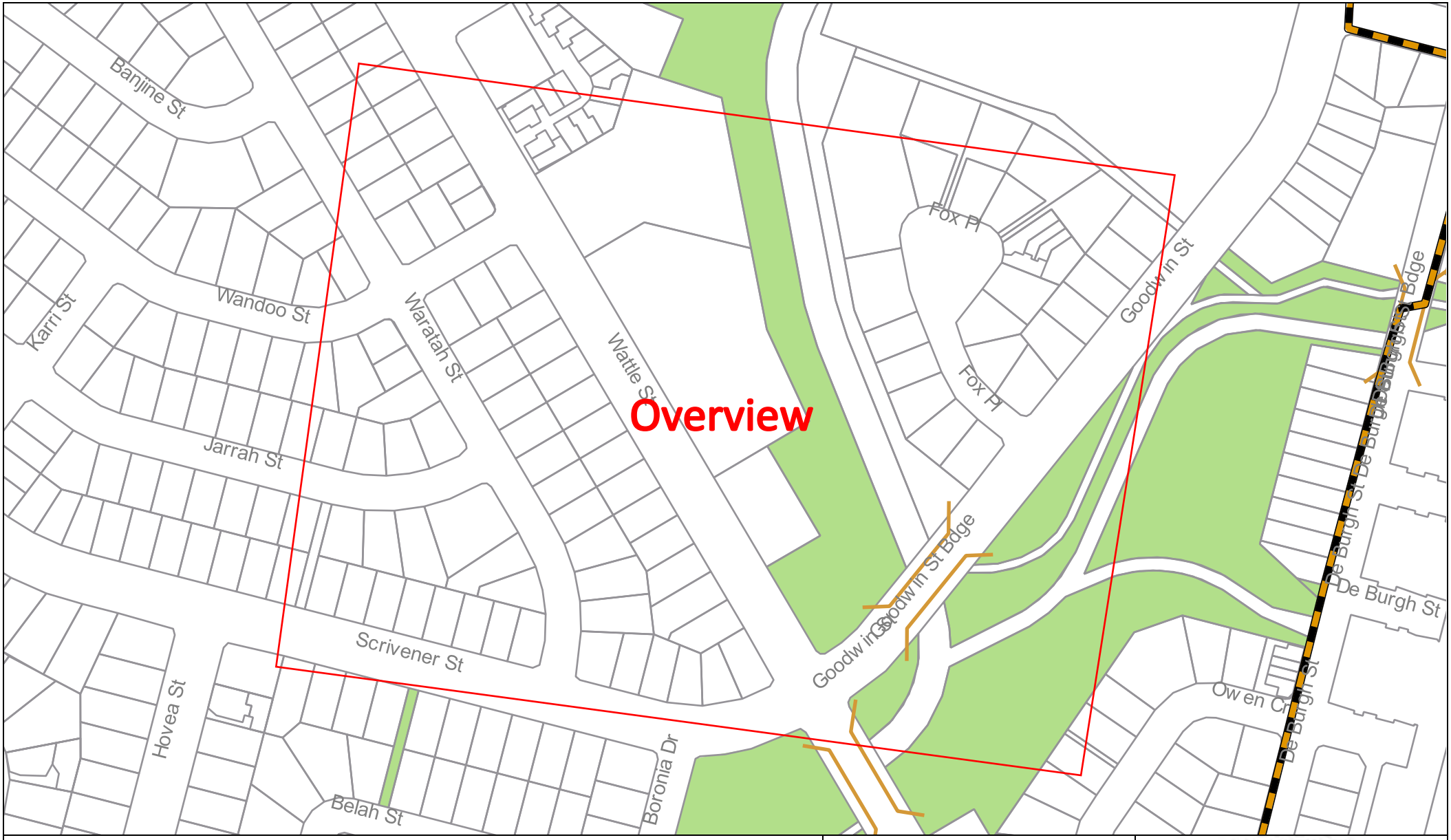
- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days.
Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
81368472	Department of Finance	0262263869	NOTIFIED
81368477	Evoenergy/Icon Water	0262935770	NOTIFIED
81368478	NBN Co, NswAct	1800626762	NOTIFIED
81368474	Nextgen, NCC - NSW	1800032532	NOTIFIED
81368476	Optus and/or Uecomm, Nsw	1800505777	NOTIFIED
81368475	Telstra NSW, South	1800653935	NOTIFIED
81368473	Transact Communications	0262298009	NOTIFIED
81368479	TransGrid	0296200422	NOTIFIED
81368480	Transport Canberra and City Services	0278013960	NOTIFIED

END OF UTILITIES LIST



Sequence Number: 81368474

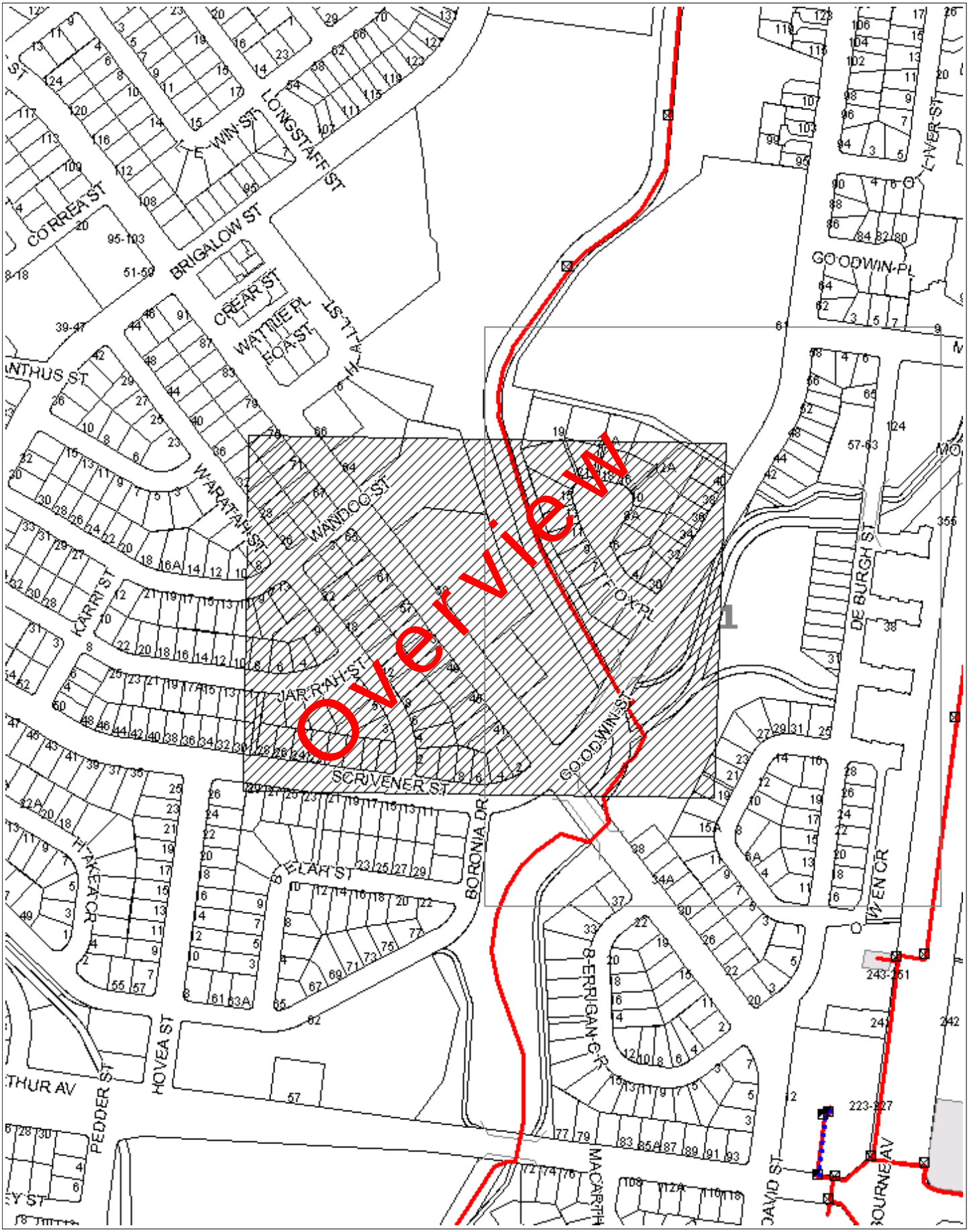
Date: 19/03/2019

DISCLAIMER: THIS DRAWING SHOULD NOT BE SCALED TO LOCATE CABLES. NO WARRANTY IS GIVEN THAT THE INFORMATION IS ACCURATE OR COMPLETE. IF YOU REQUIRE INFORMATION REGARDING LOCATING THE CABLE PLEASE CALL NEXTGEN. THIS DOCUMENT HAS BEEN PREPARED SOLELY FOR DIAL BEFORE YOU DIG USE. THIS PLAN CONTAINS COMMERCIALLY SENSITIVE INFORMATION AND IS TO BE TREATED ACCORDINGLY. NO SUCH INFORMATION IS TO BE PASSED ONTO OTHER PARTIES WITHOUT WRITTEN CONSENT FROM NEXTGEN PTY LTD.

nextgen GROUP

LEGEND

Digsite	Assets
Area	Cable
	3rd Party Duct
	Marker Post



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Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed please raise a new enquiry.

Sequence Number: 81368476

Date Generated: 19/03/2019

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

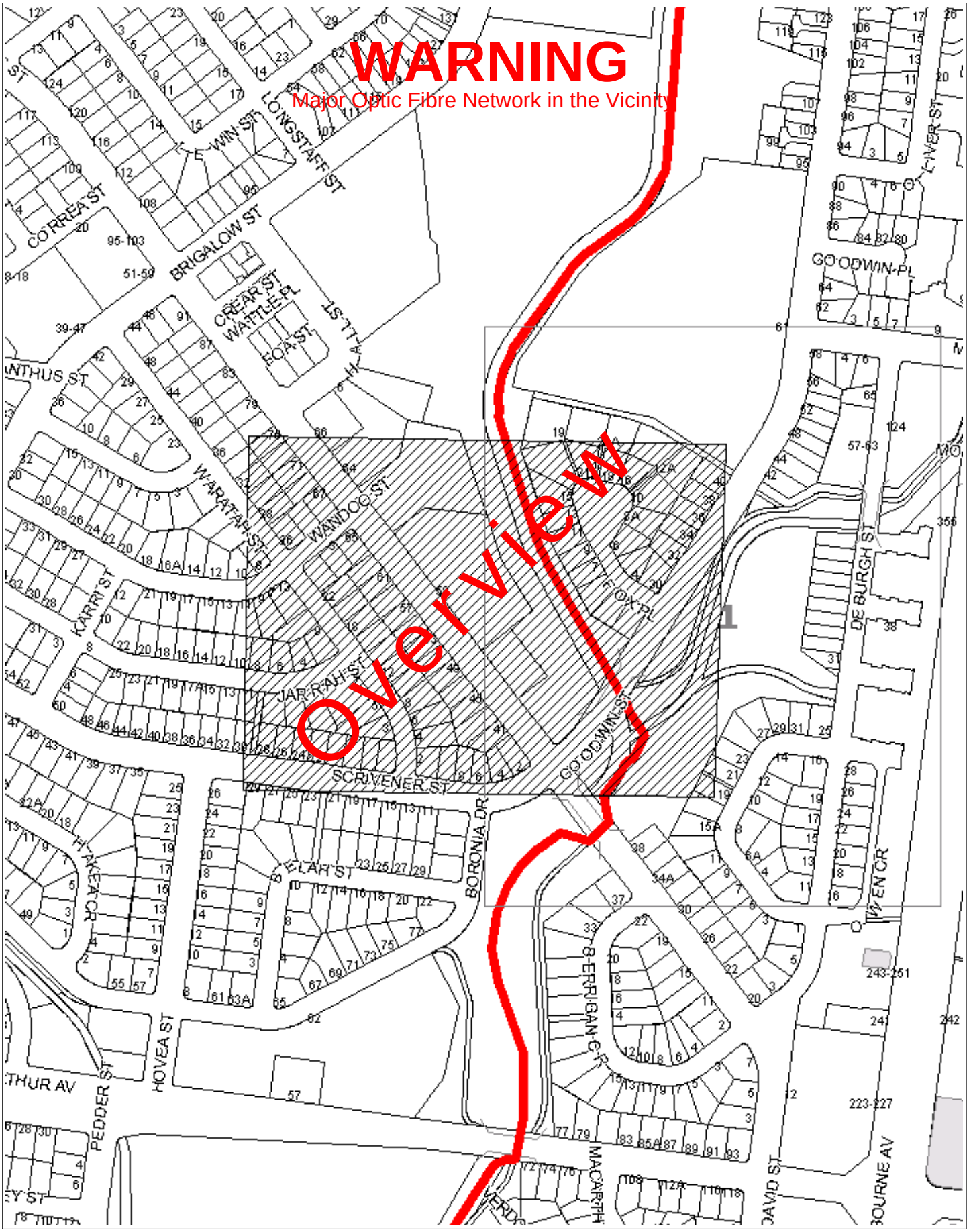


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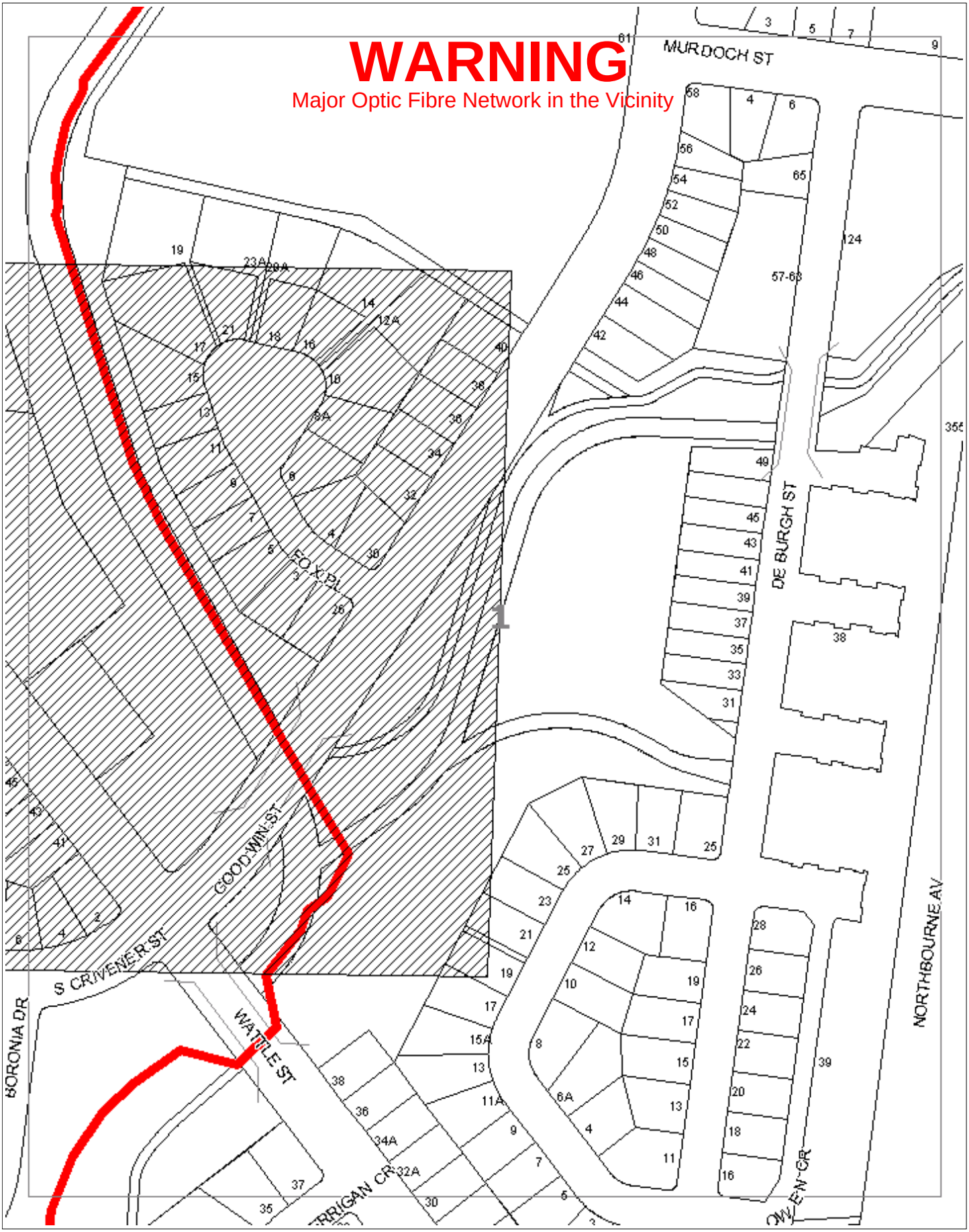
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WARNING

Major Optic Fibre Network in the Vicinity



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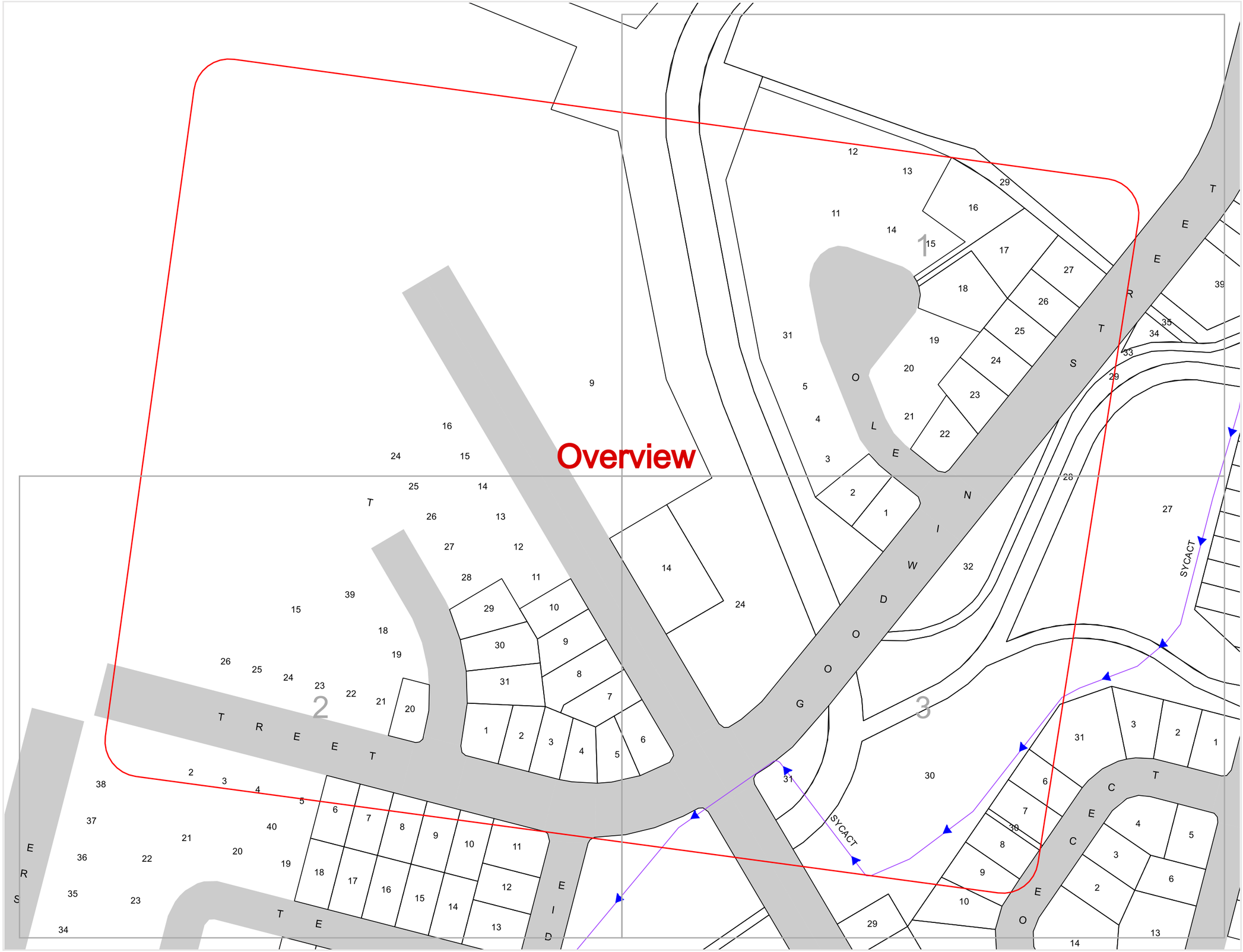
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Sequence No: 81368479

Job No: 15953565

Location: Scrivener Street, O'Connor, ACT 2602

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The Essential First Step.



Legend:

- DBYD Enquiry
- Cable Assets
- Communication Cable
- Tunnel Assets

Scale: 1:2050

N

WARNINGS

- Damage to TransGrid underground power cables could lead to serious injury or death
- Damage to TransGrid underground assets could lead to substantial costs which are recoverable under NSW legislation
- This drawing is representative of TransGrid underground assets in this area and has been provided as a part of a number of documents in response to this enquiry and must be read with those documents
- No work can commence within the vicinity of those underground assets without approval from a TransGrid representative as detailed in those documents.

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither TransGrid or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

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TransGrid

Sequence No: 81368479

Job No: 15953565

Location: Scrivener Street, O'Connor, ACT 2602

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The Essential First Step.



Legend:

- DBYD Enquiry
- Cable Assets
- Communication Cable
- Tunnel Assets

Scale: 1:1000

N

WARNINGS

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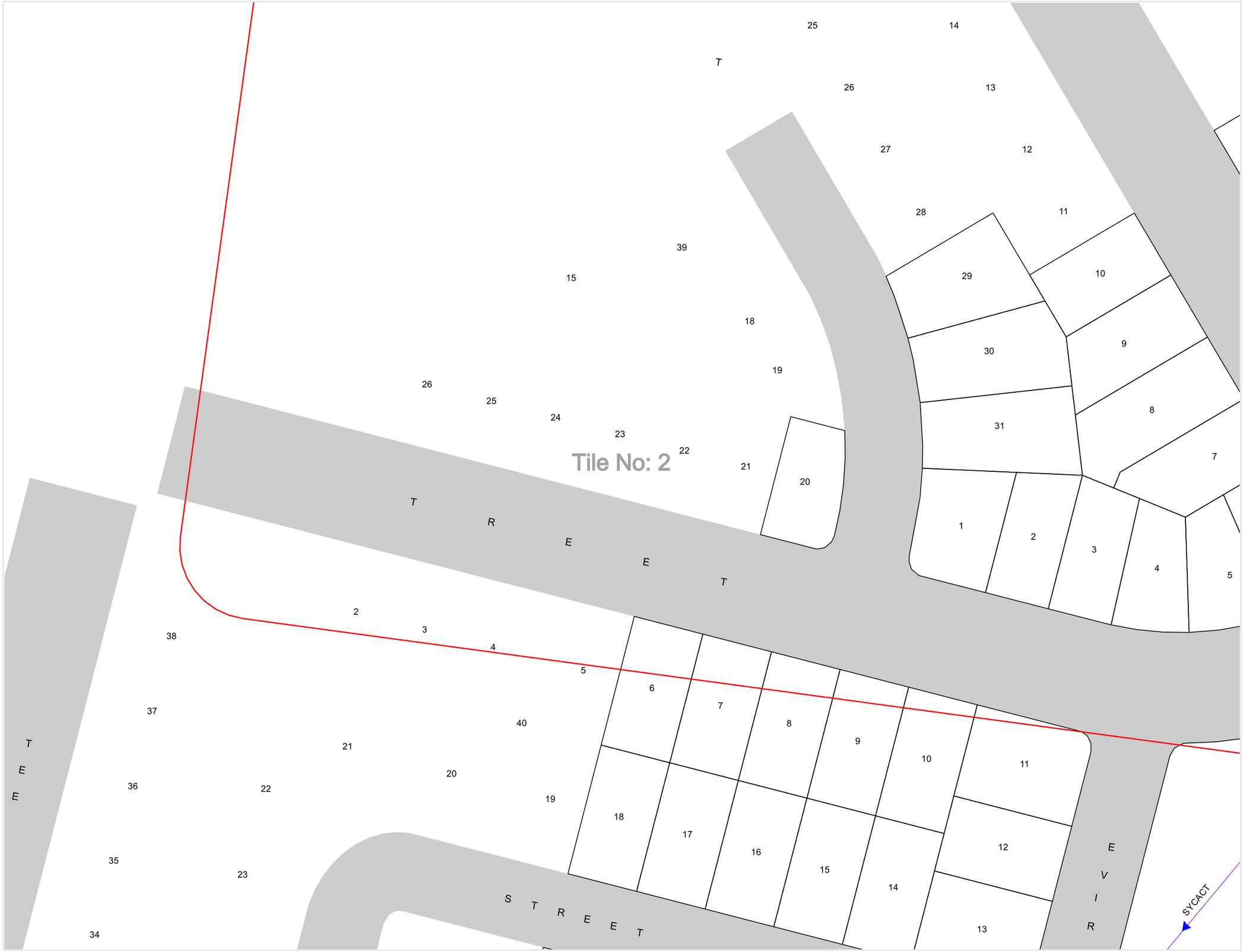
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Sequence No: 81368479

Job No: 15953565

Location: Scrivener Street, O'Connor, ACT 2602

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The Essential First Step.



Legend:

- DBYD Enquiry
- Cable Assets
- Communication Cable
- Tunnel Assets

Scale: 1:1000

N

WARNINGS

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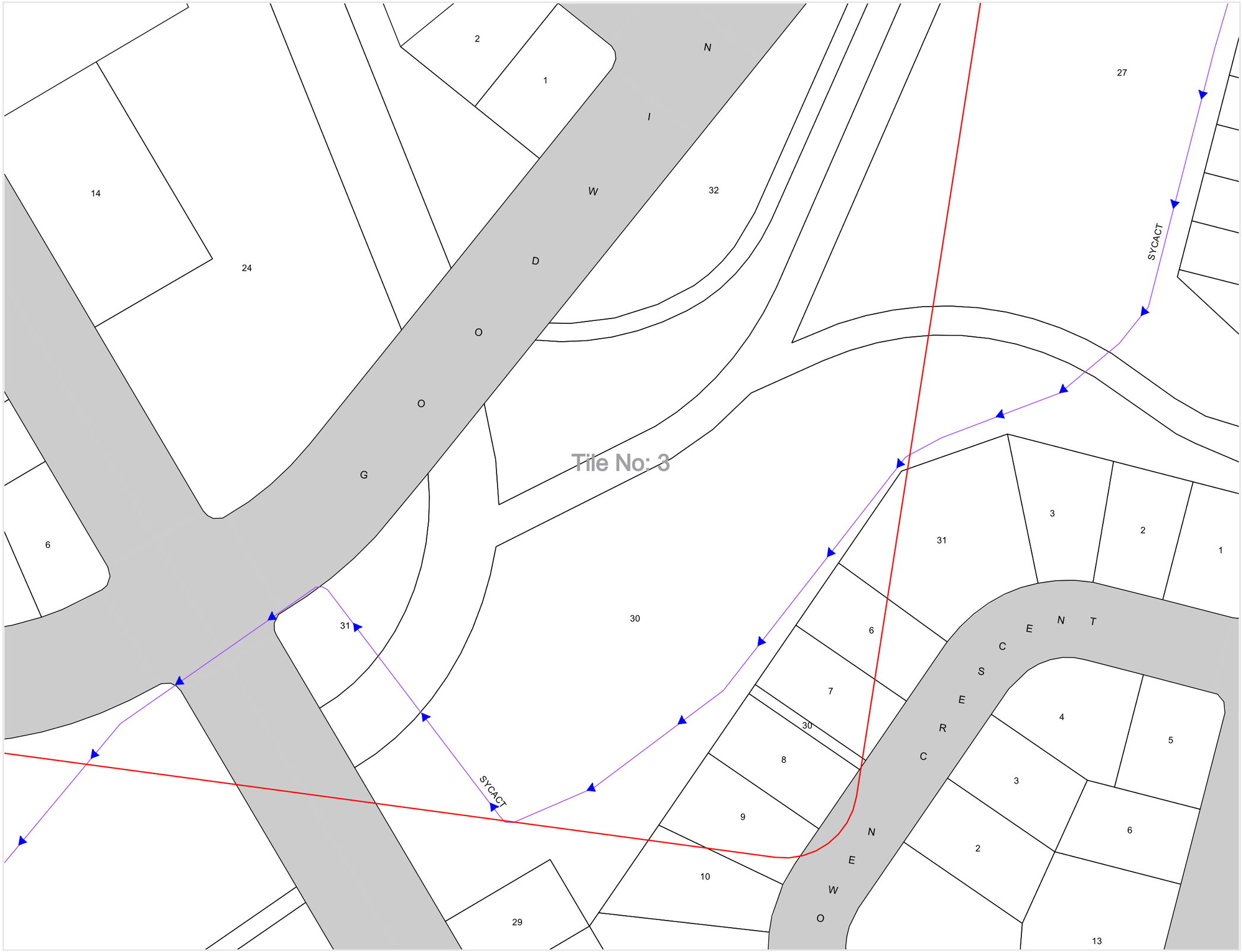
TransGrid

Sequence No: 81368479

Job No: 15953565

Location: Scrivener Street, O'Connor, ACT 2602

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The Essential First Step.



Legend:

- DBYD Enquiry
- Cable Assets
- Communication Cable
- Tunnel Assets

Scale: 1:1000

N

WARNINGS

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Evoenergy Electricity Network

Seq #: 81368477

Scrivener Street, O'Connor

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The Essential First Step

evoenergy

ACT Government
Transport Canberra and City Services

Dial Before You Dig (DBYD)
Location Information

Assets owner
Transport Canberra and City Services
GPO Box 158
Fyshwick ACT 2601

Service provider
Electrix – Omexom ACT
PO Box 218
Mitchell ACT 2911

To:
Cardno - Mr Andrew Grisinger
Level 2 14 Wormald Street
Symonston ACT 2609

Enquiry Details	
Utility ID	90520
Job Number	15953565
Sequence Number	81368480
Enquiry Date	19/03/2019 11:23
Response	**AFFECTED**
Address	Scrivener Street O'Connor
Location in Road	Not Supplied
Activity	Mechanical Excavation

Enquirer Details			
Customer ID	1925996		
Contact	Mr Andrew Grisinger		
Company	Cardno		
Email	andrew.grisinger2@cardno.com.au		
Phone	0488375355	Mobile	Not Supplied

Disclaimer

PLEASE READ ALL THE INFORMATION AND DISCLAIMERS PROVIDED ON THE ATTACHED PAGES

General location only

- The approximate location of Street Light Network assets (**the Assets**) in the nominated area are shown on the attached maps (**the Asset Plan**).
- The Asset locations provided with this response are based on the information available at the time and are only an indication of the presence of Assets within the nominated location. If the nominated area is not what you require, please resubmit another inquiry.
- The Asset Plans provided do not show the presence of any other assets, including private property assets.
- Please be aware that the location of the Assets may change to those indicated on the Asset Plan. The Asset locations shown on the attached Asset Plan are indicative only. Due to changes in surface levels and surrounding infrastructure, and works undertaken by other parties, Asset location may differ to those shown on the Asset Plan.
- *It is your responsibility to verify the location of the Assets shown on the Asset Plan through positive identification process*
- A new Asset Plan should be obtained every 28 days to ensure currency and accuracy. It is your responsibility to obtain a new Asset Plan if required.
- While every endeavour has been made to provide information that is accurate and reliable, complete accuracy cannot be guaranteed. Electrix does not represent or warrant that you or any user of the Asset Plan will achieve any particular objective or guarantee any outcome.

Limitation of Liability

To the maximum extent permitted by law, Electrix and its officers, employees, contractors and agents accept no liability and are not responsible for any actions, liabilities, losses, damages (including consequential damages), costs, claims or expenses of whatever nature and regardless of the cause of action, whether in contract, tort (including negligence) or otherwise, arising out of or in connection with or as a consequence of any inaccuracies in the Asset Plan or the use of the information contained in the Asset Plan.

Without limiting the above, Electrix and its officers, employees, contractors and agents are not responsible to any person for:

(a) The currency, accuracy or completeness of the information provided in the Asset Plan; or
(b) Any delays in respect of delivery or supply by Electrix of the information sought in connection with the location of the Assets.

To the maximum extent permitted by law, Electrix specifically excludes any conditions, terms or warranties that may be implied into, or in respect of the provision of the Asset Plan and to the extent that any such condition, term or warranty or liability cannot be excluded, Electrix's liability for breach of such implied term, condition or warranty is limited to the resupply of the Asset Plan provided by Electrix or the payment of the reasonable costs of having the Asset Plan supplied again.

Work to be carried out without interference or damage to Assets

Any work undertaken near the Assets, must be performed in a way that does not interfere with the reliability of or access to the Assets. Any work carried out that includes changing the surface level in any area where Assets are indicated must be carried out with care and you will be responsible for any damage caused through failure to exercise such care. Electrix may pursue the person or organisation responsible for causing any damage or interference to the Assets.

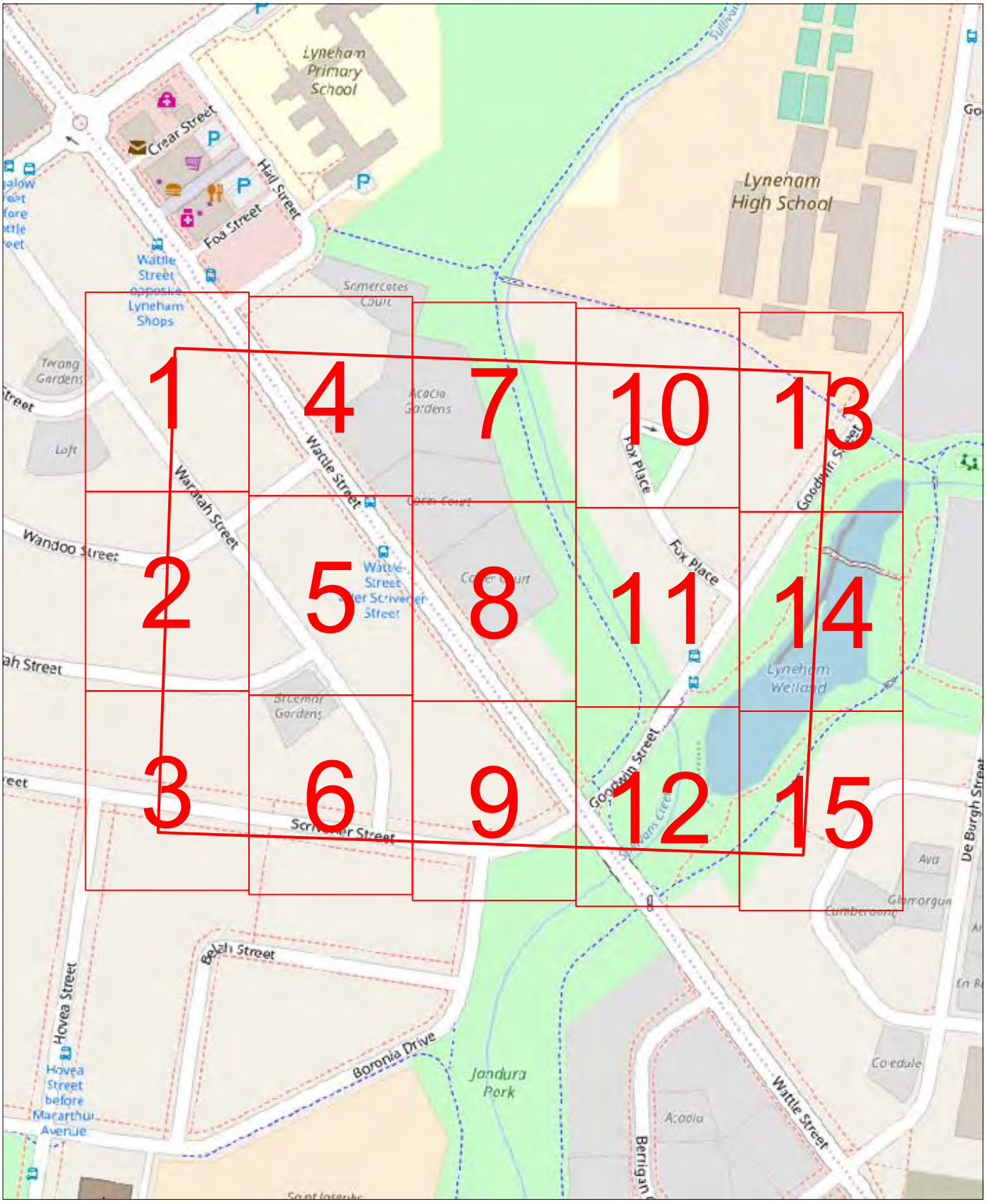
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Overview Map

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.03km

LEGEND:

1 Detail Map

Affected DBYD Work Area

Powered by dbyd x-info

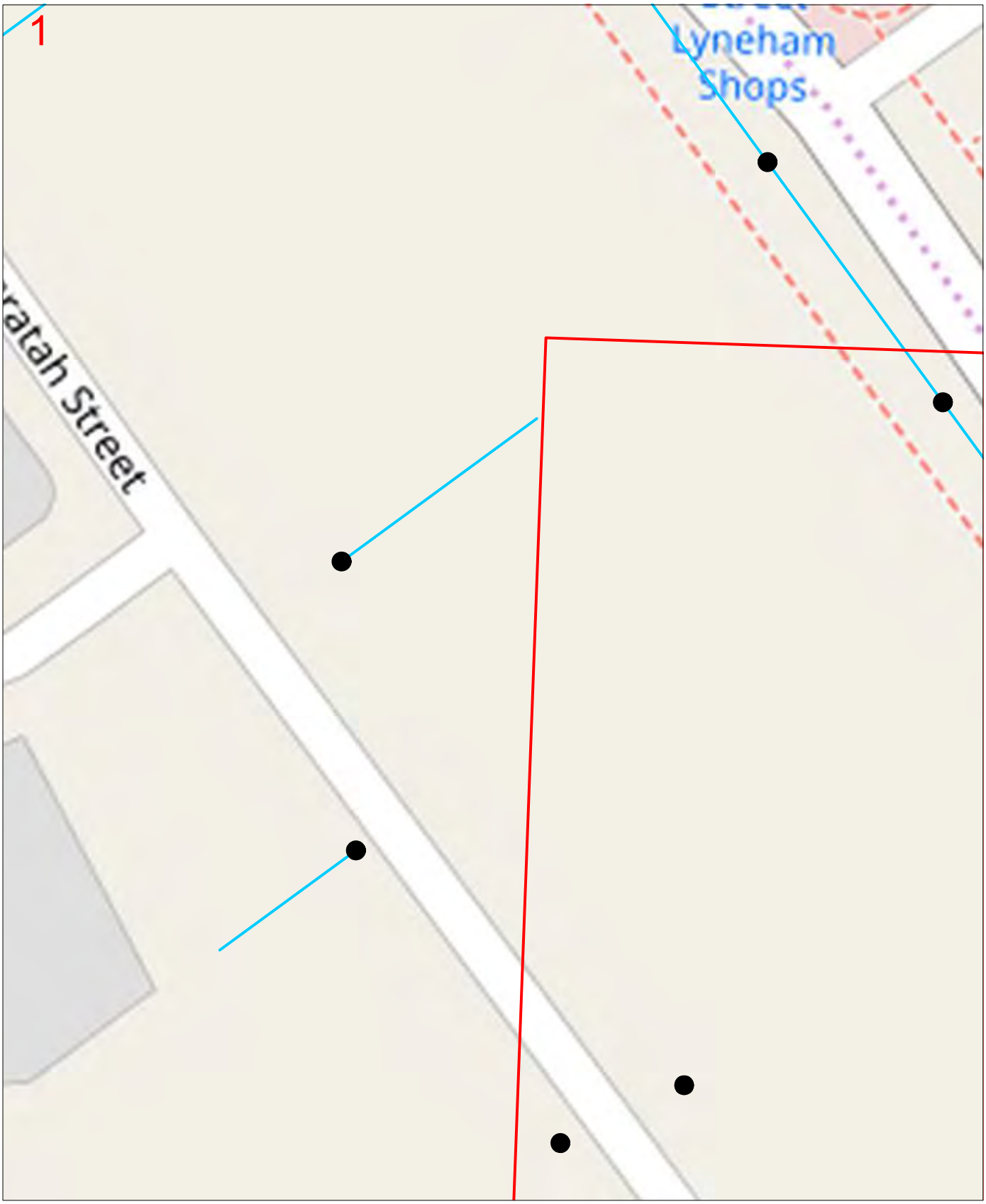
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 1

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

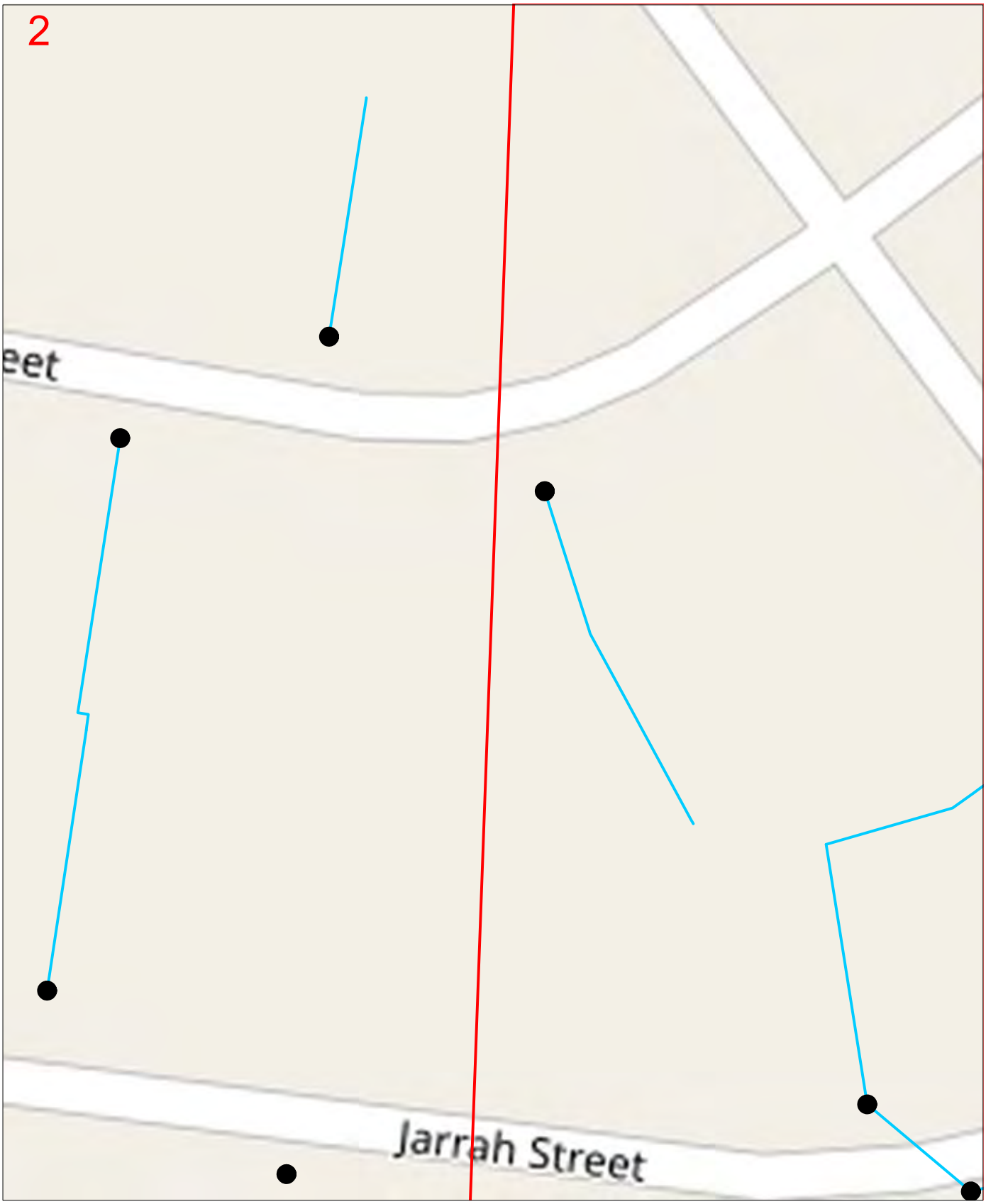
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 2

Sequence No: 81368480

Scrivener Street O'Connor



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Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

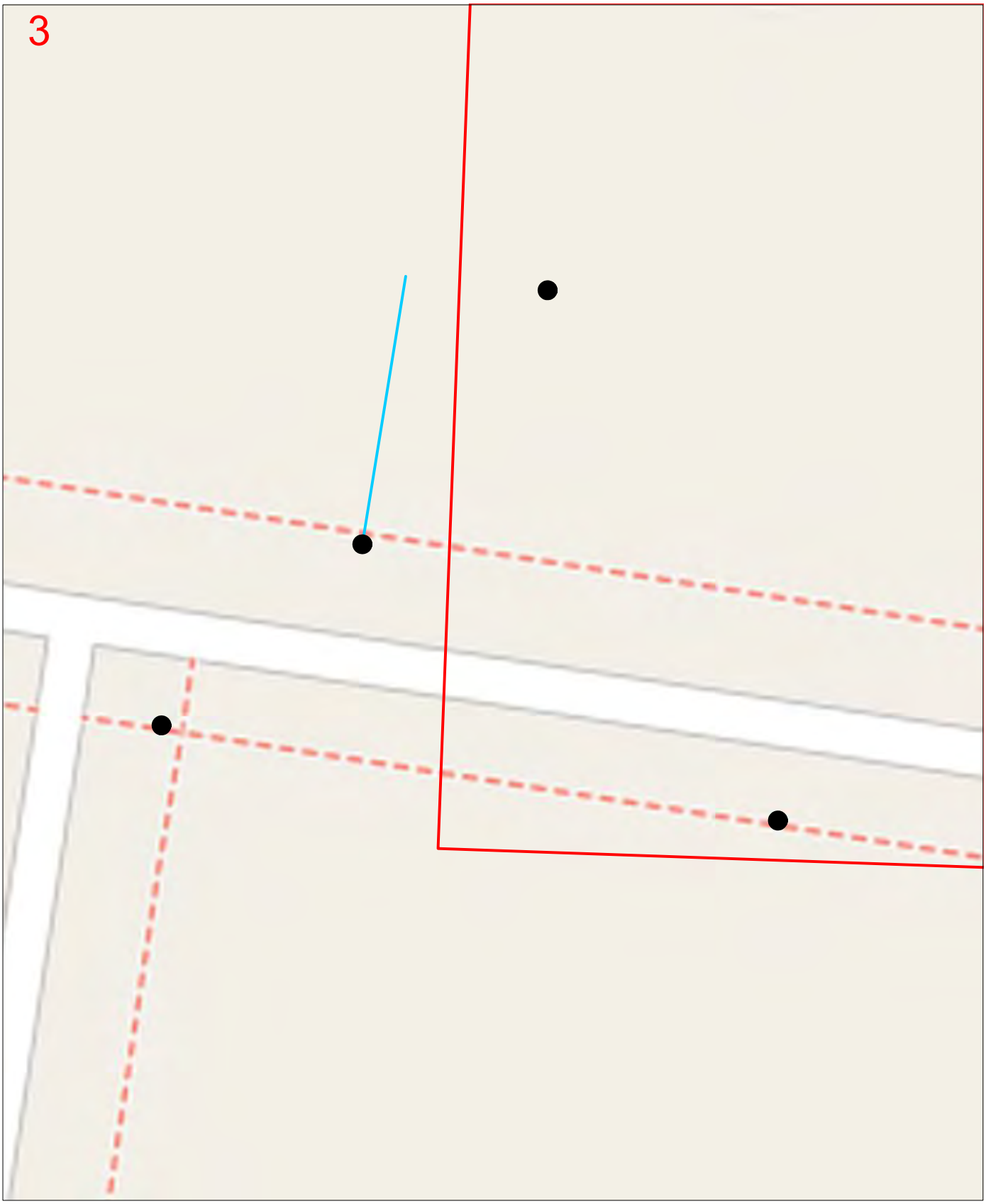
Date: 19/03/2019

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Map 3

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

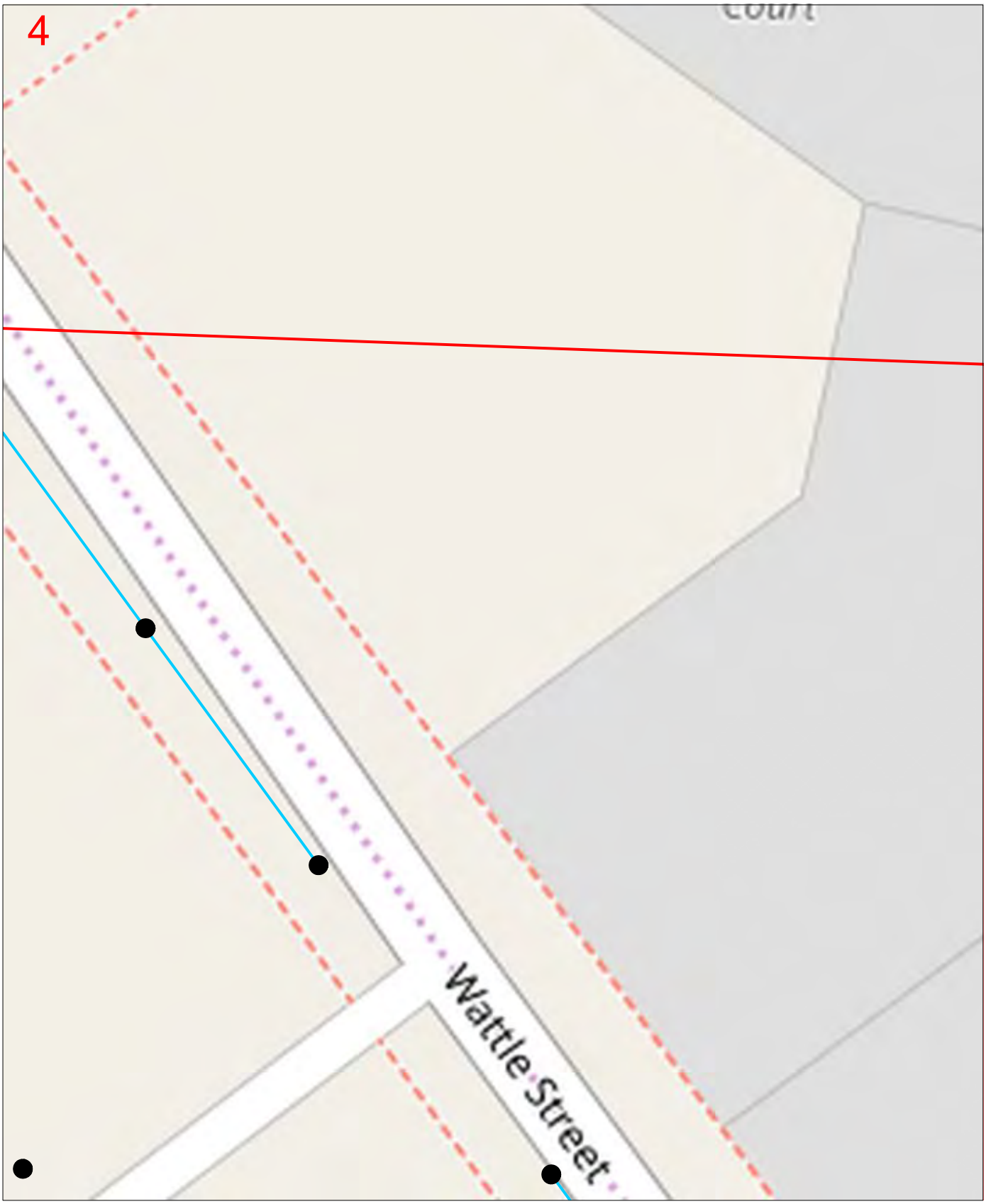
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 4

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

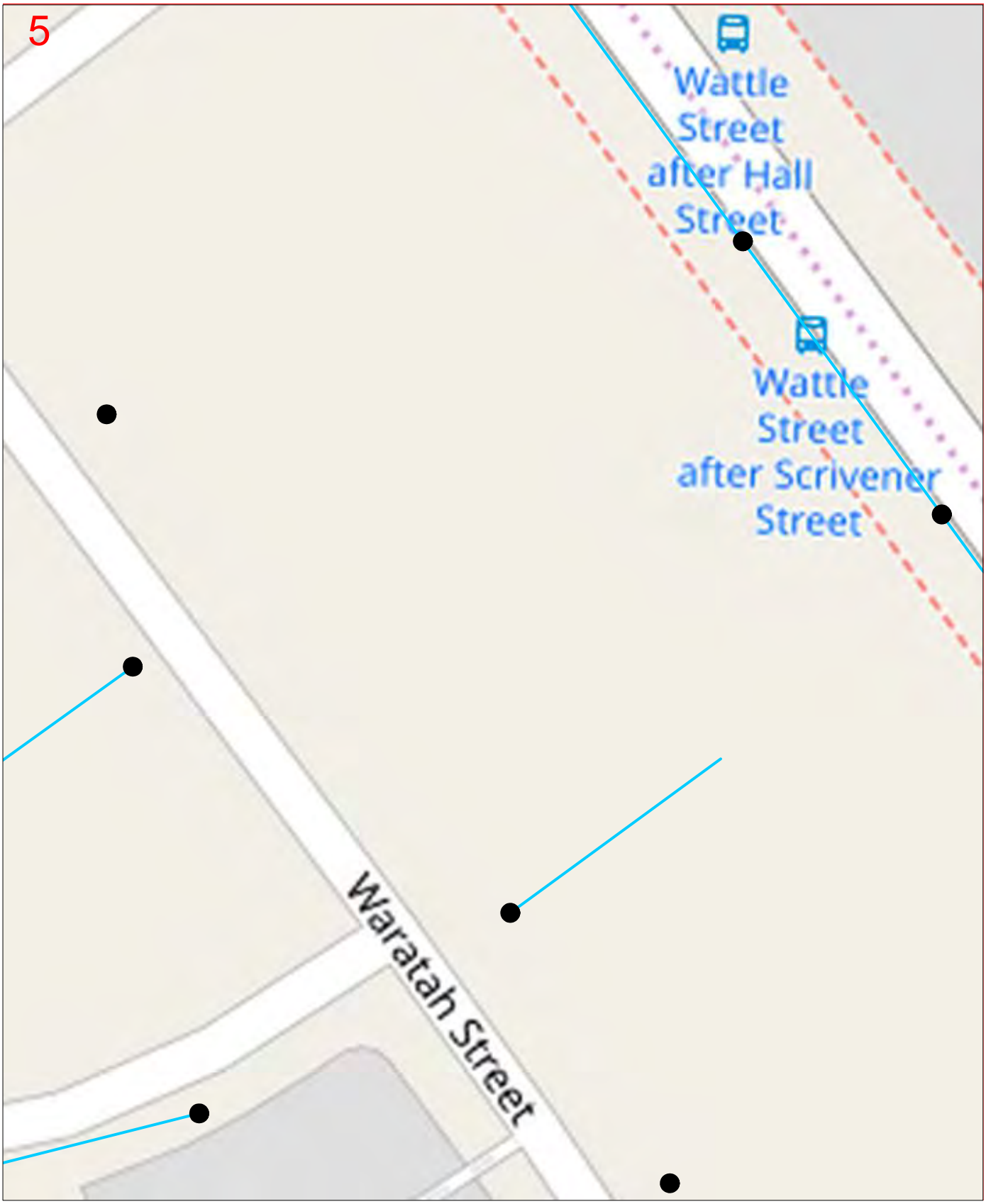
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 5

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

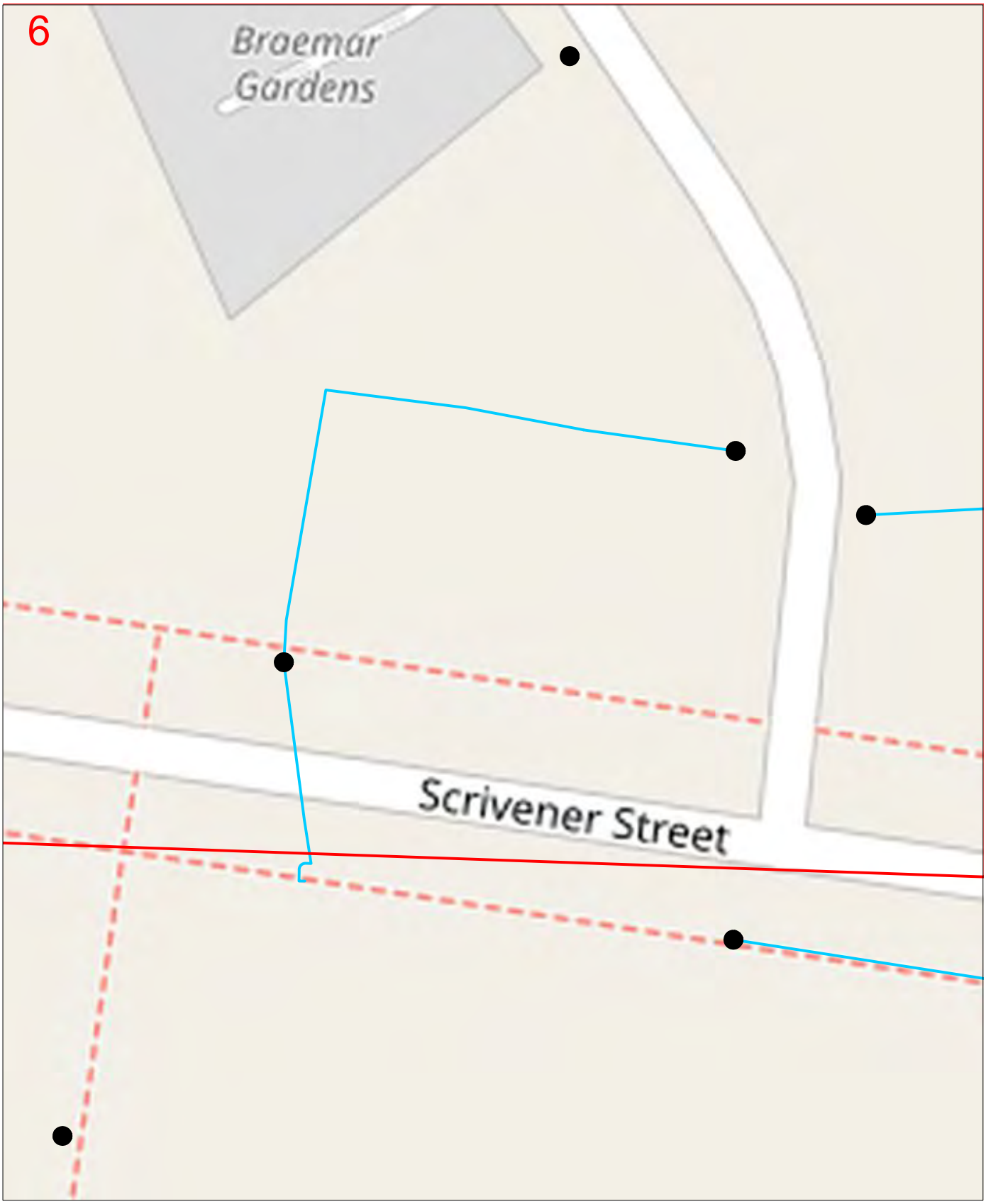
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 6

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 7

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

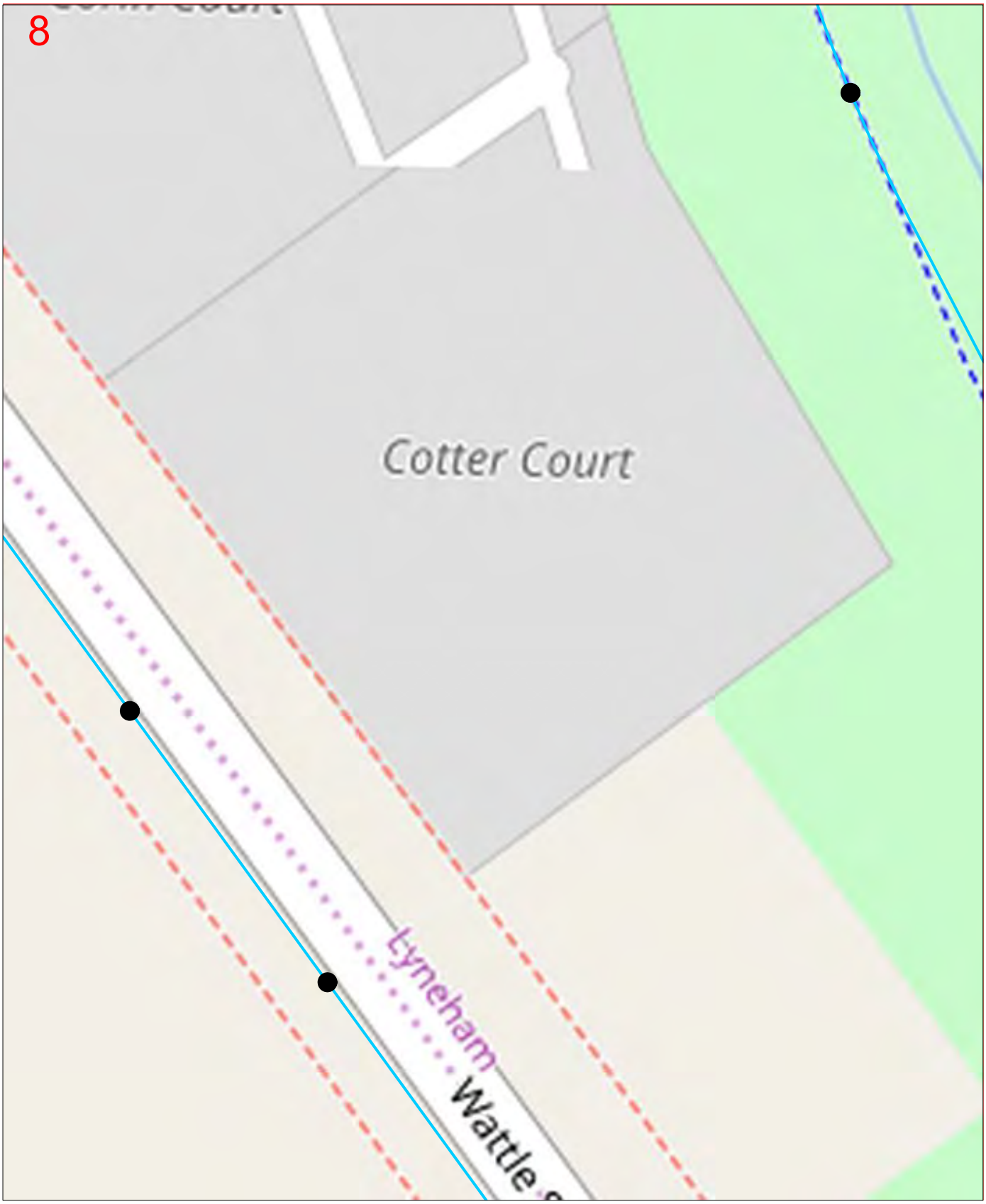
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 8

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

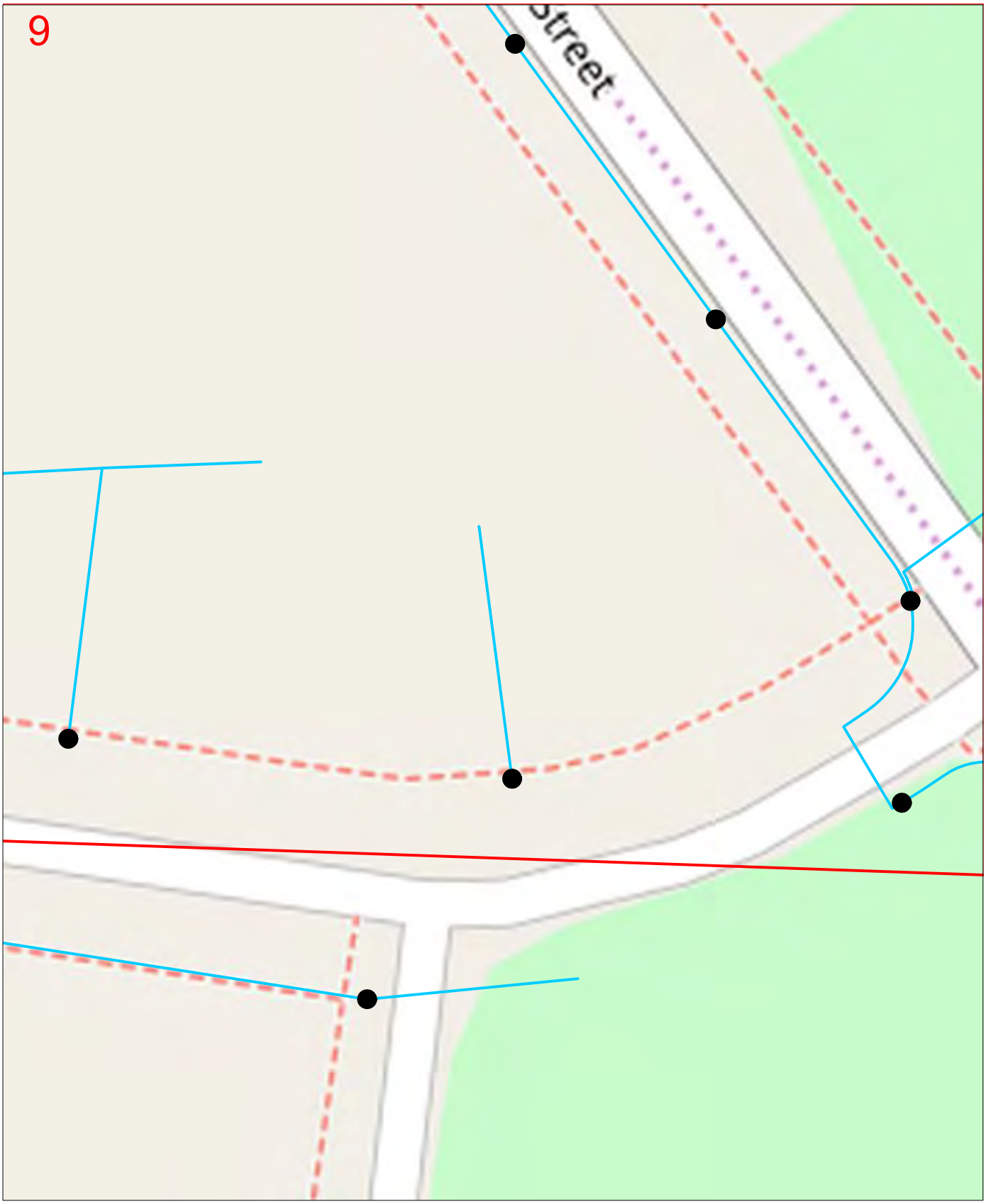
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 9

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 10

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

ACT Government
Transport Canberra and City Services

Map 11

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 12

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

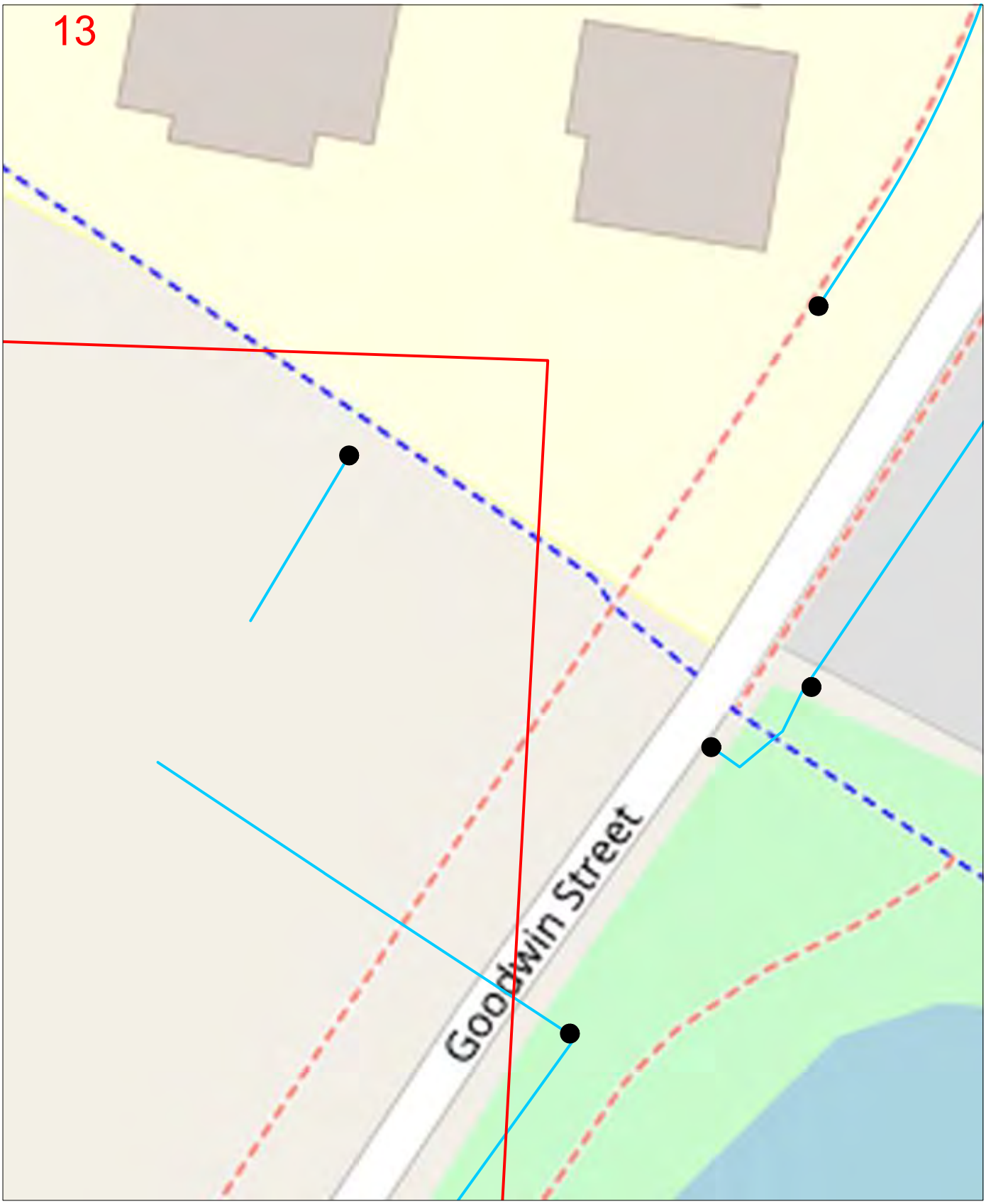
Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 13

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

Powered by x-info dbyd

Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 14

Sequence No: 81368480

Scrivener Street O'Connor



Supplied Maps and Plans should only be used as a guide and are indicative only.

Imagery sourced from Open StreetMaps

N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

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Date: 19/03/2019

ACT Government
Transport Canberra and City Services

Map 15

Sequence No: 81368480

Scrivener Street O'Connor



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Imagery sourced from Open StreetMaps

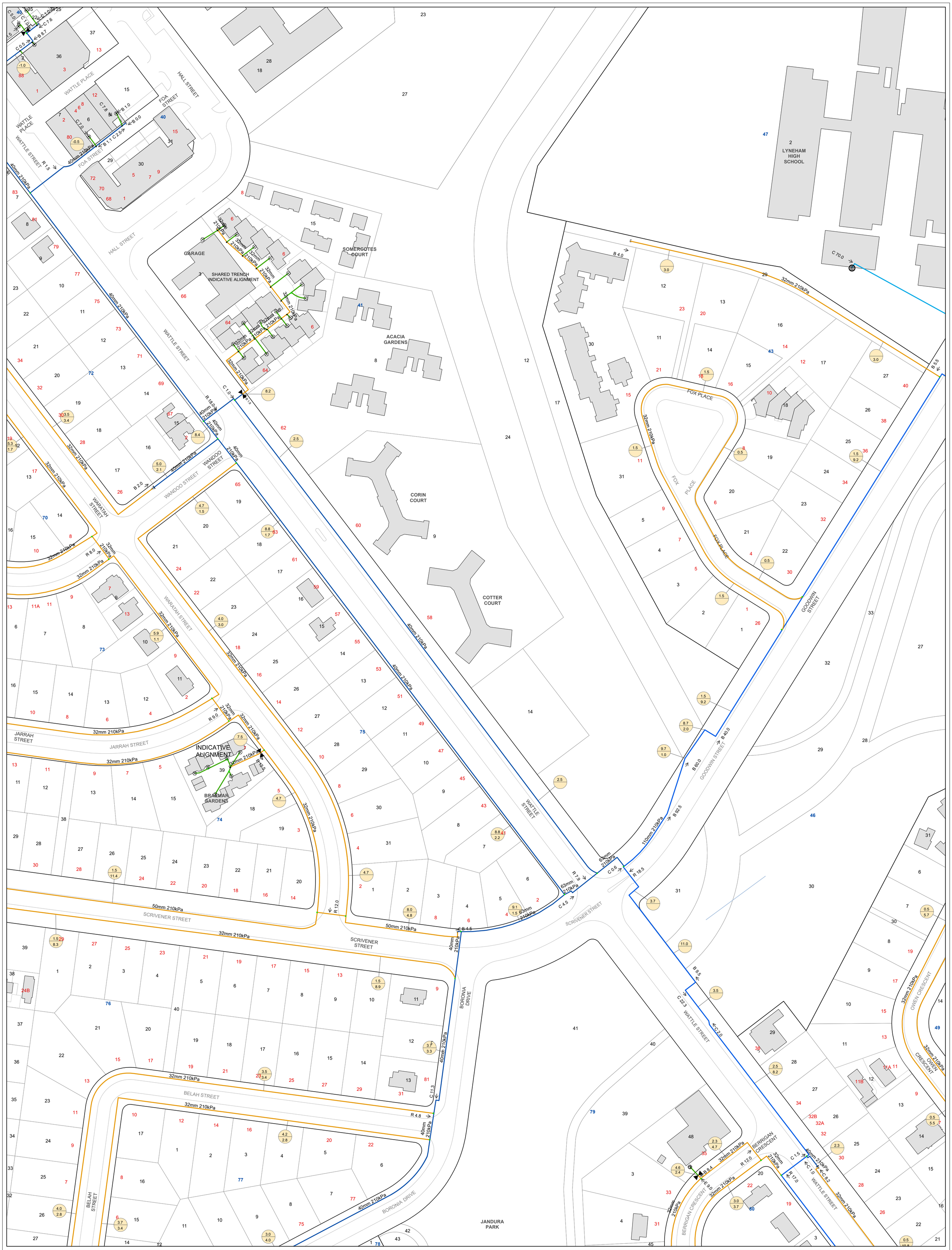
N

0 0.006km

LEGEND:

- Affected DBYD Work Area
- Column
- Controller Box
- Cable

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Evoenergy Gas Network

evoenergy

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0 5 10 20 30 40 M

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The Essential First Step

Seq #: 81368477

Scrivener Street, O'Connor

Template: GasA1Portrait

Creation Date: 19-Mar-2019

Indicative Plans

Issue Date:	19/03/2019
Location:	Scrivener Street , O'Connor , ACT , 2602

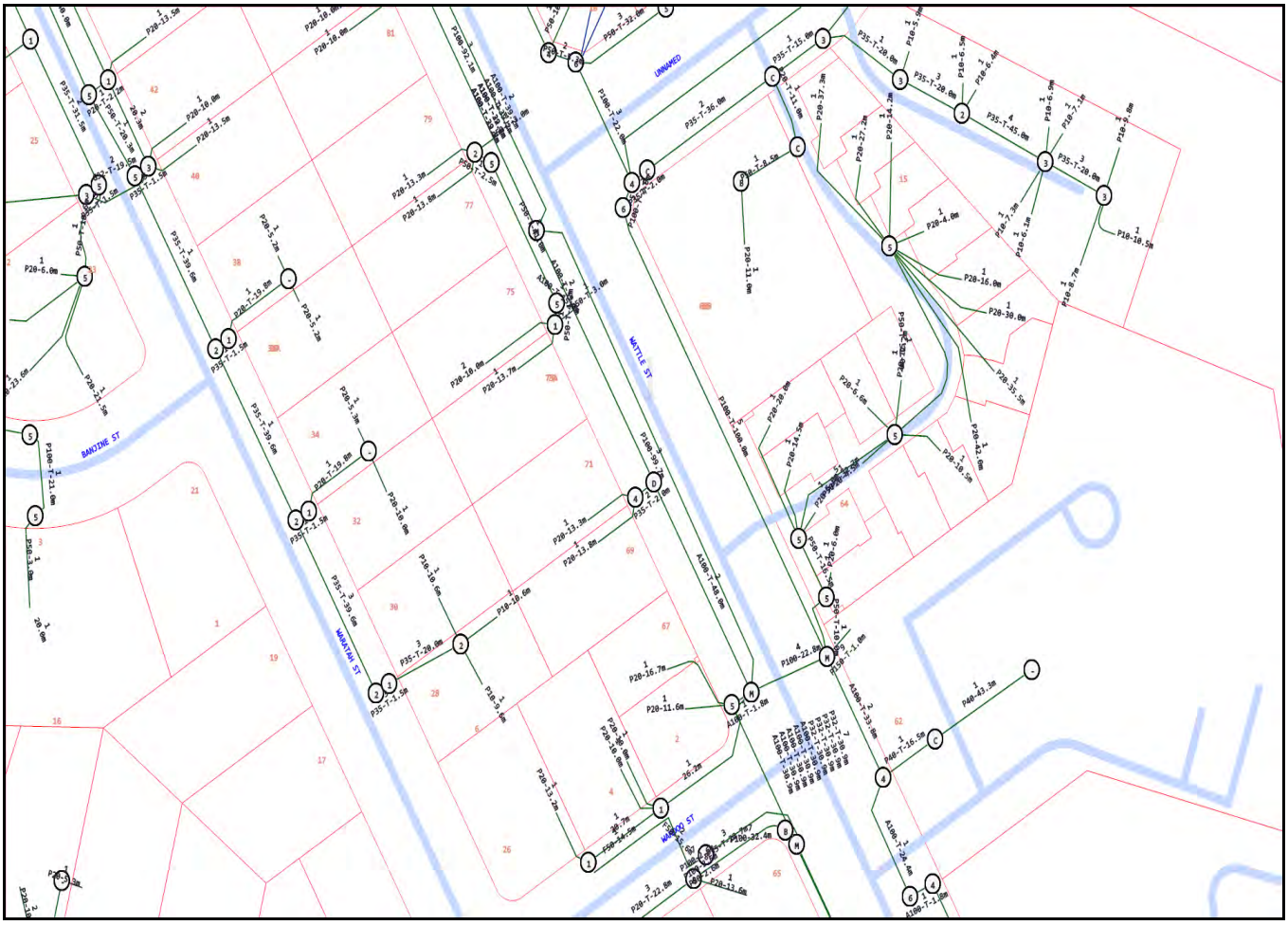
1	4
2	5
3	6

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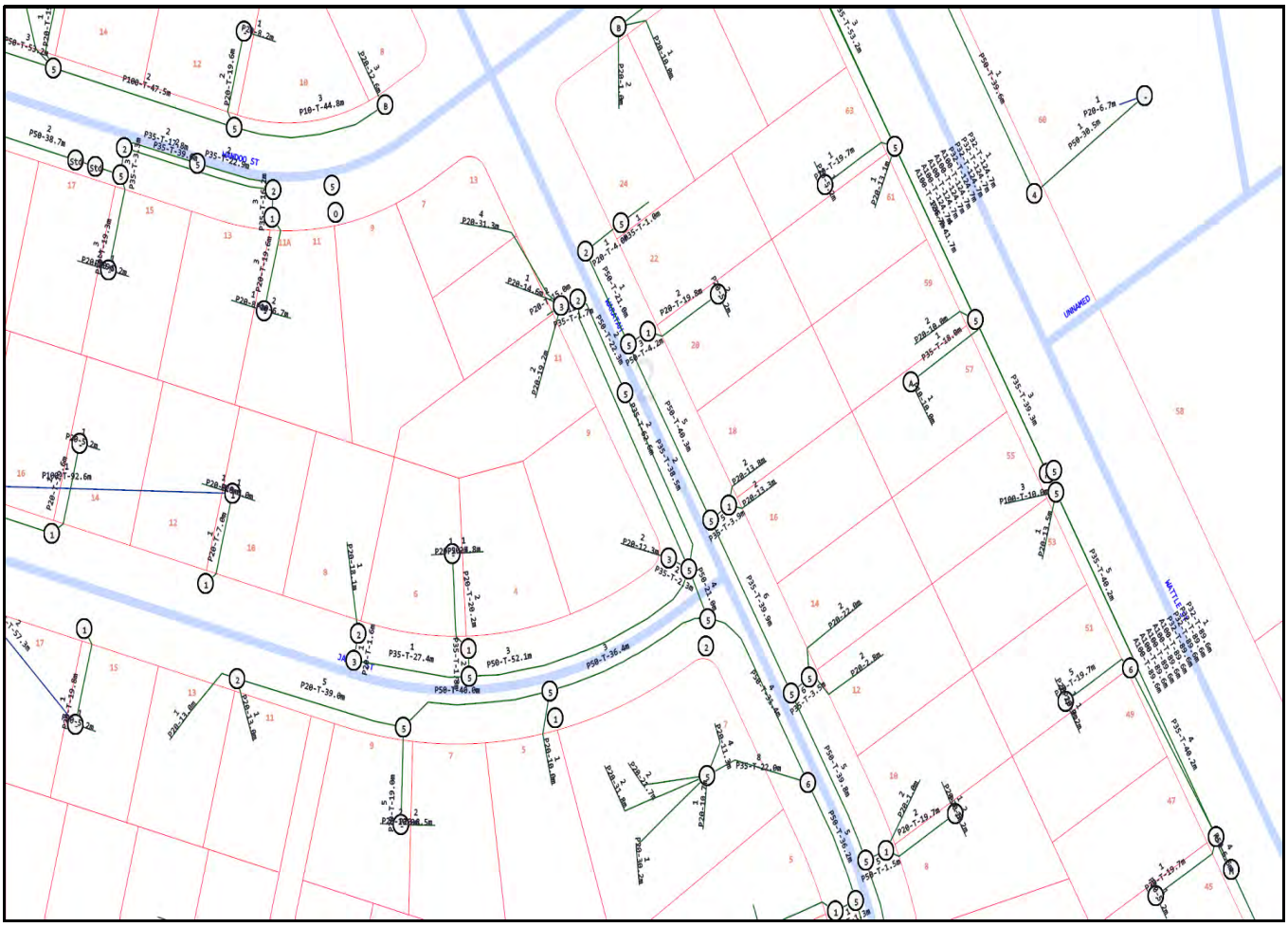
LEGEND

14	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PPT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
M	Manhole "M"
2 PO – T- 25.0m P40 – 20.0m 5 — 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 — 9	2 Direct buried cables between pits of sizes ."5" and "9" are 10.0m apart.
5 — 9	Trench containing any INSERVICE (Copper/RF/Fibre) cables.
5 — 9	Trench containing only DESIGNED/CONSTRUCTED (Copper/RF/Fibre/Power) cables.
5 — 9	Trench containing any INSERVICE (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m

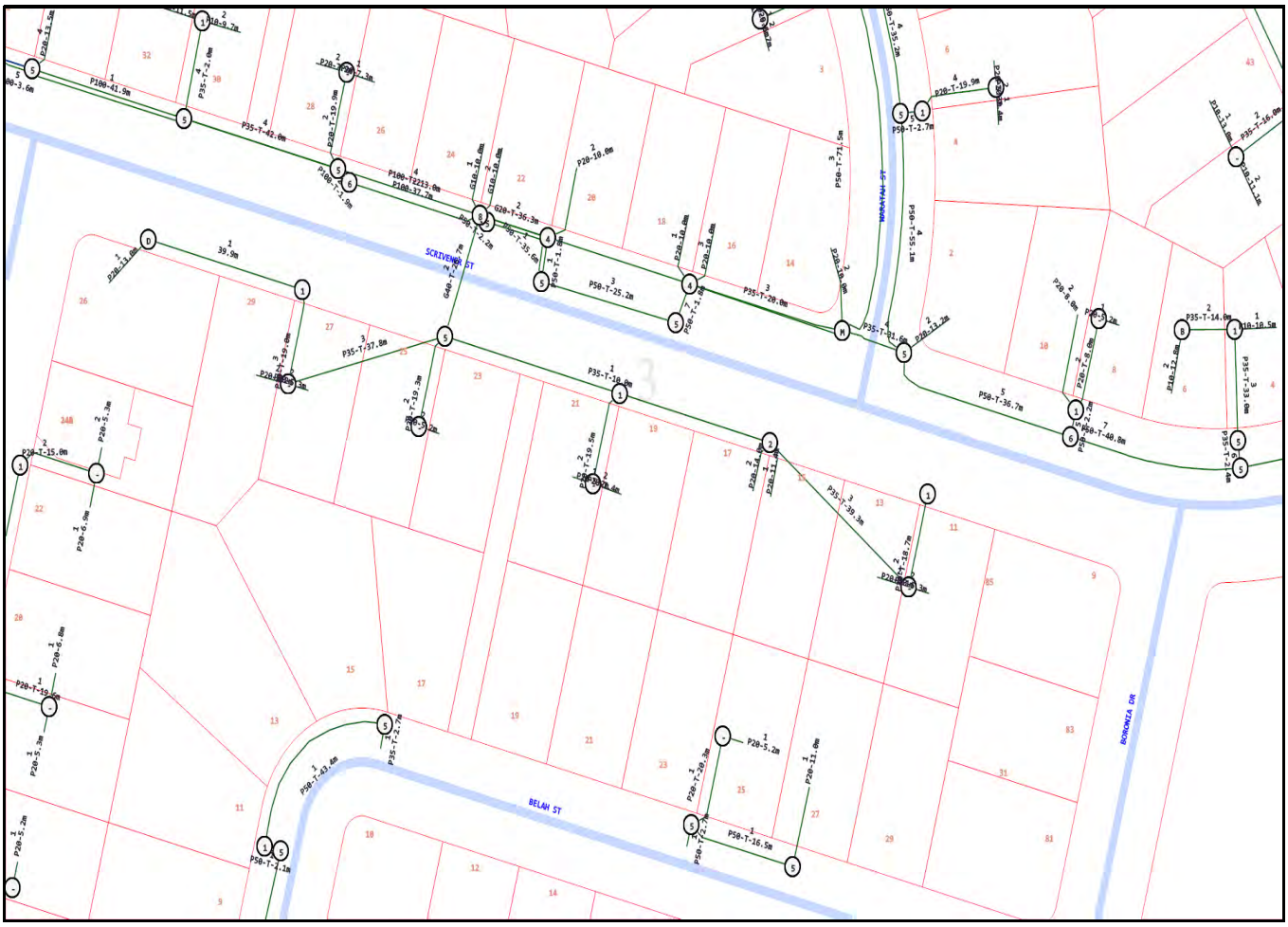
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Email info@nbn.com.au Web nbn.com.au



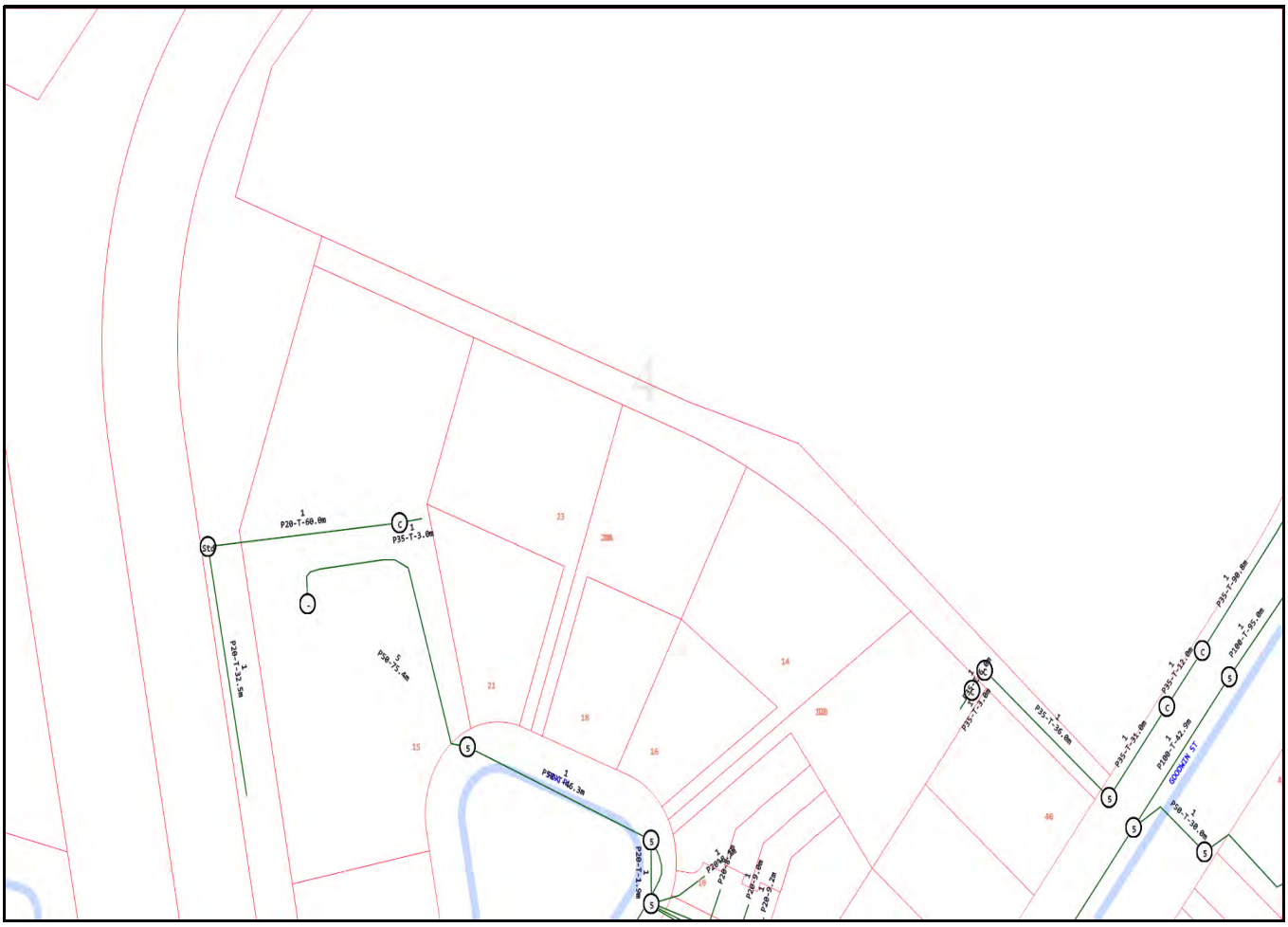
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Email info@nbn.com.au Web nbn.com.au



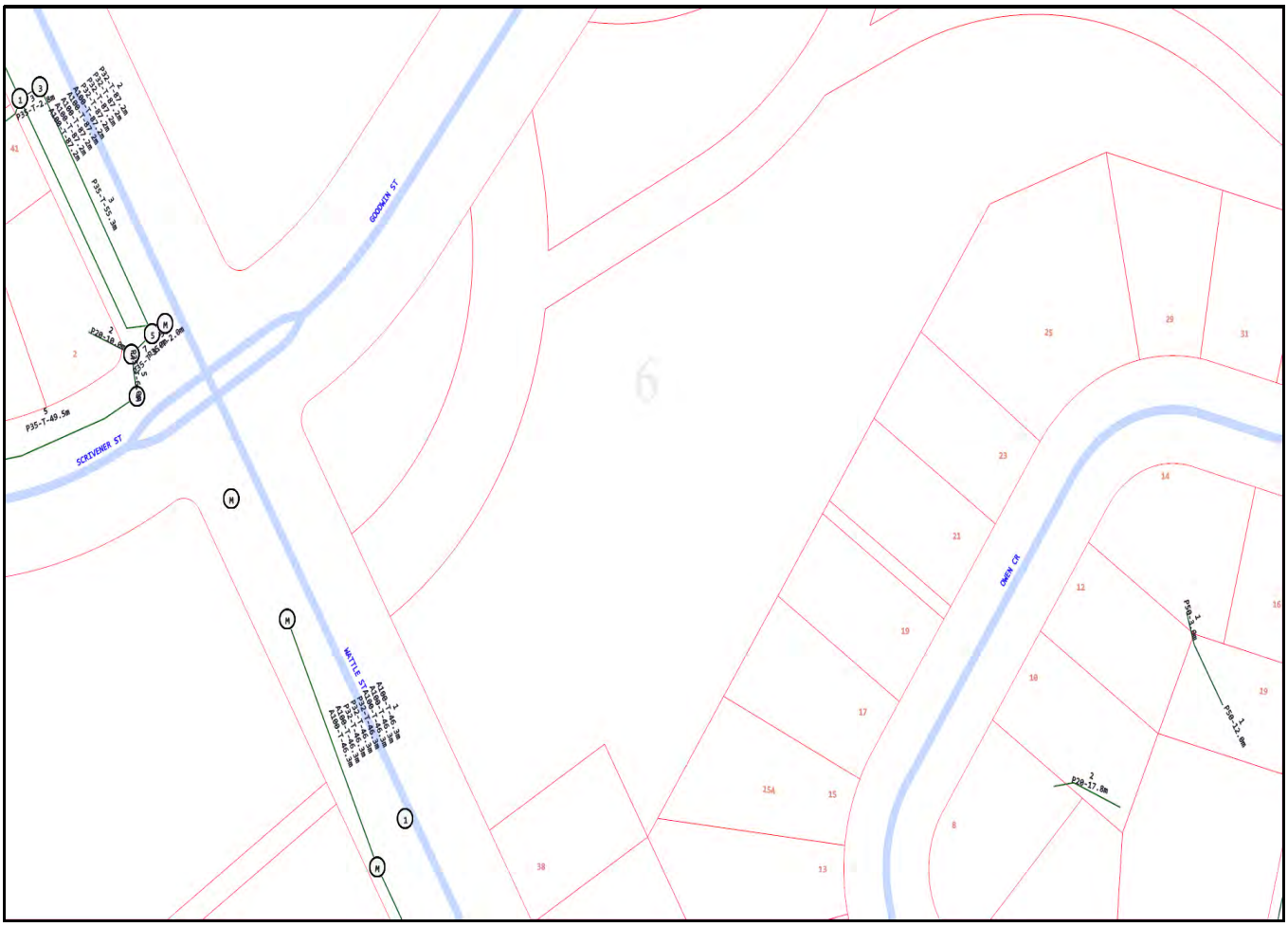
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email info@nbn.com.au
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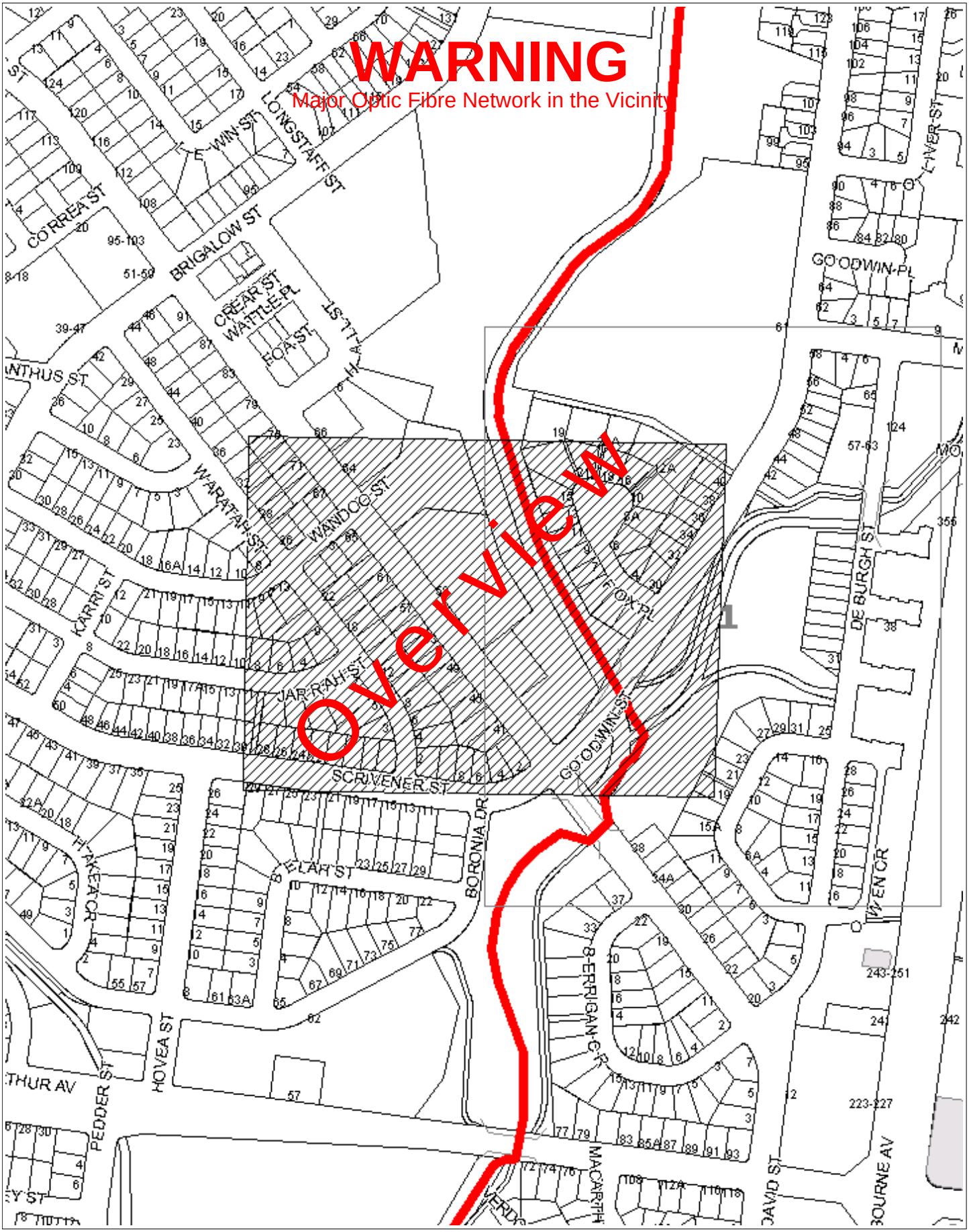
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email info@nbn.com.au
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Emergency Contacts

You must immediately report any damage to **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

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Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed please raise a new enquiry.

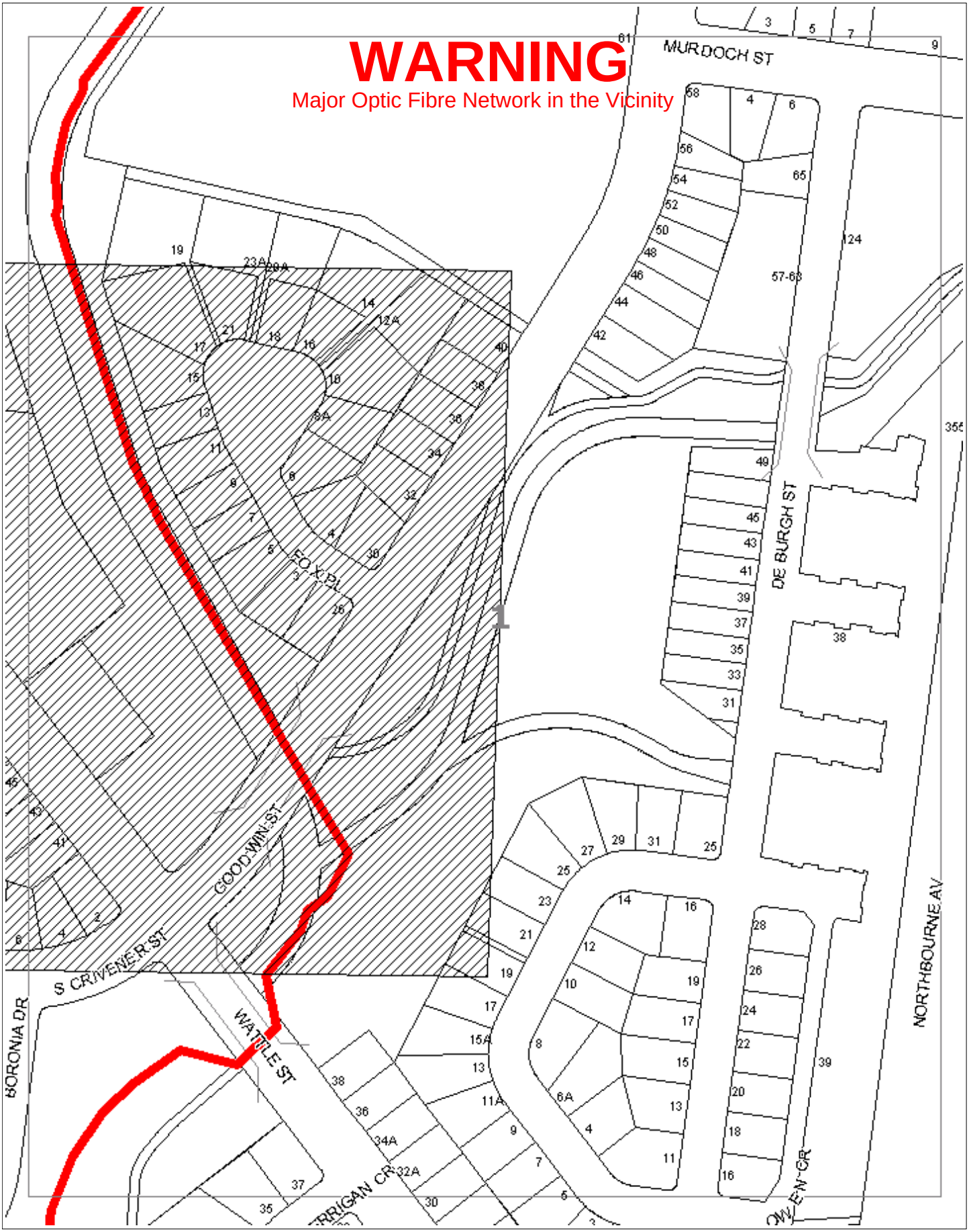
Sequence Number: 81368476

Date Generated: 19/03/2019

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

WARNING

Major Optic Fibre Network in the Vicinity



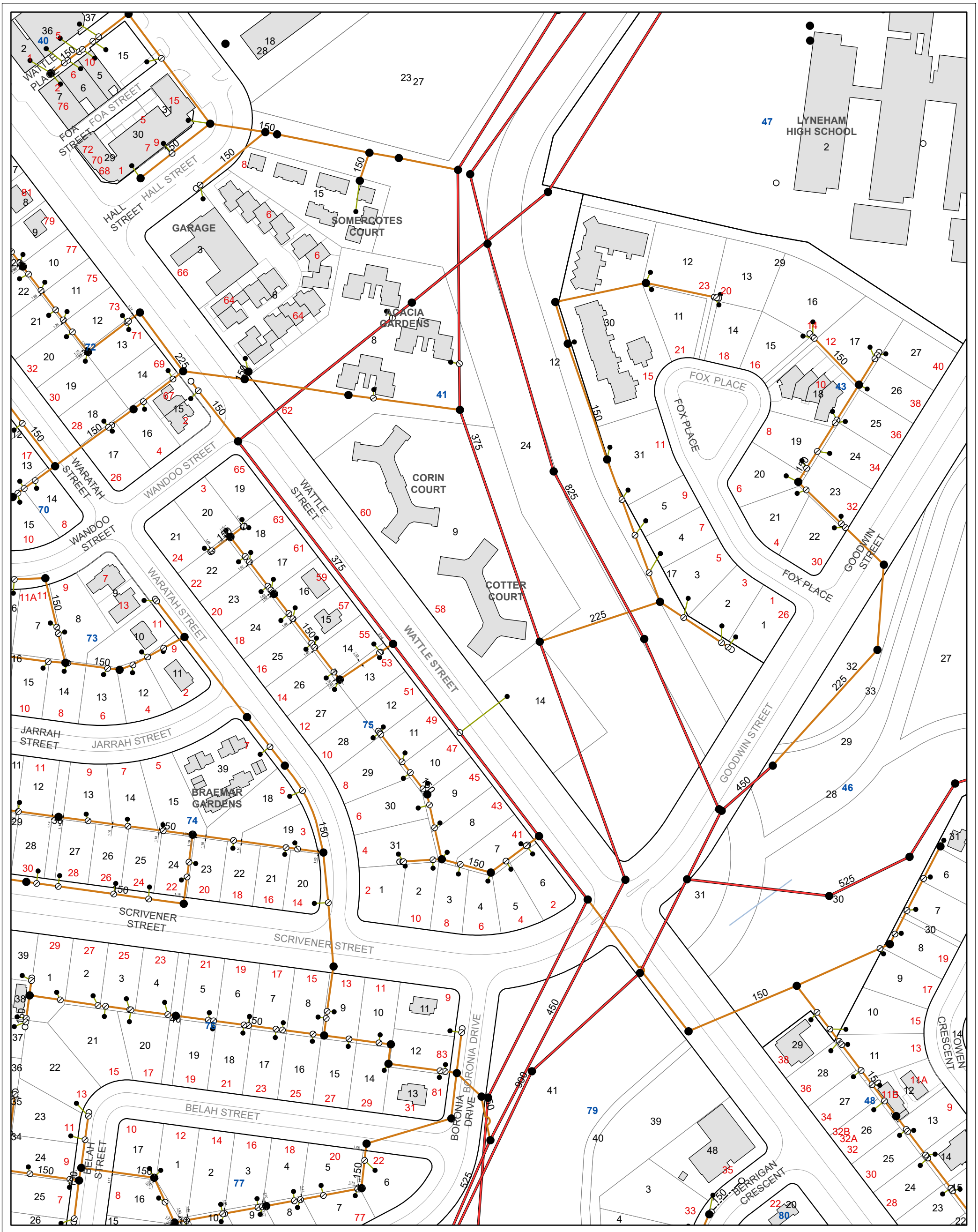
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Sequence Number: 81368476

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Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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Seq #: 81368477

Scrivener Street, O'Connor

Sewer Network

icon WATER

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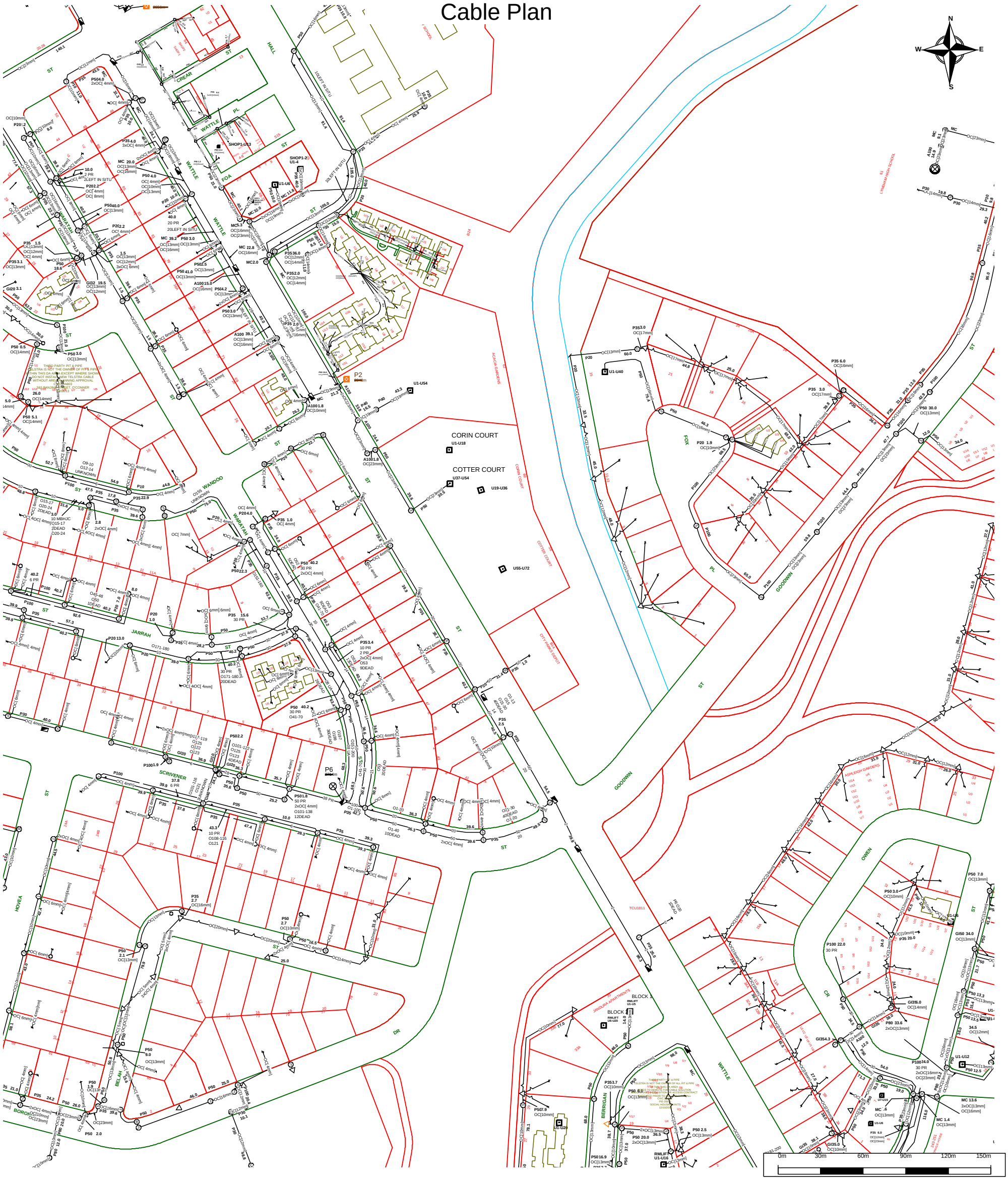
0 12.5 25 50 75 100 M

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Template: SewerA3Portrait

Creation Date: 19-Mar-2019

Cable Plan



Telstra

For all Telstra DBYD plan enquiries -
email - Telstra.Plans@team.telstra.com
For urgent onsite contact only - ph 1800 653 935 (bus hrs)

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Generated On 19/03/2019 11:31:27

Sequence Number: 81368475

CAUTION: Critical Network Route in plot area.
DO NOT PROCEED with any excavation prior to seeking advice from Telstra Plan Services on : 1800 653 935

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

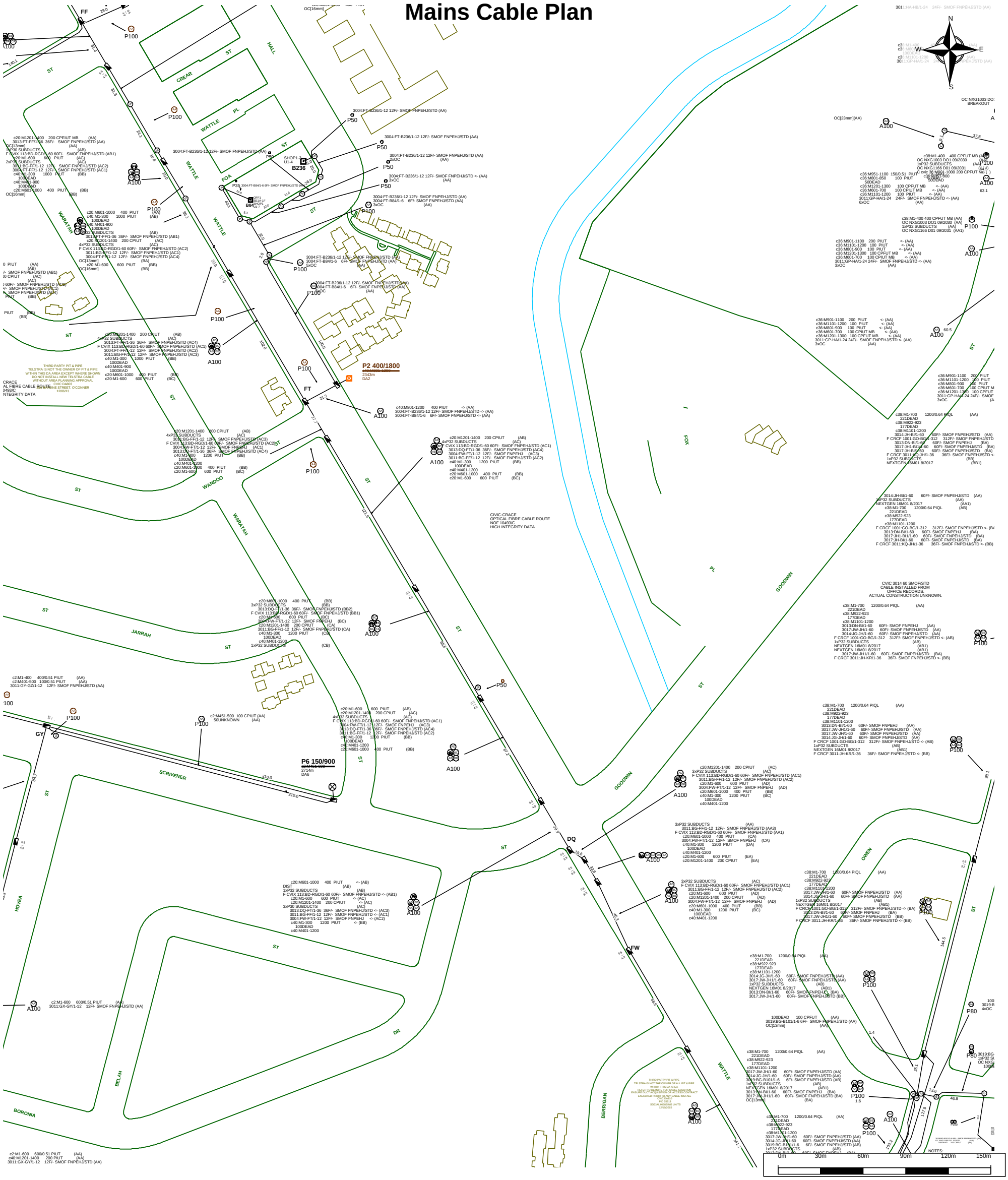
WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

Mains Cable Plan



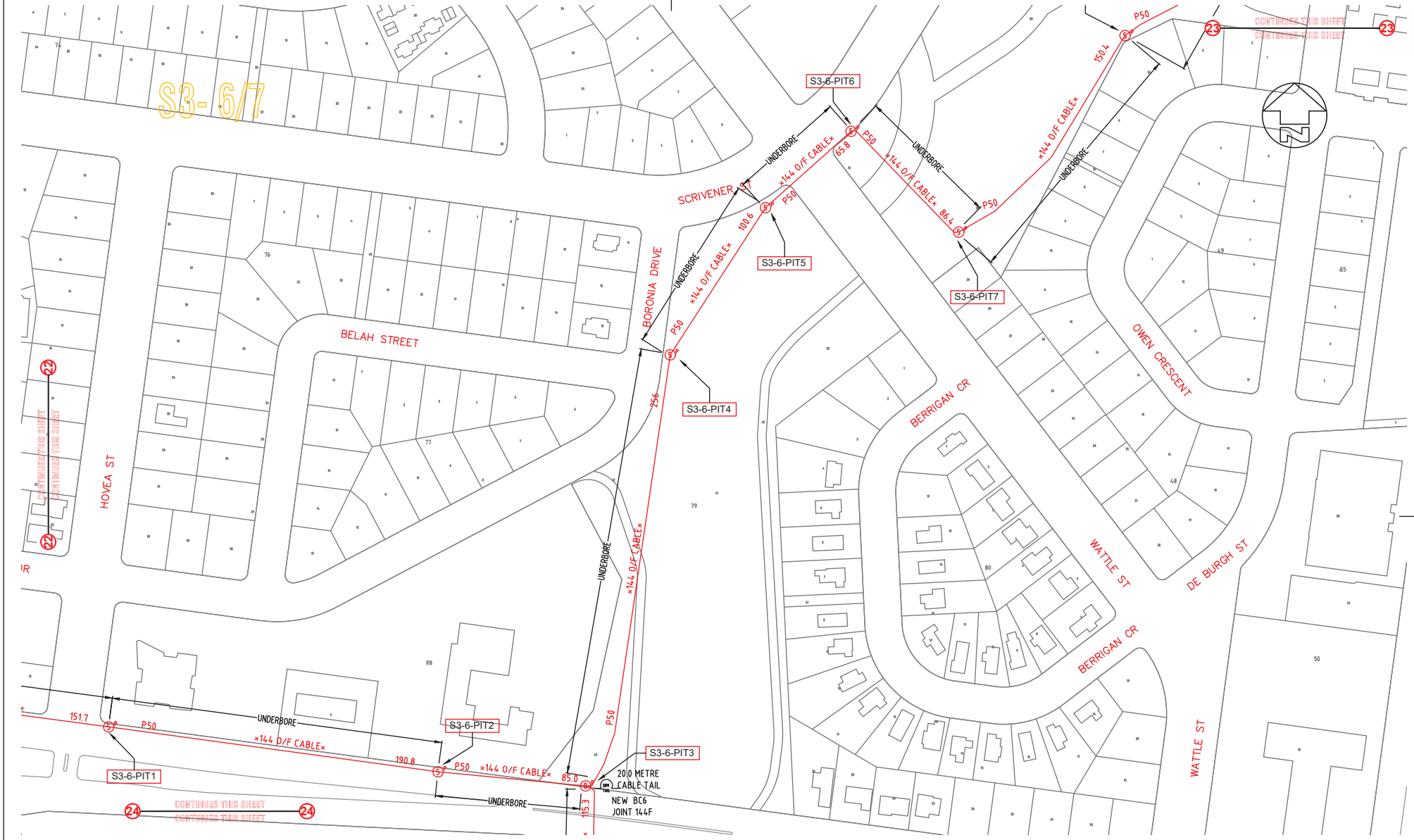
For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)	Sequence Number: 81368475
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556	CAUTION: Critical Network Route in plot area. DO NOT PROCEED with any excavation prior to seeking advice from Telstra Plan Services on : 1800 653 935
Generated On 19/03/2019 11:31:33	

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.



LEGEND

- FOOTWAY MANHOLE BY OTHER CARRIER
- P50 41.0 — PIPE. MATERIAL & DISTANCE BETWEEN THE CENTRE OF PITS SHOWN, DISTANCE MEASURED ON THE GROUND, NOT HORIZONTALLY. NOTE: THE SYMBOL ⌊ DENOTES THE TRENCH IS SHARED.
- EXISTING NETWORK BY OTHER CARRIER
- P50 41.0 — PROPOSED PIPE OR CABLE
- 5 — PROPOSED PIT
- 5 — PROPOSED PIT WITH 25mm LEAD-IN STARTER PIPE
- P50 41.0 — EXISTING PIPE OR CABLE BY OTHER CARRIER
- C5 — PROPOSED PIT, PIPE OR CABLE ON OTHER PROJECTS
- 0.75 / 1.5 — DEPTH / ALIGNMENT
- T P100 — PROPOSED CONDUITS
- G —
- 5P — CONSTRUCTED COMMUNICATIONS PIT
- P50 41.0 — CONSTRUCTED CONDUIT
- 20M TAIL — 20M CABLE TAIL IN PIT

LAND ACCESS COMPLIANCE NOTICE REQUIRED PRIOR TO CONSTRUCTION

NOTE: FOR ALL LIFE THREATENING EMERGENCY CALLS DIAL 000 OR 112 FOR GSM MOBILE PHONE USERS
For Local Emergency Service locations and contact details associated with this installation, call 1234.

ASBUILT

WARNING: DO NOT SCALE - This drawing may be a reduced copy or variations may exist in Cadastre Database.

DANGER

BEFORE EXCAVATING CHECK FOR POWER CABLES AND GAS PIPES.
ENSURE THAT YOU HAVE CALLED
"1100 DIAL BEFORE YOU DIG"
FAX 1300652077
FOR ALL SERVICE LOCATIONS.

CONTRACTORS NOTE
THE CONSTRUCTION DIRECTIONS ON THIS DRAWING MUST NOT VARY UNLESS APPROVED. APPROVAL MUST BE OBTAINED FROM THE DESIGN MANAGER PRIOR TO EXECUTING ANY VARIATION AS RENOTIFICATION MAY BE REQUIRED TO AUTHORITIES AND LANDOWNERS TO ENSURE LAND ACCESS COMPLIANCE.
WARNING
THIS PLAN CONTAINS COMMERCIALLY SENSITIVE INFORMATION AND IS TO BE TREATED ACCORDINGLY. NO SUCH INFORMATION IS TO PASS ON TO OTHER PARTIES WITHOUT THE WRITTEN CONSENT OF THE DESIGN IT.

NOTES
1. DISTANCES ARE ALL IN SURFACE MEASUREMENTS
2. ALL CONDUCTORS 0.40 DIAMETER UNLESS OTHERWISE SPECIFIED
3. FOR GENERAL INQUIRIES PLEASE CONTACT CANBERRA COMMUNICATIONS SOLUTIONS 0418 275 697
4. ALL WORK TO BE DONE IN ACCORDANCE WITH AUTHORIZED SAFE WORKING PRACTICES & INDUSTRY PRACTICES.
5. REPORT ALL HAZARDS & INCIDENTS TO YOUR SUPERVISOR.

DESIGNER ID: 90023407
DESIGNER CONTACT No.: 02-6260 2020

DRAWN BY	SIGNED	DESIGNED BY	SIGNED	REVIEWED BY	SIGNED	DATE	REV	AMENDMENT	AUTHORISED	SIGNED	DATE
A. Smith	AS	CCS	CCS	B.Crossling	BC	07/08/2015	H	ASBUILT			07/08/2015
A.Smith	AS	CCS	CCS	B.Crossling	BC	06/03/15	G	IFC (Minor Change)			06/03/15
H.Tara.Lu	HL	CCS	CCS	B.Crossling	BC	12/12/14	F	IFC (incl. Heritage and Contamination)			15/12/14
H.Tara.Lu	HL	CCS	CCS	B.Crossling	BC	30/10/14	E	IFC (Minor Alignment Change)			30/10/14
H.Tara.Lu	HL	CCS	CCS	B.Crossling	BC	27/10/14	D	IFC			28/10/14
A. Frio	AF					31/07/14	A-C	Preliminary Designs			13/10/14

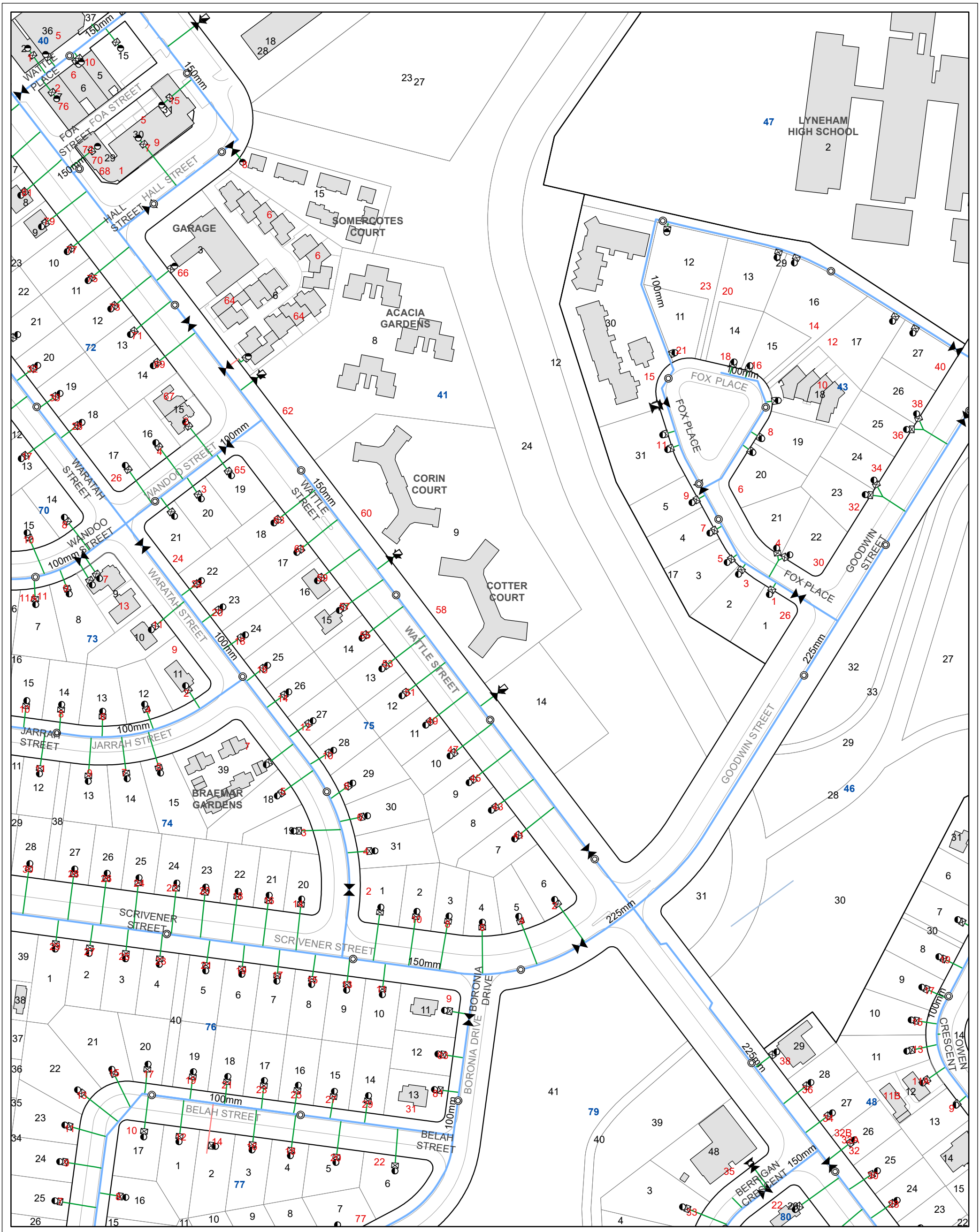
TransGrid

CANBERRA COMMUNICATIONS - UNDERGROUND FIBRE INSTALLATION
NORTHBOURNE AVENUE, DICKSON

CCS REF. No.	TRG-S3-25-31	SCOPER	EK
CLIENT REF.	1405	SCALE	NOT TO SCALE
		DATE SCOPED	31/07/2014
STATE	ACT	COUNCIL	
		UBD REF No.	
DRAWING No.	CCS - TRG - S3 -H	SHEET	6 of 7

CANBERRA CommunicationsSolutions MAKE IT HAPPEN

A3



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Seq #: 81368477

Scrivener Street, O'Connor

Water Network

icon WATER

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0 12.5 25 50 75 100 M

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Template: WaterA3Portrait

Creation Date: 19-Mar-2019

John Sutcliffe

From: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Sent: Tuesday, 5 November 2019 2:18 PM
To: John Sutcliffe
Cc: Mundy, Graham; Hydraulic Asset Acceptance
Subject: RE: Block 14 Section 41 Lyneham trunk sewer enquiry

Hi John

All services are to be exhumed in the first instance.

If you are asking for a dispensation then you will have to provide sufficient reasons (such as specific engineering constraints) for consideration.

Regards
Peter

Please note: For every design submission and resubmissions, please always attach the Design Form Pack, complete set of drawings and other relevant documents including engineering certification(s).

Peter Havelka
Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6015
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

Important notice for Canberra Developers: The transition period for the Water and Sewerage Capital Contributions Code (WSCCC) charge ended on 30 June 2019. From 1 July 2019 all developments fitting the criteria explained in the code will attract a WSCCC charge. For further information, please visit our website at http://www.iconwater.com.au/capitalcontributions

---

From: John Sutcliffe <john.sutcliffe@cardno.com.au>
Sent: Friday, 1 November 2019 9:59 AM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Cc: Mundy, Graham <Graham.Mundy@act.gov.au>
Subject: RE: Block 14 Section 41 Lyneham trunk sewer enquiry

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and are expecting the content or attachment from the sender

Hi Peter,

Thanks for that feedback, we will progress our plans for the site on that basis. In terms of the existing main, our surveyor measured the main as a DN450 in the presence of an ICON Water representative two weeks ago, though he did not that measuring the pipe size at a depth of 4m is challenging and there are limits to the accuracy of such information.

Given the depth of the existing main, will it be possible to concrete cap and condemn the existing line?

Regards,

John Sutcliffe
SENIOR PROJECT MANAGER
CARDNO

Phone +61 2 6112 4507 Direct +61 2 6112 4507
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email john.sutcliffe@cardno.com.au Web www.cardno.com

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From: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Sent: Friday, 25 October 2019 10:26 AM
To: John Sutcliffe <john.sutcliffe@cardno.com.au>
Cc: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: RE: Block 14 Section 41 Lyneham trunk sewer enquiry

Hi John

In response to your enquiry please see below:

1. No construction over the main / easement. Please review the "Building requirements for Icon Water approval" document on our website
2. Developer is responsible for the works (as previously advised by Nabin). Please be advised no reduction in capacity if the Main was to be relocated – this is a major asset
3. No. The Design Form Pack holds that information and not provided – but you can use this link for an estimate: http://www.iconwater.com.au/developers-and-renovators/capital-contributions/capital-contributions-code-calculator.aspx
4. Icon Waters information identifies the Main as a DN375. Please advise how the surveyor got DN450? Do you have any evidence of this being a DN450?

Regards
Peter

Please note: For every design submission and resubmissions, please always attach the Design Form Pack, complete set of drawings and other relevant documents including engineering certification(s).

Peter Havelka
Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6015
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

Important notice for Canberra Developers: The transition period for the Water and Sewerage Capital Contributions Code (WSCCC) charge ended on 30 June 2019. From 1 July 2019 all developments fitting the criteria explained in the code will attract a WSCCC charge. For further information, please visit our website at http://www.iconwater.com.au/capitalcontributions

---

From: John Sutcliffe <john.sutcliffe@cardno.com.au>
Sent: Tuesday, 22 October 2019 12:06 PM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: Block 14 Section 41 Lyneham trunk sewer enquiry

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and are expecting the content or attachment from the sender

Good afternoon,

Cardno are currently undertaking a development analysis of Block 14 Section 41, Lyneham, on behalf of ESPDD Urban Projects. Through this analysis we have identified a trunk sewer main which transects the site (see plan attached). I have previously discussed the main with Nabin Dahl (correspondence attached) and would like to seek some further information on the following:

1. Is there any feasible means by which a multi-unit residential development could be constructed over the existing main?
2. If the main were to be relocated, would the developer be responsible for undertaking the works, or would they be required to pay a capital contribution toward Icon Water undertaking the works?
3. If a capital contribution were required, can you indicate the approximate value of that contribution?
4. The sketch provided by Icon noted the main as DN375, our surveyor has identified it as a DN450. Does Icon have any additional data to confirm the actual size?

The current development proposal is for 35 units, but is subject to the ultimate developers intent.

Any information which you could provide in relation to the above would be greatly appreciated.

Regards,

John Sutcliffe
SENIOR PROJECT MANAGER
CARDNO

Cardno

Phone +61 2 6112 4507 Direct +61 2 6112 4507
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email john.sutcliffe@cardno.com.au Web www.cardno.com

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John Sutcliffe

From: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Sent: Monday, 8 April 2019 5:07 PM
To: John Sutcliffe
Subject: RE: Block 14 Section 41 Lyneham trunk sewer realignment

Good Afternoon John,

The existing DN375 sewer main is a critical asset to Icon Water with the existing grade of 0.29%.The re-alignment will flatten the sewer main reducing its capacity.

To resolve it, the developer could investigate the new alignment (shown in purple) out the block and increase the diameter of the sewer main to DN450. The increase diameter should be paid in full by the developer.



Regards,

Nabin Dahal
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6011
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

From: John Sutcliffe <john.sutcliffe@cardno.com.au>
Sent: Friday, 5 April 2019 8:49 AM
To: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: Block 14 Section 41 Lyneham trunk sewer realignment

Moring Nabin,

We are currently undertaking a site investigation for Block 14 Section 41 Lyneham. The block is currently encumbered by a trunk sewer and we are investigating a possible relocation of this trunk per the attached sketch.

Does ICON Water have any work as executed levels on the existing trunk main in this area which you could provide? Further, would the proposed relocation, assuming all serviceability could be maintained, something which ICON Water would be supportive of?

Regards,

John Sutcliffe
PROJECT MANAGER - CIVIL ENGINEER
CARDNO

Phone +61 2 6112 4507 Direct +61 2 6112 4507
Address Level 2, 14 Wormald Street, Symonston, Australian Capital Territory 2609 Australia

Email john.sutcliffe@cardno.com.au Web www.cardno.com

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****

APPENDIX

C

SITE PHOTOS






NO PARKING



APPENDIX

D

ENGINEERING CALCULATIONS

SIR GENERAL INFORMATION

PROJECT NAME:	Block 14 Section 41 Lyneham
DATE:	2/04/2019
PROJECT NUMBER (#)	50519072
CLIENT	EPSDD
REVISION	1

Potable Simultaneous Demand (PSD) Calculations

Project: **Block 14 Section 41 Lyneham**

Project #: **50519072**

PSD calculations based on AS3500, Part 1, Water Services (AS3500) and the National Construction Code, Table D1.13 (NCC, 2016)

Yield and Occupancy

USE	GFA (m²)	DWELLINGS
Residential		45

Section 3 of the Stage 1 SIR

PSD of Residential Dwellings	Value	Unit
Dwellings	45	Dwellings
Residential PSD	4.41	L/s
Total PSD	4.410	

$$Q = 0.03n + 0.4554\sqrt{n}$$

Probable Simultaneous Demand (PSD) Table 3.2.3 AS3500

Stormwater Design Calculations based on TCCS Design Standards

Project: **Block 14 Section 41 Lyneham**

Project #: **50519072**

Block catchment flow calculations based on TCCS Design Standards - Stormwater

	Value	Unit	
ARI =	10.00	Years	*Average Recurrence Intervals, Table 1.2 Minor System Design ARI*
Catchment Area =	0.2359	Ha	
IMP % =	60%		*Section 3 of SIR Proposed Development table 1.3 and NCC2016-BCA-V1, Table*
PER % =	40%		
IMP Area =	0.14	Ha	*Calculated from impervious area % and Catchment Area*
PER Area =	0.09	Ha	*Calculated from pervious area % and Catchment Area*
Flow Path Length =	62.80	m	*Estimated from drawing*
Average Grade =	1.00%		*Estimated from ACTmapi 2004 contours* [Calc: (568-567.5)/62.8]
IMP Tc =	16.00	min	*Time of Concentration, Section 1.2.4.1 and Table 1.4 Horton's Roughness Valu*
PER Tc =	48.01	min	*Time of Concentration, Section 1.2.4.1 and Table 1.4 Horton's Roughness Valu*
Ci =	0.90		*Impervious Area Run off Coefficient, 1.2.4.2 Runoff Coefficient*
Cp =	0.57		*Pervious Area Run off Coefficient, 1.2.4.2 Runoff Coefficient*
IMP RI =	74.00		*Rainfall Intensity, Table 1.14 Canberra Rainfall Intensities (mm/hr)*
PER RI =	41.30	mm/hr	*Rainfall Intensity, Table 1.14 Canberra Rainfall Intensities (mm/hr)*
Q =	**32.31**	**(L/s)**	***Design Stormwater flow rate Clause 5.4.8 (d)***

Pipe sizing calculations based on Manning's Equation

S (Gradient)	1.00	%
Pipe Diameter	0.225	m
R (Hydraulic Radius)	0.06	sq.m/m
Area	0.04	sq.m
n (Pipe Roughness)	0.011	n
V (Velocity)	1.33	m/s

Q (Flow Rate)	**0.05**	**cu.m/s**
	53.07	**L/s**

Sanitary Drainage Design Calculations

Project: **Block 14 Section 41 Lyneham**

Project #: **50519072**

Sanitary Drainage Calculations Based On AS3500, Part 2, Sanitary Plumbing & Drainage (AS3500) and ICON Water Supplement to WSA 02-2014-3.1 Gravity Sewerage Code Of Australia (STD-SPE-G-011)

	Value	Unit	
Residetntial Dwellings =	45.000	Dwellings	*Table D1.13 NCC*
EP Residential =	2.000	EP / Dwelling	*Equivalent Population (EP) ICON Water STD-SPE-G-011 Table IW.1 Design L*
TEP =	90.000	Population	*Total Equivalent Population (TEP) ICON Water STD-SPE-G-011 IW.3.3 TOTA*
ADWF =	0.188	L/s	*Average Dry Weather Flow (ADWF) ICON Water STD-SPE-G-011 IW.3.4.2 P*
PDWF	0.697	L/s	*Peak Dry Weather Flow (PDWF) ICON Water STD-SPE-G-011 IW.3.4.2 Peak*
NSA =	0.700	Ha	*Net Sewered Area (NSA) (Block Area)*
GWI =	0.010	L/s	*Ground Water Inflow ICON Water STD-SPE-G-011 IW.3.4.2 Peak dry weath*
RDI =	1.227	L/s	*Rainfall Dependent Inflow (RDI) ICON Water STD-SPE-G-011 IW.3.4.4 Rainf*
DF =	1.934	L/s	*Design Flow (DF) ICON Water STD-SPE-G-011 IW.3.4.1 General*
Q =	1.934	**(L/s)**	***Design Sewer flow rate***

Pipe sizing calculations based on Manning's Equation

S (Gradient)	1.00	%	*Minimum Sewer Tie Grade*
Pipe Diameter	0.10	m	
R (Hydraulic Radius)	0.03	sq.m/m	
Area	0.01	sq.m	
n (Pipe Roughness)	0.01	n	
V (Velocity)	0.78	m/s	
Q (Flow Rate)	6.10	L/s	*Manning's Equation*

A DN100 pipe will have sufficient capacity to service the proposed development

Water Services Design Calculations

Project: **Block 14 Section 41 Lyneham**

Project #: **50519072**

Water services calculations based on AS3500, Part 1, Water Services (AS3500) and ICON Water Supplement to WSA 03-2011-3.1 Water Supply Code of Australia (STD-SPE-G-012)

	Value	Unit	
Maximum Hourly Rate	1.5	L/s/Ha	*Maximum hourly rate for future development, ICON Water STD-SPE-G-012 Table IW.1*
Area	0.2359	Ha	Total GFA
PSD =	4.410	L/s	*Probable Simultaneous Demand (PSD) Table 3.2.3 AS3500*
HP level =	578.000	m	*High point level, allowance made for fixture height*
Water Tie Level =	568.000	m	*Depth of tie at main*
Difference =	10.000	m	*Difference in High point level to water tie level*
Pressure head at tie during peak =	45.000	m	*Static head at tie during peak demand*
Pressure Drop (h) =	35.000	m	
Index Length =	74.000	m	*Conservative length to furthest fixture*
Head Loss Gradient=	9.009	m/100m	*Head loss gradient formula, Clause D1, Appendix D, AS3500 Pt 1*
Existing Internal Pipe Size =		mm	*Existing water tie internal diameter based on WAE*
Req Pipe Size =	50.989	mm	*Required water tie internal diameter based on Table D1, AS3500 & Formula A*
Proposed Tie Size	80.000		
Capacity of Required Tie =	12.540	L/s	*Capacity of required water tie based on Table C1, AS3500*

Therefore a 80mm ID water service tie will be required to service the proposed development.

APPENDIX

E

SPECIALIST INVESTIGATIONS

ACT Government
Chief Minister, Treasury and Economic Development

File Ref: New File

Mr John Sutcliffe
Cardno (NSW/ACT) Pty Ltd
Level 2, 14 Wormald Street
Symonston ACT 2609

Linked to Job No.	
Date Received	9.1.20
Was a SC Agreed For	
Additional SC Fee	
Approval for Payment	
Entered	
Paid	
Amount	

Dear Mr Sutcliffe

ENDORSEMENT OF SITE ASSESSMENT REPORT -
BLOCK 14 SECTION 41 LYNEHAM CANBERRA CENTRAL

The Environment Protection Authority (the Authority) has reviewed the report titled "*Detailed Site Investigation Block 14, Section 41, Lyneham*" dated 17 December 2019 by Lanterra Consulting Pty Ltd.

The Authority has assessed the report and supports the consultant's findings that the site is "*suitable from a contamination perspective for the uses permitted under the RZ1: Suburban zone*" subject to the following conditions:

- A site specific unexpected finds protocol (UFP) must be prepared by a suitably qualified environmental consultant and implemented during site development works. The UFP must include, amongst other things, appropriate procedures for the identification, assessment, management, validation and disposal of potential contamination at the site and contractor induction procedures into the use of the UFP;

  Note: Where remediation and validation is required at the site under the UFP the site validation report must be forwarded to the Authority for review and endorsement prior to occupancy of the site;
- All soil subject to disposal from the site must be assessed in accordance with the Authority's Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT;
- No soil is to be disposed from site without the Authority's approval.

This letter of endorsement must be read in conjunction with the above report.

Please note that where the above report has been submitted in accordance with a condition of a development approval, the report along with this letter of endorsement must be lodged with the ACT Environment, Planning and Sustainable Development Directorate using their eDevelopment system.

This should not be taken as a warranty by the Authority or the Territory that the land is fit for any particular purpose.

Yours sincerely

N Sargent

Narelle Sargent
Environment Protection Authority

2 January 2020

SPACELAB
CREATING TIMELESS PLACES

SPACELAB STUDIO PTY LTD

ACT TREE ASSESSMENT

J19-00546
BLOCK 14 SECTION 41 LYNEHAM
Prepared for: Cardno
Date: 23.08.2019
Revision: A
Prepared by: JS
Reviewed by: AJ

AUSTRALIAN STANDARD
Quality Systems –AS/NZS ISO 9001:2008
Occupational Health and Safety System – AS4801:2001
Environmental Management System – AS/NZS ISO 14001:2004

Unit 5/97 Northbourne Avenue Turner ACT 2612
P: (02) 6262 6363
E: contact@spacelab.net.au W: www.spacelab.net.au

Table of Contents

1. OVERVIEW 3
1.1 Introduction 3
1.2 Site Description 3
2. ASSESSMENT INVENTORY 4
2.1 Tree number 4
2.2 Botanical Name/Species 4
2.3 Height 4
2.4a Number of Trunks 4
2.4b Trunk Circumference 4
2.5 Canopy Width 4
2.6 General Health and Vigour 4
2.7 Structural Defects 5
2.8 Presence of Damage 5
2.9 Presence of Disease 5
2.10 Current Growth Stage 5
2.11 Tree Quality Classification 5
2.12 Risk Assessment 6
2.13 Protected Trees. Regulated or Registered 7
3. Recommendations 8
4. Notes / Disclaimer 9
5. Appendix A Tree Assessment Data Sheets 10
6. Appendix B Tree Assessment Plans 11
7. Appendix C Assessment Data Spreadsheet 12

1 OVERVIEW

1.1 Introduction

This tree assessment report has been prepared in response to a brief issued by Cardno Consulting, ACT. The purpose of this report is to provide detailed information on the location and status of trees within a portion of the site referred to as Block 14 Section 41 Lyneham. The information will aid in the development of the site by identifying and assessing trees that are Protected, and/or covered by the Tree Protection Act 2005.
This report has been prepared in accordance with the mandatory requirements of ACT Tree Protection (Guidelines for Tree Management Plans) Determination 2010.

Assessment of the trees within the site was undertaken by Jim Laity on 15 August 2019.

SPACELAB's brief was to provide a tree assessment report and drawings to ACT Government standard criteria to guide future redevelopment of the site.

1.2 Site Description

The assessment site, Block 14 Section 41 Lyneham, ACT is pictured below in figure 1.1. It is bounded by Wattle street and Goodwin Street.

The extent of assessment is indicated by the yellow area.

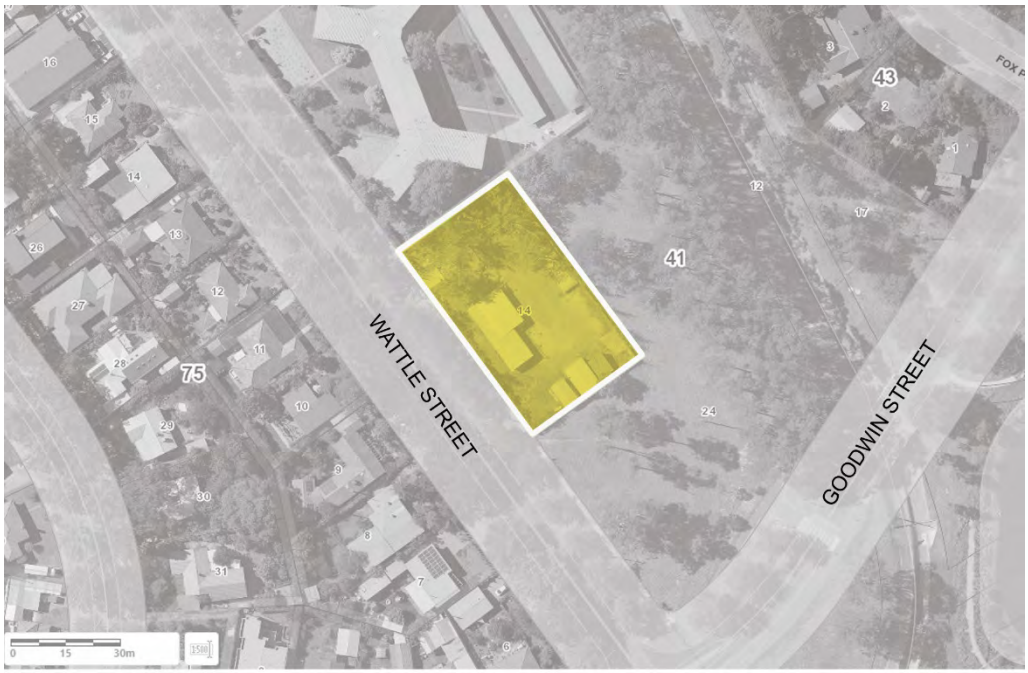


Figure 1.1 Assessment Area

2 ASSESSMENT INVENTORY

The trees identified in this report have been assessed to the mandatory requirements of Tree Survey as described in ACTs *Tree Protection (Guidelines for Tree Management Plans) Determination 2010.*
Descriptions of the assessment criteria is provided below;
The Results of the assessment are provided at Section 3 of this report.

2.1 Tree number

A unique number is provided for each individual tree or group of trees where they are present as closely spaced trees of the same size and species.

2.2 Botanical Name/Species

The botanical Name/Species is provided for each tree.

Identification of trees on site as follows:

Code	Botanical Name
Liquidambar	Sweetgum
Platanus acerifolia	London plane

2.3 Height

The height in metres is provided for each tree. (Any tree taller than 12m is a protected tree under the Tree Protection Legislation)

2.4a Number of Trunks

The number of trunks below 1m above natural ground line is provided for each tree. Multiple trunk trees with a circumference of 1500mm are protected trees under the Tree Protection Legislation.

2.4b Trunk Circumference

The trunk circumference is provided for each tree.
Measured in millimetres at 1 metre above natural ground level. Trees with a combined trunk circumference of 1500mm are protected trees under Tree Protection Legislation. Where more than one trunk exists the circumference provided equals the sum of the circumference of all trunks.

2.5 Canopy Width

The canopy width is provided for each tree.
Shown in meters it is the maximum canopy width of the tree. Trees with crown diameter/spread of 12m or greater are protected trees under the Tree Protection Legislation.

2.6 General Health and Vigour

The General health and vigour of each tree is rated as below.

E = Excellent
G = Good
F = Fair
P = Poor.

2.7 Structural Defects

The presence of structural defects or evidence of internal decay is indicated for each tree as below:
Y = Yes, a significant defect is evident. A Comment is provided detailing defect.
N = No significant defects are evident

2.8 Presence of Damage

The presence of past damage to the tree or disturbance within the root zone for each tree as below:
Y = Yes, significant damage is evident. A Comment is provided detailing damage.
N = No significant damage is evident

2.9 Presence of Disease

The presence of past or present disease or insect infestation for each tree as below:
Y = Yes, significant disease is evident. A Comment is provided detailing damage.
N = No significant disease is evident

2.10 Current Growth Stage

The Current Growth Stage of each tree is rated as below:

J = Juvenile
SM = Semi-Mature
M = Mature
OM = Over Mature. Limited life expectancy

2.11 Tree Quality Classification

Each regulated/protected tree is provided with a tree quality classification as below:

Non-regulated trees are indicated with the code NR.

E **<u>Excellent/Exceptional Quality</u>**

- Has natural or cultural heritage importance
- Has high aesthetic value and will contribute significantly to the surrounding landscape.
- Is of outstanding form and condition and is an excellent example of the species
- Has significant scientific value, including ecological importance
- Mature specimen
- Well balanced grand and/or outstanding appearance and stature
- Little or no evidence of:

- insect or parasitic attack and/or disease
- epicormic growth and/or
- dead wood and/or
- physical damage

H **<u>High Quality</u>**

- Is of good form, structure and health
- Is without significant defect
- Presents a low hazard/safety risk
- Mature Tree specimen
  - Tree structure, appearance form and balance is considered typical
  - Little no evidence of insect/parasite attack, epicormic growth and/or dead wood

M **<u>Medium Quality</u>**

- Is of reasonable form, structure and health
- Presents a medium to low hazard/safety risk
- Sparse or pale coloured foliage
- Epicormic growth and/or dead wood throughout the crown
- Evidence of some branch fall
- Less than desirable form

P **<u>Poor Quality</u>**

- Is of poor form, structure or health is in decline
- Presents a high or very high hazard or safety risk
- limited life expectancy (less than 5-10 years) and/or
- limited habitat value; and/or
- significant risk potential with regard to:
  - poor form, health and condition, significant die back or sparse canopy; and/or
  - physical damage, disease, decay, susceptible to large limb drop, included bark forks etc

D **<u>Dead</u>**

- The tree is dead

2.12 Risk Assessment

The risk potential for each tree is provided as below:

S = Significant
M = Medium
L = Low

Significant risk potential

- decay within trunk or major branches and/or
- prevalence of hollows or decay and/or
- depressed sections of the trunk indicative of underlying health issue and/or
- storm damage or physical and/or
- risk cannot be mitigated by extensive tree surgery or horticultural techniques

Medium risk potential

- poor branch unions, narrow angle branch forks or multiple leaders etc
- risk can be mitigated and managed by tree surgery and horticulture maintenance techniques

Low risk potential

- good structural integrity with low risk potential
- may require minimal or no short-term horticultural maintenance

2.13 Protected Trees. Regulated or Registered

The protection status of each tree is provided as below:

Y = Yes. The tree is regulated or registered and is protected.
N = No. The tree does not meet the requirements for regulation and is not protected.

Under the Tree Protection Act 2005, a tree is a regulated if it is growing on leased land and it has:

- Canopy width of 12m or more
- Trunk circumference of 1500mm or more or two or more trunks total greater than 1500mm at 1m above the ground
- A height of 12 metres or more;

A registered tree is a tree that has been included on the ACT Tree Register.

Any activity that will potentially damage a protected tree will require approval.

Under the Tree Protection Act 2005, a Tree Damaging Activity (TDA) is defined as undertaking any of the following activities on a Protected Tree:
• kill or destroy the tree;
• poison the tree;
• ringbark the tree (whether partially or completely);
• fell or remove the tree;
• cut branches or stems of the tree between branch unions (lopping);
• remove branches of the tree to a previously pruned or lopped point (pollarding);
• major pruning of the tree;
• anything else done to or in relation to the tree that—
• causes it to die; or
• significantly reduces its expected life; or
• significantly and adversely affects its health, stability or general appearance.

A Tree Protection Zone (TPZ) for a Protected Tree is:
• the area under the canopy of the tree; and
• the 2m wide area surrounding the vertical projection of the canopy; and
• the 4m wide area surrounding the trunk as measured at 1m above natural ground level.

3 Recommendations

The following recommendations should be considered in the development of this site:

All four mature deciduous trees are in decline with various amount of dead wood in the canopies.

The dieback and dead wood is very typical in these species in neglected old landscapes.

This area is an old City Parks depot where the trees would have been well maintained for 50+years.

No remedial action could improve the trees and I recommend they be removed.

Regards

Jim Laity
16 August 2019

4 Notes / Disclaimer

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or copy) is referenced in, and directly attached to that submission, report or presentation.

Information contained in this report covers only those trees, which were examined, and reflects the condition of those trees at the time of inspection on 15.08.2019.
The inspection was limited to visual examination, without dissection, excavation, probing or coring. There is no warranty or guarantee or expressed or implied, that problems or deficiencies of the subject trees may not arise in the near future.

The findings of this report may not necessarily agree with reports prepared by others, including the Government Conservator of Trees.

APPENDIX A
TREE ASSESSMENT DATA SHEETS

TREE ASSESSMENT

1



COMMENTS FROM ARBORIST

Dieback and dead branches

SPACELAB
CREATING TIMELESS PLACES

SUMMARY

Assessment date	15/08/2019
Group	
Tree number	1
Regulated Tree	Y

RECOMMENDATION

Arborist	JL
Landscape Architect	SPACELAB
Retain/Remove	N

GENERAL TREE DATA

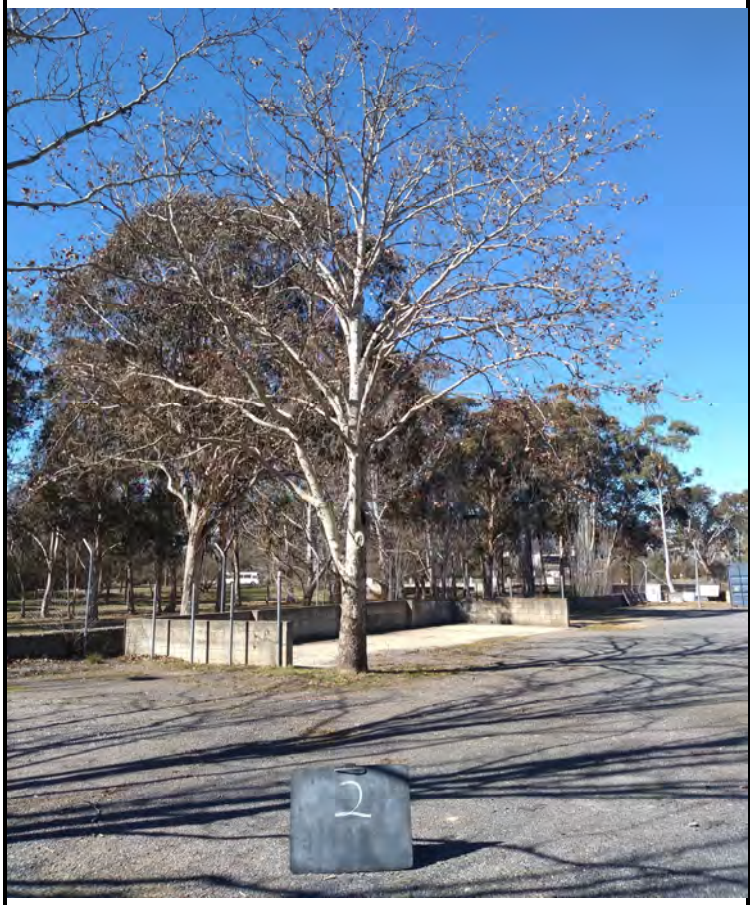
Botanical name	Liquidambar
Height (M)	11
Canopy Width (M)	15
Quality Classification	P
Trunk Circ. (MM)	1800
No. of Trunks	1
Growth Stage	M

TREE MANAGEMENT

Health	P
Structural Defects	N
Damage Evident	Y
Disease Evident	N
Risk Potential	L

TREE ASSESSMENT

2



SUMMARY

Assessment date	15/08/2019
Group	
Tree number	2
Regulated Tree	Y

RECOMMENDATION

Arborist	JL
Landscape Architect	SPACELAB
Retain/Remove	N

GENERAL TREE DATA

Botanical name	Platanus acerifolia
Height (M)	13
Canopy Width (M)	12
Quality Classification	P
Trunk Circ. (MM)	1500
No. of Trunks	1
Growth Stage	M

COMMENTS FROM ARBORIST

Dieback and small dead branches throughout canopy

TREE MANAGEMENT

Health	P
Structural Defects	N
Damage Evident	N
Disease Evident	N
Risk Potential	L

SPACELAB
CREATING TIMELESS PLACES

TREE ASSESSMENT

3



COMMENTS FROM ARBORIST

Dieback, large dead branches

SPACELAB
CREATING TIMELESS PLACES

SUMMARY

Assessment date	15/08/2019
Group	
Tree number	3
Regulated Tree	Y

RECOMMENDATION

Arborist	JL
Landscape Architect	SPACELAB
Retain/Remove	N

GENERAL TREE DATA

Botanical name	Platanus acerifolia
Height (M)	13
Canopy Width (M)	15
Quality Classification	P
Trunk Circ. (MM)	1500
No. of Trunks	1
Growth Stage	M

TREE MANAGEMENT

Health	P
Structural Defects	N
Damage Evident	N
Disease Evident	N
Risk Potential	L

TREE ASSESSMENT

4



SUMMARY

Assessment date	15/08/2019
Group	
Tree number	4
Regulated Tree	Y

RECOMMENDATION

Arborist	JL
Landscape Architect	SPACELAB
Retain/Remove	N

GENERAL TREE DATA

Botanical name	Platanus acerifolia
Height (M)	14
Canopy Width (M)	8
Quality Classification	P
Trunk Circ. (MM)	1700
No. of Trunks	1
Growth Stage	M

COMMENTS FROM ARBORIST

Large dead branches, epicormic growth

TREE MANAGEMENT

Health	P
Structural Defects	N
Damage Evident	N
Disease Evident	N
Risk Potential	L

SPACELAB
CREATING TIMELESS PLACES

APPENDIX B
TREE ASSESSMENT PLANS

BLOCK 14 SECTION 41 LYNEHAM
TREE ASSESSMENT

PROJECT No. J19-00546
ISSUE DATE: 23.08.2019

CLIENT

ACT Government

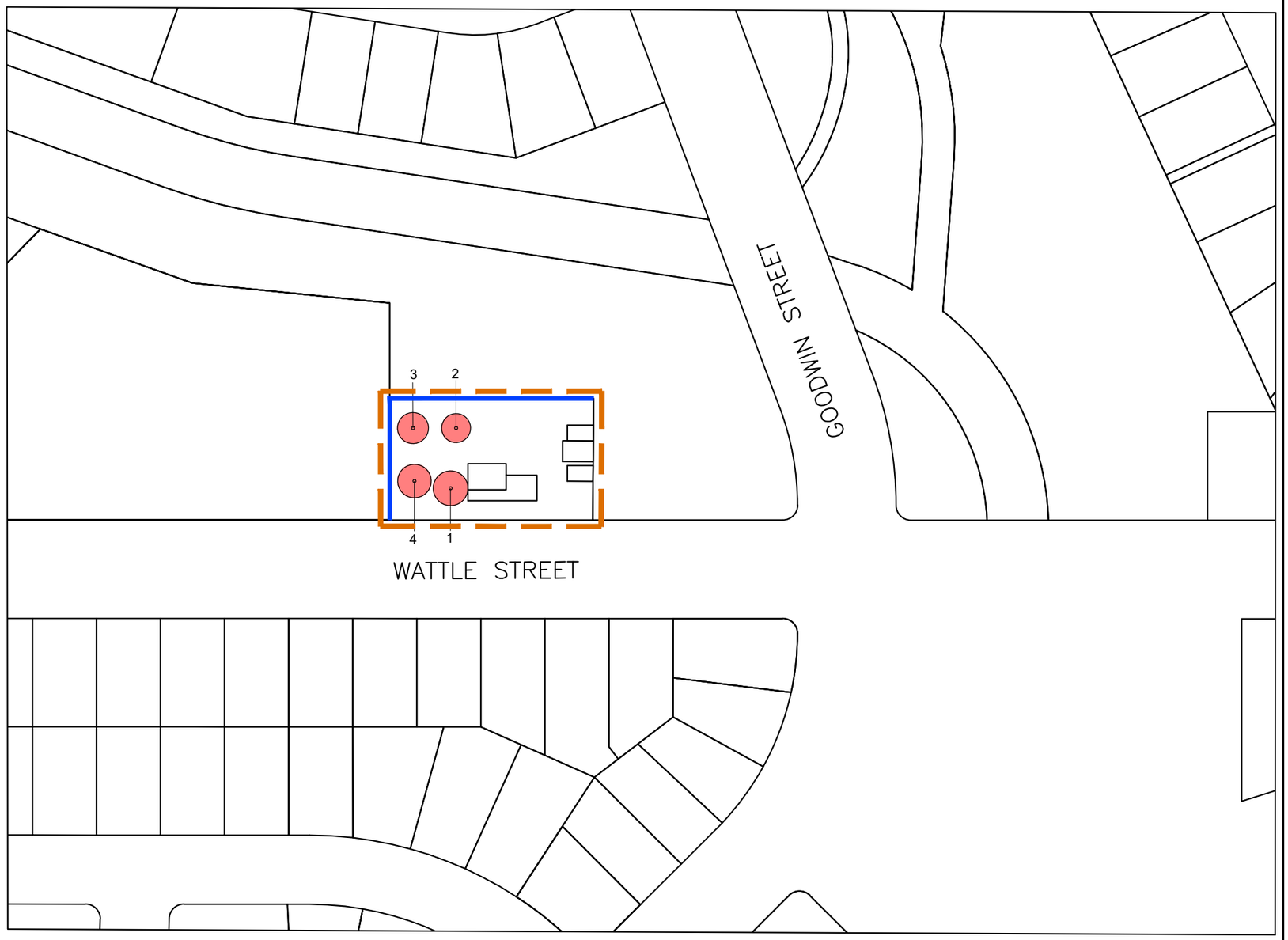
CONSULTANT

SPACELAB
CREATING TIMELESS PLACES

DRAWING SCHEDULE

TREE ASSESSMENT DRAWINGS:

DRAWING NO.	DRAWING TITLE	SCALE @A1	REVISION
TA-0	TREE ASSESSMENT - COVER PAGE	1:750	A
TA-1	TREE ASSESSMENT - TREE ASSESSMENT SHEET 1	1:300	A



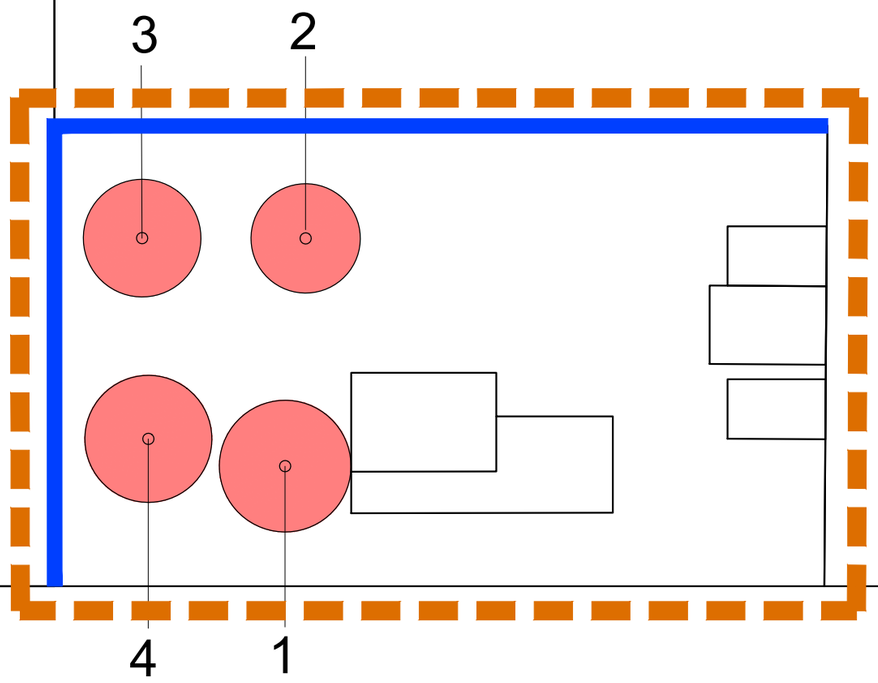
SHEET LAYOUT OVERVIEW

15 10 5 0 15m

SCALE @ A1 1:750

SCALE @ A3 1:1500

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GODWIN STREET

WATTLE STREET

LEGEND

EXTENT OF SURVEY DATA:

EXTENT OF TREE ASSESSMENT

EXISTING FENCE

2 TREE NUMBER

ARBORICULTURAL TREE QUALITY RATING:

EXCEPTIONAL QUALITY
~~RATING REGULATED TREE~~

HIGH QUALITY
~~RATING REGULATED TREE~~

MEDIUM QUALITY
~~RATING REGULATED TREE~~

POOR QUALITY
RATING REGULATED TREE

EXCEPTIONAL QUALITY
~~RATING NON-REGULATED~~
TREE

HIGH QUALITY
~~RATING NON-REGULATED~~
TREE

MEDIUM QUALITY
~~RATING NON-REGULATED~~
TREE

POOR QUALITY
~~RATING NON-REGULATED~~
TREE

TREE NOT ASSESSED
~~SHRUB OR BEYOND~~
ASSESSMENT EXTENTS

NP TREE ON SURVEY
NOT PRESENT ON SITE

ARBORICULTURAL TREE GROUP QUALITY RATING:

~~HIGH QUALITY TREE GROUP~~

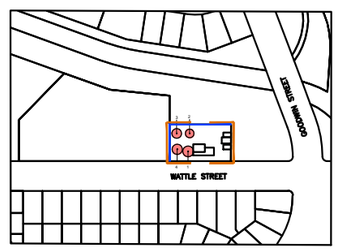
~~MEDIUM QUALITY TREE GROUP~~

~~LOW QUALITY TREE GROUP~~

NOTE:

1. THE QUALITY RATINGS SHOWN ON THIS DRAWING ARE DERIVED FROM THE TREE ASSESSMENT (DATED 16.08.2019) THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE TREE ASSESSMENT REPORT BY SPACELAB STUDIO PTY LTD.

KEY PLAN



ISSUE	REASON FOR ISSUE	DATE	ASSESS.	DRAWN	CHECKED	APPROVED FOR ISSUE
A	FIRST ISSUE	23.08.2019	JL	JS	AJ	AJ

DRAWING STATUS
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CLIENT
ACT Government
ENVIRONMENT PLANNING AND SUSTAINABLE DEVELOPMENT DIRECTORATE - URBAN PROJECTS

CONSULTANT
SPACELAB
CREATING TIMELESS PLACES

PROJECT
TREE ASSESSMENT
BLOCK 14 SECTION 41
LYNEHAM

DRAWING
TREE ASSESSMENT PLAN
SHEET 1

0 5 10m

SCALE @ A1 1:250 SCALE @ A3 1:500

PROJECT No	DRAWING No	ISSUE	REVISION
J19-00546	TA-1	DA	A

APPENDIX C
ASSESSMENT DATA SPREADSHEET

2019 Lyneham B14 S41 Tree Assessment

Assessment Data Required for all Regulated and/or Registered Trees: **Regulated Tree** – a tree on leased land in an area declared as a Tree Management Precinct that is: greater than 12m tall; has a trunk circumference of 1.5m or more at one metre above the ground; or a canopy spread of 12m or more; or **Registered Tree** – a tree that has been included on the ACT Tree Register

Tree No.	arborist	date assessed	Botanical name/Species	Height (m)	No. of Trunks	Trunk circ. 1m above FSL (mm)	Canopy Width (m)	Health (Excellent, Good, Fair, Poor)	Structural Defects (Yes, No)	Damage Evident (Yes, No)	Disease Evident (Yes, No)	Growth Stage (Juvenile, Semi-mature, Mature, Over-mature)	Quality Classification (Exceptional,High, Medium, Poor, Dead)	Risk Potential (Significant, Medium, Low)	Regulated Tree (Yes, No) and/or Registered	Comments (list all defects, decay, damage, disturbance, disease, infestation, features etc)	Recommendation- (Retain or Remove)
1	JL	15/08/2019	Liquidambar	11	1	1800	15	P	N	Y	N	M	P	L	Y	Dieback and dead branches	N
2	JL	15/08/2019	Platanus acerifolia	13	1	1500	12	P	N	N	N	M	P	L	Y	Dieback and small dead branches throughout canopy	N
3	JL	15/08/2019	Platanus acerifolia	13	1	1500	15	P	N	N	N	M	P	L	Y	Dieback, large dead branches	N
4	JL	15/08/2019	Platanus acerifolia	14	1	1700	8	P	N	N	N	M	P	L	Y	Large dead branches, epicormic growth	N

Preliminary Site Investigation

Block 14, Section 41, Lyneham

Cardno (ACT/NSW) Pty Ltd

8 August 2019

Author	Sophie Moss	
Reviewer	Chris Gunton	
Approver	Chris Gunton	

Report Reference	P19013_PSI_20120325
Date	8/08/2019
Revision Text	R01

This report has been prepared for Cardno (ACT/NSW) Pty Ltd in accordance with the terms and conditions of appointment for Q19018 (14 March 2019). Lanterra Consulting Pty Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared	Approved
R00	24/06/2019	Draft for Review	SM	CG
R01	8/08/2019	Final	CG	CG

Table of Contents

Executive Summary **4**

1. Introduction **5**

1.1 Background 5

1.2 Objectives 5

1.3 Scope of Work 5

1.4 Limitations 5

2. Site Characteristics **7**

2.1 Site Location 7

2.2 Site Description 7

2.3 Surrounding Land Uses 8

2.4 Sensitive Environments 8

2.5 Proposed Land Use 8

3. Site History **9**

3.1 Previous Investigations 9

3.2 Zoning 9

3.3 Land Title Search 9

3.4 Aerial and Historical Photograph Review 9

3.5 ACT EPA Contaminated Site Search 10

3.6 Worksafe ACT Dangerous Goods Search 11

3.7 Storage Tanks 11

3.8 Building File Search 11

3.9 Hazardous Materials 11

3.10 Chemical Storage 11

3.11 Manufacturing Processes 11

3.12 Discharges to Land, Water and Air 11

4. Site Condition and Environmental Setting **12**

4.1 Topography 12

4.2 Visible Signs of Contamination 12

4.3 Fill Material 12

4.4 Odours 12

4.5 Staining 12

5. Geology and Hydrogeology **13**

5.1 Geology 13

5.2 Hydrogeology 13
5.3 Hydrology 13
5.4 Acid Sulfate Soil Risk 13
6. Conceptual Site Model 14
6.1 Areas of Environmental Concern 14
6.2 Contaminants of Potential Concern 14
6.3 Exposure Pathways and Receptors 15
7. Summary and Conclusions 16
7.1 Recommendations 17
8. References 18

List of Tables

Table 1: Summary of Site Details 7
Table 2: Details of the Review of Aerial Photographs 9
Table 3: Summary of Exposure Pathways 15

Appendices

Appendix A Figures
Appendix B Site Photographs
Appendix C Lotsearch Environmental Risk Report
Appendix D Contaminated Land Search

Executive Summary

Cardno (ACT/NSW) Pty Ltd (Cardno) engaged Lanterra Consulting Pty Ltd (Lanterra) to complete a Preliminary Site Investigation (PSI) for Block 14 Section 41, Lyneham, ACT (herein referred to as the Site).

It is understood that site has an approximate area of 2,359 square metres (m^2) and is used by ACT Parks and Conservation. The site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. The site is currently zoned as RZ1: Suburban under the ACT Territory Plan and it is understood that the site is to be assessed for its suitability to be redeveloped for the uses permitted by this zone.

The objective of the PSI is to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

The following scope of work was completed to meet the project objectives:

- Review aerial photographs that are available of the site to assist with identifying previous land uses.
- Review of the results of an ACT Environment Protection Authority (EPA) contaminated sites search to understand any known contamination issues that may be on record.
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology.
- A search of the WorkSafe ACT Dangerous Goods Database for the storage of dangerous goods on the site.
- Conduct an initial site visit to understand the layout of the site and assess whether there is any obvious visual or olfactory indicators of contamination on the site.
- Prepare a preliminary site investigation report for submission to Cardno

Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility and fuel storage and vehicle maintenance activities may have been undertaken. The results of the investigation have identified three (3) areas of environmental concern (AEC) on the site:

AEC 1: Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern, given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

At present there is insufficient information to assess the suitability of the site for the land uses permitted under the RZ1: Suburban zone and a detailed site investigation would be required to assess the suitability of the site.

1. Introduction

Cardno (ACT/NSW) Pty Ltd (Cardno) engaged Lanterra Consulting Pty Ltd (Lanterra) to complete a Preliminary Site Investigation (PSI) for Block 14, Section 41 Lyneham, ACT (herein referred to as the Site).

1.1 Background

The site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. It is occupied by the ACT Parkes and Conservation and has an approximate area of 2,359 square metres (m^2). It is currently zones as RZ1: Suburban, under the ACT Territory Plan. The purpose of this investigation is to assess whether past or present activities on the site have the potential to introduce contaminants which may pose a contamination risk to the suitability of the site for future use.

The location and layout of the site is illustrated on **Figure 1** and **Figure 2, Appendix A**.

1.2 Objectives

The objective of the PSI is to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

1.3 Scope of Work

The following scope of work has been completed to meet the project objectives:

- Review aerial photographs that are available of the site to assist with identifying previous land uses.
- Review of the results of an ACT Environment Protection Authority (EPA) contaminated sites search to understand any known contamination issues that may be on record.
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology.
- A search of the WorkSafe ACT Dangerous Goods Database for the storage of dangerous goods on the site.
- Conduct a site visit to understand the layout of the site and assess whether there is any obvious visual or olfactory indicators of contamination on the site.
- Prepare a preliminary site investigation report for submission to Cardno

1.4 Limitations

The findings of the report are based on the Scope of Work outlined above. Lanterra has perform services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties express or implied, are made.

The assessment was limited strictly to identifying typical environmental conditions associated with the subject property area and does not include evaluation of any other issues.

The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the site.

The results of this assessment are based upon the site inspection and the sampling specified above conducted by Lanterra personnel and information from the Client or regulatory agencies. All

conclusions and recommendations regarding the property area will be the professional opinions of the Lanterra personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability are made, Lanterra will not assume responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Lanterra, or developments resulting from situations outside the scope of this project.

2. Site Characteristics

2.1 Site Location

The site location and a detailed site plan are presented as **Figure 1** and **Figure 2**, **Appendix A**.

Table 1: *Summary of Site Details*

Site Characteristics	Detail
Street Address	Wattle Street, Lyneham
Approximate Easting and Northing (centre of site)	Easting: 693573.83 Northing: 6096545.93
Approximate Elevation (m AHD)	568 m
Block, Section, Division	Block 14, Section 41 Lyneham
Land Zoning	RZ1: Suburban
Current Land Use	Occupied office building
Block Area	2,359m^2

2.2 Site Description

The following description is based on observations made during a site visit conducted on Friday 28 June 2019 by a suitably qualified environmental scientist from Lanterra.

In addition to the single storey building on the site, there are two (2) sheds and two (2) shipping containers located along the southeast site boundary. Observations made during the site visit are presented below:

- The site surface was predominantly unsealed gravel.
- The site was secured by 2m high chain mesh fence with barbed wire. Access on to the site was via a security gate along Wattle Street.
- A retaining wall encircled the northeast and southeast boundaries of the site, with a secondary U-shaped retaining wall located along the north eastern boundary of the site which forms what may have been a soil storage area. This area is sealed with concrete, with some cracking.
- The site is predominantly flat with a gentle slope towards the northeast.
- To the west of the site is Wattle Street, to the south and east is open space, and to the north there is medium-high density residential properties.
- The main building on the site is currently used for fish research.
- The western shed contains general fishing equipment and filing cabinets. The concrete floor is in good condition.
- The larger shed is sealed with a concrete floor that exhibited some staining and cracking. There is a self-contained flammable liquids cupboard that contains engine oil. There is also a boat, fishing and electrical equipment.

A detailed site plan is presented in **Figure 2** while photographs of the site are provided in **Appendix B**.

2.3 Surrounding Land Uses

A summary of the land uses that surround the site are as follows:

- **North:** Medium density residential properties;
- **South:** Low density residential properties;
- **East:** Urban open space, treed parkland that is bounded on the north-east by Sullivans Creek stormwater drain, and Goodwin Street, opposite Goodwin Street are low density residential properties and a stormwater retention basin;
- **West:** low density residential properties on the opposite side of Wattle Street.

2.4 Sensitive Environments

The low and medium density residential properties surrounding the property are the nearest sensitive receptors, in addition to Sullivans Creek which is located 50m to the northeast of the site and carries stormwater to Lake Burley Griffin.

2.5 Proposed Land Use

This report aimed to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

3. Site History

3.1 Previous Investigations

No previous environmental or geotechnical investigations were made available to Lanterra.

3.2 Zoning

According to the ACT Territory Plan, the site is zoned RZ1: Suburban.

Based on the ACT Territory Plan, the objectives of the RZ1: Suburban zone are as follows:

- Provide for the establishment and maintenance of residential areas where the housing is low rise and predominantly single dwelling and low density in character
- Protect the character of established single dwelling housing areas by limiting the extent of change that can occur particularly with regard to the original pattern of subdivision and the density of dwellings
- Provide for a wide range of affordable and sustainable housing choices that meet changing household and community needs
- Ensure development respects valued features of the neighbourhood and landscape character of the area and does not have unreasonable negative impacts on neighbouring properties
- Provide opportunities for home based employment consistent with residential amenity
- Provide for a limited range of small-scale facilities to meet local needs consistent with residential amenity
- Promote good solar access
- Promote energy efficiency and conservation
- Promote sustainable water use
- Promote active living and active travel

3.3 Land Title Search

A land title search lodged with the ACT Land Information System found no records of the site.

3.4 Aerial and Historical Photograph Review

A review of historical aerial photographs was completed to assist with assessing the history of the site. A summary of each photograph examined as a part of the investigation is provided in Table 2 below.

Table 2: *Details of the Review of Aerial Photographs*

Date	Description of the Subject Site	Description of Surrounding Land
1950	The site is vacant, undeveloped land.	The surrounding land is vacant and undeveloped. There are sporadic trees and a wide creek line is visible, approximately where Sullivan's Creek is presently.
1958	The building has been constructed on the site and appears to have the same configuration as currently present on the site.	Low density residential houses and roads to the south-west of the site have been constructed. Sullivan's Creek has been converted to a

Date	Description of the Subject Site	Description of Surrounding Land
		stormwater drain and the surrounding creek bed filled. Some trees are visible on the site. What appears to be an unsealed road has been constructed in the same location as the current Goodwin Street.
1961	No discernible differences to the site are apparent.	Trees have been planted to the south and north of the site, the roads appear to be sealed and more low density residential houses have been constructed to the north-east of the site.
1967	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
1973	No discernible differences to the site are apparent.	The area directly to the north of the site has been developed into the current medium density apartment buildings, with corresponding carparks. The existing trees have grown.
1978	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
1981	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
1985	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
1992	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
1997	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
2004	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
2008	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.
2017	No discernible differences to the site are apparent.	No discernible differences to the surrounding area are apparent.

A copy of the Lotsearch Report is presented in **Appendix C**.

3.5 ACT EPA Contaminated Site Search

Lanterra requested a contaminated land search under Section 21 (A) of the Environment Protection Act (1997) from the ACT Environment Protection Authority (EPA). EPA records indicated that the site

is occupied by a depot facility. Fuel storage and vehicle maintenance activities may have been undertaken at the site associated with the operation of the depot.

The ANZECC 1992, Guidelines for the Assessment and Management of Contaminated Sites and the ACT EPA 2017 Contaminated Sites Environment Protection Policy (EPP) list fuel storage and vehicle maintenance as activities associated with land contamination which may pose a risk to human health and the environment.

3.6 Worksafe ACT Dangerous Goods Search

A dangerous goods search for the site was not conducted due to difficulties in obtaining authorisation from the correct lessee of the site. However, based on the results of the site visit an other records reviewed, the absence of the dangerous goods search does not change the outcomes of the investigation.

3.7 Storage Tanks

There was no evidence of storage tanks during the site walkover.

3.8 Building File Search

A building file search returned no files for Block 14, Section 41, Lyneham on record.

3.9 Hazardous Materials

No hazardous materials survey reports were made available to Lanterra.

3.10 Chemical Storage

Given evidence through discussions with ACT Property Group that the site was previously used as a depot, the building may have been used to store chemicals and heavy machinery. During the site visit, small volumes of chemicals (volumes of less than 20 litres).

3.11 Manufacturing Processes

There are no known manufacturing processes that currently occur or have previously occurred on the site.

3.12 Discharges to Land, Water and Air

No information regarding discharges to land, water and air was available for review at the time of writing this report. As no manufacturing operations are known to have occurred at the site, it is unlikely that there may have been previous discharges to land, water or air in the past.

4. Site Condition and Environmental Setting

4.1 Topography

The digital topographic map presented in ACTMAPi (available at http://www.actmapi.act.gov.au/) indicates the site has an elevation of approximately 568 m above Australian Height Datum (m AHD). The general topography of the block and surrounding area is relatively flat.

4.2 Visible Signs of Contamination

Other than some minor oil stains from leaks from vehicles that were observed on the concrete of the main building, there were no visible indications of contamination observed during the site visit conducted on 28 June 2019.

4.3 Fill Material

Based on the proximity of the site to the original Sullivan's Creek, which was later filled in for development, there is a possibility that fill material may have been imported onto the site, particularly along the site's northeast boundary.

4.4 Odours

There was no olfactory indicators of possible contamination during the site walkover.

4.5 Staining

Minor oil spot staining was observed on the concrete surface inside the main building.

5. Geology and Hydrogeology

5.1 Geology

The 1:100,000 Geological Series, Canberra, New South Wales and Australian Capital Territory, Sheet 8727 (Bureau of Mineral Resources, 1992) shows that the site is comprised of quaternary alluviual sediments made up of gravel, sand, silty clay, and black organic clay. This is underlain by Black Mountain Sandstone comprised of early Silurian sandstone, siltstone and minor shale.

5.2 Hydrogeology

A groundwater bore search was provided within the Lotsearch report (**Appendix C**). The purpose of the bore search was to document the location and depth of any nearby registered groundwater bores and assess the associated quality of the groundwater so that potential impacts of contaminants from the site or surrounding land uses (if any) on local users of groundwater may be assessed. A copy of the groundwater bore search results is presented in **Appendix C**.

This search indicated that there were two (2) abstraction groundwater boreholes according to the ACT Government data source and nine (9) groundwater boreholes were registered with the Bureau of Mineralogy within 2 km of the site. The nearest of these boreholes is located approximately 990 m to the north of the site.

A review of the Bureau of Mineral Resources (1984) Hydrogeology of the Australian Capital Territory and Environs indicates that groundwater is hosted in unconsolidated aquifers with highly permeable layers rarely occurring, and of limited areal extent. These aquifers have generally poor storage except where leakage occurs from underlying fractured rock aquifers. The quality of groundwater is expected to be variable, and the general total dissolved solids (TDS) is anticipated to be between 500-1000 milligrams per litre (mg/l) and the yield is estimated to be between 0.5-1.0 litres per second (l/sec).

Based on the topography of the site and the nearest water body which is the stormwater retention basin to the north-east, the groundwater flow direction is inferred to be in a north easterly direction. Based on the elevation difference between the site and the retention basin, the depth to groundwater is estimated to be approximately 5-10 m below ground level.

5.3 Hydrology

The nearest surface water receptor is Sullivan's Creek and is located approximately 50m north-east of the site.

Surface water on the site is expected to follow the topographic contours of the site and flow in a north-easterly direction where the water would be captured by Sullivan's Creek stormwater drains.

5.4 Acid Sulfate Soil Risk

A review of the Australian Soil Resource Information System (ASRIS) map shows the subject site to be situated in an area of extremely low probability for acid sulfate soil.

6. Conceptual Site Model

Conceptual site models (CSM) are a method of presenting site contamination information and the relationships between sources of contamination, how it may have been introduced to the site, possible pathways for contaminant migration and exposure and the receptors that may be affected by contaminants.

6.1 Areas of Environmental Concern

Based on the information presented in the Lotsearch report and the observations made during the site visit on 28 June 2019, three (3) areas of environmental concern were identified, that may present a contamination risk that could compromise the suitability of the site for the land uses permitted under the RZ1: Suburban zone.

AEC 1: Based on the historical aerial photographs and the slope of the site and surrounding area, there is a strong likelihood of fill located specifically along the northeast boundary of the property. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern, given that the site was potentially used to store heavy equipment, including trucks. The leaks and spills associated with this could be potential sources of contamination.

AEC 3: Given the previous use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site may have also been used to store machinery and/or chemicals.

6.2 Contaminants of Potential Concern

Potential contaminants of concern for each AEC are as follows:

AEC 1

Contaminants associated with imported fill can include:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine and organphosphate pesticides (OCP/OPP);
- Polychlorinated Biphenyls (PCB);
- Phenols;
- Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).
- Asbestos

AEC 2

Contaminants associated with vehicle leaks and spills can include:

- TRH;
- BTEX;
- PAH;
- lead.

AEC 3

Contaminants associated with the storage of machinery and or chemicals can include:

- TRH;
- BTEX;
- PAH;
- OCP/OPP;
- Phenols;
- Heavy Metals

Based on the age of the building, it is noted that asbestos containing materials (ACM) may have been used as construction materials and a hazardous material survey should be completed prior to any demolition.

6.3 Exposure Pathways and Receptors

Based on the results of this PSI, a summary of the potential exposure pathways is shown in Table 3.

Table 3: *Summary of Exposure Pathways*

Pathway	Contaminants of Concern	Exposure Pathway Complete or Potentially Complete (Yes/No)	Comments
Direct Contact with Soil including dermal contact and ingestion	TRH, BTEX, PAH, OCP/OPP, PCB, Phenols, Heavy metals.	Potentially Complete	Based on the possible storage/maintenance of equipment and vehicles and the possible storage of chemicals on the site, any contaminating activities are likely to have occurred at the surface.
Direct Contact with Groundwater including dermal contact and ingestion	TRH, BTEX, PAH, OCP/OPP, PCB, Phenols, Heavy metals.	Incomplete	While no groundwater abstraction wells are located on the site, if contaminants are present the pathway is potentially complete.
Inhalation of Asbestos Fibres	Asbestos	Incomplete	No asbestos was identified during the site visit. This excludes asbestos containing materials that may be present as a part of the building construction.
Inhalation of gasses and vapour	TRH, BTEX	Incomplete	No fuel storage facilities or chemical stores of volatile compounds were identified on the site.

7. Summary and Conclusions

Cardno (ACT/NSW) Pty Ltd (Cardno) engaged Lanterra Consulting Pty Ltd (Lanterra) to complete a Preliminary Site Investigation (PSI) for Block 14 Section 41, Lyneham, ACT (herein referred to as the Site).

It is understood that site has an approximate area of 2,359 square metres (m^2) and is used by ACT Parks and Conservation. The site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. The site is currently zoned as RZ1: Suburban under the ACT Territory Plan and it is understood that the site is to be assessed for its suitability to be redeveloped for the uses permitted by this zone.

The objective of the PSI is to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

The following scope of work was completed to meet the project objectives:

- Review aerial photographs that are available of the site to assist with identifying previous land uses.
- Review of the results of an ACT Environment Protection Authority (EPA) contaminated sites search to understand any known contamination issues that may be on record.
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology.
- Conduct an initial site visit to understand the layout of the site and assess whether there is any obvious visual or olfactory indicators of contamination on the site.
- Prepare a preliminary site investigation report for submission to Cardno

Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility and fuel storage and vehicle maintenance activities may have been undertaken. The results of the investigation have identified three (3) areas of environmental concern (AEC) on the site:

AEC 1: Based on the historical aerial photographs and the slope of the site and surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern, given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

At present there is insufficient information to assess the suitability of the site for the land uses permitted under the RZ1: Suburban zone. Therefore, Lanterra recommends a detailed site investigation is undertaken to assess whether the contaminants of potential concern are present, and whether there is impact on the site that may compromise the suitability of the site for uses permitted under the RZ1: Suburban zone.

7.1 Recommendations

The exact historical use of the site is unclear and it was formerly used as a depot and activities that may introduce contamination onto the site may have been undertaken.

Based on this, Lanterra recommends that a detailed site investigation is completed to assess whether the contaminants of potential concern are present, and the site may be suitable for the land uses permitted under the RZ1 Suburban zone.

8. References

ACT EPA (2009) '*Contaminated Sites Environment Protection Policy*'

ACT EPA (2018) '*Information Sheet 7 – Guidance for Undertaking Preliminary Contamination Investigations for Development/Lease Variation Purposes*'

ACT EPA (2018) '*Information Sheet 4 - Requirements for the Reuse and Disposal of Contaminated Soil in the ACT*'

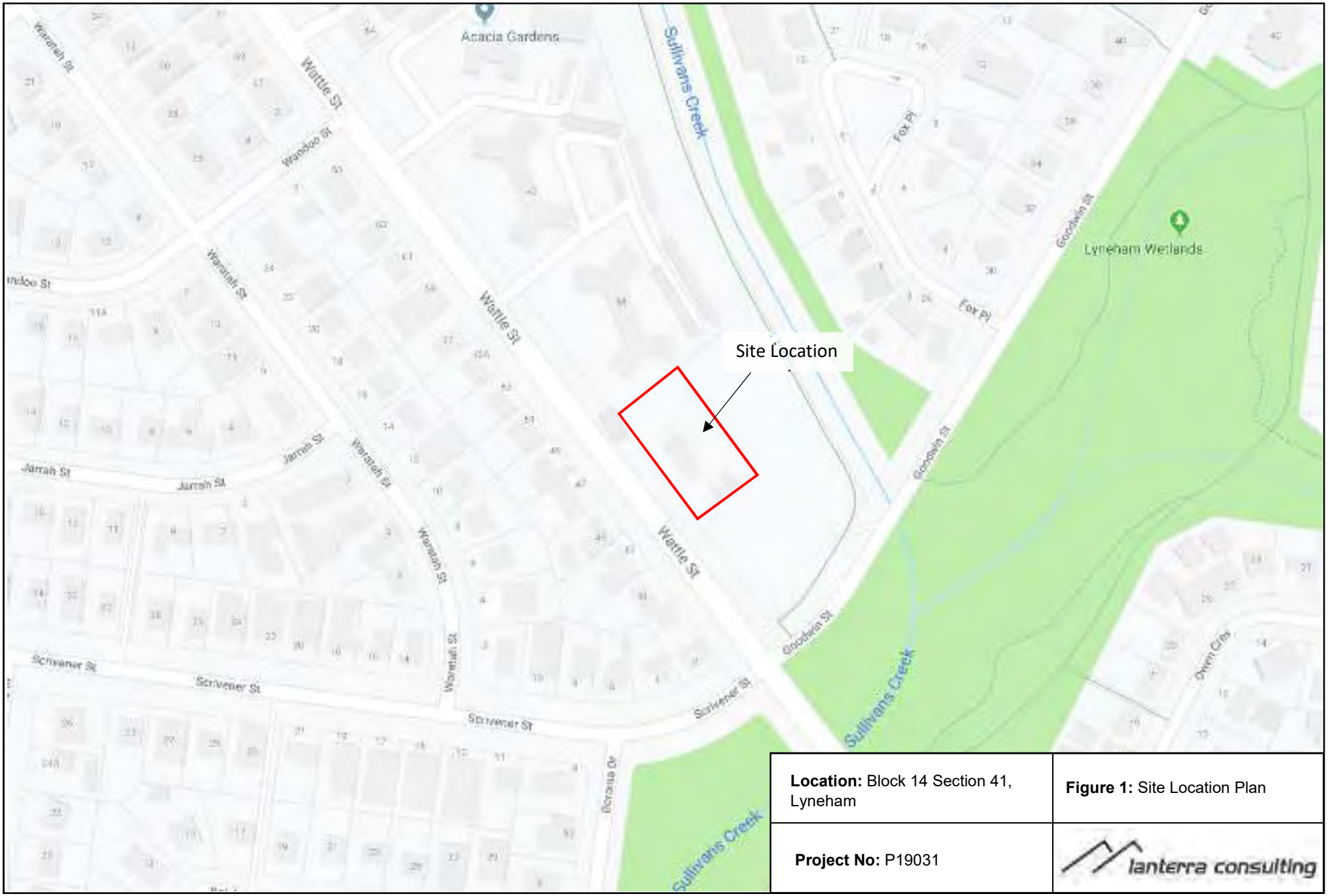
Bureau of Mineral Resources, Geology and Geophysics (1984) '*1:100,000 Hydrogeology of the Austrailan Capital Territory and Environs*'

Bureau of Mineral Resources, Geology and Geophysics (1992) '*1:100,000 Geological Series, Canberra, New South Wales and Australian Capital Territory, Sheet 8727*'

National Environment Protection Council (1999) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' (amended 2013).

Appendix A

Figures



Location: Block 14 Section 41, Lyneham	**Figure 1:** Site Location Plan
Project No: P19031	lanterra consulting



Location: Block 41 Section 14, Lyneham	**Figure 2:** Detailed Site Plan
Project No: P19031	lanterra consulting



Location: Block 41 Section 14, Lyneham	**Figure 3:** Areas of Environmental Concern
Project No: P19031	lanterra consulting

Appendix B

Site Photographs

Ianterra consulting	**SITE PHOTOGRAPHS**

Client Name	**Site Location**	**Project No.**
Cardno (ACT/NSW) Pty Ltd	Block 14, Section 41 Lyneham (Wattle street)	P19031

Photo No.	**Date**
1	11/06/2019

Description

Photograph from the south eastern boundary of the site showing a storage building.



Photo No.	**Date**
2	28/06/2019

Description

Possible soil storage bay of former depot facility.



lanterra consulting	**SITE PHOTOGRAPHS**

Client Name	**Site Location**	**Project No.**
Cardno (ACT/NSW) Pty Ltd	Block 14, Section 41 Lyneham (Wattle street)	P19031

Photo No.	**Date**
3	28/06/2019

Description

Current internal laboratory within the existing building



Photo No.	**Date**
4	28/06/2019

Description

Minor spot oil stains on concrete floor of main building.



lanterra consulting	**SITE PHOTOGRAPHS**

Client Name	**Site Location**	**Project No.**
Cardno (ACT/NSW) Pty Ltd	Block 14, Section 41 Lyneham (Wattle street)	P19031

Photo No.	**Date**
5	28/06/2019

Description

Fill located along the eastern boundary



Photo No.	**Date**
6	28/06/2019

Description

Unsealed surface located in the centre of the site.



Appendix C

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Address: Wattle Street, Lyneham, ACT 2602

Date: 23 May 2019 15:33:25

Reference: LS006425 EP

Report Buffer: 1000m

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Table of Contents

Location Confidences 2
Dataset Listing 3
Site Location Aerial 5
Contaminated Sites Register & Waste Management Facilities 6
PFAS Investigation Programs 8
Defence Sites 9
EPA Authorisations & Agreements 10
Historical Business Directories 12
Historical Aerial Imagery & Maps 23
Topographic Features 44
Elevation Contours 49
Hydrogeology & Groundwater Boreholes 50
Geology 54
Soil Landscapes 56
Acid Sulfate Soils 60
Territory Plan Zones 62
Territory Plan Overlays 66
Heritage 69
Natural Hazards 72
Ecological Constraints 74
Terms & Conditions 84

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a confidence is given under the field heading “LocConf” or “Location Confidence”.

Location Confidence	Description
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced with the confidence of the general/approximate area
Road Match	Georeferenced to the road or rail
Road Intersection	Georeferenced to the road intersection
Buffered Point	Feature is a buffered point
Network of Features	Georeferenced to a network of features

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Land Administration Databases	ACT Government	30/04/2019	30/04/2019	Quarterly	-	-	-
Register of Contaminated Sites	ACT Government - Environment Protection Authority	03/05/2019	03/05/2019	Monthly	0	0	8
National Waste Management Facilities Database	Geoscience Australia	07/05/2019	07/03/2017	Quarterly	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	29/04/2019	29/04/2019	Monthly	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	29/04/2019	29/04/2019	Monthly	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	29/04/2019	29/04/2019	Monthly	0	0	0
EPA Authorisations	Environment Protection Authority	30/04/2019	30/04/2019	Monthly	0	2	13
EPA Agreements	Environment Protection Authority	30/04/2019	30/04/2019	Monthly	0	0	2
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	0	2	3
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	-	11	11
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	0	6	8
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	-	11	11
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	0	3	3
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	-	19	19
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	-	2	2
Features of Interest	ACT Government	18/03/2019	18/03/2019	Quarterly	0	1	106
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1	1	1
Hydrogeological Landscapes Units	ACT Government - Environment, Planning and Sustainable Development Directorate	04/01/2018	22/11/2017	As required	1	1	1
Groundwater Boreholes (ACT)	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	2
Groundwater Boreholes (Bureau of Meteorology)	Commonwealth of Australia (Bureau of Meteorology)	20/11/2017	25/08/2017	Annually	0	0	9
Geological Units 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1	-	6
Geological Structures 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	0	-	1
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1	-	4
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1	1	2
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1	1	2

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Territory Plan Zones	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	1	8	102
Territory Plan Overlays (Areas)	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	2	24
Territory Plan Overlays (Lines)	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	11
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	2	2	2
Heritage Sites	ACT Government - Environment, Planning and Sustainable Development Directorate	19/03/2019	19/03/2019	Quarterly	0	0	8
Bushfire Prone Areas	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	0
Bushfire Abatement Zones	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	0
Bushfire Operational Plan - Access Management	ACT Government - Environment, Planning and Sustainable Development Directorate	26/02/2019	26/02/2019	Quarterly	0	0	0
Bushfire Operational Plan - Fuel Management	ACT Government - Environment, Planning and Sustainable Development Directorate	26/02/2019	26/02/2019	Quarterly	0	0	0
Flood 1 percent Annual Exceedance Probability	ACT Government - Environment, Planning and Sustainable Development Directorate	09/03/2018	18/01/2017	As required	0	0	0
Vegetation Communities	ACT Government	08/01/2019	04/01/2019	Annually	1	4	19
Vegetation Subformation	ACT Government	14/01/2019	14/01/2019	Annually	1	2	2
Threatened Woodland	ACT Government	08/01/2019	29/11/2018	Annually	0	0	0
Tree Register	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	15
Important Wetlands	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	0	1	1
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	23/05/2019	23/05/2019	Daily	-	-	-

Aerial Imagery 2017

Wattle Street, Lyneham, ACT 2602

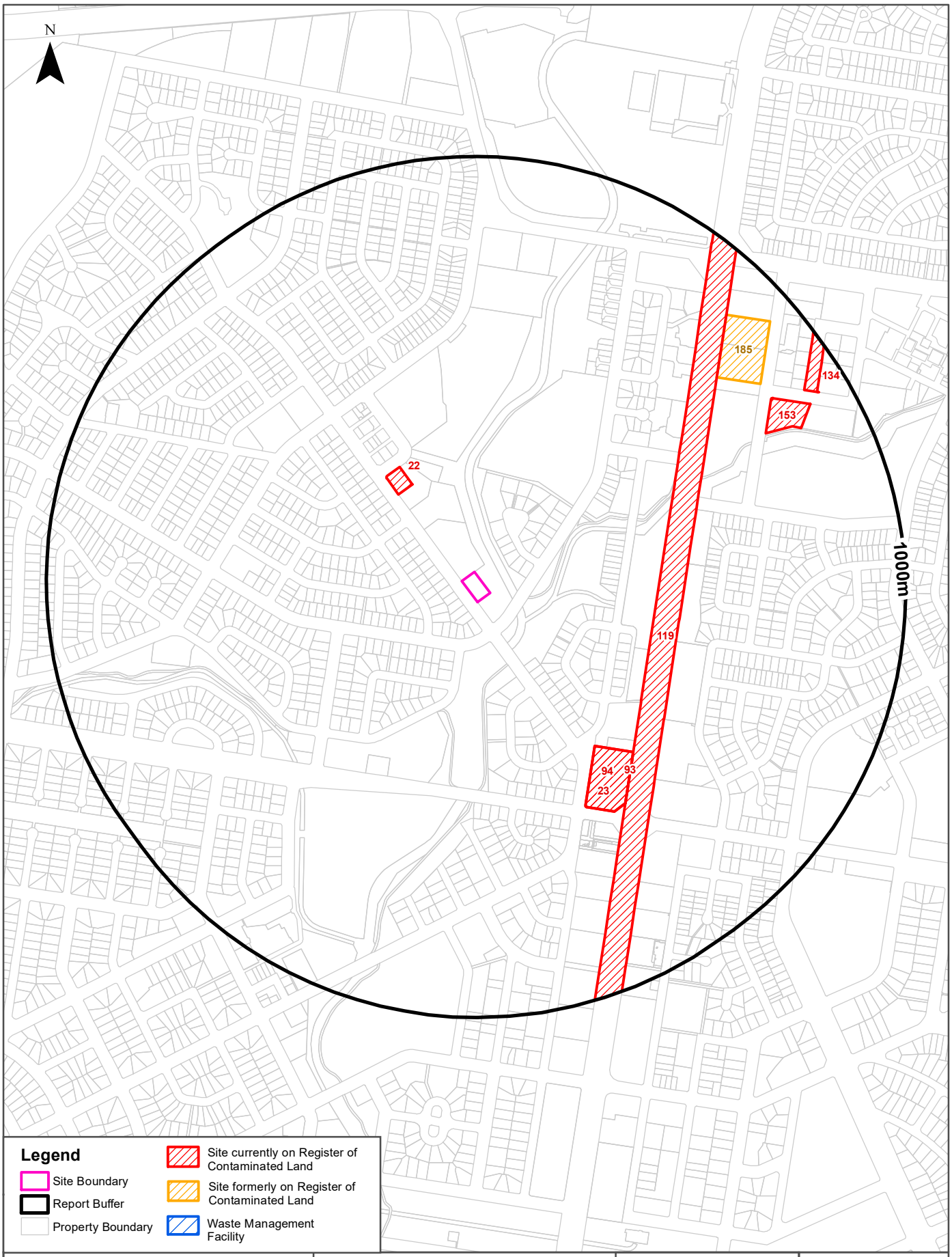


Scale:	Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 May 2019

0 25 50 100 Meters

Contaminated Sites Register & National Waste Facilities

Wattle Street, Lyneham, ACT 2602



Contaminated Land & Waste Management Facilities

Wattle Street, Lyneham, ACT 2602

Register of Contaminated Sites

Records from the ACT Register of Contaminated Sites within the report buffer:

Map Id	Site Description	Notification	District	Division	Section	Block	Status	Loc Conf	Dist	Direction
22	Former Caltex Service Station	76A(1)	Canberra Central	Lyneham	41	3	Site currently on EPA Register	Premise Match	258m	North West
119	Capital Metro alignment	76A(1)	Canberra Central		0	0	Site currently on EPA Register	Road Match	398m	North East
23	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	12	Site currently on EPA Register	Premise Match	445m	South East
94	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	26	Site currently on EPA Register	Premise Match	445m	South East
93	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	27	Site currently on EPA Register	Premise Match	533m	South East
185	Former ACT Motor Registry site	76A(1)	Canberra Central	Dickson	33	2	Site formerly on EPA Register	Premise Match	747m	North East
153	Former Government depot site	76(2)	Canberra Central	Dickson	34	3	Site currently on EPA Register	Premise Match	765m	North East
134	Woolley Street Dickson adjacent to former BP service station located at Block 1 Section 31 Dickson	76(2)	Canberra Central	Dickson	31	0	Site currently on EPA Register	Road Match	899m	North East

ACT Register of Contaminated Sites Data Source: ACT Government Environment Protection Authority
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National Waste Management Site Database

Sites on the National Waste Management Site Database within the report buffer:

Site Id	Owner	Name	Address	Suburb	Postcode	Landfill	Reprocess	Transfer	Loc Conf	Distance	Direction
N/A	No records in buffer										

Waste Management Facilities Data Source: Australian Government Geoscience Australia
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

PFAS Investigation Sites

Wattle Street, Lyneham, ACT 2602

Defence PFAS Investigation & Management Program

Sites being investigated or managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

Wattle Street, Lyneham, ACT 2602

Defence 3 Year Regional Contamination Investigation Program

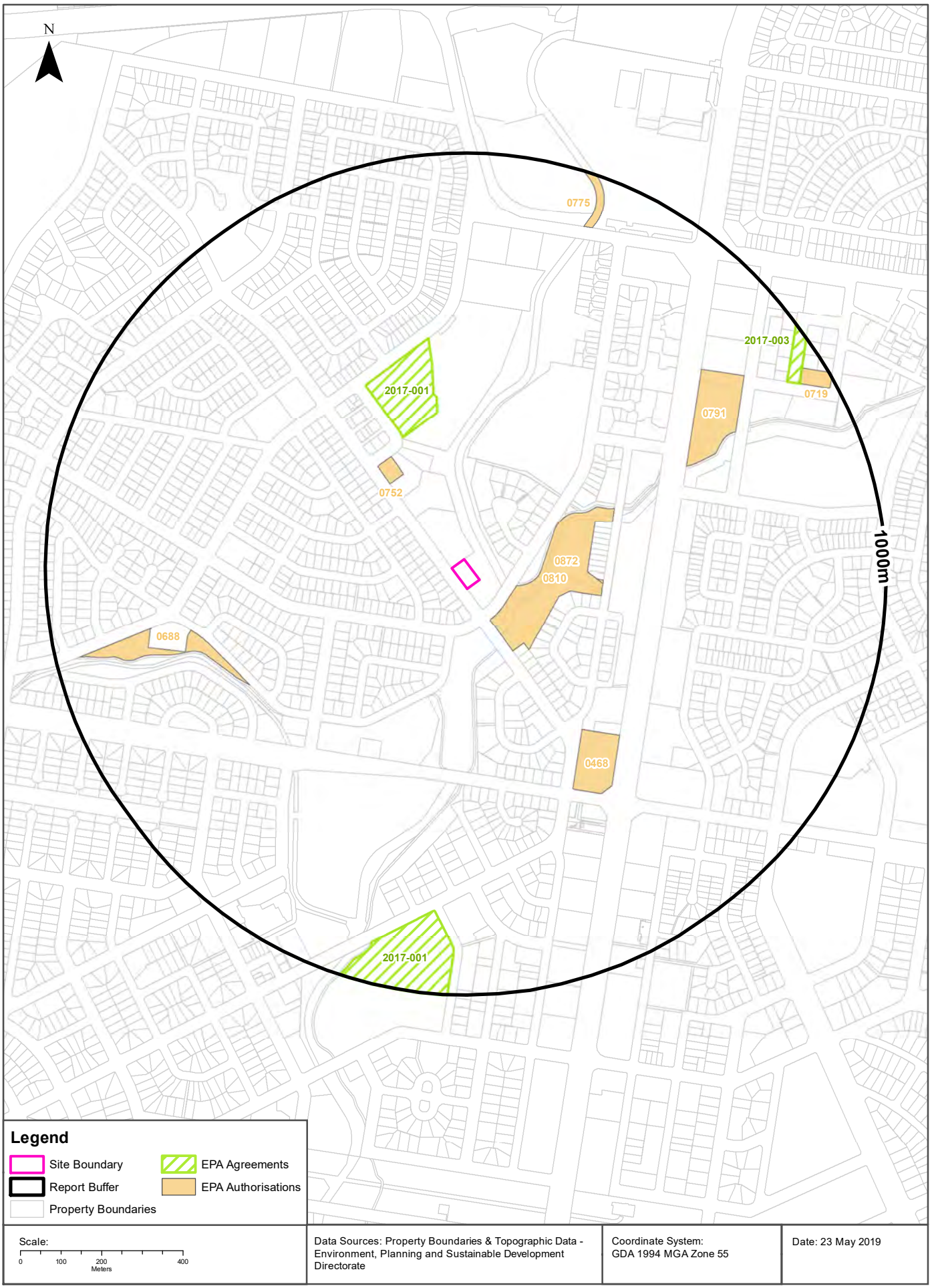
Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Authorisations and Agreements

Wattle Street, Lyneham, ACT 2602



EPA Authorisations & Agreements

Wattle Street, Lyneham, ACT 2602

EPA Authorisations

EPA Authorisations within the report buffer:
Note. Please click on ID Number to activate a hyperlink to online documentation. If link does not work, no documentation is accessible via the EPA.

ID Number	Activity	Business / Individual Name	Grant Date	Expiry Date	Status	Loc Conf	Distance	Direction
0810	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Guideline ACT Pty Ltd	11/2/2010	11/2/2011	Expired	Premise Match	82m	East
0872	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Guideline ACT Pty Ltd	12/7/2011	12/7/2012	Expired	Premise Match	82m	East
0752	Petroleum storage (Activity 30)	Caltex Petroleum Pty Ltd - LYNEHAM	10/3/2011	6/13/2012	Ceased	Premise Match	258m	North West
0468	Firewood (Activity 44)	City Services - Transport Canberra & City Services	9/3/2004	8/31/2017	Ceased	Premise Match	445m	South East
0688	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Department of the Environment, Climate Change, Energy and Water (DECCEW)	11/27/2009	11/27/2010	Ceased	Premise Match	574m	West
0791	Petroleum storage (Activity 30)	TransACT Capital Communications Pty Ltd	7/29/2010		Current	Premise Match	579m	North East
0775	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Cord Civil Pty Ltd	6/25/2010	6/25/2012	Expired	Premise Match	868m	North
0719	Petroleum storage (Activity 30)	Woolworths Petrol Limited - DICKSON	1/14/2010		Current	Premise Match	924m	North East
0036	Commercial use of chemicals (Activity 29)	Eagle Environmental Services Pty Ltd	8/10/1998	6/12/2001	Ceased	Suburb/Area Match	-	-
0215	Burning off (Activity 28)	Parks and Places	5/4/1999	6/1/1999	Expired	Suburb/Area Match	-	-
0270	Burning off (Activity 28)	Parks and Places	10/3/2000	12/19/2006	Ceased	Suburb/Area Match	-	-
0700	Outdoor concerts (Activity 23)	Northside Community Services	10/22/2009	10/25/2009	Expired	Suburb/Area Match	-	-
0725	Commercial use of chemicals (Activity 29)	Barrier Pest Management	11/6/2009	12/7/2011	Ceased	Suburb/Area Match	-	-

EPA Authorisations Data Source: ACT Government Environment Protection Authority
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EPA Agreements

Note. Due to the lack of premise details within the documentation, this list does not include the following agreement:
Land development

EPA Agreements within the report buffer:
Note. Please click on ID Number to activate a hyperlink to online documentation. If link does not work, no documentation is accessible via the EPA.

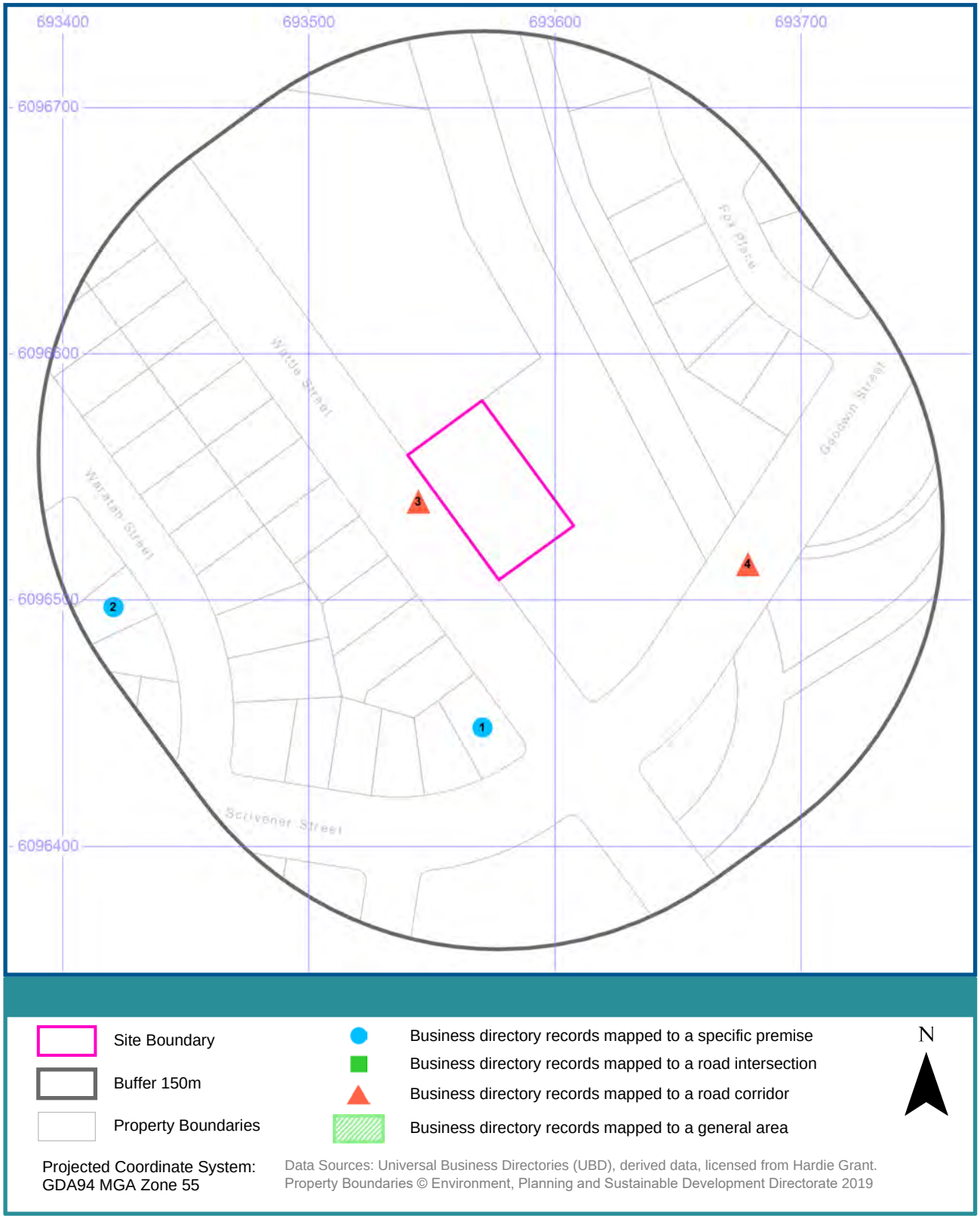
ID Number	Agreement Type	Business / Individual Name	Grant Date	Expiry Date	Status	Loc Conf	Distance	Direction
2017-001	Management of Contaminated Land	Education and Training Directorate	1/4/2017		Current	Premise Match	335m	South
2017-003	Management of Contaminated Land	BP Australia Pty Ltd	2/22/2017		Current	Road Match	899m	North East

EPA Agreements Data Source: ACT Government Environment Protection Authority
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Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1982 Business Directory Records



Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	ELECTRICAL APPLIANCES - REPAIRS &/OR SERVICE AGENTS	Atam Radio T.V.Service, 39 Wattle St., O'Connor., Canberra .(A.C.T.)	2384	Premise Match	39m	South
	RADIO &/OR TELEVISION SALES &/OR SERVICE &/OR HIRERS	Atam Radio T.V.Service, 39 Wattle St., O'Connor., Canberra .(A.C.T.)	5851	Premise Match	39m	South
2	PIANO TUNERS &/OR REPAIRERS	Pogsons Piano Sales & Service, 5 Waratah St., O'Connor., Canberra .(A.C.T.)	5540	Premise Match	120m	West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

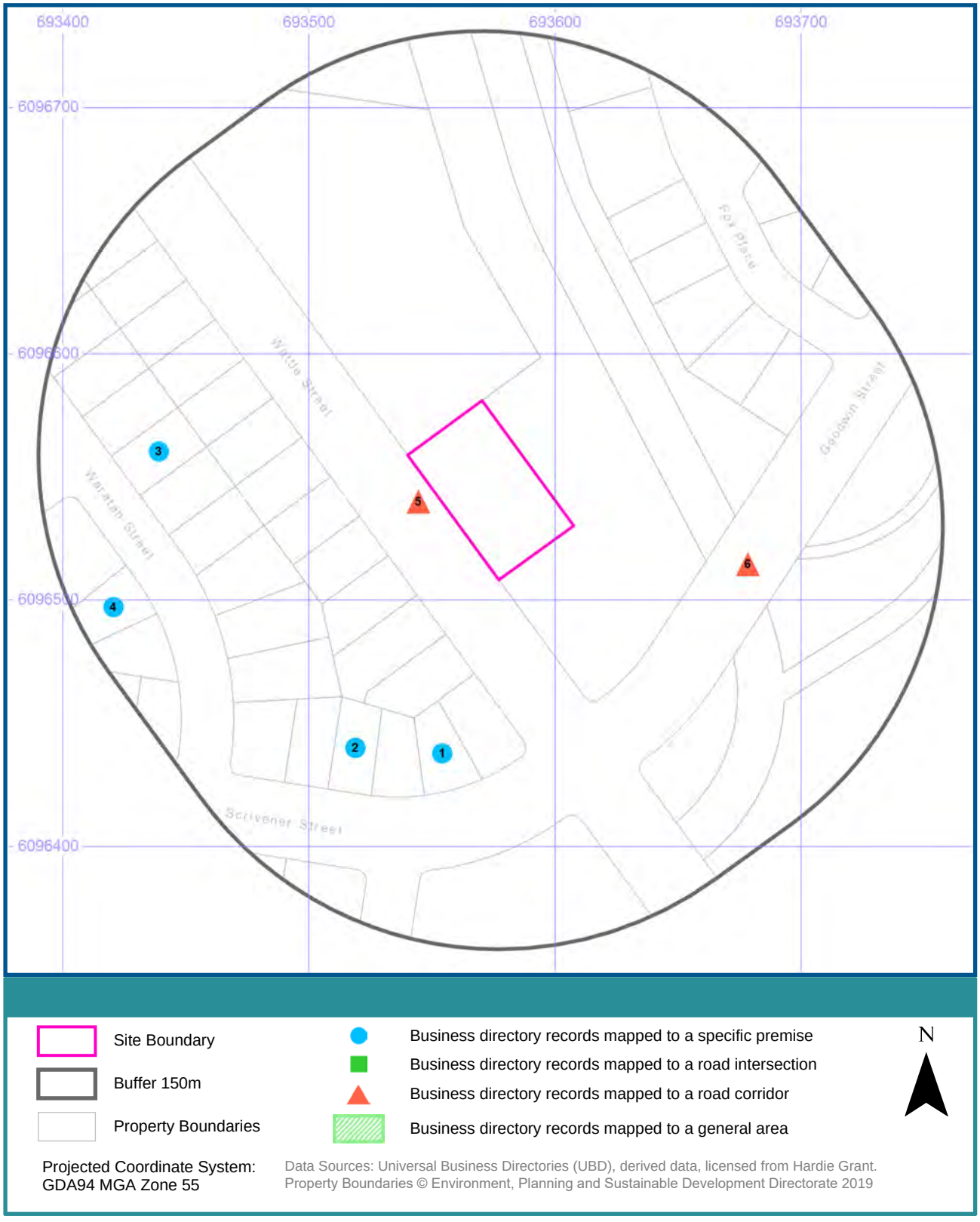
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	BUTCHERS - RETAIL	E. & R. Meat Service, Wattle St., Lyneham., Canberra .(A.C.T.)	1136	Road Match	0m
	CLUBS &/OR SPORTING BODIES	Lithuanian Australian Club, Wattle St., Lyneham., Canberra . (A.C.T.)	1699	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen. Wattle St., Lyneham., Canberra . (A.C.T.)	1990	Road Match	0m
	FISH SHOPS	Lyneham Fish Market, Wattle St., Lyneham., Canberra .(A.C.T.)	2794	Road Match	0m
	HAIRDRESSERS - LADIES &/OR BEAUTY SALONS	Lyneham Hair Fashions, Wattle St., Lyneham., Canberra . (A.C.T.)	3563	Road Match	0m
	MOTOR ACCESSORIES &/OR SPARE PARTS - RETAIL	Lyneham Service Centre, Wattle St., Lyneham., Canberra . (A.C.T.)	4579	Road Match	0m
	MOTOR GARAGES &/OR. ENGINEERS &/OR SERVICE STATIONS	Lyneham Service Centre. Wattle St., Lyneham., Canberra . (A.C.T.)	4875	Road Match	0m
	STAMP DEALERS	Lyneham Stamp Exchange, Wattle St., Lyneham., Canberra . (A.C.T.)	6686	Road Match	0m
	TOY DEALERS - RETAIL	Lyneham Stamp Exchange, Wattle St., Lyneham., Canberra . (A.C.T.)	7154	Road Match	0m
	MOTOR CAR &/OR TRUCK DEALERS - NEW &/OR USED	Monaro Multilist Motors, Wattle St., Lyneham., Canberra . (A.C.T.)	4692	Road Match	0m
4	SCHOOLS &/OR COLLEGES - PRIVATE &/OR PUBLIC	Lyneham High School, Goodwin St., Lyneham., Canberra . (A.C.T.)	6317	Road Match	53m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1970 Business Directory Records



Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1970 Business Directory Records
Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	BUILDING ALTERATIONS & REPAIRS	McGrath, J., 4 Scrivener St., O'Connor	1404	Premise Match	55m	South
	PLUMBERS, GASFITTERS & DRAINLAYERS	McGrath, James, 4 Scrivener St., O'Connor	5806	Premise Match	55m	South
2	BUILDING ALTERATIONS & REPAIRS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor	1401	Premise Match	71m	South West
	COMMERCIAL, INDUSTRIAL & HOME BUILDERS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor	1200	Premise Match	71m	South West
	PAINTERS, PAPERHANGERS & DECORATORS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor.	5487	Premise Match	71m	South West
3	INSTRUMENT REPAIRERS	Angus Instrument Makers, 14 Waratah St., O'Connor	4033	Premise Match	82m	West
4	MUSIC & MUSICAL INSTRUMENTS	Pogson's Piano Sales & Service, 5 Waratah St., O'Connor	5268	Premise Match	120m	West
	PIANO TUNERS & REPAIRERS	Pogson's Piano Sales & Service, 5 Waratah St., O'Connor	5678	Premise Match	120m	West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records
Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
5	BUTCHERS-RETAIL	E. & R. Meat Service, Wattle St., Lyneham	1467	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen, Wattle St., Lyneham	2115	Road Match	0m
	MIXED BUSINESSES	Lyneham Delicatessen, Wattle St., Lyneham	4855	Road Match	0m
	FISH SHOPS	Lyneham Fish Market, Wattle St., Lyneham	2976	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market, Wattle St., Lyneham	3129	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Fruit Market, Wattle St., Lyneham	4743	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	4913	Road Match	0m

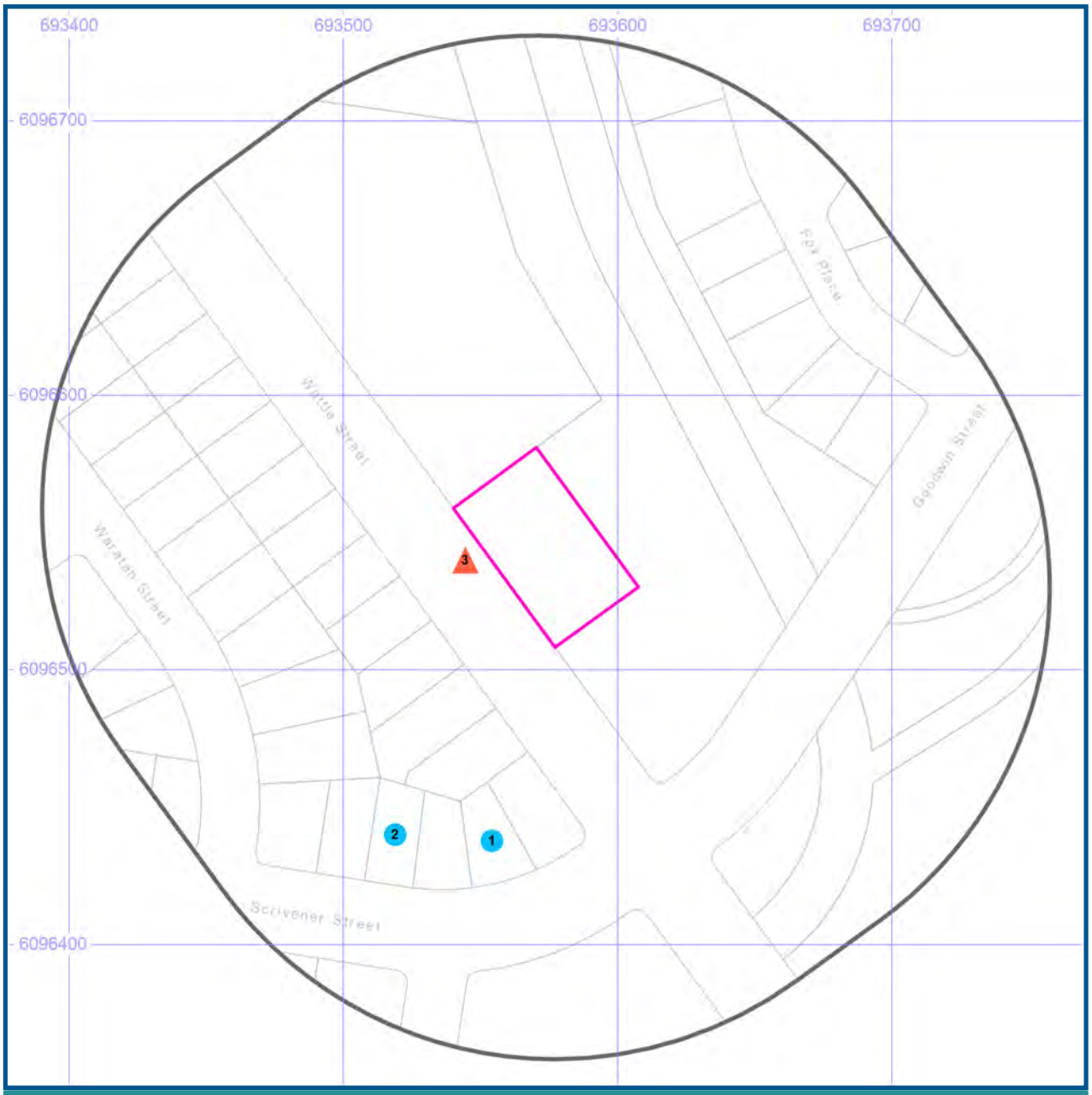
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
5	MOTOR CAR & TRUCK DEALERS-NEW & USED	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5013	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5139	Road Match	0m
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS	Petite Paris, Wattle St., Lyneham	881	Road Match	0m
6	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Lyneham High School, Goodwin St., Lyneham	196	Road Match	53m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1961 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1961 Business Directory Records
Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	BUILDING ALTERATIONS & REPAIRS	McGrath, J., 4 Scrivener St., O'Connor, Canberra	1221	Premise Match	55m	South
	PLUMBERS, GASFITTERS & DRAINLAYERS	McGrath, James, 4 Scrivener St., O'Connor, Canberra	3694	Premise Match	55m	South
2	PAINTERS, PAPERHANGERS & DECORATORS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor, Canberra	3534	Premise Match	71m	South West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records
Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	BUSINESS AGENTS & BROKERS	E. & R. Meat Service Wattle Street, Lyneham, Canberra	1239	Road Match	0m
	BUTCHERS-RETAIL	E. & R. Meat Service, Wattle St., Lyneham, Canberra	1252	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	1625	Road Match	0m
	GROCERS & GENERAL STOREKEEPERS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	2571	Road Match	0m
	MILK VENDORS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	3153	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	3134	Road Match	0m
	FISH MERCHANTS-WHOLESALE	Lyneham Fish market Wattle Street, Lyneham, Canberra	2049	Road Match	0m
	FISH MERCHANTS-RETAIL	Lyneham Fish Market, Wattle St., Lyneham, Canberra	2039	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market Wattle Street, Lyneham, Canberra	2204	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	2212	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	3135	Road Match	0m
	TOBACCONISTS-RETAIL	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	4211	Road Match	0m
	GIFT SHOPS	Lyneham Pharmacy, Wattle St., Lyneham, Canberra	2365	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	DELICATESSENS	M.P.R. Superette, Wattle St., Lyneham, Canberra	1631	Road Match	0m
	FOODS FROZEN-SPECIALISTS	M.P.R. Superette, Wattle St., Lyneham, Canberra	2094	Road Match	0m
	GROCERS & GENERAL STOREKEEPERS	M.P.R. Superette, Wattle St., Lyneham., Canberra	2578	Road Match	0m
	BEAUTY SALONS WOR LADIES' HAIRDRESSERS	Petit Paris Beauty Salon, Wattle St., Lyneham, Canberra	949	Road Match	0m
	CHEMISTS-PHARMACEUTICAL	Rollason, Wattle Park, Lyneham, Canberra	1467	Road Match	0m
	WINE & SPIRIT MERCHANTS-RETAIL	Superette, Wattle St., Lyneham, Canberra	4403	Road Match	0m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1950 Business Directory Records
Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records
Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

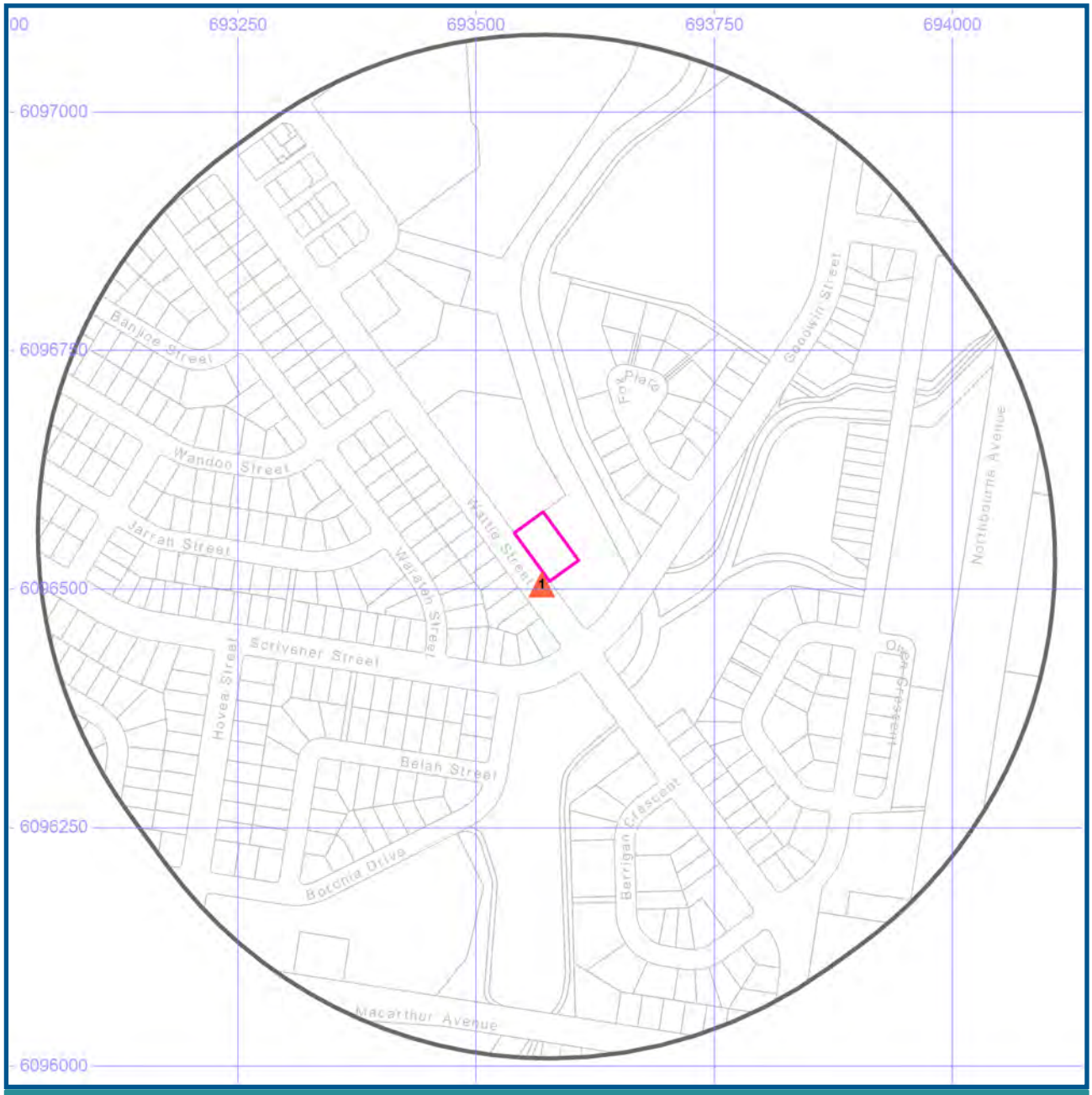
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

Dry Cleaners, Motor Garages & Service Stations



Site Boundary

Buffer 500m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
1	MOTOR GARAGES &/OR. ENGINEERS &/OR SERVICE STATIONS	Lyneham Service Centre. Wattle St., Lyneham., Canberra . (A.C.T.)	4875	1982	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5139	1970	Road Match	0m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Aerial Imagery 2008

Wattle Street, Lyneham, ACT 2602



Scale:
0 25 50 100
Meters

Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 55

Date: 22 May 2019

Aerial Imagery 2002

Wattle Street, Lyneham, ACT 2602



Scale: 0 25 50 100 Meters	Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 May 2019

Aerial Imagery 1997

Wattle Street, Lyneham, ACT 2602



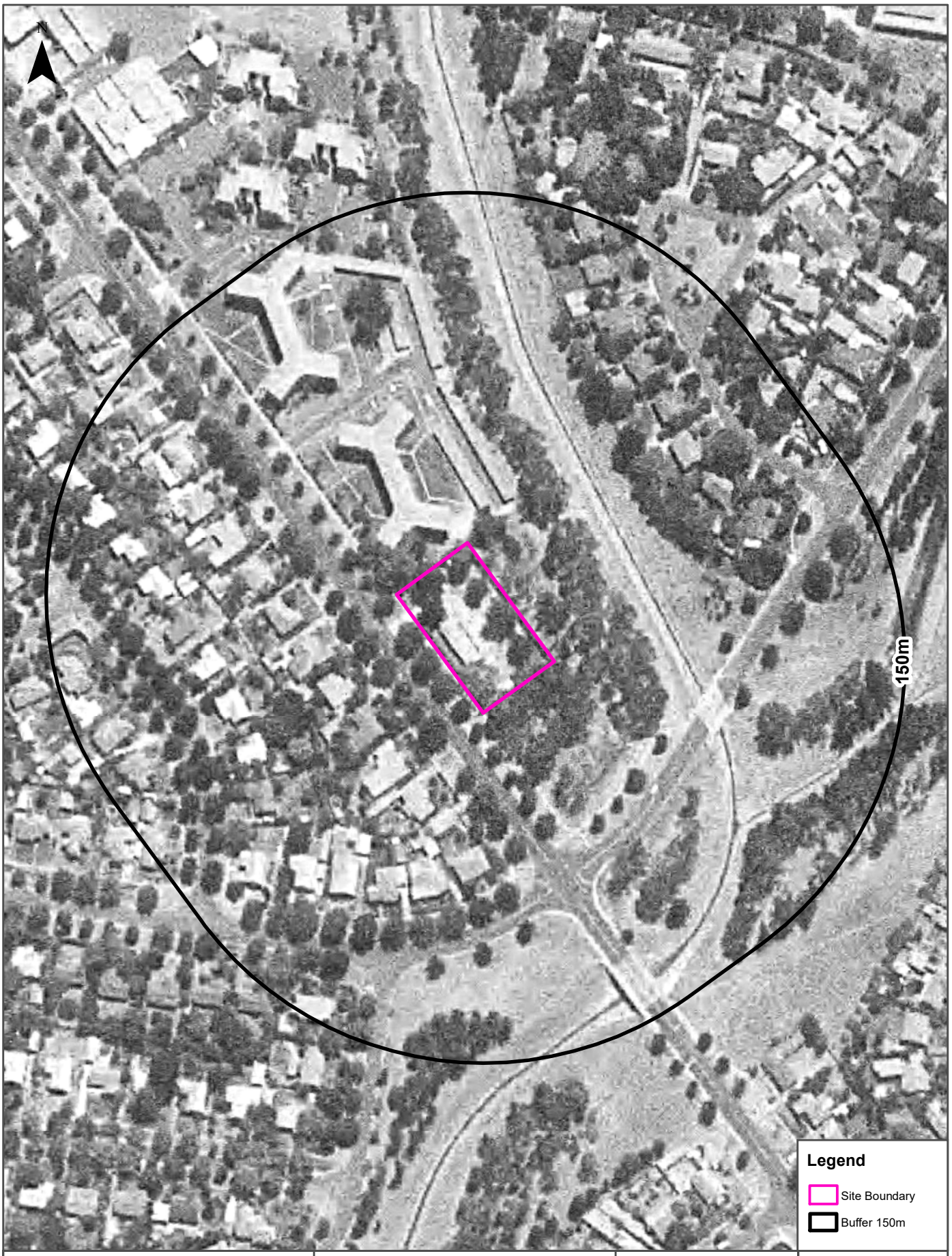
Aerial Imagery 1992

Wattle Street, Lyneham, ACT 2602



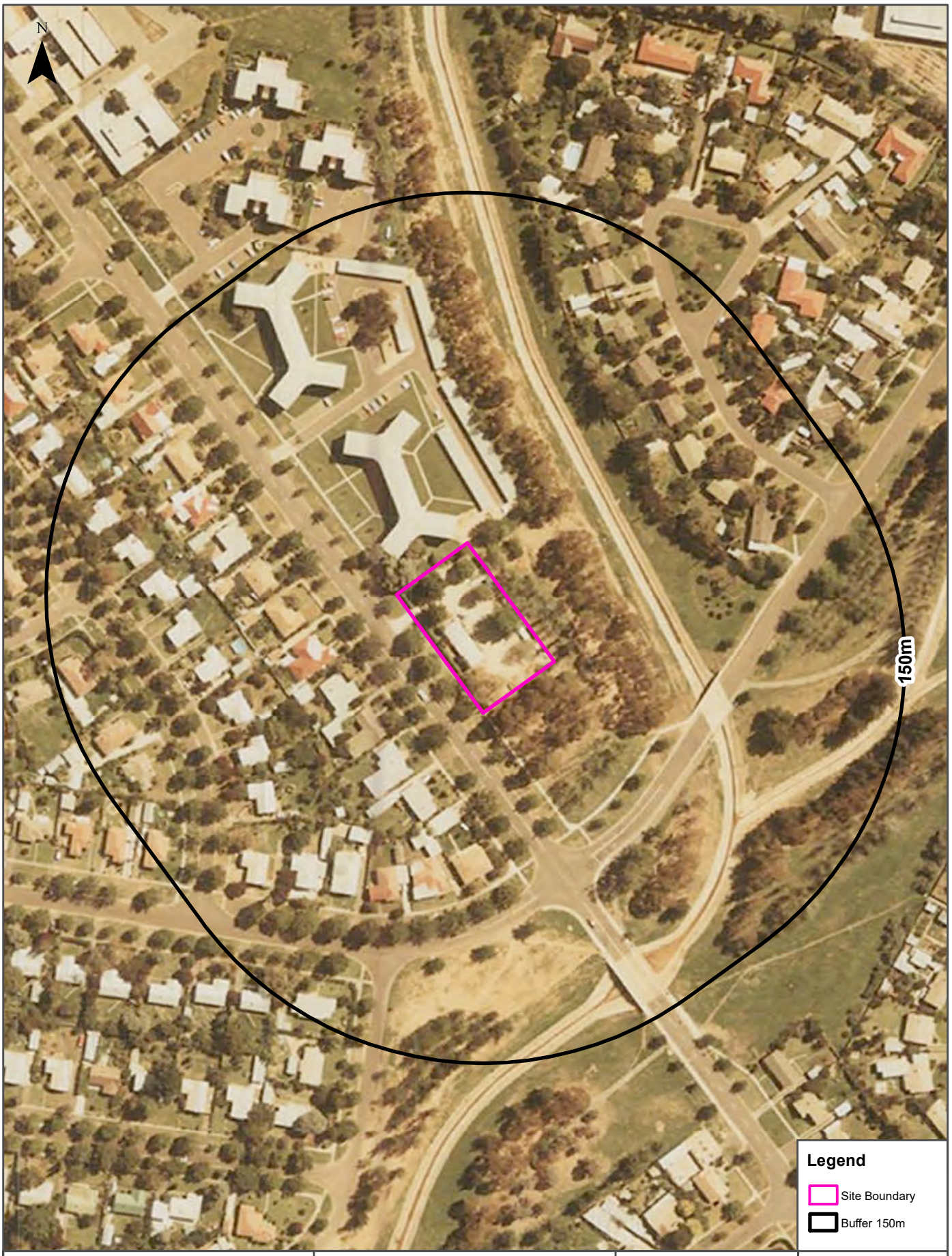
Aerial Imagery 1985

Wattle Street, Lyneham, ACT 2602



Aerial Imagery 1981

Wattle Street, Lyneham, ACT 2602



Aerial Imagery 1978

Wattle Street, Lyneham, ACT 2602



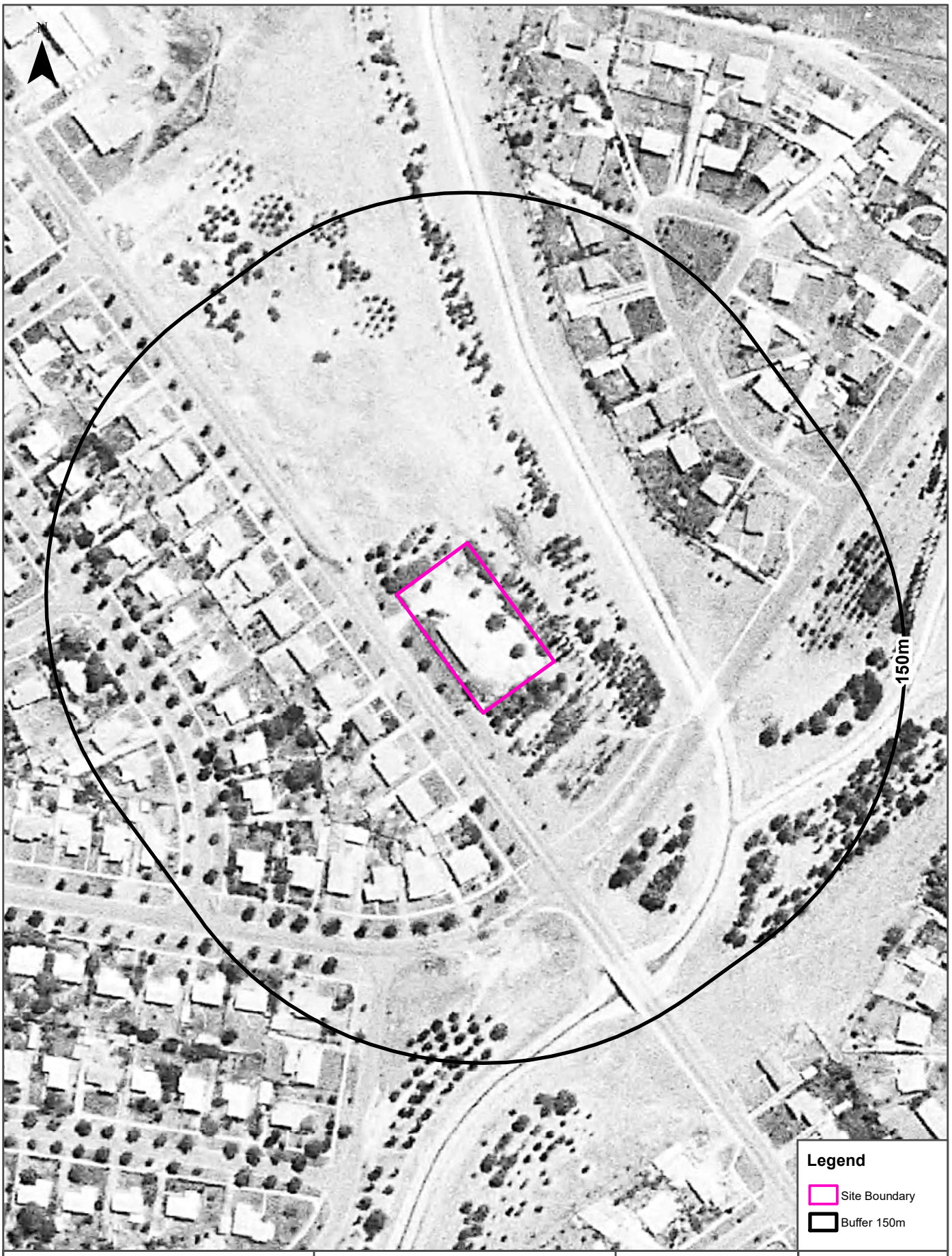
Aerial Imagery 1973

Wattle Street, Lyneham, ACT 2602



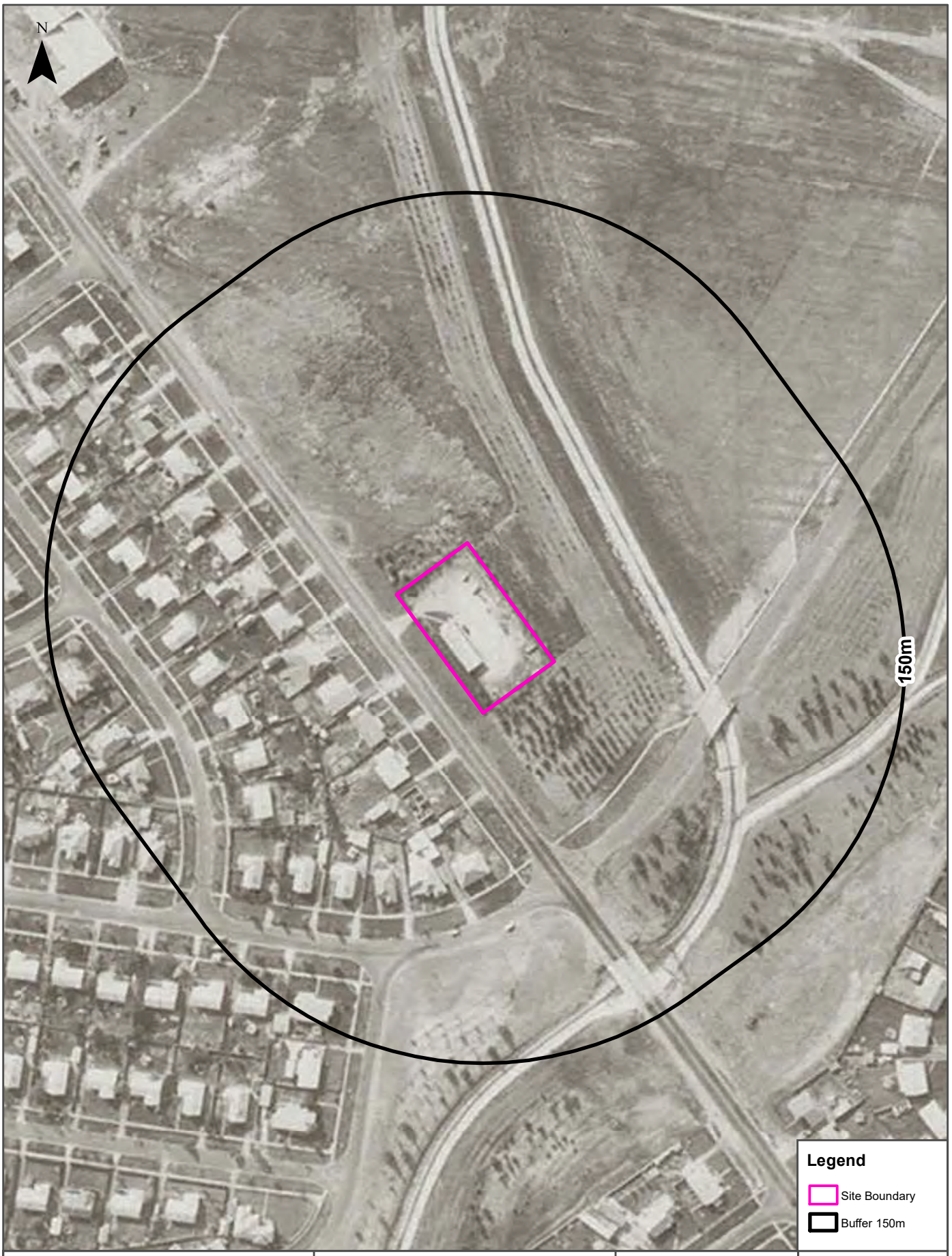
Aerial Imagery 1967

Wattle Street, Lyneham, ACT 2602



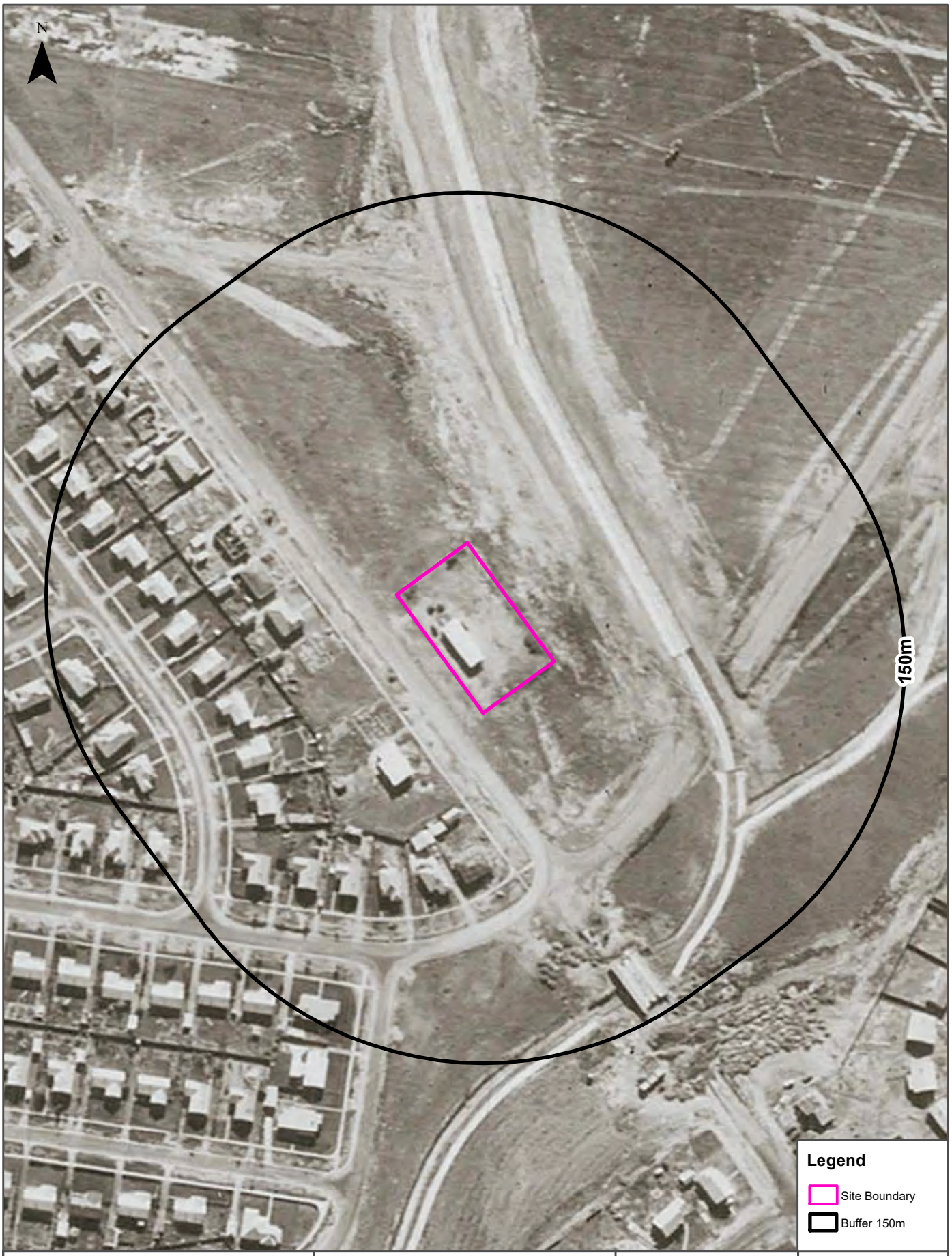
Aerial Imagery 1961

Wattle Street, Lyneham, ACT 2602



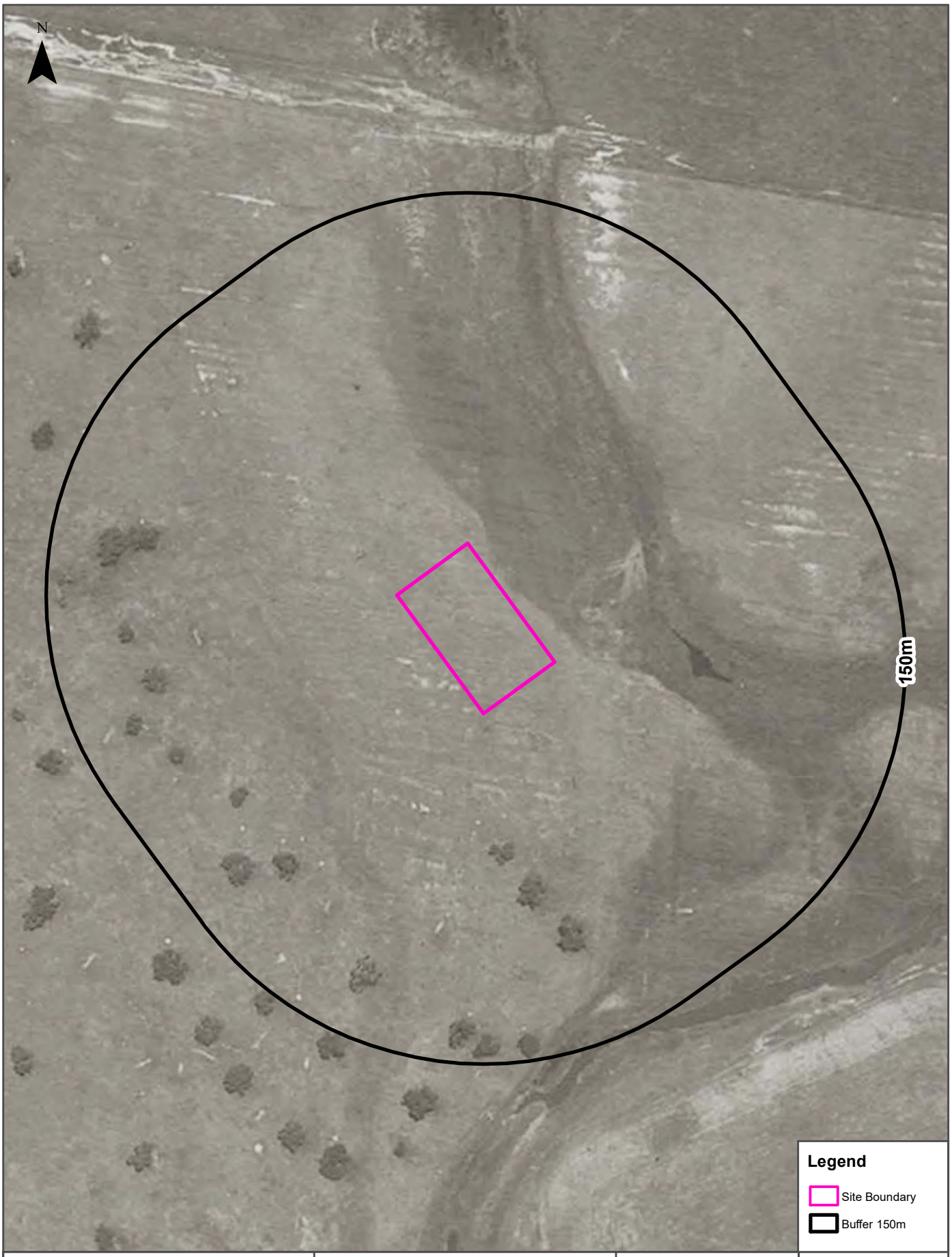
Aerial Imagery 1958

Wattle Street, Lyneham, ACT 2602



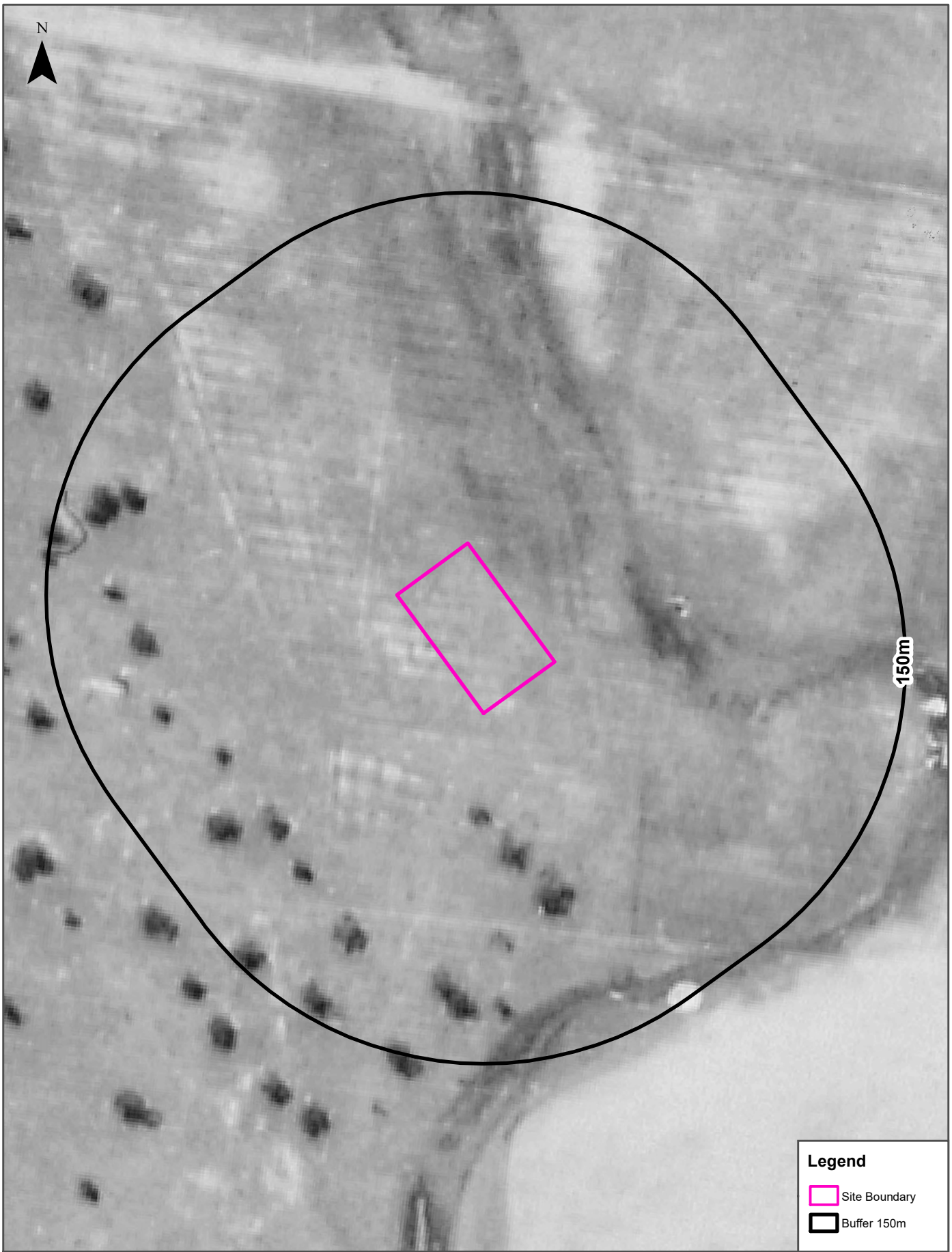
Aerial Imagery 1950

Wattle Street, Lyneham, ACT 2602



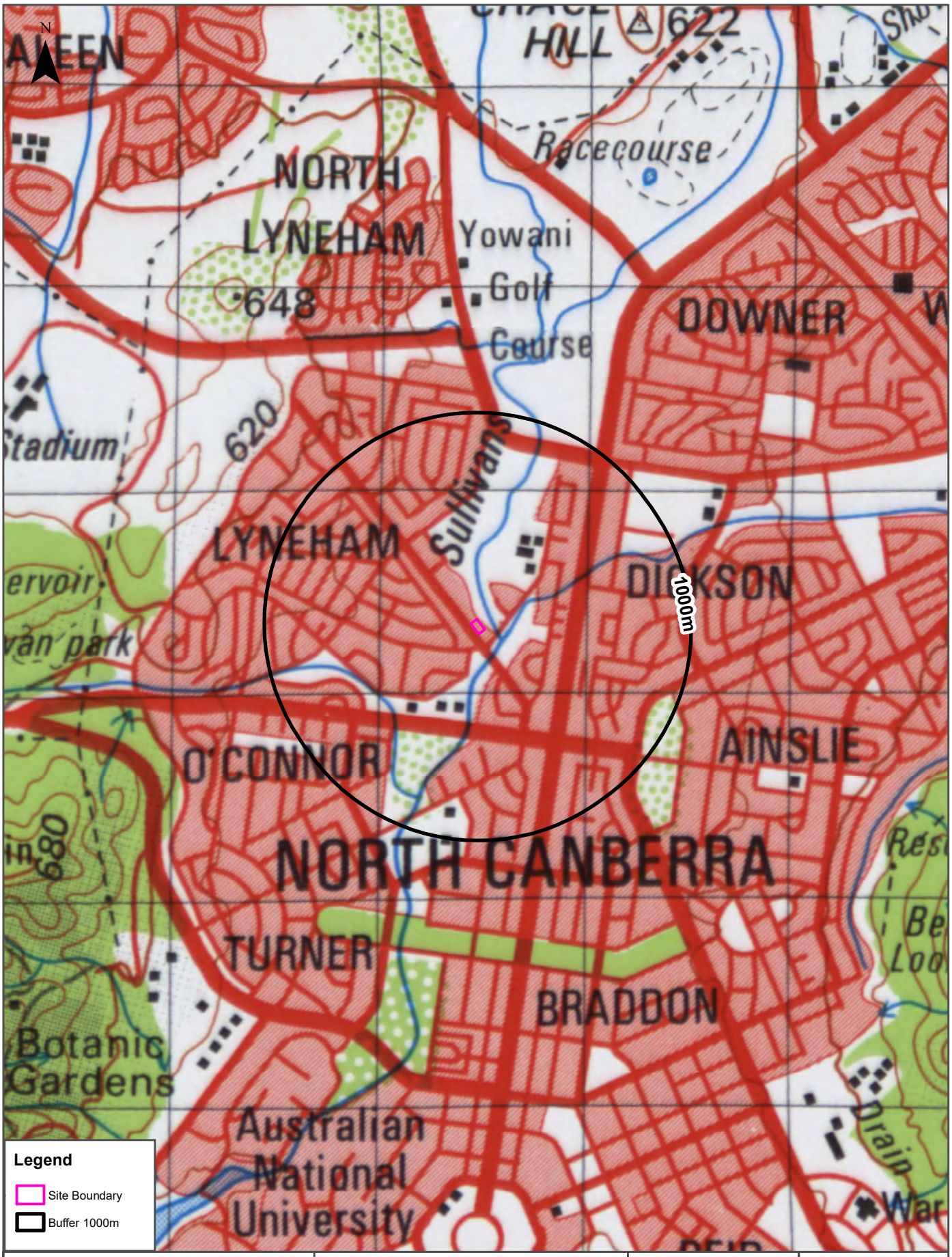
Aerial Imagery 1944

Wattle Street, Lyneham, ACT 2602



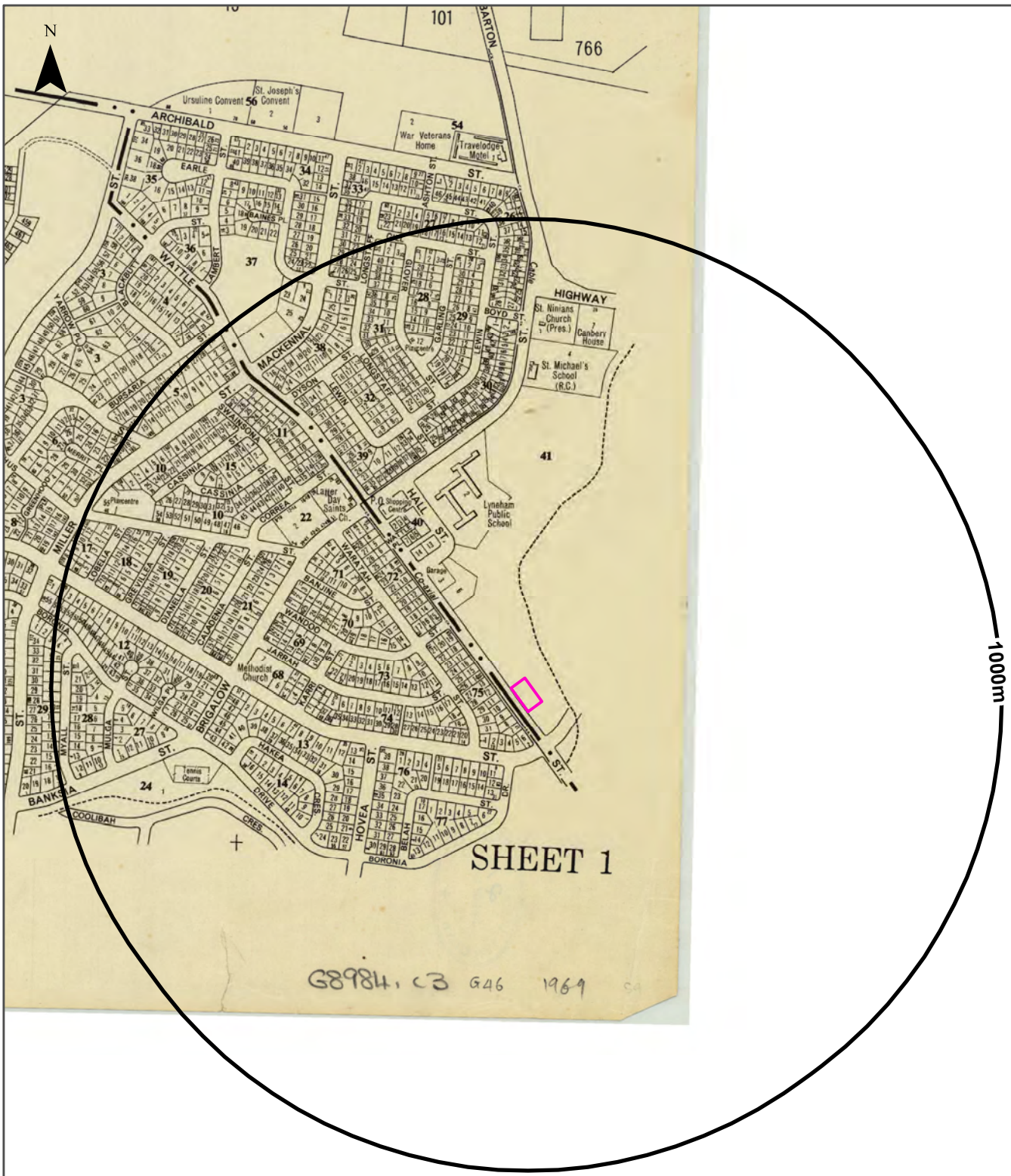
Historical Map 1987

Wattle Street, Lyneham, ACT 2602



Historical Map 1969

Wattle Street, Lyneham, ACT 2602



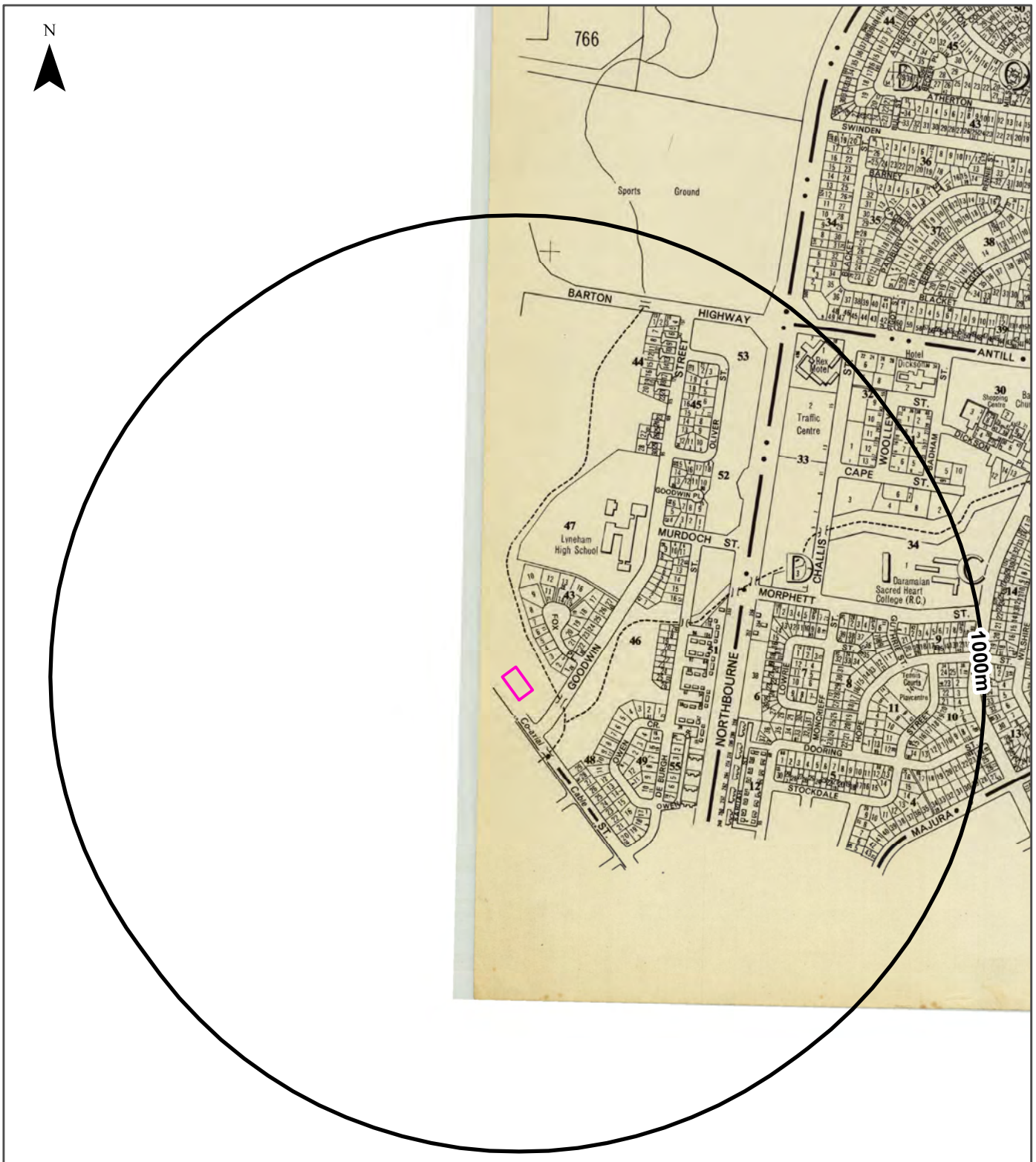
Legend

- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Parish of Queanbeyan ACTMapi © Australian Capital Territory	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Historical Map 1969

Wattle Street, Lyneham, ACT 2602



Legend

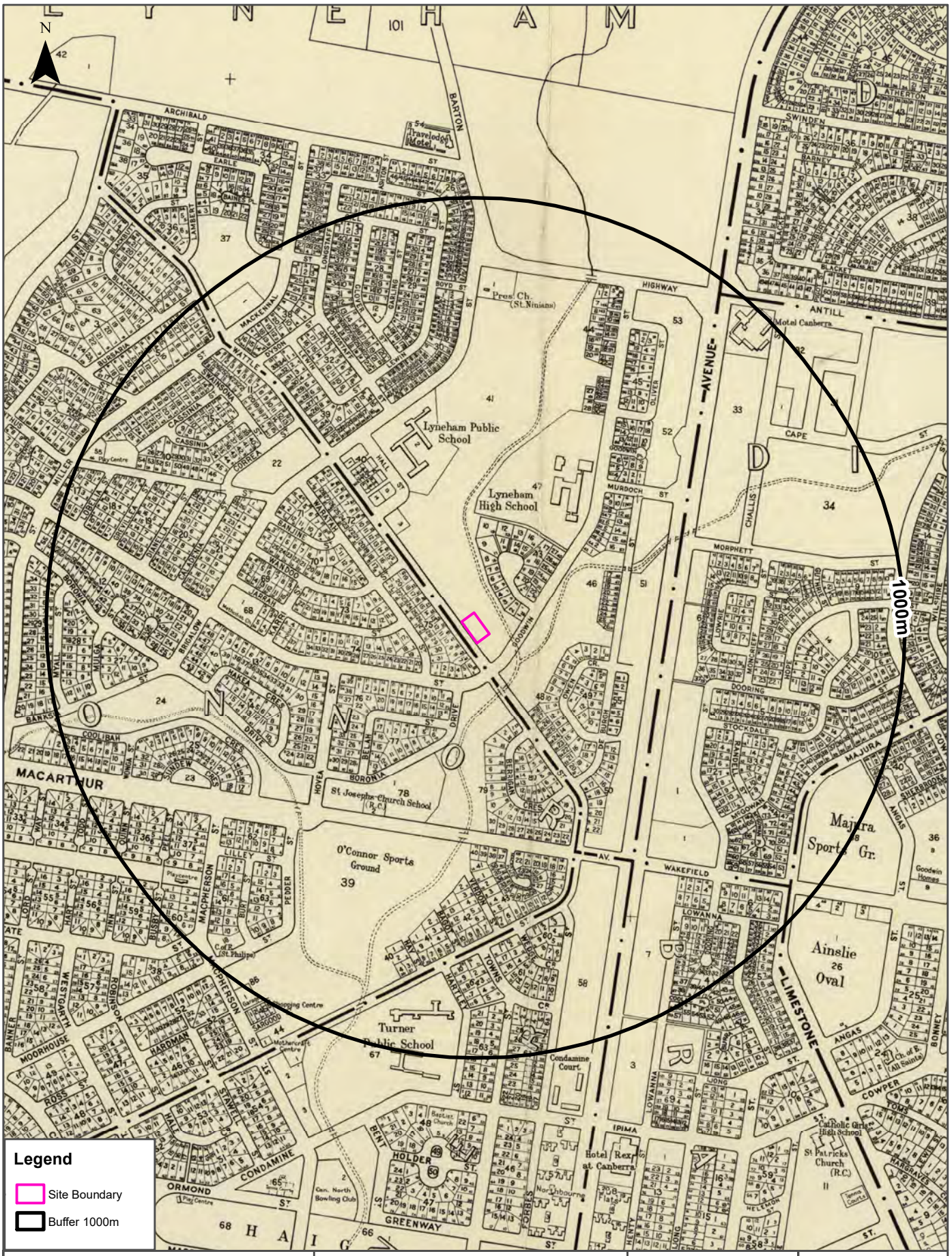
- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Parish of Queanbeyan ACTMapi © Australian Capital Territory	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

0 175 350 700 Meters

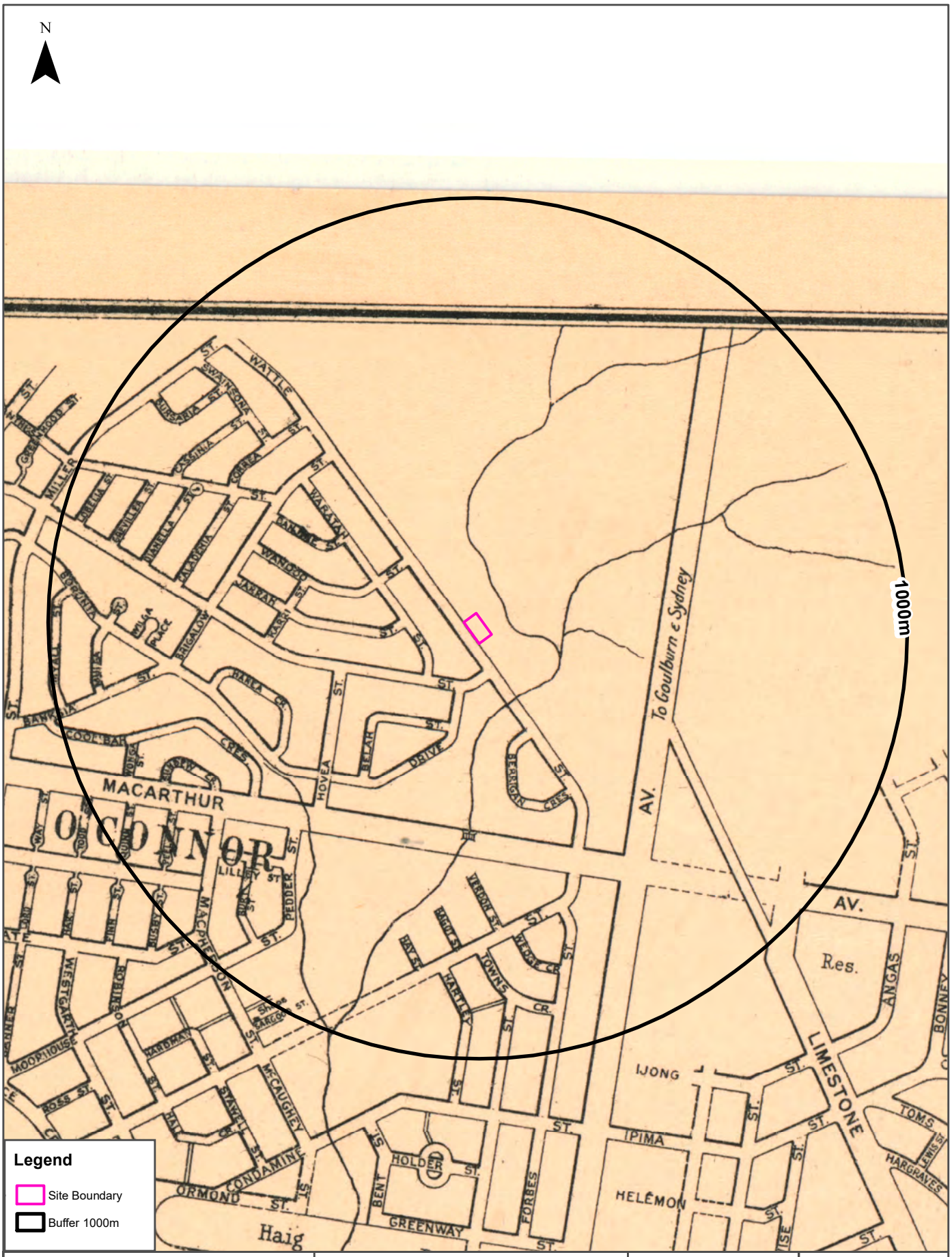
Historical Map 1960

Wattle Street, Lyneham, ACT 2602



Historical Map 1950

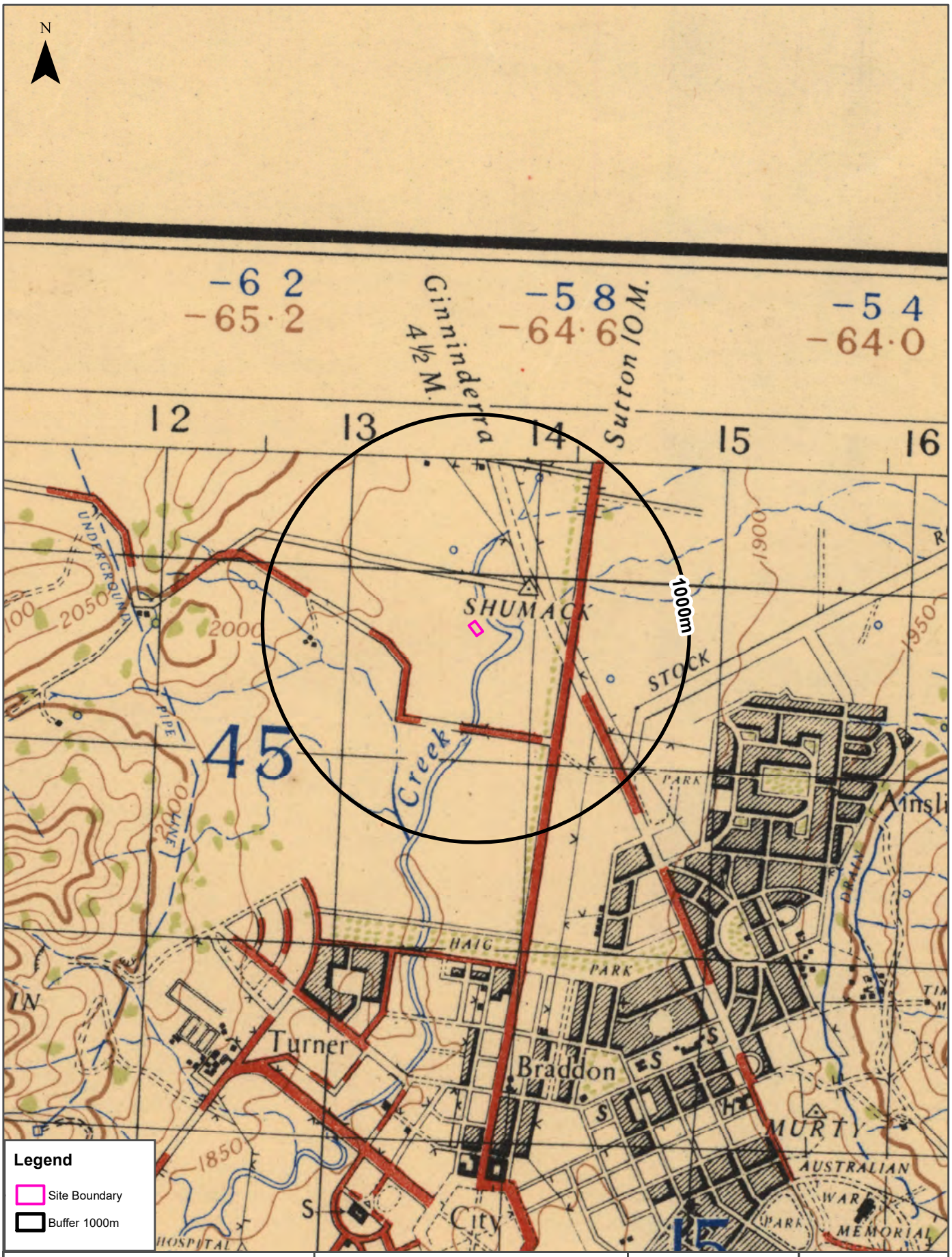
Wattle Street, Lyneham, ACT 2602



Scale: 0 150 300 600 Meters	Data Sources: Canberra 1950 Compiled and drawn by Property & Survey Branch, Department of the Interior, Canberra, A.C.T.	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

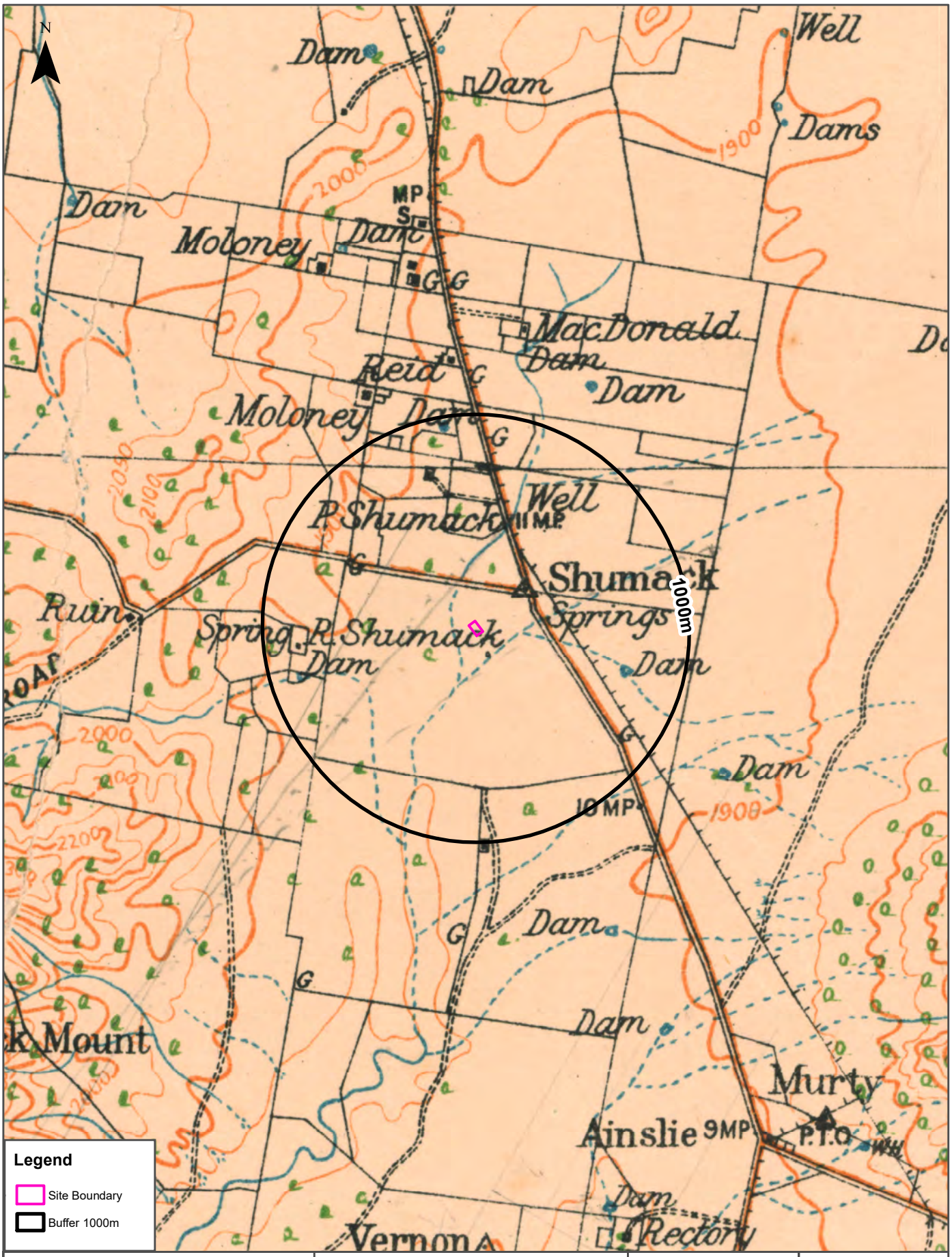
Historical Map c.1942

Wattle Street, Lyneham, ACT 2602



Historical Map c.1914

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Buffer 1000m

Scale: 0 175 350 700 Meters

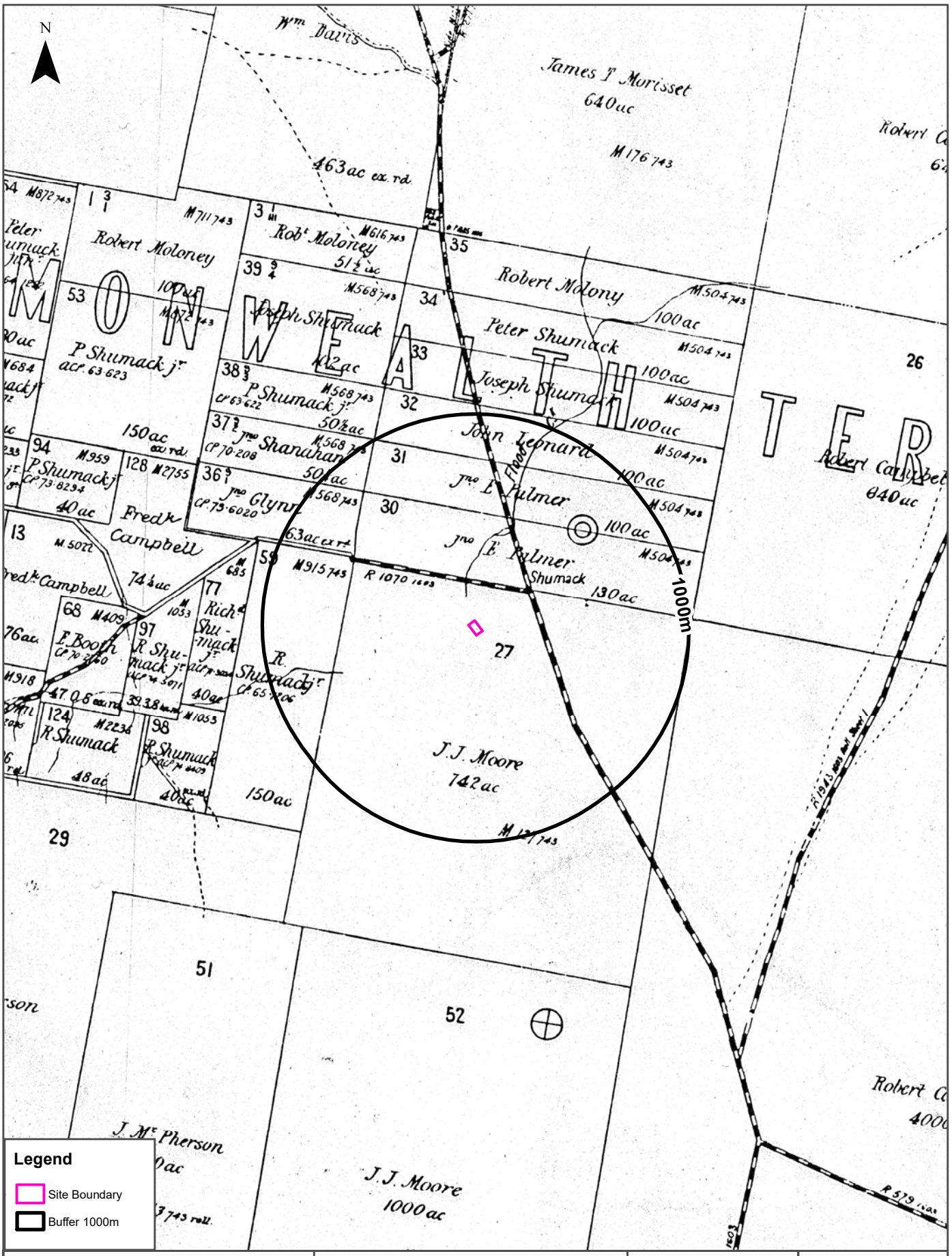
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Prepared by Commonwealth Section, Imperial General Staff

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

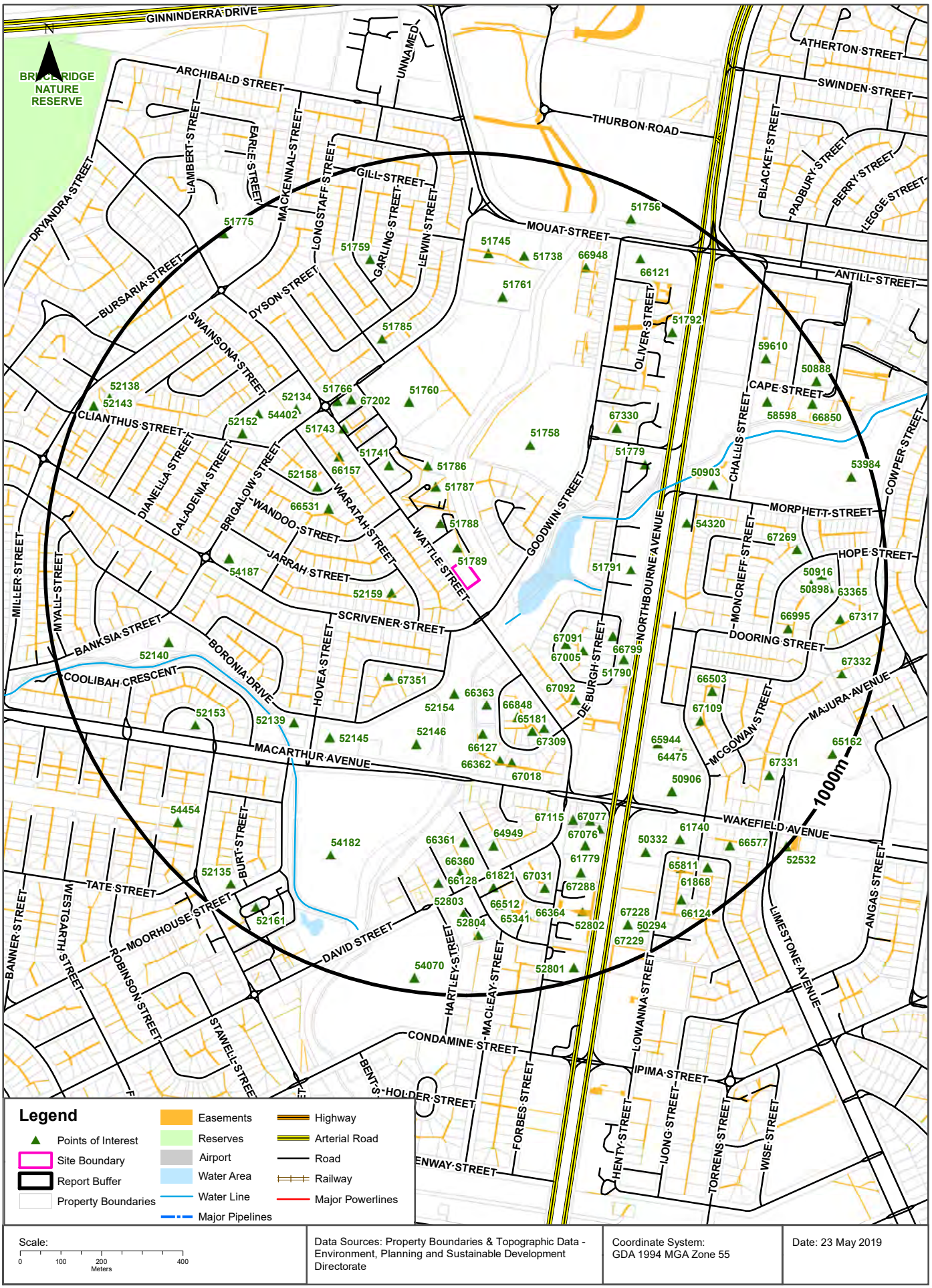
Historical Map 1912

Wattle Street, Lyneham, ACT 2602



Topographic Features

Wattle Street, Lyneham, ACT 2602



Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Topographic Features

Wattle Street, Lyneham, ACT 2602

Features of Interest

What Features of Interest exist within the report buffer?

Map Id	Feature Type	Name	Description	Distance	Direction
51789	BUILDING	Cotter Court	APARTMENT - FLATS, HOME UNITS	32m	North
51788	BUILDING	Corin Court	APARTMENT - FLATS, HOME UNITS	105m	North West
52159	BUILDING	Braemar Gardens	MULTI-UNIT DEVELOPMENT	159m	West
51787	BUILDING	Acacia Gardens	APARTMENT - FLATS, HOME UNITS	192m	North
51786	BUILDING	Somercotes Court	APARTMENT - FLATS, HOME UNITS	246m	North
52154	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Jandura Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	259m	South
67005	BUILDING	Cumberoona	MULTI-UNIT DEVELOPMENT	264m	South East
67351	BUILDING	Belah House	RETIREMENT COMPLEX, SPECIAL CARE ESTABLISHMENT	288m	South West
66363		Camera	UNCATEGORIZED	289m	South
51741	BUILDING	Garage	SERVICE STATION	295m	North West
67091	BUILDING	Glamorgan	MULTI-UNIT DEVELOPMENT	307m	South East
51758	BUILDING	Lyneham High School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	323m	North East
66531	BUILDING	Loft	MULTI-UNIT DEVELOPMENT	335m	North West
66848	BUILDING	Acadia	MULTI-UNIT DEVELOPMENT	338m	South
66799	BUILDING	Signature	MULTI-UNIT DEVELOPMENT	355m	South East
66127		Ajana Gardens	MULTI-UNIT DEVELOPMENT	358m	South
51791	BUILDING	Lyneham Flats	APARTMENT - FLATS, HOME UNITS	372m	East
67092	BUILDING	Coledale	MULTI-UNIT DEVELOPMENT	379m	South East
65181		Sorrento	MULTI-UNIT DEVELOPMENT	384m	South East
52158	BUILDING	Terang Gardens	MULTI-UNIT DEVELOPMENT	386m	North West
66157	BUILDING	Wattle Street Medical Practice	HEALTH FACILITY - BABY HEALTH CLINIC, CONSULTING ROOM	390m	North West
67309	BUILDING	Oakland	MULTI-UNIT DEVELOPMENT	391m	South East
52146	BUILDING	St Josephs Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	400m	South
51790	BUILDING	Owen Flats	APARTMENT - FLATS, HOME UNITS	404m	South East
51760	BUILDING	Lyneham Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	409m	North
66362	BUILDING	Echelon	MULTI-UNIT DEVELOPMENT	429m	South
51743	BUILDING	Lyneham Shops	COMMERCIAL USE	434m	North West
67018	BUILDING	Cobram	MULTI-UNIT DEVELOPMENT	440m	South
67202	BUILDING	Your GP Lyneham	HEALTH FACILITY - BABY HEALTH CLINIC, CONSULTING ROOM	479m	North West

Map Id	Feature Type	Name	Description	Distance	Direction
67330	BUILDING	North @ Lyneham	APARTMENT - FLATS, HOME UNITS	494m	North East
51779	BUILDING	Chalet Court	MULTI-UNIT DEVELOPMENT	496m	North East
52145	BUILDING	St Josephs Catholic Church	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	496m	South West
51766	BUILDING	PO	GOVERNMENT OFFICES	497m	North West
54320	BUILDING	Dickson Flats	APARTMENT - FLATS, HOME UNITS	528m	East
52139	BUILDING	Scout Hall	COMMUNITY USE	536m	South West
52134	BUILDING	Church of Latter Day Saints	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	546m	North West
54187	BUILDING	Uniting Church of Australia	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	547m	West
51785	BUILDING	Gidleigh Court	APARTMENT - FLATS, HOME UNITS	577m	North
64475	BUILDING	Pavilion On Northbourne	APARTMENT - FLATS, HOME UNITS	593m	South East
54402	BUILDING	Brigalow Court	MULTI-UNIT DEVELOPMENT	607m	North West
52152	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	611m	North West
50903	BUILDING	Ambulance Station	EMERGENCY SERVICES FACILITY - AMBULANCE STATION,CIVIL DEFENCE	619m	East
66361	BUILDING	Orana	MULTI-UNIT DEVELOPMENT	622m	South
67115	BUILDING	Edgeworth	RESIDENTIAL USE	624m	South East
64949	BUILDING	Vibe	MULTI-UNIT DEVELOPMENT	633m	South
66503	BUILDING	Ashby	MULTI-UNIT DEVELOPMENT	633m	South East
67109	BUILDING	Elimbah	MULTI-UNIT DEVELOPMENT	643m	South East
67076	BUILDING	Mid/Town	COMMERCIAL USE	645m	South East
51761	BUILDING	Brindabella Christian College	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	651m	North
65944		Aria Hotel Canberra	MULTI-UNIT DEVELOPMENT	651m	South East
67077	BUILDING	Mantra	MOTEL	673m	South East
61779	BUILDING	Monarch	MULTI-UNIT DEVELOPMENT	694m	South East
66360	BUILDING	Affinity	MULTI-UNIT DEVELOPMENT	699m	South
50906	BUILDING	Australian Broadcasting Commission	UNCATEGORIZED	702m	South East
52140		Tennis Courts	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	717m	West
66128		Shoreham	MULTI-UNIT DEVELOPMENT	727m	South
54182		Playing Fields	PLAYING FIELD - UNFENCED OVAL	735m	South West
52153	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	737m	South West
61821	BUILDING	The Berwick	MULTI-UNIT DEVELOPMENT	737m	South
67288	BUILDING	On Forbes	APARTMENT - FLATS, HOME UNITS	751m	South
51745	BUILDING	St Ninians Uniting Church	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	755m	North
51792	BUILDING	The Pines	APARTMENT - FLATS, HOME UNITS	756m	North East
67031	BUILDING	Zara Gardens	MULTI-UNIT DEVELOPMENT	760m	South
51738	BUILDING	Motor Inn	MOTEL	761m	North

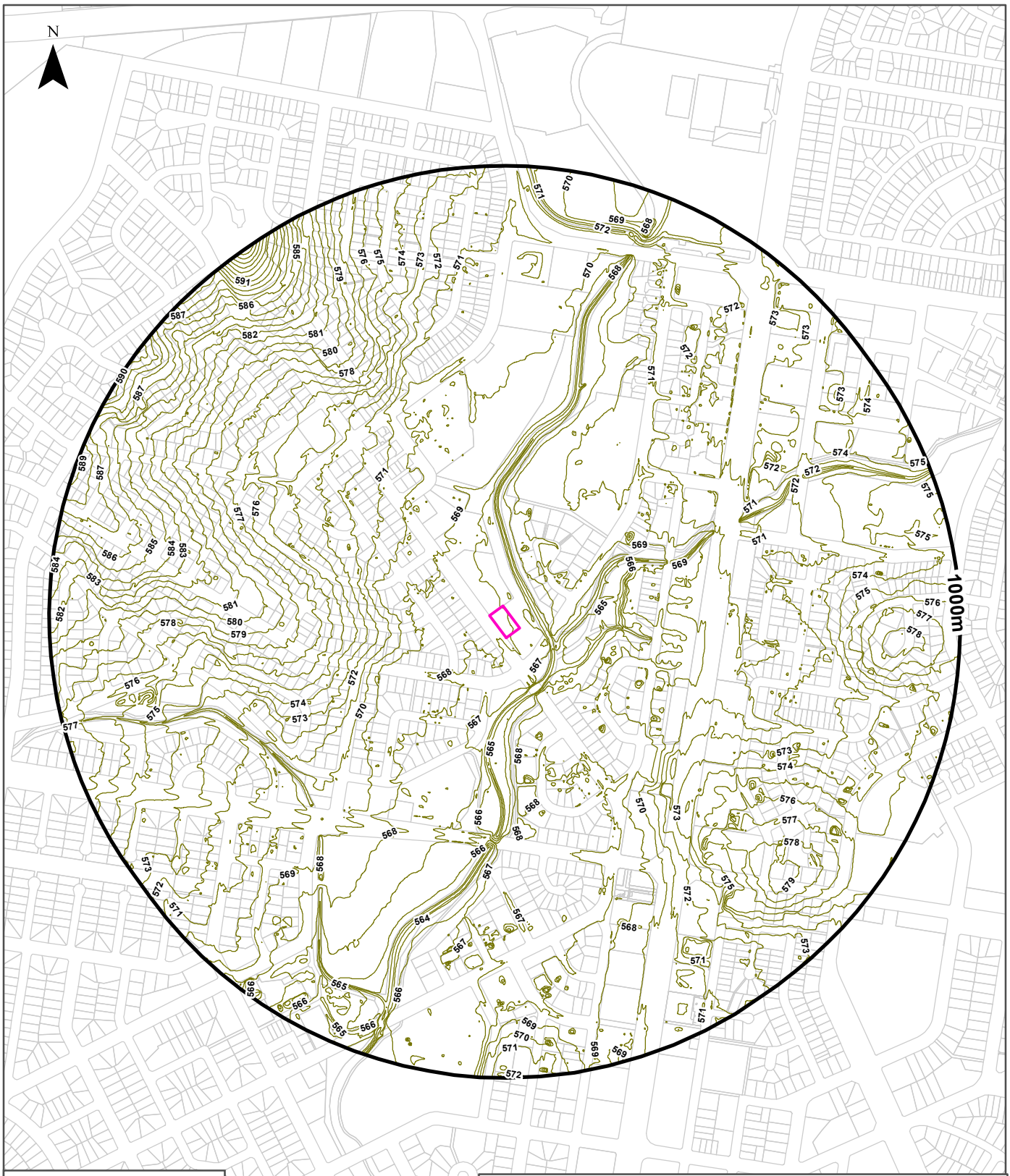
Map Id	Feature Type	Name	Description	Distance	Direction
66995	BUILDING	Otto Terraces	MULTI-UNIT DEVELOPMENT	767m	East
51759	BUILDING	Lyneham Pre-School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	773m	North
66948	BUILDING	Rostella	MULTI-UNIT DEVELOPMENT	777m	North
50332	BUILDING	John Overall Offices	CIVIC ADMINISTRATION - ACT LEGISLATIVE ASSEMBLY,CIVIC SQUARE	780m	South East
65341		Cabarita	MULTI-UNIT DEVELOPMENT	781m	South
67269	BUILDING	Indigo North	APARTMENT - FLATS, HOME UNITS	783m	East
52803	BUILDING	True North	MULTI-UNIT DEVELOPMENT	799m	South
61740	BUILDING	Valonia	MULTI-UNIT DEVELOPMENT	806m	South East
66512	BUILDING	Avion	MULTI-UNIT DEVELOPMENT	813m	South
50916	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	814m	East
66364	BUILDING	Wedge Gardens	MULTI-UNIT DEVELOPMENT	815m	South
58598		Coventry	MULTI-UNIT DEVELOPMENT	831m	North East
50898		Tennis Courts	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	840m	East
52802	BUILDING	Northgate Gardens	APARTMENT - FLATS, HOME UNITS	842m	South
52804	BUILDING	Beaufront Court	APARTMENT - FLATS, HOME UNITS	851m	South
66121		Axis Apartments	MULTI-UNIT DEVELOPMENT	856m	North East
67331	BUILDING	Majura Key	APARTMENT - FLATS, HOME UNITS	857m	South East
63365	BUILDING	Blue Gum Pre-school	UNCATEGORIZED	858m	East
61868	BUILDING	The Billington	MULTI-UNIT DEVELOPMENT	864m	South East
59610	BUILDING	Dame Pattie Menzies House	OFFICE - CHANCELLERY, DEPARTMENTAL OFFICES	889m	North East
67317	BUILDING	The Santana	RESIDENTIAL USE	891m	East
50294	BUILDING	Mining Industry House	OFFICE - CHANCELLERY, DEPARTMENTAL OFFICES	896m	South East
66577	BUILDING	Lowanna	MULTI-UNIT DEVELOPMENT	896m	South East
65811	BUILDING	Avanti	MULTI-UNIT DEVELOPMENT	902m	South East
54454	BUILDING	O'Connor Co-operative School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	912m	South West
67228	BUILDING	Deco Hotel	HOTEL	914m	South East
67332	BUILDING	Haus Lane	MULTI-UNIT DEVELOPMENT	919m	East
66850	BUILDING	Malabar	RESIDENTIAL USE	924m	North East
66124		Minnipa	MULTI-UNIT DEVELOPMENT	927m	South East
52135	BUILDING	St Philips C of E Church	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	928m	South West
51756	BUILDING	Toilets	COMMUNITY USE	930m	North East
52138	BUILDING	Guide Hall	COMMUNITY USE	938m	North West
52161	BUILDING	City Edge	APARTMENT - FLATS, HOME UNITS	938m	South West
67229	BUILDING	Artisan	RESIDENTIAL USE	938m	South East
53984	BUILDING	Daramalan College	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	947m	East
50888	BUILDING	Garage	SERVICE STATION	961m	North East

Map Id	Feature Type	Name	Description	Distance	Direction
52143	BUILDING	Pre-School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	965m	North West
54070	BUILDING	Turner Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	965m	South
65162	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Keith Tournier Enclosed Oval	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	966m	South East
52801	BUILDING	Condamine Court	APARTMENT - FLATS, HOME UNITS	968m	South
51775	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	994m	North West
52532	BUILDING	ACTEW Depot	MUNICIPAL DEPOT - PARKS MAINTENANCE DEPOT	998m	South East

Features of Interest Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Elevation Contours (2015 - 1m)

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundaries
- Elevation Contour (m)

Automatically generated 1m contours of the ACT derived from 1m hydro-flattened DEM. Major lakes and dams within the ACT were assigned an elevation to produce a hydro-flattened DEM. 1m DEMs derived from 4ppm and 8ppm LiDAR were used as the input DEMs and polygons of major water bodies were used to determine the extent of lakes within the DEM extent. The input DEM defines the classified Australian Height Datum (AHD) LiDAR point cloud data as a 1 meter Digital Elevation Model (DEM). The Water Features data were digitised in 1995 from the following map sources - 1:10,000 Plan Series, 1:2,500 Cadastre, 1:2,500 Detail, 1:1,000 Detail and traced from Topobase. The mean elevation of each of these polygons was used to hydro -flatten the corresponding water bodies in the DEM. Contours were generated from the DEM using ESRI ArcGIS Contour tool.

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Hydrogeology

Description of aquifers on-site:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Description of aquifers within the report buffer:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)
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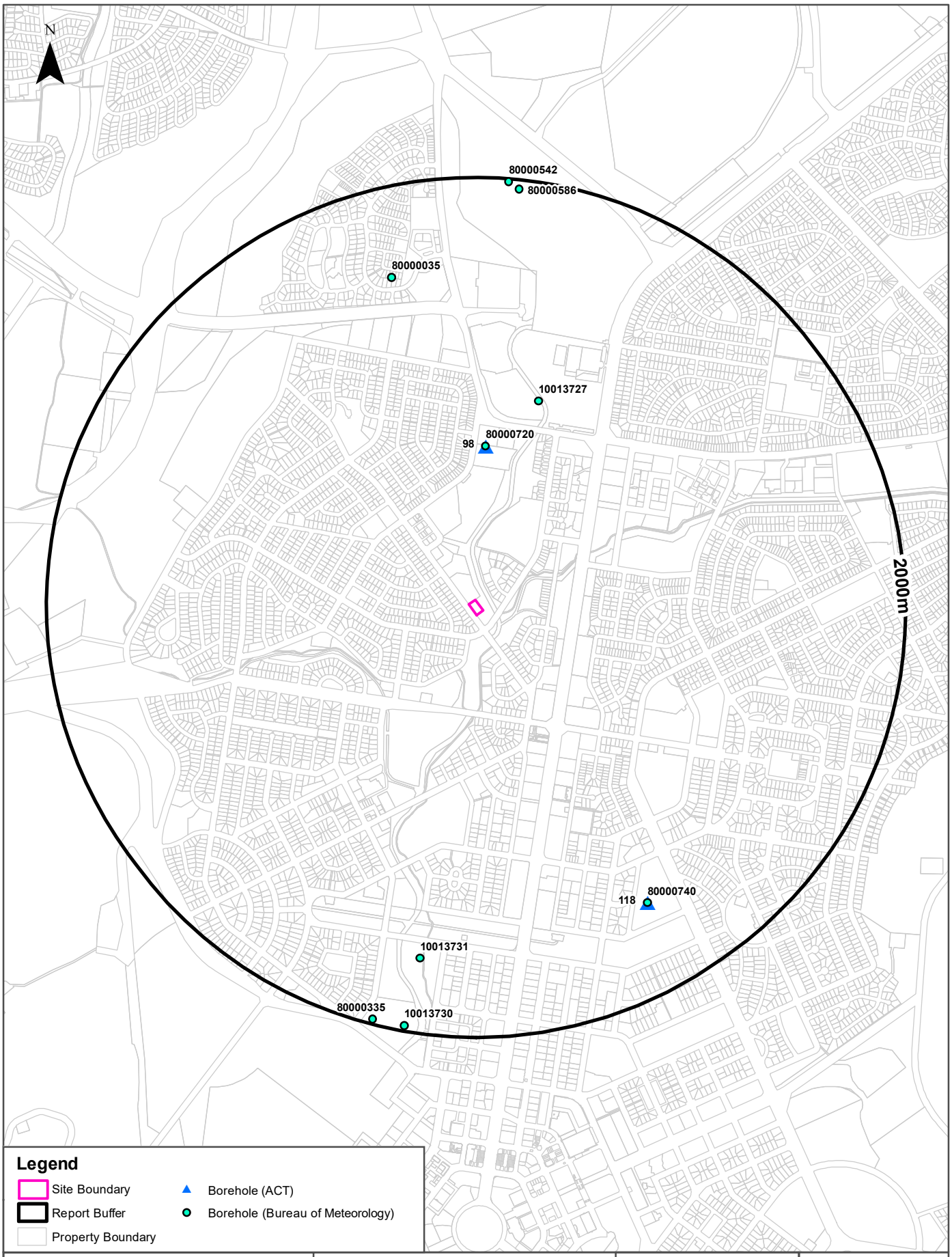
Hydrogeological Landscapes Units

Unit No	Landscape Name	Land Salinity	Stream Salinity	Stream EC	Salt Store	Salt Availability	Salt Mobility	Hazard Impact	Hazard Likelihood	Hazard Overall	Distance	Direction
23	Sullivans Creek	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Limited	Moderate	Low	0m	Onsite

Hydrogeological Landscapes Units Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Groundwater Boreholes

Wattle Street, Lyneham, ACT 2602



Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Groundwater Boreholes (ACT)

Please note that this dataset does not include investigation and/or monitoring bores associated with possible contaminated sites in the search area. If you require more information please contact the Environmental Quality team via email environment.protection@act.gov.au or phone via Access Canberra 13 22 81.
Boreholes from an ACT Government Data Source within 2km of the site:

Bore Id	Bore Type	Method	Date	Bore Depth To	Bit Diameter	1st Water Intersection Depth From	1st Water Intersection Depth To	Final Static GW Level IM	1st Est Yield	Final Yield	Dist	Direction
98	Abstraction	Rotary	16/12/2003	72.00	175	60.0	66.0	14.00	2.25	2.25	728m	North
118	Abstraction	Rotary Hamme	21/08/2004	60.00	180	44.0	46.0		1.90	1.90	1584m	South East

Boreholes (ACT) Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Groundwater Boreholes (Bureau of Meteorology)

Boreholes (Bureau of Meteorology) within 2km of the site:

Hydro ID	State Bore ID	Drilled Date	Final Depth	Drilled Depth	Elevevation	Distance	Direction
80000720	273	16/12/2003	72.00	72.00	573.09	728m	North
10013727	410772				571.77	987m	North
80000035	20	01/01/1949	120.40	120.40	582.06	1575m	North
80000740	345	21/08/2004	60.00	60.00	577.41	1584m	South East
10013731	410775A				569.37	1648m	South
80000586	760				575.57	1954m	North
80000335	433	28/05/1976	49.80	49.80	562.86	1975m	South
10013730	410775				561.78	1975m	South
80000542	704	16/09/1983	100.52	100.52	578.98	1986m	North

Borehole Data Source : © Commonwealth of Australia (Bureau of Meteorology) . Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Driller's Logs (Bureau of Meteorology)

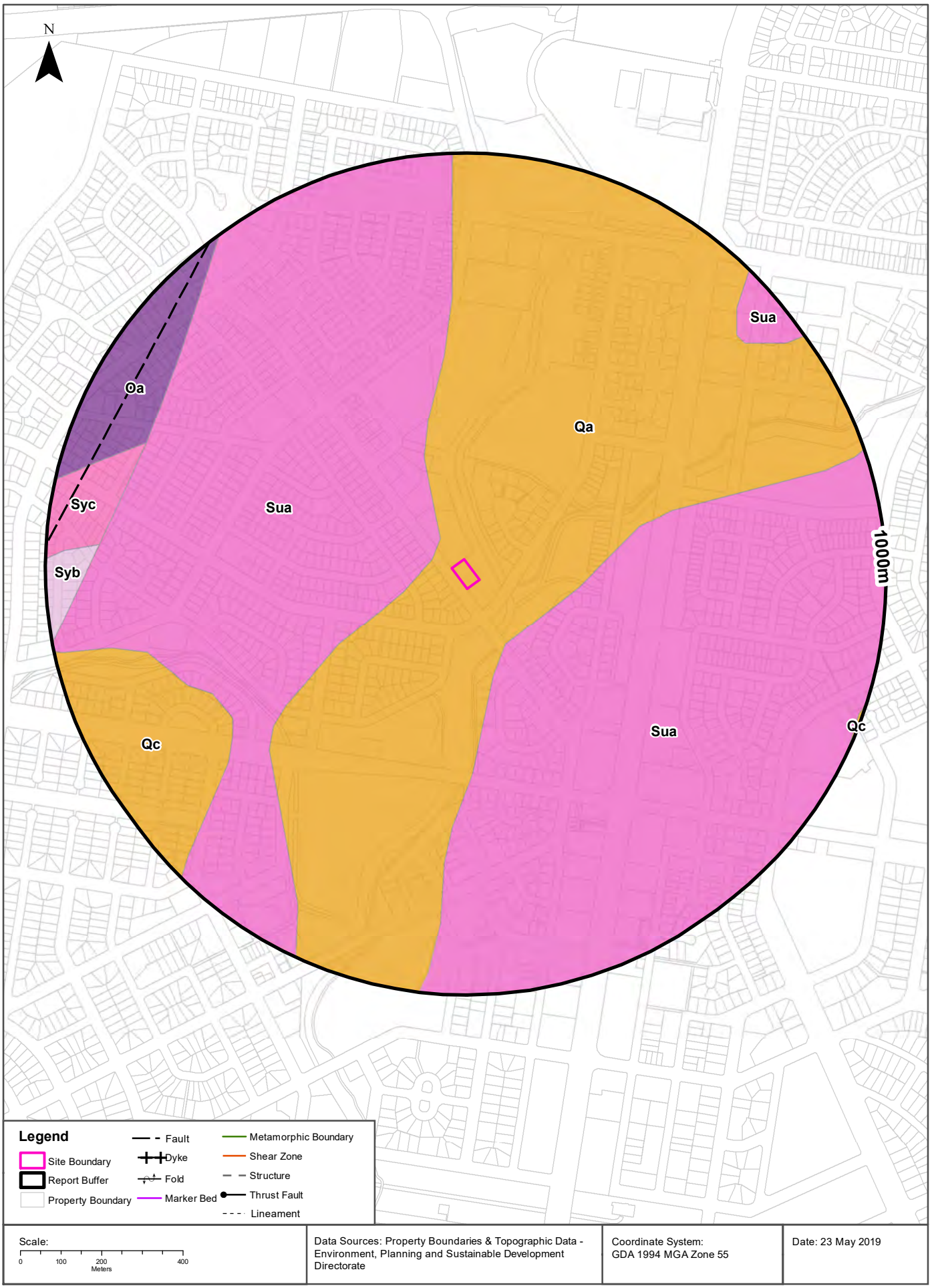
Drill log data relevant to the Boreholes (Bureau of Meteorology) within 2km of the site:

Hydro ID	State Bore ID	Drillers Log	Distance	Direction
80000586	760	0.00m-3.05m Extremely weathered rock	1954m	North
80000335	433	0.00m-4.60m Stiff clayey soil 4.60m-49.80m Moderately weathered	1975m	South
80000542	704	0.00m-1.04m Extremely weathered tuff and clays 1.04m-2.36m Interbedded hard limestone and calcite shales cavaties 2.36m-2.54m Highly weathered calcite shales	1986m	North

Drill Log Data Source: © Commonwealth of Australia (Bureau of Meteorology) .
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Geology 1:250,000

Wattle Street, Lyneham, ACT 2602



Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Geology

Wattle Street, Lyneham, ACT 2602

Geological Units (1:250,000 scale)

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Member	Era	Period	Dataset
Qa	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated	unknown			Cainozoic	Quaternary	1:250,000

What are the Geological Units within the report buffer?

Symbol	Description	Unit Name	Group	Sub Group	Member	Era	Period	Dataset
Oa	Turbiditic sequence; sandstone, mudstone, shale; quartzite, quartz phyllite, phyllite, slate	Adaminaby Group	Adaminaby Group			Palaeozoic	Ordovician	1:250,000
Qa	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated	unknown			Cainozoic	Quaternary	1:250,000
Qc	Fanglomerate and poorly cemented conglomerate, gravel and sand: colluvium	unnamed	unknown			Cainozoic	Quaternary	1:250,000
Sua	Mudstone, siltstone, minor sandstone, limestone, hornfels, dacitic ignimbrite, and volcaniclastic sediments	Canberra Formation	unknown			Palaeozoic	Silurian	1:250,000
Syb	Sandstone, siltstone and minor shale	Black Mountain Sandstone	unknown			Palaeozoic	Silurian	1:250,000
Syc	Shale, mudstone, siltstone and minor sandstone	State Circle Shale	unknown			Palaeozoic	Silurian	1:250,000

Geological Structures (1:250,000 scale)

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

What are the Geological Structures within the report buffer?

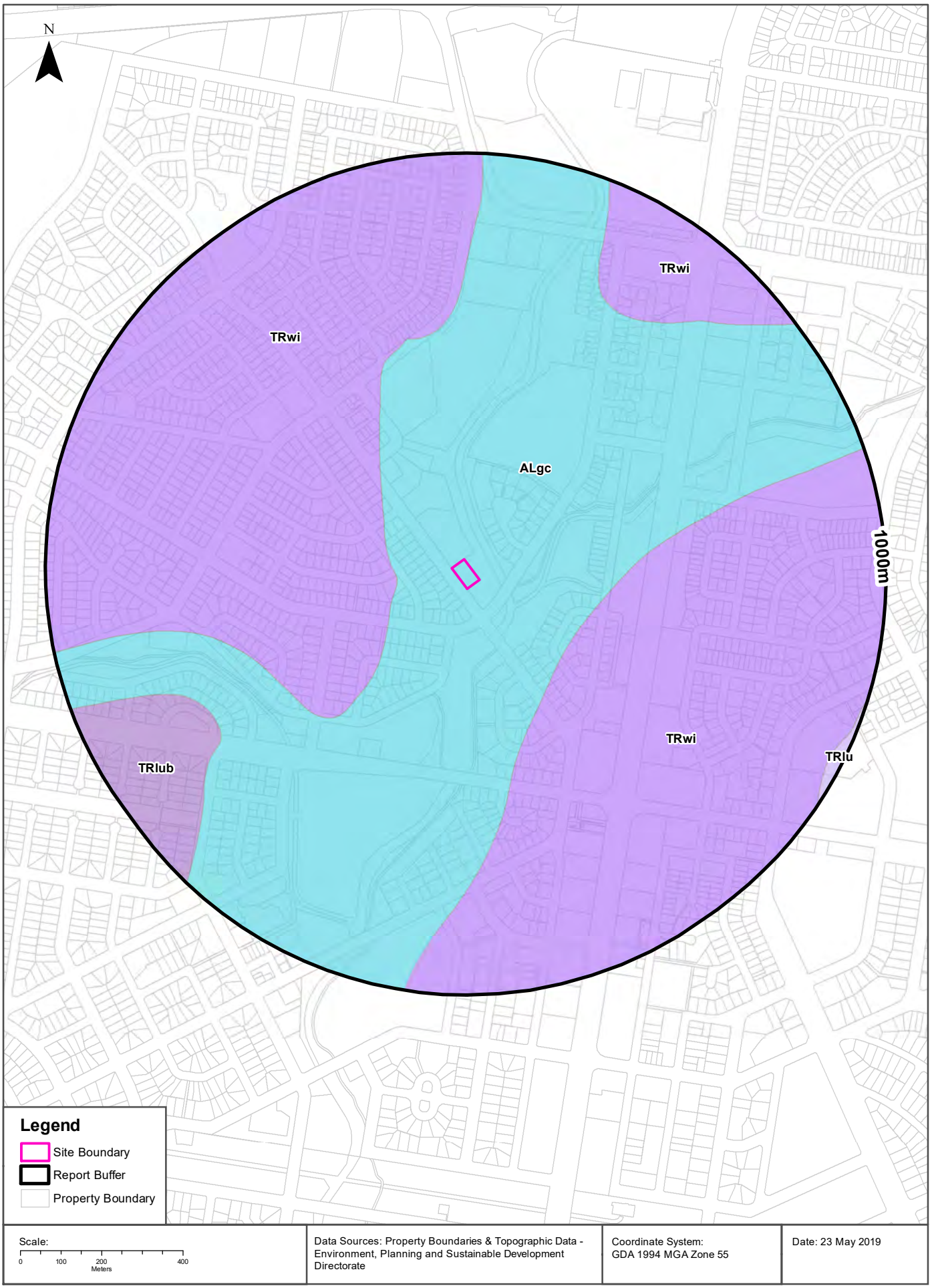
Feature	Name	Description	Map Sheet	Dataset
Fault		Fault, Accurate	SCRA	1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy

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Soil Landscapes

Wattle Street, Lyneham, ACT 2602



Soils

Wattle Street, Lyneham, ACT 2602

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALgc	GINNINDERRA CREEK		ALLUVIAL	Canberra	1:100,000

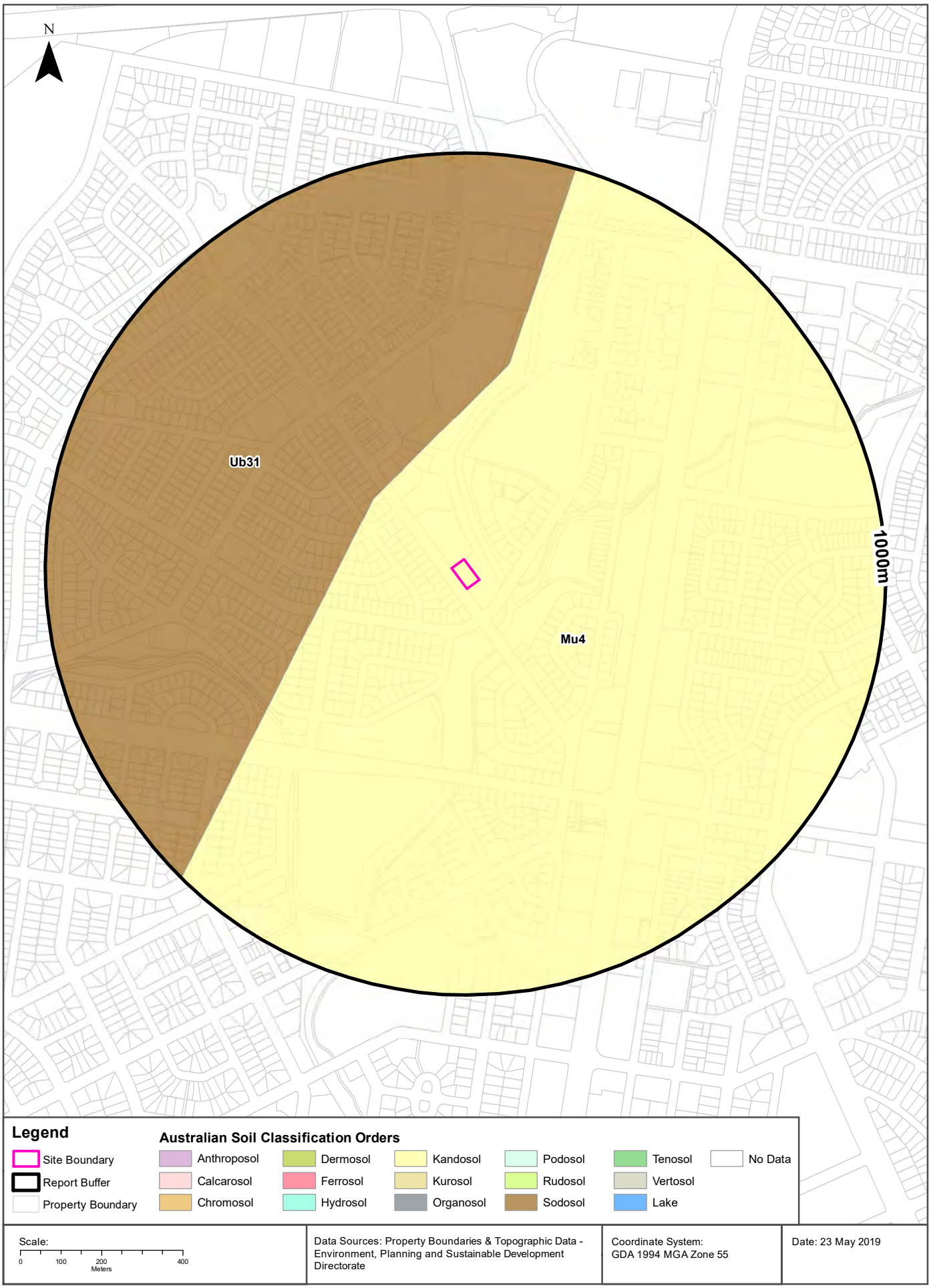
What are the Soil Landscapes within the report buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALgc	GINNINDERRA CREEK		ALLUVIAL	Canberra	1:100,000
TRlu	LUXOR		TRANSFERRAL	Canberra	1:100,000
TRlub	LUXOR variant b		TRANSFERRAL	Canberra	1:100,000
TRwi	WILLIAMSDALE		TRANSFERRAL	Canberra	1:100,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage
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Atlas of Australian Soils

Wattle Street, Lyneham, ACT 2602



Soil Landscapes

Wattle Street, Lyneham, ACT 2602

Atlas of Australian Soils

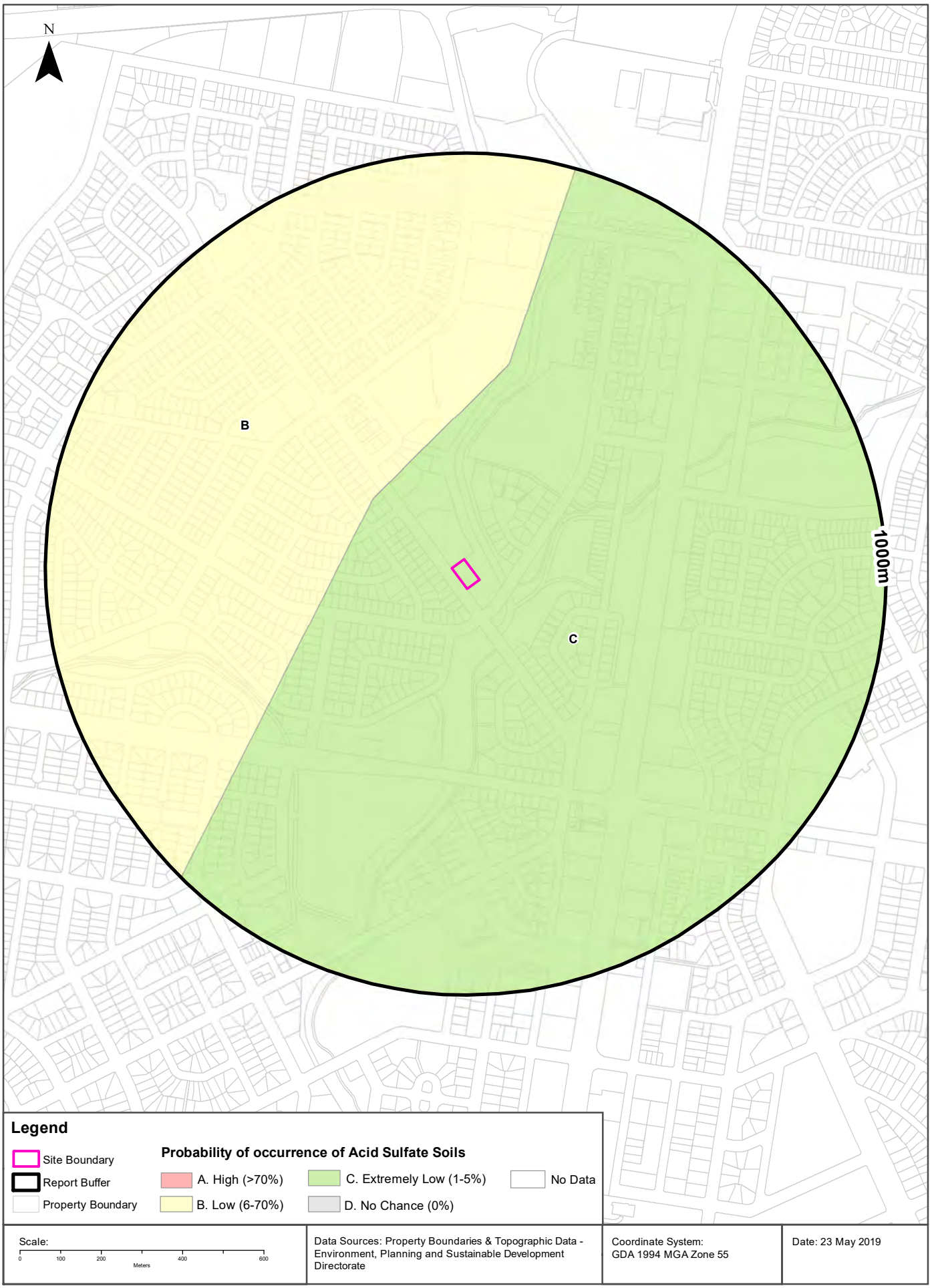
Australian soil types within the dataset buffer:

Symbol	Soil Order	Map Unit Description	Distance
Mu4	Kandosol	Gently to strongly undulating plains at moderate to low elevations (<2000 ft) with basins, stream terraces, and low residual hills and ridges; buried, layered soil materials are present: undulating plains of neutral leached red earths (Gn2.15) in the better-drained sites and yellow earths (Gn2.25) in intermediate drainage situations, with yellow leached earths (Gn2.75) often associated with hard neutral and/or alkaline yellow mottled soils (Dy3.42 and Dy3.43) in poorly drained areas, swampy sites, and seepage situations--all often with heavy clay D horizons below the solum. Associated are: low residual hills and ridges of (Dr2.22 and Dr2.42) or (Dy3.22 and Dy3.42) soils, with small areas of (Um4.2) soils and rock outcrops; basins of (Gn2.15 and Gn2.25) or (Dy3.42) soils; and stream terraces of variable width and development with (Um1) soils on present flood-plains, (Um6.11) soils on the youngest terraces, (Gn2.15, Gn2.25, and Gn2.75) in drainage sequence from well-drained to poorly drained sites on the next, and most extensive, terrace, adjacent to which sand sheets of (Uc1.2) soils may occur; (Dr2.42), (Dy3.42), and (Dy3.43) soils on remnants of the highest terrace, above which gravel fills and ironstone slabs may occur.	0m
Ub31	Sodosol	Low step-like range country--stepped rolling country with scarps, hills, and valleys: chief soils are hard neutral yellow and yellow mottled soils (Dy3.42), (Dy2.42), (Dy2.22), and (Dy3.22) with a variety of other (D) soils and some (Gn2) and (Um4) soils, generally associated as follows: irregularly spaced cuesta-like ranges with (i) moderate to steep scarps of rock outcrops, (Um4.1), (Dr3.42), (Dr2.22), and other (D) soils passing to (iia) long rolling back slopes of (Dy3.42), (Dy2.42), (Dy3.22) with (Dr2.22 and Dr2.42) and sometimes (Gn2.1 and Gn2.2) soils through the mid and upper slope positions, which in turn merge with (iib) undulating basins of (Dy3.42 and Dy3.43) soils sometimes with (Gn2.7) soils, and gullies of (Dy3.42) and/or (Gn2.7) and (Gn2.9) soils; this sequence may be broken by (iii) hills and mountains with slopes and/or scarps of (Um4.1), (Um4.2), (Dr2.21), (Dy3.41), and other (D) soils, also sometimes with belts of partially dissected upland basins of (Dy3.42) soils along the crests--i.e. with areas similar to (iib) but at a relatively higher elevation (compare unit Ub38); the whole area is traversed by (iv) narrow stream valleys of (Um1) soils on flood-plains, (Um6.11) and (Gn2) soils respectively on the next two terraces; and finally there are (v) minor occurrences of other soils, such as (Dr4.12) (e.g. Red Hill) and (Db3.12) on some basaltic areas. Saline patches are fairly common in low-lying situations, especially the (iib) areas.	250m

Atlas of Australian Soils: CSIRO
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Atlas of Australian Acid Sulfate Soils

Wattle Street, Lyneham, ACT 2602



Acid Sulfate Soils

Wattle Street, Lyneham, ACT 2602

Atlas of Australian Acid Sulfate Soils

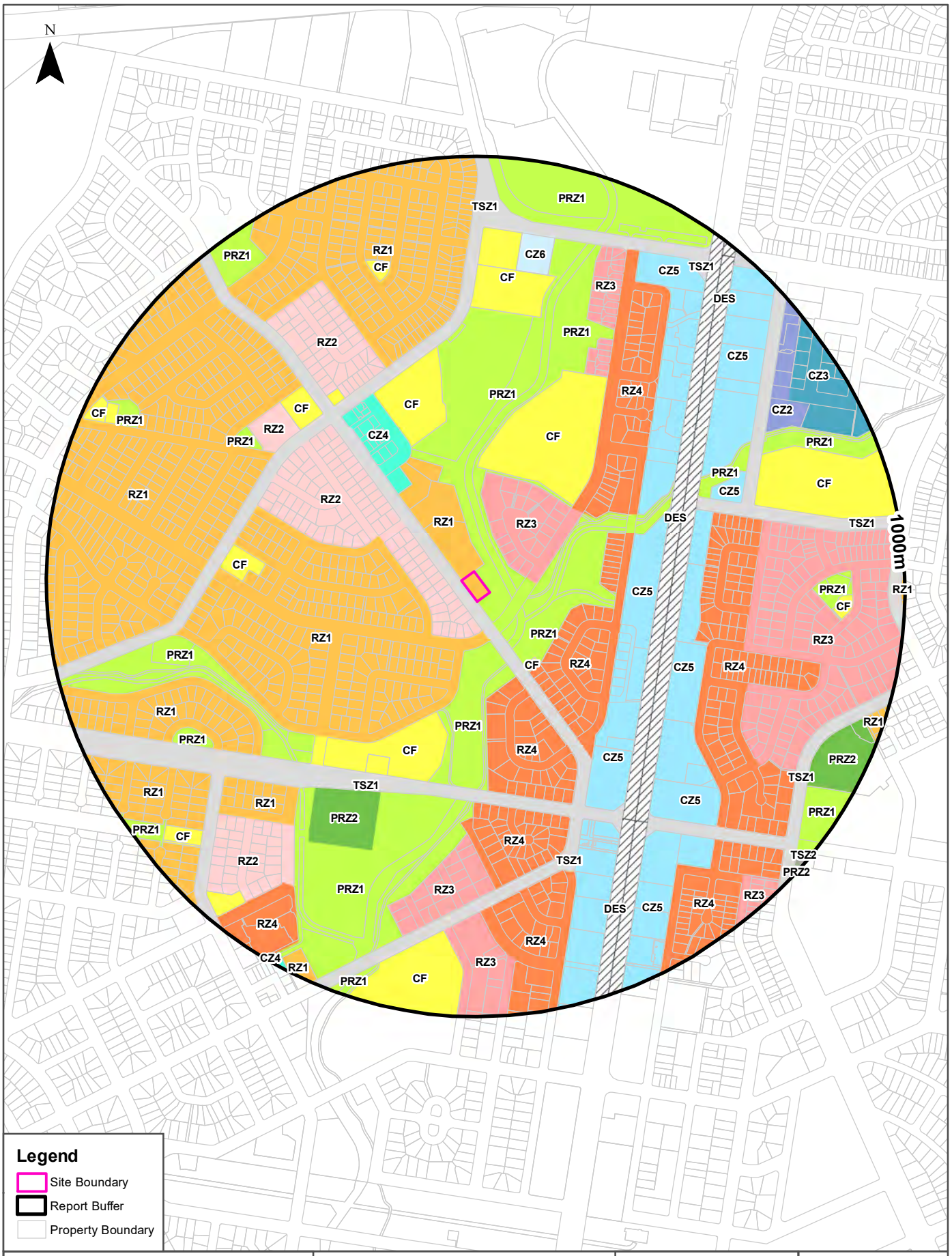
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m
B	Low Probability of occurrence. 6-70% chance of occurrence.	251m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO
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Territory Plan Zones

Wattle Street, Lyneham, ACT 2602



Territory Plan Zones

Wattle Street, Lyneham, ACT 2602

Territory Plan Zones

What Plan Zones exist within the report buffer?

Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	0m	Onsite
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	0m	North
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	0m	North
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	14m	West
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	29m	North West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	65m	West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	73m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	99m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	124m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	143m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	189m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	189m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	193m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	202m	South
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	245m	North East
CZ4	LOCAL CENTRE		TP 2008	NI2008-27	31/03/2008	258m	North West
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	279m	North East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	280m	South West
CZ4	LOCAL CENTRE		TP 2008	NI2008-27	31/03/2008	305m	North West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	322m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	335m	North
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	390m	South East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	398m	North East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	402m	North East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	428m	East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	459m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	471m	West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	477m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	480m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	481m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	505m	East

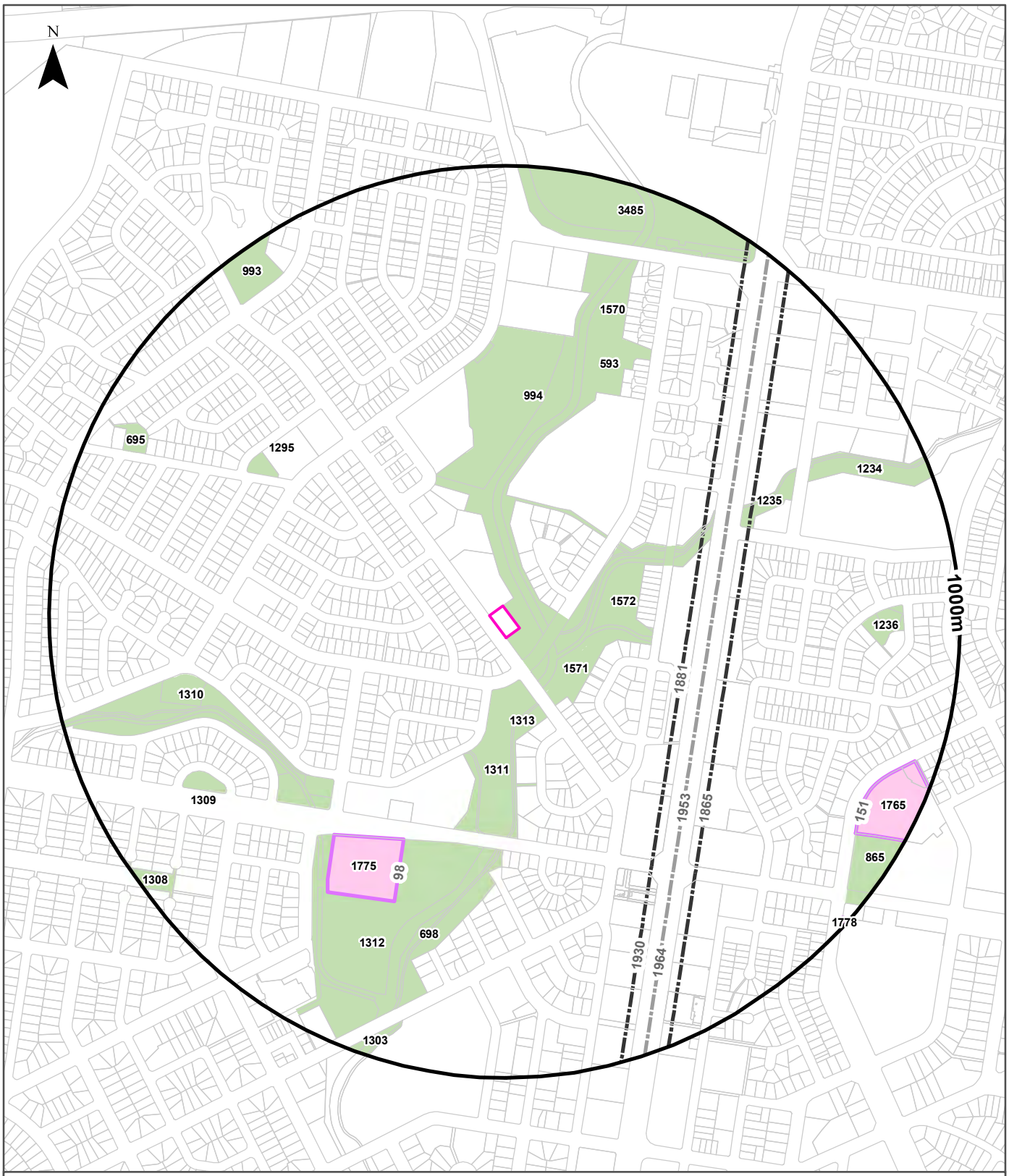
Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	506m	West
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	512m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	520m	North West
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	520m	North West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	521m	North West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	521m	North
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	529m	North West
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	532m	East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	532m	North
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	543m	West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	545m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	553m	North East
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	557m	South
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	559m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	573m	North West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	577m	East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	579m	North East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	582m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	592m	West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	597m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	617m	South West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	623m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	627m	North
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	628m	South
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	649m	South
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	665m	North East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	670m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	671m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	677m	South
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	695m	South West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	697m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	713m	South West
CZ6	LEISURE AND ACCOMMODATION		TP 2008	NI2008-27	31/03/2008	731m	North
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	734m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	734m	North
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	742m	South East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	745m	South

Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	747m	South
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	762m	South West
CZ2	BUSINESS ZONE		TP 2008	NI2008-27	31/03/2008	765m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	775m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	793m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	795m	South
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	799m	North East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	814m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	825m	East
CZ3	SERVICES ZONE		TP 2008	NI2008-27	31/03/2008	846m	North East
PRZ1	URBAN OPEN SPACE		327	CN2015-14	20/08/2015	853m	North
CZ3	SERVICES ZONE		TP 2008	NI2008-27	31/03/2008	854m	North East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	858m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	859m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	862m	North West
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	873m	South East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	891m	North East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	891m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	893m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	899m	South
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	899m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	901m	North West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	910m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	913m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	913m	North West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	935m	South West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	947m	East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	966m	North East
TSZ2	SERVICES		TP 2008	NI2008-27	31/03/2008	968m	South East
CZ4	LOCAL CENTRE	O'Connor Local Centre	TP 2008	NI2008-27	31/03/2008	968m	South West
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	981m	North East
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	985m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	989m	East
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	994m	South West

Territory Plan Zones Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Territory Plan Overlays

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Inter-town Public Transport
- Main Avenues & Approach Routes
- Future Urban Areas
- Special Requirements
- National Land
- Kingston Foreshore
- Public Land
- Wilderness Area
- National Park
- Nature Reserve
- Special Purpose Reserve
- Urban Open Space
- Cemetery or Burial Ground
- Protection of Water Supply
- Lake
- Sport and Recreation Reserve
- National Land Proposed for Urban Development

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Territory Plan Overlays

Wattle Street, Lyneham, ACT 2602

Territory Plan Overlays (areas)

What Plan Overlays (areas) exist within the report buffer?

Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
994	Pe	Urban Open Space.	TP 2008	NI2008-27	0m	North
1311	Pe	Urban Open Space.	TP 2008	NI2008-27	99m	South
1571	Pe	Urban Open Space.	TP 2008	NI2008-27	124m	South East
1313	Pe	Urban Open Space.	TP 2008	NI2008-27	143m	South
1572	Pe	Urban Open Space.	TP 2008	NI2008-27	193m	East
1312	Pe	Urban Open Space.	TP 2008	NI2008-27	477m	South
698	Pe	Urban Open Space.	TP 2008	NI2008-27	480m	South
1310	Pe	Urban Open Space.	TP 2008	NI2008-27	506m	West
1775	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	512m	South West
593	Pe	Urban Open Space.	TP 2008	NI2008-27	521m	North
1235	Pe	Urban Open Space.	TP 2008	NI2008-27	553m	North East
1295	Pe	Urban Open Space.	TP 2008	NI2008-27	573m	North West
1570	Pe	Urban Open Space.	TP 2008	NI2008-27	644m	North
1309	Pe	Urban Open Space.	TP 2008	NI2008-27	713m	South West
1234	Pe	Urban Open Space.	TP 2008	NI2008-27	734m	East
1236	Pe	Urban Open Space.	TP 2008	NI2008-27	775m	East
3485	Pe	Urban Open Space.	327	CN2015-14	853m	North
695	Pe	Urban Open Space.	TP 2008	NI2008-27	862m	North West
1765	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	873m	South East
865	Pe	Urban Open Space.	TP 2008	NI2008-27	893m	South East
1303	Pe	Urban Open Space.	TP 2008	NI2008-27	899m	South
993	Pe	Urban Open Space.	TP 2008	NI2008-27	901m	North West
1308	Pe	Urban Open Space.	TP 2008	NI2008-27	913m	South West
1778	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	985m	South East

Territory Plan Overlays (lines)

What Plan Overlays (lines) exist within the report buffer?

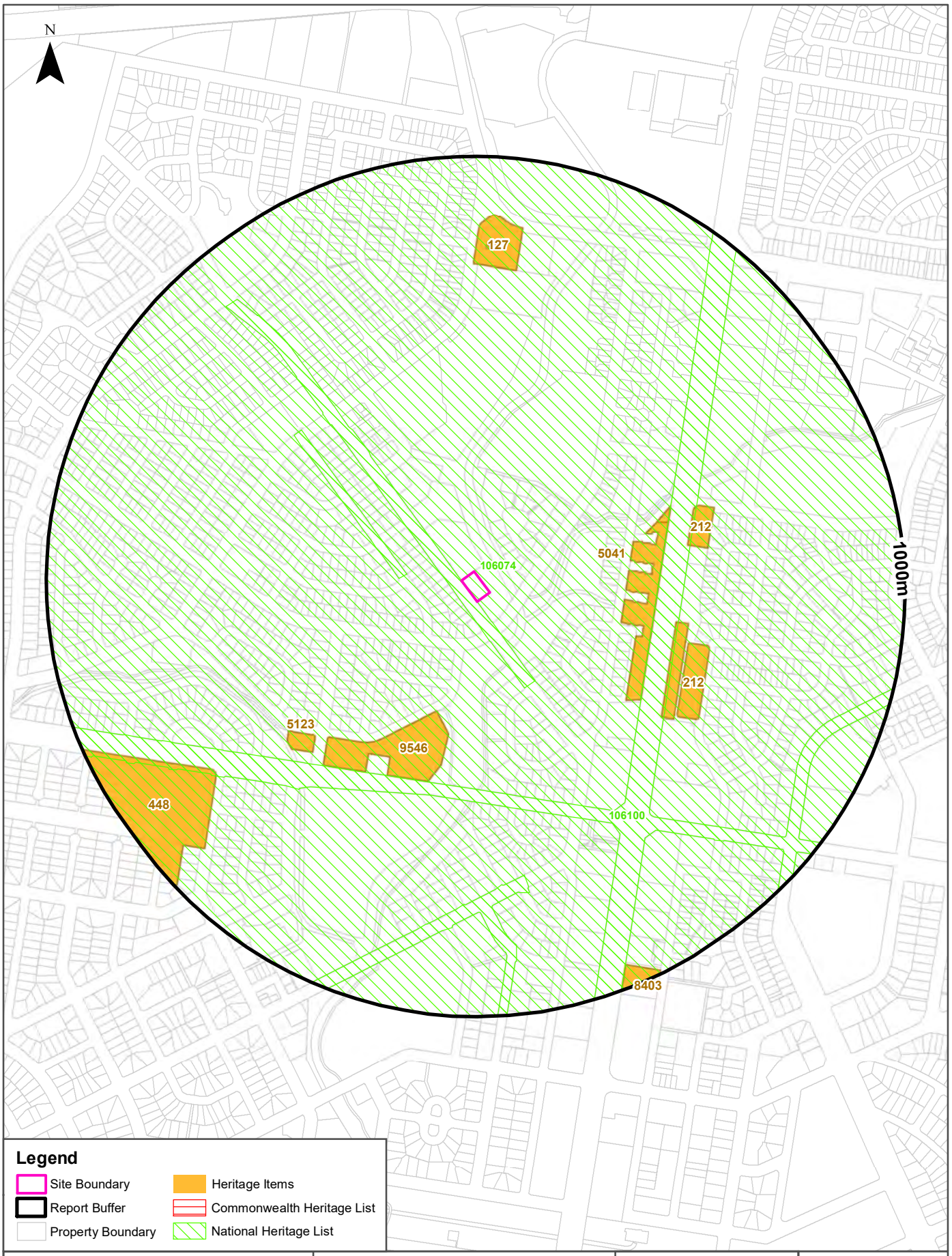
Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
1881	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	378m	East

Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
1953	IPT	Inter-town Public Transport.	TP 2008	NI2008-27	428m	North East
1865	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	479m	East
98	PUBLAN	Public Land	TP 2008	NI2008-27	512m	South West
1930	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	614m	South
1964	IPT	Inter-town Public Transport.	TP 2008	NI2008-27	649m	South
1928	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	684m	South
151	PUBLAN	Public Land	TP 2008	NI2008-27	873m	South East
1879	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	952m	North
20	PUBLAN	Public Land	TP 2008	NI2008-27	985m	South East
1866	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	992m	North East

Territory Plan Overlay Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Heritage Items

Wattle Street, Lyneham, ACT 2602



Heritage

Wattle Street, Lyneham, ACT 2602

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106074	Canberra and Surrounding Areas	Northbourne Av, Canberra ACT	8/01/000/0134	Historic	Minister considering decision within extended period		0m	Onsite
106100	Canberra - Central National Area and Inner Hills/ Canberra the Planned	Northbourne Av, Canberra ACT	8/01/000/0134	Historic	Minister considering decision within extended period		0m	Onsite

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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Heritage Sites

What Heritage SItes exist within the report buffer?

Map Id	Heritage Id	Name	Description	Status	Status Date	Location Type	Block Key	District	Division	Dist	Dir
9546	3361	St Josephs Catholic Church		Nominated for Provisional Registration		Historic		CANBERRA CENTRAL	O'CONNOR	280m	South West
5041	120	Northbourne Housing Precinct Representative Sample	Section 51 Block 8	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	322m	East
212	120	Northbourne Housing Precinct Representative Sample	Section 1 Block 4, Section 12 Block 1, Section 6 Block 41	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	435m	East
212	120	Northbourne Housing Precinct Representative Sample	Section 1 Block 4, Section 12 Block 1, Section 6 Block 41	Final Registration		Historic		CANBERRA CENTRAL	DICKSON	453m	South East

Map Id	Heritage Id	Name	Description	Status	Status Date	Location Type	Block Key	District	Division	Dist	Dir
5123	1721	13th Canberra Scout Hall	Section 24 Block 19	Final Registration		Historic		CANBERRA CENTRAL	O'CONNOR	506m	South West
127	205	St Ninian's Church	Section 41 Block 1	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	731m	North
448	436	Tocumwal Housing Precinct	Section 33 Blocks 1-14, Section 34 Blocks 1-14, Section 35 Blocks 1-14, Section 36 Blocks 1-14, Section 37 Blocks 1-14, Section 54 Blocks 1-16, Section 55 Blocks 1-16, Section 56 Blocks 1-16, Section 59 Blocks 1-7 & 10-17, Section 60 Blocks 1 & 8-13, Sec	Final Registration		Historic		CANBERRA CENTRAL	O'CONNOR	751m	South West
8403	2821	The former AAA Building		Final Registration	14/04/2016	Restricted	11060030464	CANBERRA CENTRAL	BRADDON	944m	South East

Heritage Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Natural Hazards

Wattle Street, Lyneham, ACT 2602

Bushfire Prone Areas

What Bushfire Prone Areas exist within the report buffer?

Feature Id	Description	Distance	Direction
N/A	No records within buffer		

Bushfire Prone Area Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Abatement Zones

What Bushfire Abatement Zones exist within the report buffer?

Feature Id	Feature	Distance	Direction
N/A	No records within buffer		

Bushfire Abatement Zone Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Operational Plan - Access Management

What Bushfire Operational Plan - Access Management exist within the report buffer?

Map Id	Treatment	Distance	Direction
N/A	No records within buffer		

Bushfire Operational Plan Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Operational Plan - Fuel Management

What Bushfire Operational Plan - Fuel Management exist within the report buffer?

Unique Id	Treatment	Hectares	Distance	Direction
N/A	No records within buffer			

Bushfire Operational Plan Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Flood (1 Percent Annual Exceedance Probability)

What Flood zone (1% AEP) exists within the report buffer?

Feature Id	Description	Distance	Direction
N/A	No records within buffer		

Flood Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Vegetation Communities

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundaries
- Alpine Complex
- Dry Sclerophyll Forests
- Freshwater Wetlands
- Forested Wetlands
- u52 Ribbon Gum
- u53 Mountain Gum
- u239 Alpine Ash
- Grassy Woodlands
- Grasslands
- APN, APE, ARB, EPN
- DNF, DNS, DNW
- EXF, EXS, EXW
- PLE Plantation exotic
- PWR Power easement
- EXG Exotic grassland
- NG Native grassland
- URB Urban and developed areas
- UOS Urban Open Space
- Sand
- Rock
- Water

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Vegetation Communities

What Vegetation Communities exist within the report buffer?

UMC Id	Community	Formation	"Keith" Vegetation Class	Mean Height	Canopy Cover	Distance	Direction
URB	Urban and developed areas_URB			8.40	15.73	0m	Onsite
UOS	Urban Open Space_UOS			11.42	19.54	0m	North
Water	Water			3.53	0.09	99m	East
UOS	Urban Open Space_UOS			12.77	46.78	99m	South
UOS	Urban Open Space_UOS			10.63	22.58	477m	South
UOS	Urban Open Space_UOS			11.34	36.76	506m	West
UOS	Urban Open Space_UOS			12.09	39.96	553m	North East
UOS	Urban Open Space_UOS			10.66	44.85	573m	North West
UOS	Urban Open Space_UOS			5.76	19.73	713m	South West
UOS	Urban Open Space_UOS			10.94	34.81	734m	East
UOS	Urban Open Space_UOS			7.96	30.39	775m	East
UOS	Urban Open Space_UOS			10.11	5.82	853m	North
UOS	Urban Open Space_UOS			13.56	37.23	862m	North West
UOS	Urban Open Space_UOS			11.75	21.27	873m	South East
Water	Water			8.04	9.99	887m	South West
UOS	Urban Open Space_UOS			12.08	48.78	899m	South
UOS	Urban Open Space_UOS			9.75	53.24	901m	North West
UOS	Urban Open Space_UOS			7.59	49.28	913m	South West
UOS	Urban Open Space_UOS			12.55	26.57	985m	South East

Vegetation Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Vegetation Subformation

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Dry Forest
- Dry heath shrubland complex
- Former Pine Plantation Post 2003
- Grassland
- Lakes / Water
- Modified grassland / Urban vegetation complex
- Montane Woodland
- Plantation / Arboretum
- Riparian Woodland
- Subalpine Woodland
- Upland Montane Forest
- Urban
- Wet Forest
- Wetlands
- Woodland

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Vegetation Subformation

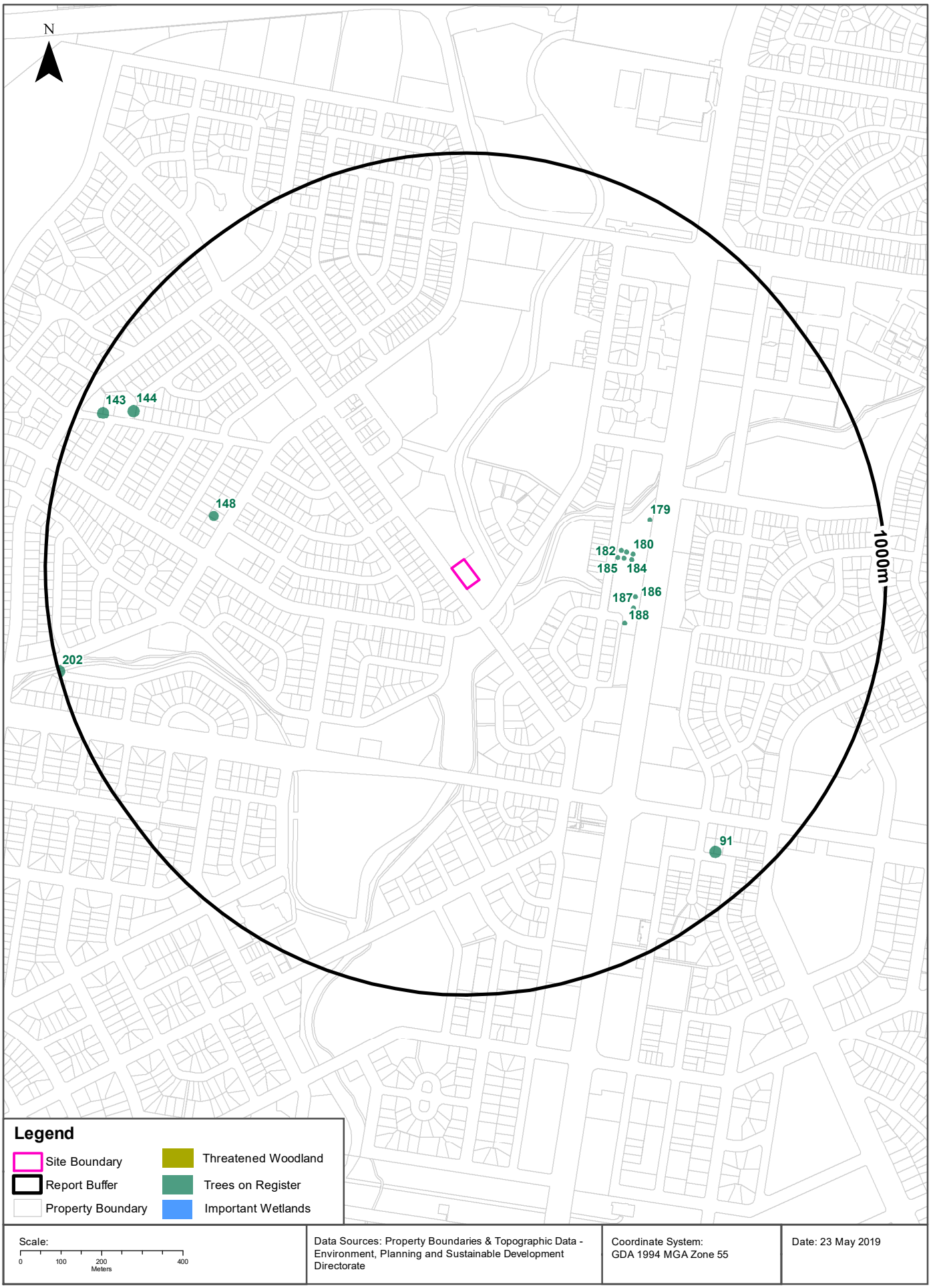
What Vegetation Subformations exist within the report buffer?

Object Id	Subformation	Distance	Direction
13	Urban	0m	Onsite
6	Modified grassland / Urban vegetation complex	0m	South West

Vegetation Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Threatened Woodland, Wetlands &Tree Register

Wattle Street, Lyneham, ACT 2602



Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Threatened Woodland

What ACT Listed Threatened Woodland exists within the report buffer?

Feature Id	Community	EPBCStatus	ACT Status	Distance	Direction
N/A	No records within buffer				

Threatened Woodland Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Tree Register

What Trees on the ACT register exists within the report buffer?

Feature Id	Genus	Species	Tree Ref	Tree Height	Status	Date Edit	Distance	Direction
185	Quercus	macrocarpa	PTR204-Group	14.0	REGISTERED	06/01/2019	338m	East
182	Quercus	macrocarpa	PTR204-Group		REGISTERED	06/01/2019	350m	East
184	Quercus	macrocarpa	PTR204-Group	14.0	REGISTERED	06/01/2019	353m	East
181	Quercus	macrocarpa	PTR204-Group	16.0	REGISTERED	06/01/2019	362m	East
188	Quercus	robur	PTR203	14.0	REGISTERED	06/01/2019	366m	East
183	Quercus	macrocarpa	PTR204-Group	17.0	REGISTERED	06/01/2019	371m	East
180	Quercus	macrocarpa	PTR204-Group	16.0	REGISTERED	06/01/2019	377m	East
187	Cedrus	atlantica	PTR202	17.7	REGISTERED	06/01/2019	378m	East
186	Cedrus	atlantica	PTR201	17.0	REGISTERED	06/01/2019	379m	East
179	Quercus	robur	PTR200	17.0	REGISTERED	06/01/2019	438m	East
148	Quercus	palustris	PTR229	26.0	PROVISIONAL	06/01/2019	587m	West
144	Eucalyptus	melliodora	PTR078	26.0	REGISTERED	06/01/2019	858m	North West
91	Cornus	florida	PTR133	8.0	REGISTERED	06/01/2019	870m	South East
143	Eucalyptus	melliodora	PTR079	26.0	REGISTERED	06/01/2019	923m	North West
202	Eucalyptus	melliodora	PTR030	32.0	REGISTERED	06/01/2019	983m	West

Tree Register Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Important Wetlands

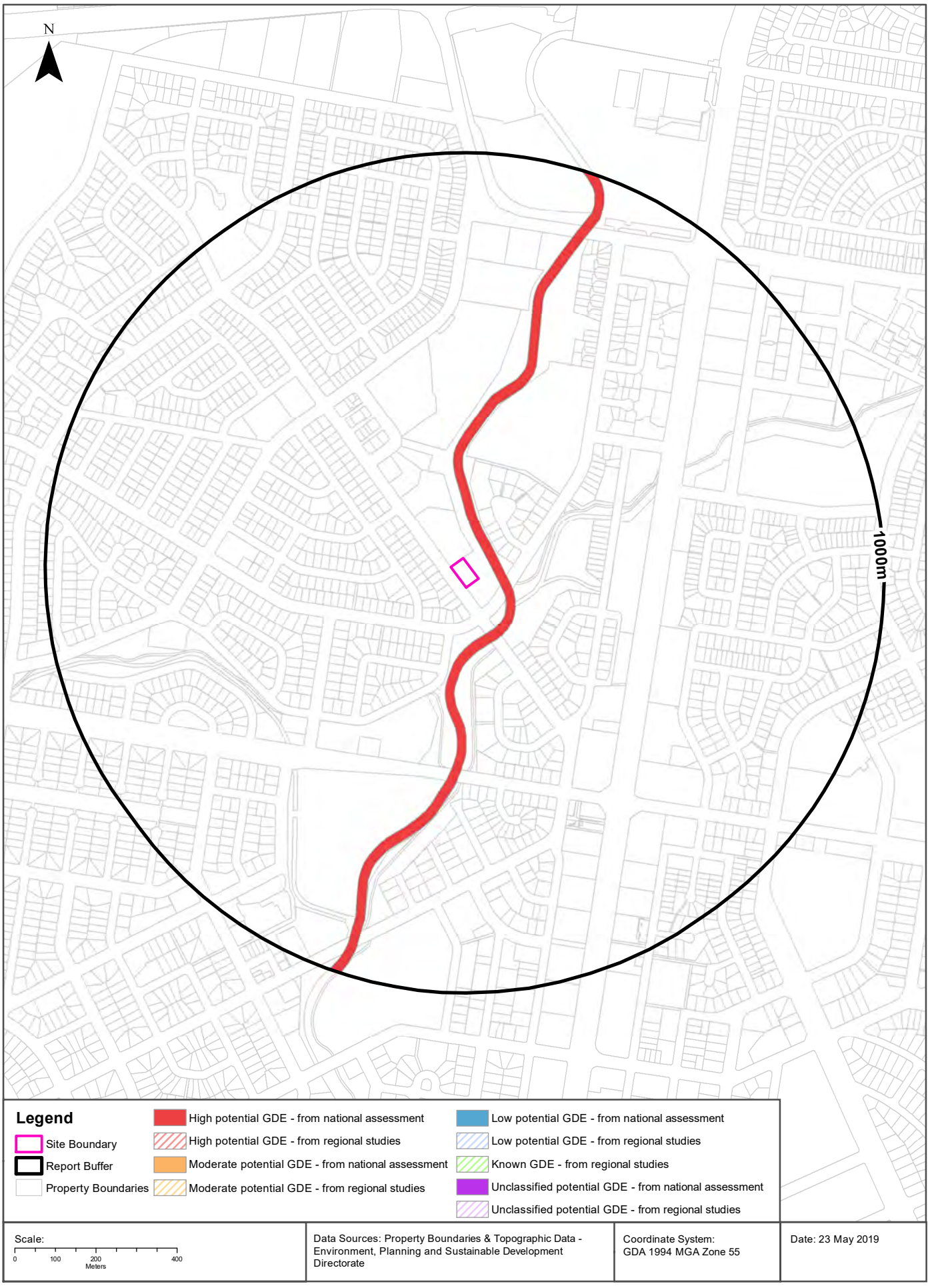
What Wetlands exist within the report buffer?

Feature Id	Name	Distance	Direction
N/A	No records within buffer		

Important Wetlands Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Wattle Street, Lyneham, ACT 2602



Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Groundwater Dependent Ecosystems Atlas

GDEs within the dataset buffer:

Type	Name	GDE Potential	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Aquatic		High potential GDE - from national assessment	8	Upland plains with separating strike-aligned hills, closed lake basins.	River		40m	South

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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Ecological Constraints

Wattle Street, Lyneham, ACT 2602

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Litoria castanea	Yellow-spotted Tree Frog	Critically Endangered	Not Sensitive	Endangered	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Ardenna pacificus	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pedionomus torquatus	Plains-wanderer	Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Vulnerable	Category 3	Vulnerable	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Delma impar	Striped Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus aggregata	Black Gum	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Lepidium pseudopapillosum	Formbe Peppercress	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Leucochrysum albicans subsp. tricolor	Hoary Sunray	Not Listed	Not Sensitive	Endangered	
Plantae	Flora	Rutidosis leptorrhynchoides	Button Wrinklewort	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Swainsona recta	Small Purple-pea	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage

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Appendix D

ACT Government
Chief Minister, Treasury and Economic Development

Ms Sophie Moss
Lanterra Consulting
PO Box 3626
Weston ACT 2611

Dear Ms Moss

RE: CONTAMINATED LAND SEARCH

Thank you for your search form request of 04/06/2019 enquiring about:

Block 14 Section 41 Lyneham Canberra Central

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

The block is not recorded on the EPA's contaminated sites management database or geographic information system.

EPA records indicate that the site is occupied by a depot facility. Fuel storage and vehicle maintenance activities may have been undertaken at the site associed with the operation of the depot.

The ANZECC 1992, Guidelines for the Assessment and Management of Contaminated Sites and the ACT EPA 2017 Contaminated Sites Environment Protection Policy (EPP) list fuel storage and vehicle maintenance as activities associated with land contamination which may pose a risk to human health and the environment.

Other potentially contaminating activities may have also been undertaken at the site associated with past or current permitted uses.

The EPA has not issued any environment protection orders under sections 91C (1), 91D (1) or 125 (4), requested an audit under section 76(2) or received a notification under section 76A (1) of the *Environment Protection Act 1997* (the Act) over the site and as a result the site is not recorded on the Register of contaminated sites under section 21(A) of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present the EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely

Jianmin Zhang
Project Officer
Office of the Environment Protection Authority
Ground Floor TransACT House
470 Northbourne Avenue
Dickson 2602

05/06/2019

Detailed Site Investigation

Block 14, Section 41, Lyneham

Cardno (ACT/NSW) Pty Ltd

17 December 2019

Author	Sophie Moss	
Reviewer	Chris Gunton	
Approver	Chris Gunton	

Report Reference	P19099_DSI_20191217
Date	17/12/2019
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This report has been prepared for Cardno (ACT/NSW) Pty Ltd in accordance with the terms and conditions of appointment for Q19113 (8 November 2019). Lanterra Consulting Pty Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared	Approved
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Table of Contents

Executive Summary **4**

1. Introduction **5**

1.1 Background 5

1.2 Objectives 5

1.3 Scope of Work 6

1.4 Limitations 7

2. Site Characteristics **8**

2.1 Site Location 8

2.2 Site Description 8

2.3 Surrounding Land Uses 9

2.4 Sensitive Environments 9

2.5 Proposed Land Use 9

3. Site History **10**

3.1 Previous Investigations 10

4. Site Condition and Environmental Setting **11**

4.1 Topography 11

4.2 Visible Signs of Contamination 11

4.3 Fill Material 11

5. Geology and Hydrogeology **12**

5.1 Geology 12

5.2 Hydrogeology 12

5.3 Hydrology 12

5.4 Acid Sulfate Soil Risk 12

6. Preliminary Conceptual Site Model **13**

6.1 Areas of Environmental Concern 13

6.2 Contaminants of Potential Concern 13

6.3 Exposure Pathways and Receptors 14

7. Data Quality Objectives **16**

8. Sampling and Analysis Quality **18**

8.1 Chronology of Events 18

8.2 Sampling Plan 18

8.3 Analytical Plan 18

9. Assessment Criteria **20**

10. Methods **21**

11. Results **22**

11.1 Observations 22
11.2 Analytical Results 22
OCP/OPP, PCB, BTEX, and Phenols 22
Asbestos 22
TRH, PAH 22
Heavy Metals 22
12. Quality Assurance / Quality Control 23
12.1 Field QA/QC 23
12.2 Laboratory Quality Assurance/Quality Control 23
13. Revised Conceptual Site Model 25
12.3 Summary of Site Condition 25
12.4 Potential Receptors and Exposure Pathways 25
14. Summary and Conclusions 26
15. References 27

List of Tables

Table 1: Summary of Site Details 8
Table 2: Summary of Exposure Pathways 14
Table 3: DQOs derived for DSI 16
Table 4: Summary of the Chronology of Works 18
Table 5: Rationale for sample locations advanced as a part of the DSI 18
Table 6: Analytical Plan Completed for the DSI 18
Table 7: Averaged Site Physicochemical Properties 20
Table 8: Surrogate samples that Exceed the Laboratory QA/QC criteria. 23
Table 9: Matrix spike samples that Exceed the Laboratory QA/QC criteria. 23
Table 10: Laboratory Duplicate Samples that Exceed the Laboratory QA/QC criteria. 24
Table 11: Revised Conceptual Site Model 25

Appendices

Appendix A Figures
Appendix B Laboratory Data Summary Tables
Appendix C Lotsearch Environmental Risk Report
Appendix D EIL Calculation Spreadsheets
Appendix E Laboratory Analytical Report, COC and Sample Receipt
Appendix F PID Calibration Certificate
Appendix G Bore Logs

Executive Summary

Cardno (ACT/NSW) Pty Ltd (Cardno) engaged Lanterra Consulting Pty Ltd (Lanterra) to complete a Detailed Site Investigation (DSI) for Block 14, Section 41 Lyneham, ACT (herein referred to as the site) based on the results of a preliminary site investigation completed by Lanterra in August 2019.

The site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. It is occupied by ACT Parks and Conservation and has an approximate area of 2,359 square metres (m^2). It is currently zoned as RZ1: Suburban, under the ACT Territory Plan. It is understood that the site will be used for the development of demonstration housing and that it has been assumed that these buildings may be used for permanent residential purposes in the future.

The objective of the DSI was to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

In August 2019 Cardno engaged Lanterra to complete a Preliminary Site Investigation (PSI) for the site. Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility in the past, and fuel storage and vehicle maintenance activities may have been undertaken. The results of the PSI identified three (3) areas of environmental concern (AECs) on the site:

AEC 1: Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern. Given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

This DSI aimed to assess whether activities conducted on the site may have introduced contaminants by advancing eight (8) boreholes, targeting each AEC. Based on the results of the investigation, fill had been used to level the site and was present at depths ranging from 0.2-0.5 m below ground level. Minor hydrocarbon staining was noted on the surface of AEC 2, however other than this, no other aesthetic impacts were observed.

Laboratory results of soil samples selected for analysis indicated that the selected contaminants of potential concern were below the adopted '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' for standard residential properties.

Based on these results, Lanterra therefore considers the site to be suitable from a contamination perspective for the uses permitted under the RZ1: Suburban zone. As a precaution, it is recommended that an unexpected finds protocol is implemented prior to any development work on the site to provide guidance for the management of contaminated material in the event it is encountered.

1. Introduction

Cardno (ACT/NSW) Pty Ltd (Cardno) engaged Lanterra Consulting Pty Ltd (Lanterra) to complete a Detailed Site Investigation (DSI) for Block 14, Section 41 Lyneham, ACT (herein referred to as the site).

At the time of this investigation, the site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. It is occupied by ACT Parks and Conservation and has an approximate area of 2,359 square metres (m^2). It is currently zones as RZ1: Suburban, under the ACT Territory Plan.

Lanterra understands that the site will be used for the development of demonstration housing and it has been assumed that these buildings may be used for permanent residential purposes in the future.

The location and existing layout of the site is illustrated on **Figure 1** and **Figure 3, Appendix A**.

1.1 Background

In August 2019 Cardno engaged Lanterra to complete a Preliminary Site Investigation (PSI) to assess whether past and/or present activities on the site may introduce contamination that may compromise the suitability of the site for the proposed use.

The PSI considered the suitability of the site for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility in the past, and fuel storage and vehicle maintenance activities may have been undertaken. The results of the PSI identified three (3) areas of environmental concern (AECs) on the site:

AEC 1: Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern. Given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

The PSI concluded that a detailed site investigation was necessary to assess the suitability of the site for land uses permitted under the RZ1: Suburban Zone.

1.2 Objectives

The objective of the DSI is to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

1.3 Scope of Work

The following scope of work was conducted:

- A suitably qualified environmental consultant identified the proposed sample locations and a Telstra Accredited Service Locator was engaged to clear each location of underground services.
- A suitably qualified contractor with a suitable backhoe or excavator was engaged to advance boreholes across the site.
- An environmental scientist with appropriate equipment for logging each borehole was present during drilling.
- A total of eight (8) boreholes were advanced across the site with the target depth of approximately 3m below ground level (bgl) or until natural material was encountered. The proposed number of boreholes was based on the NSW EPA (1995) '*Sampling Design Guidelines*' which recommends a minimum of seven (7) sample locations for a site with an area of 2,000 m^2, therefore eight (8) sample locations is considered appropriate for a site with an area of 2,359 m^2.
- Soil samples were collected at the surface, 0.5m, 1.0m and then each metre thereafter to the target depth, at changes in lithology or at zones which exhibit indications of gross contamination.
- Quality Assurance/Quality Control samples would be collected in accordance with Australian Standard AS4482.1-2005 where one (1) duplicate, one (1) triplicate sample were collected.
- Samples would be submitted to a National Association of Testing Authorities (NATA) accredited laboratory where a total of 16 primary soil samples were analysed for the following contaminants of potential concern (COPC) that were identified in the PSI:
    - Total Recoverable Hydrocarbons (TRH);
    - Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
    - Polycyclic Aromatic Hydrocarbons (PAH);
    - Organochlorine and organphosphate pesticides (OCP/OPP);
    - Polychlorinated Biphenyls (PCB);
    - Phenols;
    - Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).
    - Asbestos
    - Two (2) samples would be analysed for pH, cation exchange capacity and percent clay for the derivation of site-specific ecological investigation levels.

  The selected COPCs were based on the assumption that fill is present on the site and that other chemicals (e.g. per and polyfluoroalkyl substances (PFAS) have not been stored or used on the site).

- The results of the investigation would be assessed against the applicable land use criteria in the National Environment Protection Council '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' as amended in 2013 (ASC NEPM 2013).
- Prepare a site investigation report for submission to Cardno.

1.4 Limitations

The findings of the report are based on the Scope of Work outlined above. Lanterra will perform services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties express or implied, are made.

The assessment was limited strictly to identifying typical environmental conditions associated with the subject property area and does not include evaluation of any other issues.

The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the site.

The results of this assessment are based upon the site inspection and the sampling specified above conducted by Lanterra personnel and information from the Client or regulatory agencies. All conclusions and recommendations regarding the property area will be the professional opinions of the Lanterra personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability are made, Lanterra will not assume responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Lanterra, or developments resulting from situations outside the scope of this project.

2. Site Characteristics

2.1 Site Location

The site location and a detailed site plan are presented as **Figure 1** and **Figure 2**, **Appendix A**.

Table 1: *Summary of Site Details*

Site Characteristics	Detail
Street Address	Wattle Street, Lyneham
Approximate Easting and Northing (centre of site)	Easting: 693573.83 Northing: 6096545.93
Approximate Elevation (m AHD)	568 m
Block, Section, Division	Block 14, Section 41 Lyneham
Land Zoning	RZ1: Suburban
Current Land Use	Parks and Conservation Facility
Block Area	2,359m^2

2.2 Site Description

The following description is based on observations made during a site visit conducted on 2 December 2019 (which were consistent with the observations made during the visit to the site during the PSI) by a suitably qualified environmental scientist from Lanterra.

In addition to the single storey building on the site, there are two (2) sheds and two (2) shipping containers located along the southeast site boundary. Observations made during the site visit are presented below:

- The site surface was predominantly unsealed gravel.
- The site was secured by 2m high chain mesh fence with barbed wire. Access on to the site was via a security gate along Wattle Street.
- A retaining wall encircled the northeast and southeast boundaries of the site, with a secondary U-shaped retaining wall located along the north eastern boundary of the site which forms what may have been a soil storage area. This area is sealed with concrete, with some cracking.
- The site is predominantly flat with a gentle slope towards the northeast.
- To the west of the site is Wattle Street, to the south and east is open space, and to the north there is medium-high density residential properties.
- The main building on the site was previously used for fish research.
- The western shed contains general fishing equipment and filing cabinets. The concrete floor is in good condition.
- The larger shed is sealed with a concrete floor that exhibited some minor staining and cracking. There is a self-contained flammable liquids cupboard that contains engine oil. There is also a boat, fishing and electrical equipment.

A detailed site plan is presented in **Figure 2**.

2.3 Surrounding Land Uses

A summary of the land uses that surround the site are as follows:

- **North:** Medium density residential properties;
- **South:** Low density residential properties;
- **East:** Urban open space, treed parkland that is bounded on the north-east by Sullivans Creek stormwater drain, and Goodwin Street, opposite Goodwin Street are low density residential properties and a stormwater retention basin;
- **West:** low density residential properties on the opposite side of Wattle Street.

2.4 Sensitive Environments

The low and medium density residential properties surrounding the property are the nearest sensitive receptors, in addition to Sullivans Creek which is located 50m to the northeast of the site and carries stormwater to Lake Burley Griffin.

2.5 Proposed Land Use

This report aimed to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

It is understood that the site is the proposed location of demonstration housing. While the demonstration housing will not be initially occupied for residential purposes, there is the possibility that the demonstration properties will be used for full-time residential use after the demonstration period is over.

3. Site History

3.1 Previous Investigations

In August 2019 Cardno engaged Lanterra to complete a Preliminary Site Investigation (PSI) for the site the results of which were presented in the report titled '*Preliminary Site Investigation, Block 14, Section 41, Lyneham*'.

The objective of the PSI was to review current and historical uses of the site and assess whether the site was suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility in the past, and fuel storage and vehicle maintenance activities may have been undertaken. A building file search returned no files for Block 14, Section 41, Lyneham on record.

The results of the PSI identified three (3) areas of environmental concern (AECs) on the site:

AEC 1: Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern. Given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

The PSI concluded that activated conducted on the site pose a contamination risk to the site and a detailed soil investigation was necessary to assess the suitability of the site for land uses permitted under the RZ1: Suburban Zone.

4. Site Condition and Environmental Setting

4.1 Topography

The digital topographic map presented in ACTMAPi (available at http://www.actmapi.act.gov.au/) indicates the site has an elevation of approximately 568 m above Australian Height Datum (m AHD). The general topography of the block and surrounding area is relatively flat.

4.2 Visible Signs of Contamination

Other than some minor oil stains from leaks from vehicles that were observed on the concrete of the main building, there were no visible indications of contamination observed during the site visit conducted on 28 June 2019.

4.3 Fill Material

Based on the proximity of the site to the original Sullivan's Creek, which was later filled in for development, there is a possibility that fill material may have been imported onto the site, particularly along the site's northeast boundary.

5. Geology and Hydrogeology

5.1 Geology

The 1:100,000 Geological Series, Canberra, New South Wales and Australian Capital Territory, Sheet 8727 (Bureau of Mineral Resources, 1992) shows that the site is comprised of quaternary alluvial sediments made up of gravel, sand, silty clay, and black organic clay. This is underlain by Black Mountain Sandstone comprised of early Silurian sandstone, siltstone and minor shale.

5.2 Hydrogeology

A groundwater bore search was provided within the Lotsearch report (**Appendix C**). The purpose of the bore search was to document the location and depth of any nearby registered groundwater bores and assess the associated quality of the groundwater so that potential impacts of contaminants from the site or surrounding land uses (if any) on local users of groundwater may be assessed. A copy of the groundwater bore search results is presented in **Appendix C**.

This search indicated that there were two (2) abstraction groundwater boreholes according to the ACT Government data source and nine (9) groundwater boreholes were registered with the Bureau of Mineralogy within 2 km of the site. The nearest of these boreholes is located approximately 990 m to the north of the site.

A review of the Bureau of Mineral Resources (1984) Hydrogeology of the Australian Capital Territory and Environs indicates that groundwater is hosted in unconsolidated aquifers with highly permeable layers rarely occurring, and of limited areal extent. These aquifers have generally poor storage except where leakage occurs from underlying fractured rock aquifers. The quality of groundwater is expected to be variable, and the general total dissolved solids (TDS) is anticipated to be between 500-1000 milligrams per litre (mg/l) and the yield is estimated to be between 0.5-1.0 litres per second (l/sec).

Based on the topography of the site and the nearest water body which is the stormwater retention basin to the north-east, the groundwater flow direction is inferred to be in a north easterly direction. Based on the elevation difference between the site and the retention basin, the depth to groundwater is estimated to be approximately 5-10 m below ground level.

5.3 Hydrology

The nearest surface water receptor is Sullivan's Creek and is located approximately 50m north-east of the site.

Surface water on the site is expected to follow the topographic contours of the site and flow in a north-easterly direction where the water would be captured by Sullivan's Creek stormwater drains.

5.4 Acid Sulfate Soil Risk

A review of the Australian Soil Resource Information System (ASRIS) map shows the subject site to be situated in an area of extremely low probability for acid sulfate soil.

6. Preliminary Conceptual Site Model

Conceptual site models (CSM) are a method of presenting site contamination information and the relationships between sources of contamination, how it may have been introduced to the site, possible pathways for contaminant migration and exposure and the receptors that may be affected by contaminants.

Based on the information reviewed prior to conducting any intrusive investigation, the preliminary CSM was developed to assist with generating areas of environmental concern (AEC) based on the risk of contamination being present and the potential for exposure pathways.

The preliminary CSM is presented in the sections below.

6.1 Areas of Environmental Concern

The following three (3) areas of environmental concern were identified in the PSI report:

AEC 1: Based on the historical aerial photographs and the slope of the site and surrounding area, there is a strong likelihood of fill located specifically along the northeast boundary of the property. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern, given that the site was potentially used to store heavy equipment, including trucks. The leaks and spills associated with this could be potential sources of contamination.

AEC 3: Given the previous use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site may have also been used to store machinery and/or chemicals. The floor of the building and storage sheds were concrete which was in good condition and the potential for contaminants to migrate into the underlying soil was considered to be limited.

The location of each AEC is shown on **Figure 2, Appendix A**.

6.2 Contaminants of Potential Concern

Potential contaminants of concern for each AEC are as follows:

AEC 1

Contaminants associated with imported fill can include:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine and organphosphate pesticides (OCP/OPP);
- Polychlorinated Biphenyls (PCB);
- Phenols;
- Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).
- Asbestos

AEC 2

Contaminants associated with vehicle leaks and spills can include:

- TRH;
- BTEX;
- PAH;
- lead.

AEC 3

Contaminants associated with the storage of machinery and or chemicals can include:

- TRH;
- BTEX;
- PAH;
- OCP/OPP;
- Phenols;
- Heavy Metals

Based on the age of the building, it is noted that asbestos containing materials (ACM) may have been used as construction materials and a hazardous material survey should be completed prior to any demolition.

6.3 Exposure Pathways and Receptors

For a contaminant to pose a risk to either human health and/or the environment, there must be a complete or potentially complete pathway that links the contaminant with the receptor. Identified receptors at the site are as follows:

- On-site workers associated with the current and future use of the site.
- Future construction workers engaged to build the electrical substation.
- Ecological receptors.
- Groundwater.

Based on the results of the PSI, a summary of the potential exposure pathways is shown in Table 2.

Table 2: *Summary of Exposure Pathways*

Pathway	Contaminants of Concern	Exposure Pathway Complete or Potentially Complete (Yes/No)	Comments
Direct Contact with Soil including dermal contact and ingestion	TRH, BTEX, PAH, OCP/OPP, PCB, Phenols, Heavy metals.	Potentially Complete	Based on the possible storage/maintenance of equipment and vehicles and the possible storage of chemicals on the site, any contaminating activities are likely to have occurred at the surface.

Pathway	Contaminants of Concern	Exposure Pathway Complete or Potentially Complete (Yes/No)	Comments
Direct Contact with Groundwater including dermal contact and ingestion	TRH, BTEX, PAH, OCP/OPP, PCB, Phenols, Heavy metals.	Incomplete	While no groundwater abstraction wells are located on the site, if contaminants are present the pathway is potentially complete.
Inhalation of Asbestos Fibres	Asbestos	Incomplete	No asbestos was identified during the site visit. This excludes asbestos containing materials that may be present as a part of the building construction.
Inhalation of gasses and vapour	TRH, BTEX	Incomplete	No fuel storage facilities or chemical stores of volatile compounds were identified on the site.

7. Data Quality Objectives

This section outlines the data quality objectives (DQOs) applied to the investigation.

The DQO process is planning tool that relies on scientific methods for establishing criteria for data quality and for designing data collection programs. The DQO defines the experimental process required to test a hypothesis. The DQO process aims to ensure that efforts relating to data collection are cost effective, by eliminating unnecessary, duplicative or overly precise data whilst at the same time, ensuring the data collected is of sufficient quality and quantity to support defensible decision making.

The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. The seven-step DQO process adopted for this DSI is as follows:

Step 1: State the Problem – concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem;

Step 2: Identify the Decision – identify what questions the study will attempt to resolve, and what actions may result;

Step 3: Identify the Inputs to the Decision – identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement;

Step 4: Define the Study Boundaries – specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected;

Step 5: Develop a Decision Rule – define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions;

Step 6: Specify Tolerable Limits on Decision Errors – define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision; and

Step 7: Optimise the Design –evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

The DQOs derived for the investigation are presented in Table 3.

Table 3: *DQOs derived for DSI*

Step	Details
Step 1: State the Problem	The site has been used for activities that have the potential to introduce contaminants into the environment. The purpose of the investigation was to assess whether the site would be suitable for the land uses permitted under the RZ1: Suburban zone which includes low density residential land use.
Step 2: Identify the Decision	The purpose of the investigation is to assess whether the site is suitable for the permitted land uses. Should COPCs be identified at concentrations that exceeded the adopted assessment criteria, then management and /or options for remediation to make the site suitable for the permitted land uses may be necessary.
Step 3: Identify the Inputs into the Decision	The COPCs selected are based on the previous site activities as described in Section 6.2. As the proposed site use is potentially for residential land use, the following assessment criteria from the National Environment Protection Council

Step	Details
	(NEPC) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' (revised in 2013; ASC NEPM 2013) has been selected: • Health Based Investigation Levels for Residential Sites (HIL A) • Health Based Screening Levels for Residential Sites (HSL A) • Ecological Investigation Levels (EIL) for Urban Residential and Public Open Space • Ecological Screening Levels (ESL) for Urban Residential and Public Open Space Values for each criteria are presented in Section 9 below.
Step 4: Define the Site Boundaries	The site boundary was restricted to the boundary of Block 14 Section 41, Lyneham as shown on **Figure 2, Appendix A**. The vertical boundary of the site was 2 m below ground level which was the maximum sampling depth. It is also noted that the results of the assessment are limited to the condition of the site as of 2 December 2019 when sampling was completed.
Step 5: Develop a Decision Rule	If analytical results for COPCs are below the adopted criteria for residential sites, then the site would be considered suitable for the electrical substation and no further management or remediation would be required. However, should the concentration of one or more COPCs exceed the adopted criteria value then further investigation may be required to delineate the lateral and vertical extent of the impact and/or recommendations for the remediation/management of contamination may be required.
Step 6: Specify Tolerable Limits	The tolerable limits for the investigation adopted for quality assurance/quality control (QA/QC) purposes are as follows: • The relative percentage difference (RPD) for laboratory duplicates for TRH and BTEX analysis is less than 60%; and • Recovery of matrix spikes and surrogate spikes is as per the laboratory's Quality Assurance targets accepted under their NATA accreditation. The tolerable limits for field QA/QC data are as follows: • RPD criteria of 50% or less, for concentrations > or = 10 times the limit of reporting (LOR); • RPD criteria of 75% or less, for concentrations between 5 and 10 times the LOR; and • RPD criteria of 100% or less, for concentrations < 5 times LOR. Replicate data for field duplicates for inorganics, including metals is expected to be as follows: • RPD criteria of 30% or less, for concentrations > or = 10 times LOR; • RPD criteria of 75% or less, for concentrations between 5 and 10 times the LOR; and • RPD criteria of 100% or less, for concentrations < 5 times LOR.
Step 7: Optimise the Design	Samples were collected at relevant intervals, changes in geology or within zones which exhibit gross contamination. Laterally, samples were placed in a grid pattern across the site using a sample spacing of approximately 10 m which should detect a contaminant hotspot with a diameter of 11.8 m.

8. Sampling and Analysis Quality

Details of the sampling and analytical plan adopted to meet the project objectives are presented in the following sections.

8.1 Chronology of Events

The chronology of key project events is summarised in Table 4.

Table 4: *Summary of the Chronology of Works*

Date	Event
1 November 2019	Lanterra engaged to undertake detailed site investigation of Block 14, Section 41, Lyneham
29 November 2019	Service location completed
2 December 2019	Drilling of borehole locations BH1-BH8
2 December 2019	Dispatch of samples to SGS Australia Pty Ltd
13 December 2019	Receipt of laboratory results
17 December 2019	Issue of draft DSI report

8.2 Sampling Plan

A total of eight (8) boreholes were drilled across the site. The rationale for each sample location is summarised in Table 5 below.

Table 5: *Rationale for sample locations advanced as a part of the DSI*

Sample Location	Target Location	Rationale
BH3, BH5	AEC1	General screen of the site for potentially contaminated fill.
BH1- BH2, BH4, BH6-BH8	AEC2	Investigation of the area where machinery may have been stored, driven, washed down and maintained.
-	AEC3	Not accessible

The locations of boreholes drilled across the site are shown on **Figure 3**.

8.3 Analytical Plan

From the samples collected across the site, the analytical plan presented in Table 6 was executed to assess the identified COPCs.

Table 6: *Analytical Plan Completed for the DSI*

Sample Type	TRH	BTEX	PAH	OCP/OPP	PCB	Heavy Metals	Asbestos	pH, CEC, % Clay
Primary	16	16	16	16	16	16	11	2
Duplicate	1	1	1	1	1	1	0	0

Sample Type	TRH	BTEX	PAH	OCP/OPP	PCB	Heavy Metals	Asbestos	pH, CEC, % Clay
Triplicate	1	1	1	1	1	1	0	0

9. Assessment Criteria

The assessment criteria that was adopted for the investigation was based on the land uses permitted under the RZ1: Residential Zone, which includes low density residential use. Therefore, the following criteria have been adopted from the ASC NEPM 2013:

- Health Based Investigation Levels for Residential Sites (HIL A)
- Health Based Screening Levels for Residential Sites (HSL A) for a silt lithology and a depth of 0 m to <1 m below ground level. This assumption is considered appropriate as the soil is located at the surface and based on the field observations the soil is predominantly silt.
- Ecological Investigation Levels (EIL) for Urban Residential and Public Open Space;
- Ecological Screening Levels (ESL) for Urban Residential and Public Open Space for fine soil based on the percentage of silt in the soil.

EIL criteria are derived based on site specific physicochemical properties: pH, cation exchange capacity (CEC) and percent clay. These parameters were measured at two (2) locations across the site. These values were averaged and then used to calculate the site specific EIL criteria. The values used for the determining EILs are summarised in Table 8 below.

Table 7: *Averaged Site Physicochemical Properties*

Physicochemical Property	Unit	Value
pH	pH Unit	7
CEC	meq / 100g	6.2
% Clay	%w / w	9.5

The EIL criteria was calculated using the ASC NEPM 2013 EIL Interactive (Excel) Calculation Spreadsheet using values for aged contaminants. Results of the EIL calculations are presented in **Appendix D**.

The criteria values adopted for the assessment of the site are presented in **Table 1, Appendix B**.

10. Methods

Boreholes were drilled using a 300 mm auger driven by a JCB backhoe. Samples were collected at the surface (0.0-0.2 m), 0.5m bgl, 1.0 m bgl and at every metre thereafter or at changes in lithology or from lenses of gross contamination if detected, until refusal or natural material was encountered. Each sample was collected directly from the auger with care taken not to collect soil that was in contact with the auger flights. A new, clean pair of nitrile gloves was used for each sample to minimise the possibility of cross contamination between samples.

Each sample was described in general accordance with the Unified Soil Classification System (USCS). A sample of soil was placed into a clean, laboratory supplied 250 millilitre (mL) glass jar. The jar was completely filled to the top and sealed with a screw top, Teflon lined lid. Details of each sample, including the sample name with the interval depth, project number and date of sample were written on each sample. The samples were then stored in an ice chilled Esky for transport to the NATA accredited laboratory for analysis.

For each soil sample taken, a portion of the soil was placed in a Ziplock bag, which was then shaken and pierced with a PID. The recorded parts per million concentration of volatile compounds for each sample was recorded. The PID calibration certificate is included in **Appendix F.**

11. Results

Visual and laboratory results of the investigation are presented in the following sections.

11.1 Observations

From the drilling of boreholes across the site, fill was identified in most of the drill holes across the site at the soil surface. Fill ranged in depth from 0.2-0.5 m bgl. Natural material was typically encountered between 0.2-0.5 m bgl. The natural material was an orange brown sandy silt.

PID measurements recorded from field screening ranged from 0 parts per million (ppm) to 12.7 ppm at BH2 0.0-0.2.

Copies of the bore logs are presented in **Appendix G.**

11.2 Analytical Results

A total of sixteen (16) primary soil samples were selected for analysis. A summary of the analytical results is presented in **Table 1, Appendix B,** while copies of the laboratory reports, sample receipt and COCs is presented in **Appendix E**.

OCP/OPP, PCB, BTEX, and Phenols

Concentrations of OCP/OPP, PCB, BTEX, and phenols were below the laboratory limit of reporting (LOR) in every analysed sample and were therefore below the adopted assessment criteria.

Asbestos

All soil samples tested negative for asbestos fibres, and no potentially asbestos containing materials were identified during sampling.

TRH, PAH

Concentrations of TRH and PAH were detected above the laboratory limit of reporting (LOR) in some samples.

TRH compounds were detected in sample BH2 0.0-0.2, however all concentrations were below the adopted criteria.

PAH compounds were detected in BH8 0.0-0.2, but all concentrations were below the adopted criteria. Given that BH2 was located under a sealed asphalt area adjacent to the access gate, the presence of PAH compound indicates that the sample likely contained fragments of asphalt. It should be noted that the benzo(a)pyrene concentration in this sample exceeded the ACT EPA Information Sheet 4 criteria. However if the soil is intended to be moved off site, it should be sampled and assessed in accordance with the requirements of Information Sheet 4.

Heavy Metals

All heavy metals analysed, with the exception of mercury and cadmium, were detected in each sample, however these were all below the adopted assessment criteria. Concentrations of mercury and cadmium were below the laboratory LOR and therefore below the adopted criteria.

12. Quality Assurance / Quality Control

12.1 Field QA/QC

One (1) duplicate and one (1) triplicate field duplicate sample were collected for calculating the relative percent difference (RPD) and assess the precision and accuracy of the laboratory. An RPD of less than 50% is considered acceptable where the analyte concentration is greater than five (5) times the laboratory LOR. Should the RPD be greater than 50%, then further investigation as to the reason for high RPD would occur.

The duplicate and triplicate samples were collected with the following primary sample:

- QC1 and QC2 were collected with primary sample BH2 0.0-0.2 on 2 December 2019

The calculated RPDs (where applicable) for detectable concentrations of COPCs was less than 50% and therefore the analytical data is considered suitable for the purpose of the assessment.

12.2 Laboratory Quality Assurance/Quality Control

A review of the laboratory QA/QC data is summarised below.

Holding Times

All holding times were reported within their tolerable ranges with the exception of pH, Conductivity and TDS in BH2 0.0-0.2 and BH7 0.5-0.6.

Laboratory Accreditation

SGS Services was the primary laboratory used for the analysis of each sample. SGS is NATA accredited for the performed analysis under accreditation number 2562.

Surrogate and Spike Recoveries

All surrogate recoveries were within the tolerable limits with the exception of the following:

Table 8: *Surrogate samples that Exceed the Laboratory QA/QC criteria.*

Parameter	Sample Name	Laboratory Sample No	Recovery (%)
d5-nitrobenzene	BH5 0.5-0.6	SE200769.010	68

The laboratory advised that for the above exceedance, 2 out of 3 surrogates were within the acceptance criteria. As a result, this exceedance is not expected to affect the outcome of the investigation.

All matrix spike recoveries were within tolerable limits with the exception of the following:

Table 9: *Matrix spike samples that Exceed the Laboratory QA/QC criteria.*

Primary	Duplicate	Analyte	RPD (%)
SE200769.001	LB189361.004	Lead	50

The laboratory advised that the above exceedances were due to matrix interference.

Based on the analytical results of primary samples of the investigation, the above RPD exceedances do not alter the outcome of the investigation.

Laboratory Control Sample Results

All laboratory control sample results were within the tolerable limits.

Laboratory Duplicate Results

The duplicate sample RPDs were within the tolerable range for each sample with the exception of the samples listed in Table 10 below.

Table 10: *Laboratory Duplicate Samples that Exceed the Laboratory QA/QC criteria.*

Primary	Duplicate	Analyte	RPD (%)
SE200769.010	LB189278.014	d4-1,2-dichloroethane	45

Based on information provided by the laboratory, the RPD exceedances were attributed to sample heterogeneity. Based on the analytical results of primary samples of the investigation, the above RPD exceedance does not alter the outcome of the investigation.

Laboratory Blank Results

All method laboratory blanks were below the laboratory LOR and therefore within tolerable limits.

13. Revised Conceptual Site Model

Based on the results of the intrusive investigation, the CSM has been revised to reflect information obtained from drilling.

12.3 Summary of Site Condition

The site was levelled using fill ranging in depth from 0.2-0.5 m bgl across the site, with the deepest fill occurring in the south eastern corner of the site in BH5. Some COPCs were detectable (TRH, PAH and heavy metals) but all were below the adopted criteria.

No asbestos fragments were identified during sampling, and no fibres were detected in the soil samples selected for analysis.

No boreholes were advance beneath the building's concrete floor, however the condition of the concrete was good an it was considered that the potential for contaminants stored in the building to impact the underlying soil was low. Furthermore, the volume of any chemicals stored in the building would be minimal and the risk of leaks or spills associated with the storage of these chemicals is considered unlikely to migrate into the underlying soil.

12.4 Potential Receptors and Exposure Pathways

Based on the results of the investigation, the revised CSM is presented in Table 11 below.

Table 11: *Revised Conceptual Site Model*

Pathway	Potential Receptor			
	On-site workers	Construction Workers	Ecological Receptors	Groundwater
Direct Dermal Contact with Soil and Ingestion	**Incomplete** COPCs are not present at harmful concentrations, this results in the pathway being incomplete.			
Direct Dermal Contact with Groundwater	**Incomplete** The pathway is incomplete as there is no potential exposure to groundwater while the risk of COPCs migrating to groundwater is low.			
Exposure to respirable Asbestos	**Incomplete** Exposure pathway is incomplete as no asbestos has been detected on the site			
Inhalation of Vapour or Gas	**Incomplete** Exposure pathway is incomplete due to the concentrations of volatile compounds in soil being below the adopted criteria.			

14. Summary and Conclusions

Cardno engaged Lanterra to complete a detailed site investigation for Block 14, Section 41 Lyneham, ACT based on the results of a preliminary site investigation that was completed by Lanterra in August 2019.

The site has a single storey building located in the central section and three (3) small sheds located along the southern boundary. It is occupied by ACT Parks and Conservation and has an approximate area of 2,359 square metres (m^2) and it is currently zoned as RZ1: Suburban under the ACT Territory Plan. It is understood that the site will be used for the development of demonstration housing and that it has been assumed that these buildings could be used for permanent residential purposes in the future.

The objective of the DSI was to assess whether the site is suitable for the land uses permitted under the RZ1: Suburban zone of the ACT Territory Plan from a contamination perspective.

In August 2019 Cardno engaged Lanterra to complete a PSI for the site. Based on the results of a contaminated land search from the Office of the Environment Protection Authority, the site was used as a depot facility in the past, and fuel storage and vehicle maintenance activities may have been undertaken. Three (3) areas of environmental concern (AECs) were identified on the site:

AEC 1: Based on the aerial photographs, the slope of the site and topography of the surrounding area, there is a strong likelihood that imported fill has been placed along the northeast boundary of the property for levelling purposes. As the source of the fill is not known, there is the possibility that the material may have originated from a contaminated property.

AEC 2: The central gravelled open area is also an area of concern. Given that the site was formerly a depot facility, there is the possibility that the area was used to store vehicles and equipment resulting in leaks and spills across this area.

AEC 3: Given the former use of the site as a depot, the area that houses the building with the roller garage door on the southwestern side of the site, the two (2) sheds and two (2) sea containers may have also been used to store machinery and/or chemicals or maintain vehicles and equipment.

This DSI aimed to assess whether activities conducted on the site may have introduced contaminants by advancing eight (8) boreholes, targeting each AEC. Based on the results of the investigation, fill had been used to level the site and was present at depths ranging from 0.2-0.5 m below ground level. Minor hydrocarbon staining was noted on the surface of AEC 2, however other than this, no other aesthetic impacts were observed. No boreholes were advanced beneath the concrete of AEC 3, however the condition of the concrete floor was considered to be good and the potential for contaminants stored in the building to migrate into the underlying soil was considered to be low.

Laboratory results of soil samples selected for analysis indicated that the selected contaminants of potential concern were below the adopted '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' for standard residential properties.

Based on these results, Lanterra therefore considers the site to be suitable from a contamination perspective for the uses permitted under the RZ1: Suburban zone. As a precaution however, it is recommended that an unexpected finds protocol is implemented prior to any development work on the site to provide guidance for the management of contaminated material in the event it is encountered.

15. References

ACT EPA (2018) '*Information Sheet 4 - Requirements for the Reuse and Disposal of Contaminated Soil in the ACT*'

Bureau of Mineral Resources, Geology and Geophysics (1984) '*1:100,000 Hydrogeology of the Austrailan Capital Territory and Environs*'

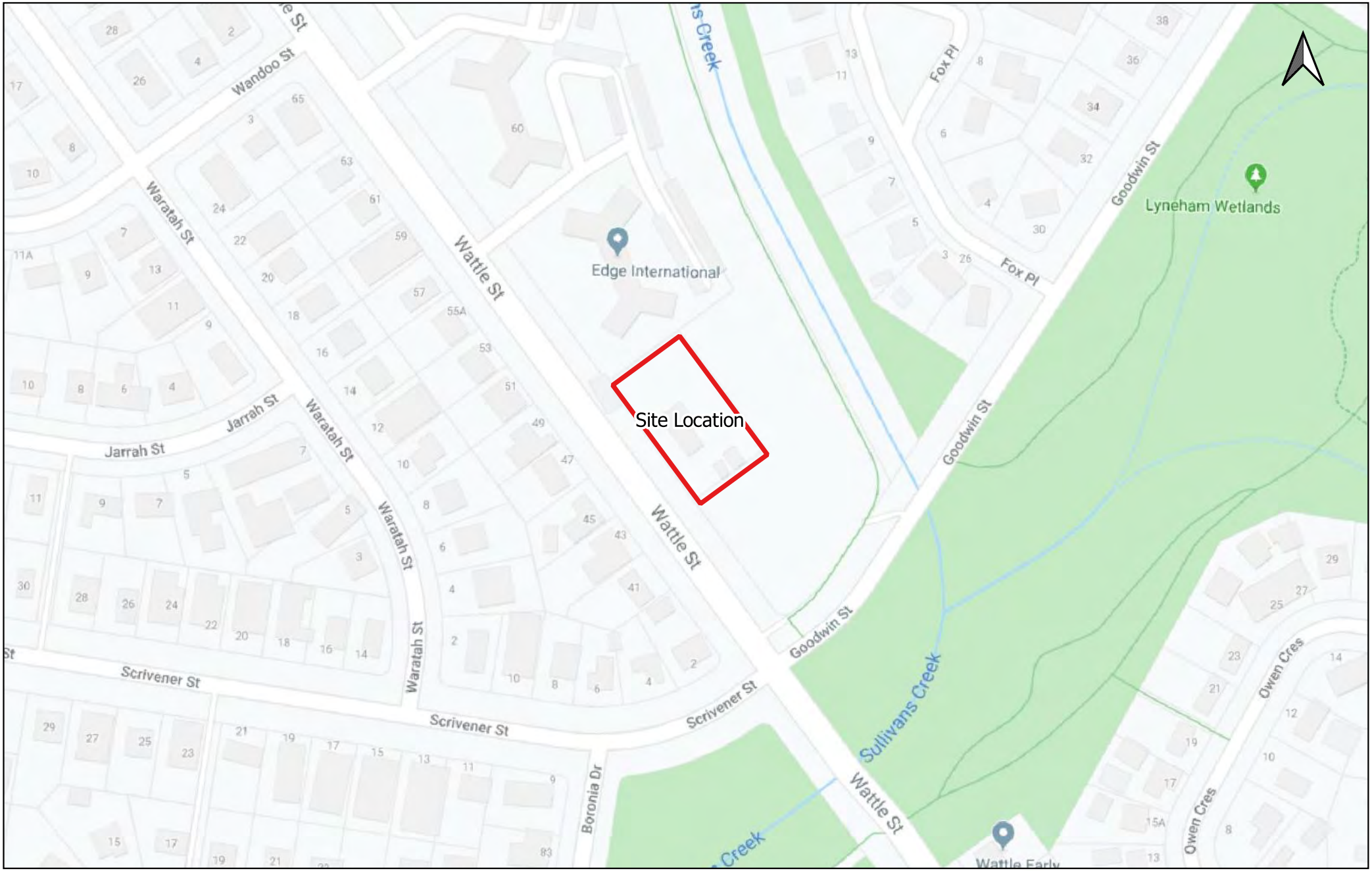
Bureau of Mineral Resources, Geology and Geophysics (1992) '*1:100,000 Geological Series, Canberra, New South Wales and Australian Capital Territory, Sheet 8727*'

National Environment Protection Council (1999) '*National Environment Protection (Assessment of Site Contamination) Measure 1999*' (amended 2013).

Lanterra Consulting (2019) *'Preliminary Site Investigation Block 14 Section 41 Lyneham'* Report Reference: P19013_PSI_20190808

Appendix A

Figures



0 50 100 m

Project: P19099
Location: Block 14 Section 41, Lyneham, ACT
Figure 1: Site Location

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Location: Block 41 Section 14, Lyneham	**Figure 2:** Areas of Environmental Concern
Project No: P19099	lanterra consulting



0 25 50 m

Project: P19099
Location: Block 14 Section 41, Lyneham, ACT

Figure 3: Sample Location Plan

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Appendix B

Laboratory Data Summary Table

P19099 - Detailed Site Investigation, Block 41 Section 14, Lyneham, ACT

Table 1: Analytical Results

							Field_ID	BH1 0.0-0.2	BH1 0.5-0.6	BH2 0.0-0.2	QC1	RPD	BH2 0.5-0.6	BH3 0.0-0.2	BH3 0.5-0.6	BH4 0.0-0.2	BH4 0.5-0.6	BH5 0.0-0.2	BH5 0.5-0.6	BH6 0.0-0.2	BH6 0.5-0.6	BH6 1.0-1.1	BH7 0.0-0.2	BH7 0.5-0.6	BH8 0.0-0.2	BH8 0.5-0.6
							Depth m	0.0-0.1																		
							Sampled-date	2/12/2019	2/12/2019	2/12/2019	2/12/2019		2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019
							Fill/Natural																			
				ACT EPA Information Sheet 4	ASC NEPM (2013) EIL/ESL Urban Residential and Public Open Space	ASC NEPM (2013) HSL A (mg/kg) 0.0-1.0m/1.0-2.0m/2.0-4.0m	ASC NEPM (2013) HIL A																			
Method_Type	**ChemName**	**Units**	**EQL**																							
Metals in soil	Arsenic, As	mg/kg	1	20	100		100	**2**	**5**	**3**	**3**	0%	**6**	**6**	**7**	**4**	**8**	**7**	**6**	**8**	**9**	**7**	**8**	**N.A.**	**4**	**7**
	Cadmium, Cd	mg/kg	0.3	3			20	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**N.A.**	<0.3	<0.3
	Chromium, Cr	mg/kg	0.3	50	400		100	**11**	**21**	**7**	**6.4**	9%	**18**	**14**	**29**	**13**	**22**	**7.7**	**16**	**14**	**27**	**21**	**13**	**N.A.**	**11**	**19**
	Copper, Cu	mg/kg	0.5	100	250		6000	**5.2**	**9.3**	**5.2**	**5.8**	11%	**13**	**10**	**9.9**	**6.1**	**13**	**22**	**7.9**	**8.8**	**14**	**10**	**18**	**N.A.**	**13**	**13**
	Lead, Pb	mg/kg	1	100	1100		300	**31**	**18**	**40**	**35**	13%	**15**	**24**	**24**	**14**	**22**	**41**	**14**	**16**	**39**	**25**	**12**	**N.A.**	**17**	**17**
	Nickel, Ni	mg/kg	0.5	60	580		400	**3.5**	**6.4**	**2.7**	**2.5**	8%	**6.8**	**8**	**8.9**	**5.3**	**8.7**	**3.9**	**6.2**	**6.2**	**13**	**9.5**	**22**	**N.A.**	**5.3**	**7.3**
	Zinc, Zn	mg/kg	2	200	960		7400	**34**	**20**	**48**	**40**	18%	**20**	**50**	**27**	**27**	**24**	**49**	**16**	**22**	**23**	**21**	**20**	**N.A.**	**28**	**22**
	Mercury	mg/kg	0.05	1			40	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**N.A.**	<0.05	<0.05
Organochlorine Pesticides	Hexachlorobenzene (HCB)	mg/kg	0.1				10	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Alpha BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Lindane	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Heptachlor	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Aldrin	mg/kg	0.1				6	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Beta BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Delta BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Heptachlor epoxide	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	o,p'-DDE	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Alpha Endosulfan	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Gamma Chlordane	mg/kg	0.1				50	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Alpha Chlordane	mg/kg	0.1				50	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	trans-Nonachlor	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	p,p'-DDE	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Dieldrin	mg/kg	0.2				6	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Endrin	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	o,p'-DDD	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	o,p'-DDT	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Beta Endosulfan	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	p,p'-DDD	mg/kg	0.1				240	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	p,p'-DDT	mg/kg	0.1				240	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Endosulfan sulphate	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Endrin Aldehyde	mg/kg	0.1	0.5			10	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Methoxychlor	mg/kg	0.1				300	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Endrin Ketone	mg/kg	0.1	0.5				<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Isodrin	mg/kg	0.1	0.5				<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Mirex	mg/kg	0.1				10	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
Organophosphorus Pesticides	Dichlorvos	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	Dimethoate	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	Fenitrothion	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Malathion	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2				160	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Parathion-ethyl (Parathion)	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Bromophos Ethyl	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Methidathion	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	Ethion	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Azinphos-methyl (Guthion)	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2

P19099 - Detailed Site Investigation, Block 41 Section 14, Lyneham, ACT

Table 1: Analytical Results

							Field_ID	BH1 0.0-0.2	BH1 0.5-0.6	BH2 0.0-0.2	QC1	RPD	BH2 0.5-0.6	BH3 0.0-0.2	BH3 0.5-0.6	BH4 0.0-0.2	BH4 0.5-0.6	BH5 0.0-0.2	BH5 0.5-0.6	BH6 0.0-0.2	BH6 0.5-0.6	BH6 1.0-1.1	BH7 0.0-0.2	BH7 0.5-0.6	BH8 0.0-0.2	BH8 0.5-0.6
							Depth m	0.0-0.1																		
							Sampled-date	2/12/2019	2/12/2019	2/12/2019	2/12/2019		2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019
							Fill/Natural																			
				ACT EPA Information Sheet 4	ASC NEPM (2013) EIL/ESL Urban Residential and Public Open Space	ASC NEPM (2013) HSL A (mg/kg) 0.0-1.0m/1.0-2.0m/2.0-4.0m	ASC NEPM (2013) HIL A																			
Method_Type	**ChemName**	**Units**	**EQL**																							
PAHs in Soil	Naphthalene	mg/kg	0.1	3	170	4/NL/NL		<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Acenaphthylene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Acenaphthene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Fluorene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Phenanthrene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.3**	<0.1
	Anthracene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Fluoranthene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.6**	<0.1
	Pyrene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.7**	<0.1
	Benzo(a)anthracene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.4**	<0.1
	Chrysene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.5**	<0.1
	Benzo(b&j)fluoranthene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.4**	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.3**	<0.1
	Benzo(a)pyrene	mg/kg	0.1	0.2	0.7			<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.6**	<0.1
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.3**	<0.1
	Dibenzo(ah)anthracene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Benzo(ghi)perylene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	**0.4**	<0.1
	Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2				3	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	**0.7**	<0.2
	Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3				3	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**N.A.**	**0.8**	<0.3
	Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2				3	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	**0.8**	<0.2
	Total PAH (18)	mg/kg	0.8	20			300	<0.8	<0.8	<0.8	<0.8	-	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	**N.A.**	**4.5**	<0.8
PCBs in Soil	Arochlor 1016	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1221	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1232	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1242	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1248	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1254	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1260	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1262	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Arochlor 1268	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	Total PCBs (Arochlors)	mg/kg	1	0.3			1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**N.A.**	<1	<1
TRH Soil C10-C40 NEPM	TRH C10-C14	mg/kg	20					<20	<20	**34**	**26**	27%	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	**N.A.**	<20	<20
	TRH C15-C28	mg/kg	45					<45	<45	**85**	**70**	19%	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	**N.A.**	<45	<45
	TRH C29-C36	mg/kg	45					<45	<45	<45	<45	-	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	<45	**N.A.**	<45	<45
	TRH C37-C40	mg/kg	100					<100	<100	<100	<100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	**N.A.**	<100	<100
	TRH >C10-C16	mg/kg	25					<25	<25	**59**	**45**	27%	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	**N.A.**	<25	<25
	TRH >C10-C16 - Naphthalene (F2)	mg/kg	25		120	230/NL/NL		<25	<25	**59**	**45**	27%	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	**N.A.**	<25	<25
	TRH >C16-C34 (F3)	mg/kg	90		1300			<90	<90	<90	<90	-	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	**N.A.**	<90	<90
	TRH >C34-C40 (F4)	mg/kg	120		5600			<120	<120	<120	<120	-	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	**N.A.**	<120	<120
	TRH C10-C36 Total	mg/kg	110	1000				<110	<110	**120**	<110	-	<110	<110	<110	<110	<110	<110	<110	<110	<110	<110	<110	**N.A.**	<110	<110
	TRH C10-C40 Total (F bands)	mg/kg	210					<210	<210	<210	<210	-	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	**N.A.**	<210	<210
BTEX + VOC	Benzene	mg/kg	0.1	1	65	0.6/0.7/1		<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Toluene	mg/kg	0.1	1	105	390/NL/NL/NL		<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	3	125	NL/NL/NL		<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	m/p-xylene	mg/kg	0.2					<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**N.A.**	<0.2	<0.2
	o-xylene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	Total Xylenes	mg/kg	0.3	14	45	95/210/NL		<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**N.A.**	<0.3	<0.3
	Total BTEX	mg/kg	0.6					<0.6	<0.6	<0.6	<0.6	-	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	**N.A.**	<0.6	<0.6
	Benzene (F0)	mg/kg	20	65		0.6/0.7/1		<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**N.A.**	<0.1	<0.1
	TRH C6-C9	mg/kg	0.1					<20	<20	<20	<20	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	**N.A.**	<20	<20
	TRH C6-C10	mg/kg	25					<25	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	**N.A.**	<25	<25
	TRH C6-C10 minus BTEX (F1)	mg/kg	25		180	50/90/150		<25	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	**N.A.**	<25	<25

lanterra consulting

P19099 - Detailed Site Investigation, Block 41 Section 14, Lyneham, ACT

Table 1: Analytical Results

								Field_ID	BH1 0.0-0.2	BH1 0.5-0.6	BH2 0.0-0.2	QC1	RPD	BH2 0.5-0.6	BH3 0.0-0.2	BH3 0.5-0.6	BH4 0.0-0.2	BH4 0.5-0.6	BH5 0.0-0.2	BH5 0.5-0.6	BH6 0.0-0.2	BH6 0.5-0.6	BH6 1.0-1.1	BH7 0.0-0.2	BH7 0.5-0.6	BH8 0.0-0.2	BH8 0.5-0.6
								Depth m	0.0-0.1																	
								Sampled-date	2/12/2019	2/12/2019	2/12/2019	2/12/2019		2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019	2/12/2019
								Fill/Natural																		
				ACT EPA Information Sheet 4	ASC NEPM (2013) EIL/ESL Urban Residential and Public Open Space	ASC NEPM (2013) HSL A (mg/kg) 0.0-1.0m/1.0-2.0m/2.0-4.0m	ASC NEPM (2013) HIL A																				
Method_Type	**ChemName**	**Units**	**EQL**																								
Speciated Phenol	Phenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2-methyl phenol (o-cresol)	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	3/4-methyl phenol (m/p-cresol)	mg/kg	1						<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**N.A.**	<1	<1
	Total Cresol	mg/kg	1.5						<1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	**N.A.**	<1.5	<1.5
	2-chlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,4-dimethylphenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,6-dichlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,4-dichlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,4,6-trichlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2-nitrophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	4-nitrophenol	mg/kg	1						<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**N.A.**	<1	<1
	2,4,5-trichlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1						<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**N.A.**	<1	<1
	Pentachlorophenol	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**N.A.**	<0.5	<0.5
	2,4-dinitrophenol	mg/kg	2						<2	<2	<2	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**N.A.**	<2	<2
	4-chloro-3-methylphenol	mg/kg	2						<2	<2	<2	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**N.A.**	<2	<2
Asbestos	Asbestos Detected	No unit	0						**No**	**N.A.**	**No**	**N.A.**	-	**N.A.**	**No**	**N.A.**	**No**	**N.A.**	**No**	**No**	**No**	**No**	**No**	**No**	**N.A.**	**No**	**N.A.**
	Estimated Fibres	%w/w	0.01						<0.01	N.A.	<0.01	N.A.	-	N.A.	<0.01	N.A.	<0.01	N.A.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N.A.	<0.01	N.A.
Physicochemical Properties	pH	No unit	0.1						N.A.	N.A.	**7.6**	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	**6.4**	N.A.	N.A.
		µS/cm	1						N.A.	N.A.	**47**	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	**78**	N.A.	N.A.
	%clay (<75 um)	%w/w	0.1						N.A.	N.A.	**8**	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	**11**	N.A.	N.A.

Appendix C

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Address: Wattle Street, Lyneham, ACT 2602

Date: 23 May 2019 15:33:25

Reference: LS006425 EP

Report Buffer: 1000m

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Table of Contents

Location Confidences 2
Dataset Listing 3
Site Location Aerial 5
Contaminated Sites Register & Waste Management Facilities 6
PFAS Investigation Programs 8
Defence Sites 9
EPA Authorisations & Agreements 10
Historical Business Directories 12
Historical Aerial Imagery & Maps 23
Topographic Features 44
Elevation Contours 49
Hydrogeology & Groundwater Boreholes 50
Geology 54
Soil Landscapes 56
Acid Sulfate Soils 60
Territory Plan Zones 62
Territory Plan Overlays 66
Heritage 69
Natural Hazards 72
Ecological Constraints 74
Terms & Conditions 84

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a confidence is given under the field heading “LocConf” or “Location Confidence”.

Location Confidence	Description
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced with the confidence of the general/approximate area
Road Match	Georeferenced to the road or rail
Road Intersection	Georeferenced to the road intersection
Buffered Point	Feature is a buffered point
Network of Features	Georeferenced to a network of features

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Land Administration Databases	ACT Government	30/04/2019	30/04/2019	Quarterly	-	-	-
Register of Contaminated Sites	ACT Government - Environment Protection Authority	03/05/2019	03/05/2019	Monthly	0	0	8
National Waste Management Facilities Database	Geoscience Australia	07/05/2019	07/03/2017	Quarterly	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	29/04/2019	29/04/2019	Monthly	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	29/04/2019	29/04/2019	Monthly	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	29/04/2019	29/04/2019	Monthly	0	0	0
EPA Authorisations	Environment Protection Authority	30/04/2019	30/04/2019	Monthly	0	2	13
EPA Agreements	Environment Protection Authority	30/04/2019	30/04/2019	Monthly	0	0	2
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	0	2	3
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	-	11	11
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	0	6	8
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	-	11	11
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	0	3	3
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	-	19	19
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	-	2	2
Features of Interest	ACT Government	18/03/2019	18/03/2019	Quarterly	0	1	106
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1	1	1
Hydrogeological Landscapes Units	ACT Government - Environment, Planning and Sustainable Development Directorate	04/01/2018	22/11/2017	As required	1	1	1
Groundwater Boreholes (ACT)	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	2
Groundwater Boreholes (Bureau of Meteorology)	Commonwealth of Australia (Bureau of Meteorology)	20/11/2017	25/08/2017	Annually	0	0	9
Geological Units 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	1	-	6
Geological Structures 1:250,000	NSW Department of Industry, Resources & Energy	20/08/2014		None planned	0	-	1
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1	-	4
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1	1	2
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1	1	2

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Territory Plan Zones	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	1	8	102
Territory Plan Overlays (Areas)	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	2	24
Territory Plan Overlays (Lines)	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	11
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	2	2	2
Heritage Sites	ACT Government - Environment, Planning and Sustainable Development Directorate	19/03/2019	19/03/2019	Quarterly	0	0	8
Bushfire Prone Areas	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	0
Bushfire Abatement Zones	ACT Government - Environment, Planning and Sustainable Development Directorate	18/03/2019	18/03/2019	Quarterly	0	0	0
Bushfire Operational Plan - Access Management	ACT Government - Environment, Planning and Sustainable Development Directorate	26/02/2019	26/02/2019	Quarterly	0	0	0
Bushfire Operational Plan - Fuel Management	ACT Government - Environment, Planning and Sustainable Development Directorate	26/02/2019	26/02/2019	Quarterly	0	0	0
Flood 1 percent Annual Exceedance Probability	ACT Government - Environment, Planning and Sustainable Development Directorate	09/03/2018	18/01/2017	As required	0	0	0
Vegetation Communities	ACT Government	08/01/2019	04/01/2019	Annually	1	4	19
Vegetation Subformation	ACT Government	14/01/2019	14/01/2019	Annually	1	2	2
Threatened Woodland	ACT Government	08/01/2019	29/11/2018	Annually	0	0	0
Tree Register	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	15
Important Wetlands	ACT Government	18/03/2019	18/03/2019	Quarterly	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	0	1	1
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	23/05/2019	23/05/2019	Daily	-	-	-

Aerial Imagery 2017

Wattle Street, Lyneham, ACT 2602

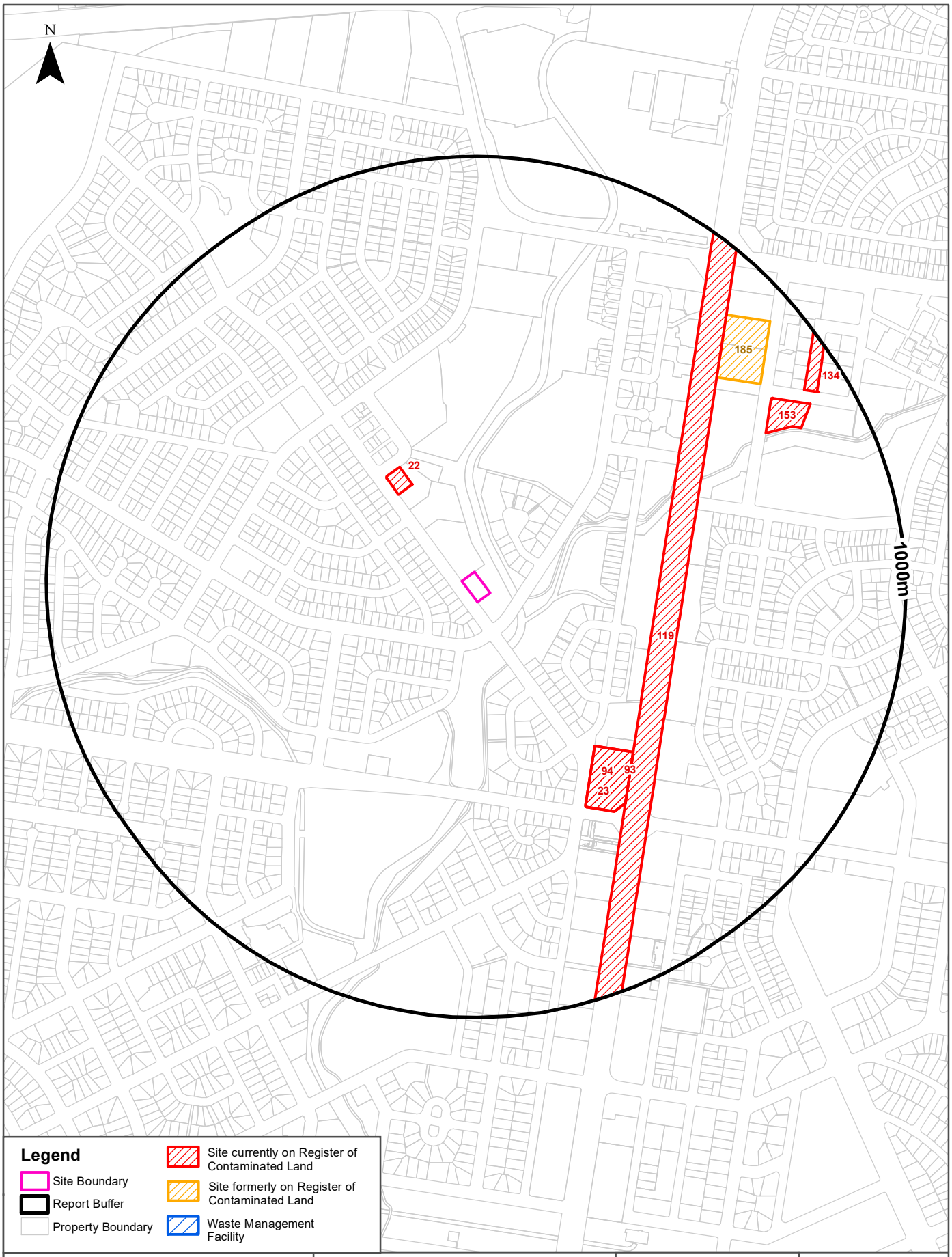


Scale:	Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 May 2019

0 25 50 100 Meters

Contaminated Sites Register & National Waste Facilities

Wattle Street, Lyneham, ACT 2602



Contaminated Land & Waste Management Facilities

Wattle Street, Lyneham, ACT 2602

Register of Contaminated Sites

Records from the ACT Register of Contaminated Sites within the report buffer:

Map Id	Site Description	Notification	District	Division	Section	Block	Status	Loc Conf	Dist	Direction
22	Former Caltex Service Station	76A(1)	Canberra Central	Lyneham	41	3	Site currently on EPA Register	Premise Match	258m	North West
119	Capital Metro alignment	76A(1)	Canberra Central		0	0	Site currently on EPA Register	Road Match	398m	North East
23	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	12	Site currently on EPA Register	Premise Match	445m	South East
94	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	26	Site currently on EPA Register	Premise Match	445m	South East
93	Capital Metro alignment	76A(1)	Canberra Central	Lyneham	50	27	Site currently on EPA Register	Premise Match	533m	South East
185	Former ACT Motor Registry site	76A(1)	Canberra Central	Dickson	33	2	Site formerly on EPA Register	Premise Match	747m	North East
153	Former Government depot site	76(2)	Canberra Central	Dickson	34	3	Site currently on EPA Register	Premise Match	765m	North East
134	Woolley Street Dickson adjacent to former BP service station located at Block 1 Section 31 Dickson	76(2)	Canberra Central	Dickson	31	0	Site currently on EPA Register	Road Match	899m	North East

ACT Register of Contaminated Sites Data Source: ACT Government Environment Protection Authority
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National Waste Management Site Database

Sites on the National Waste Management Site Database within the report buffer:

Site Id	Owner	Name	Address	Suburb	Postcode	Landfill	Reprocess	Transfer	Loc Conf	Distance	Direction
N/A	No records in buffer										

Waste Management Facilities Data Source: Australian Government Geoscience Australia
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PFAS Investigation Sites

Wattle Street, Lyneham, ACT 2602

Defence PFAS Investigation & Management Program

Sites being investigated or managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

Wattle Street, Lyneham, ACT 2602

Defence 3 Year Regional Contamination Investigation Program

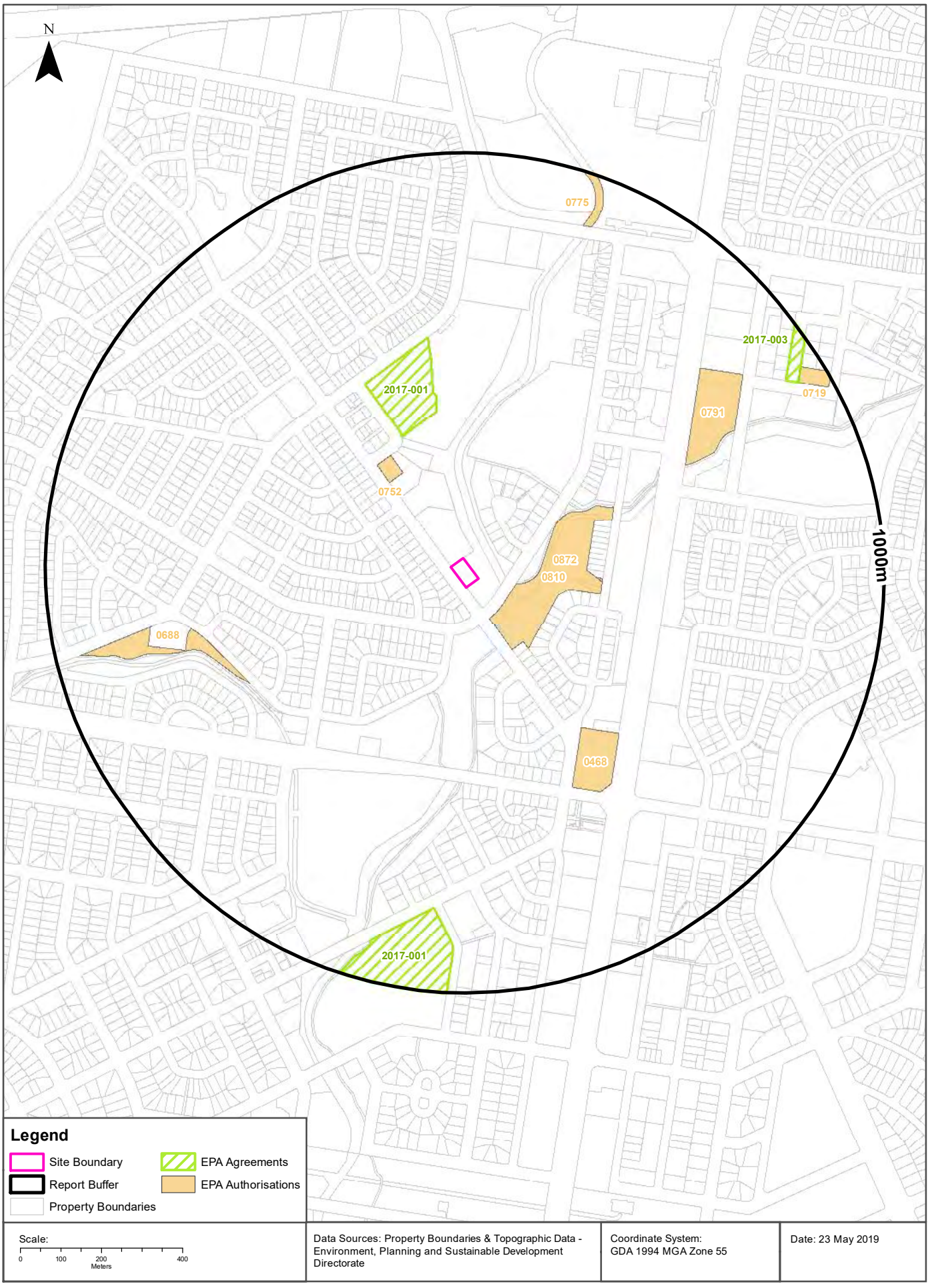
Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

EPA Authorisations and Agreements

Wattle Street, Lyneham, ACT 2602



EPA Authorisations & Agreements

Wattle Street, Lyneham, ACT 2602

EPA Authorisations

EPA Authorisations within the report buffer:
Note. Please click on ID Number to activate a hyperlink to online documentation. If link does not work, no documentation is accessible via the EPA.

ID Number	Activity	Business / Individual Name	Grant Date	Expiry Date	Status	Loc Conf	Distance	Direction
0810	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Guideline ACT Pty Ltd	11/2/2010	11/2/2011	Expired	Premise Match	82m	East
0872	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Guideline ACT Pty Ltd	12/7/2011	12/7/2012	Expired	Premise Match	82m	East
0752	Petroleum storage (Activity 30)	Caltex Petroleum Pty Ltd - LYNEHAM	10/3/2011	6/13/2012	Ceased	Premise Match	258m	North West
0468	Firewood (Activity 44)	City Services - Transport Canberra & City Services	9/3/2004	8/31/2017	Ceased	Premise Match	445m	South East
0688	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Department of the Environment, Climate Change, Energy and Water (DECCEW)	11/27/2009	11/27/2010	Ceased	Premise Match	574m	West
0791	Petroleum storage (Activity 30)	TransACT Capital Communications Pty Ltd	7/29/2010		Current	Premise Match	579m	North East
0775	Extraction of Material from waterways; Grater than 100m3 (Activity 1)	Cord Civil Pty Ltd	6/25/2010	6/25/2012	Expired	Premise Match	868m	North
0719	Petroleum storage (Activity 30)	Woolworths Petrol Limited - DICKSON	1/14/2010		Current	Premise Match	924m	North East
0036	Commercial use of chemicals (Activity 29)	Eagle Environmental Services Pty Ltd	8/10/1998	6/12/2001	Ceased	Suburb/Area Match	-	-
0215	Burning off (Activity 28)	Parks and Places	5/4/1999	6/1/1999	Expired	Suburb/Area Match	-	-
0270	Burning off (Activity 28)	Parks and Places	10/3/2000	12/19/2006	Ceased	Suburb/Area Match	-	-
0700	Outdoor concerts (Activity 23)	Northside Community Services	10/22/2009	10/25/2009	Expired	Suburb/Area Match	-	-
0725	Commercial use of chemicals (Activity 29)	Barrier Pest Management	11/6/2009	12/7/2011	Ceased	Suburb/Area Match	-	-

EPA Authorisations Data Source: ACT Government Environment Protection Authority
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EPA Agreements

Note. Due to the lack of premise details within the documentation, this list does not include the following agreement:
Land development

EPA Agreements within the report buffer:
Note. Please click on ID Number to activate a hyperlink to online documentation. If link does not work, no documentation is accessible via the EPA.

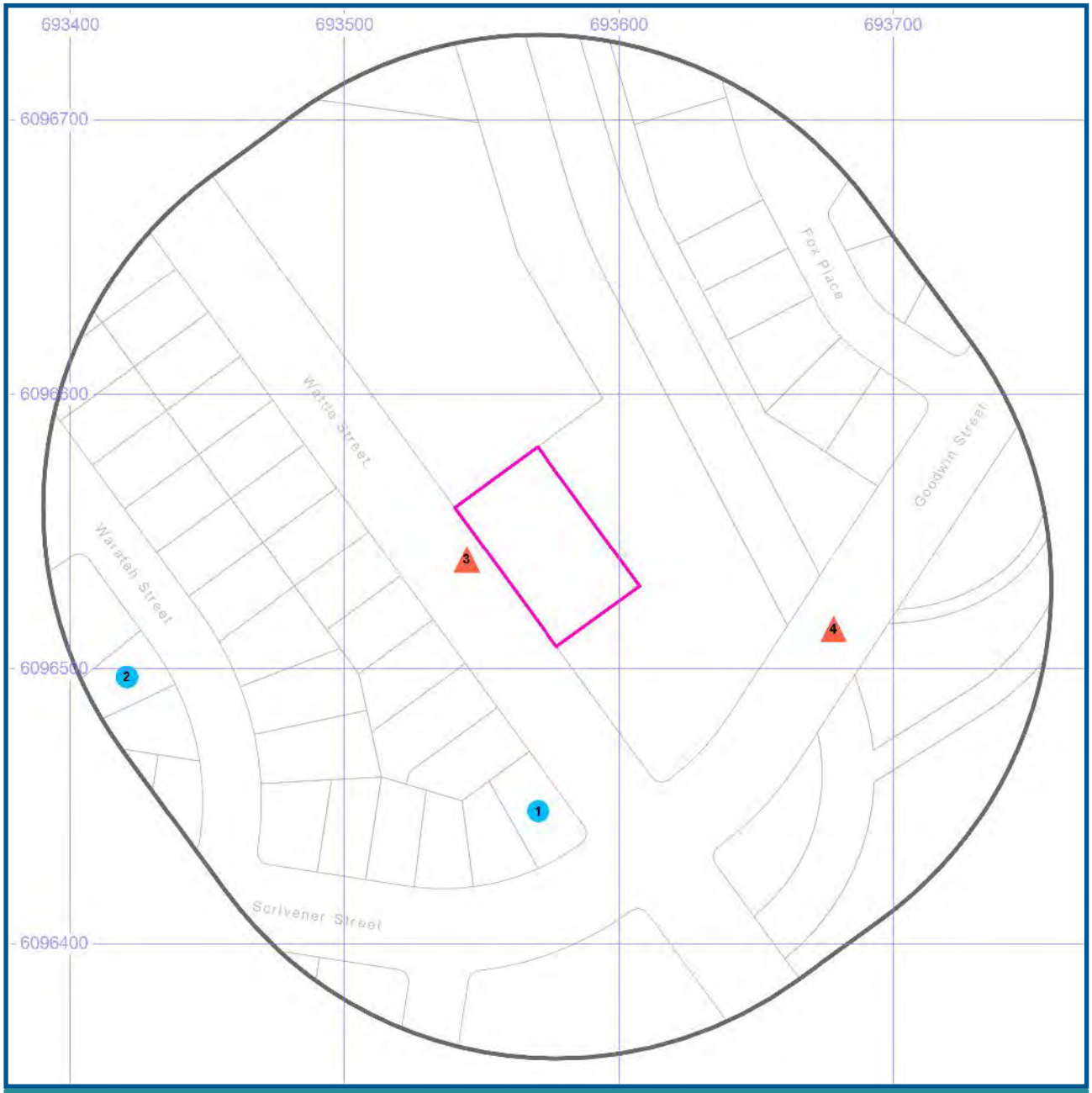
ID Number	Agreement Type	Business / Individual Name	Grant Date	Expiry Date	Status	Loc Conf	Distance	Direction
2017-001	Management of Contaminated Land	Education and Training Directorate	1/4/2017		Current	Premise Match	335m	South
2017-003	Management of Contaminated Land	BP Australia Pty Ltd	2/22/2017		Current	Road Match	899m	North East

EPA Agreements Data Source: ACT Government Environment Protection Authority
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Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1982 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	ELECTRICAL APPLIANCES - REPAIRS &/OR SERVICE AGENTS	Atam Radio T.V.Service, 39 Wattle St., O'Connor., Canberra .(A.C.T.)	2384	Premise Match	39m	South
	RADIO &/OR TELEVISION SALES &/OR SERVICE &/OR HIRERS	Atam Radio T.V.Service, 39 Wattle St., O'Connor., Canberra .(A.C.T.)	5851	Premise Match	39m	South
2	PIANO TUNERS &/OR REPAIRERS	Pogsons Piano Sales & Service, 5 Waratah St., O'Connor., Canberra .(A.C.T.)	5540	Premise Match	120m	West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

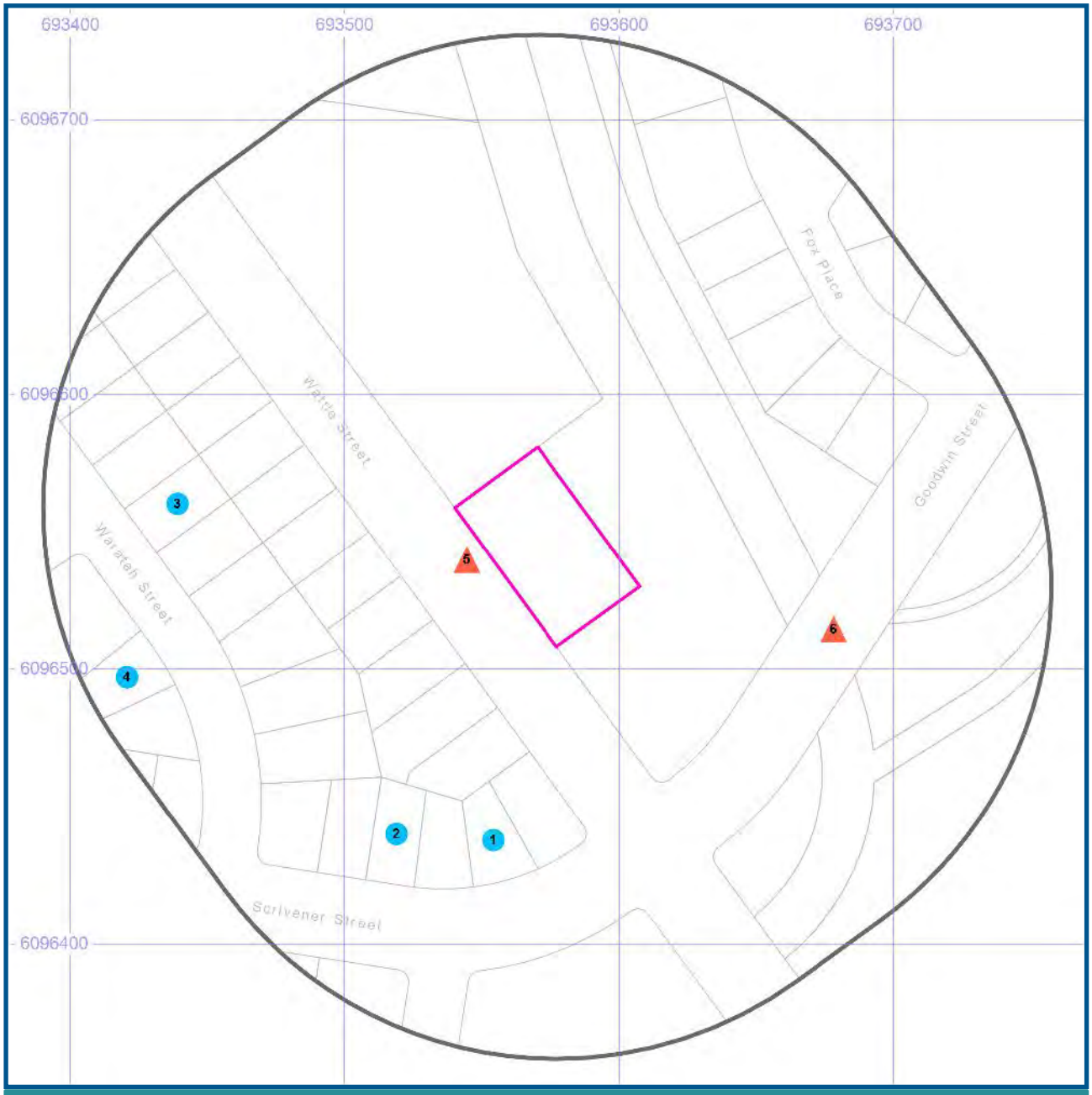
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	BUTCHERS - RETAIL	E. & R. Meat Service, Wattle St., Lyneham., Canberra .(A.C.T.)	1136	Road Match	0m
	CLUBS &/OR SPORTING BODIES	Lithuanian Australian Club, Wattle St., Lyneham., Canberra . (A.C.T.)	1699	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen. Wattle St., Lyneham., Canberra . (A.C.T.)	1990	Road Match	0m
	FISH SHOPS	Lyneham Fish Market, Wattle St., Lyneham., Canberra .(A.C.T.)	2794	Road Match	0m
	HAIRDRESSERS - LADIES &/OR BEAUTY SALONS	Lyneham Hair Fashions, Wattle St., Lyneham., Canberra . (A.C.T.)	3563	Road Match	0m
	MOTOR ACCESSORIES &/OR SPARE PARTS - RETAIL	Lyneham Service Centre, Wattle St., Lyneham., Canberra . (A.C.T.)	4579	Road Match	0m
	MOTOR GARAGES &/OR. ENGINEERS &/OR SERVICE STATIONS	Lyneham Service Centre. Wattle St., Lyneham., Canberra . (A.C.T.)	4875	Road Match	0m
	STAMP DEALERS	Lyneham Stamp Exchange, Wattle St., Lyneham., Canberra . (A.C.T.)	6686	Road Match	0m
	TOY DEALERS - RETAIL	Lyneham Stamp Exchange, Wattle St., Lyneham., Canberra . (A.C.T.)	7154	Road Match	0m
	MOTOR CAR &/OR TRUCK DEALERS - NEW &/OR USED	Monaro Multilist Motors, Wattle St., Lyneham., Canberra . (A.C.T.)	4692	Road Match	0m
4	SCHOOLS &/OR COLLEGES - PRIVATE &/OR PUBLIC	Lyneham High School, Goodwin St., Lyneham., Canberra . (A.C.T.)	6317	Road Match	53m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1970 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1970 Business Directory Records
Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	BUILDING ALTERATIONS & REPAIRS	McGrath, J., 4 Scrivener St., O'Connor	1404	Premise Match	55m	South
	PLUMBERS, GASFITTERS & DRAINLAYERS	McGrath, James, 4 Scrivener St., O'Connor	5806	Premise Match	55m	South
2	BUILDING ALTERATIONS & REPAIRS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor	1401	Premise Match	71m	South West
	COMMERCIAL, INDUSTRIAL & HOME BUILDERS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor	1200	Premise Match	71m	South West
	PAINTERS, PAPERHANGERS & DECORATORS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor.	5487	Premise Match	71m	South West
3	INSTRUMENT REPAIRERS	Angus Instrument Makers, 14 Waratah St., O'Connor	4033	Premise Match	82m	West
4	MUSIC & MUSICAL INSTRUMENTS	Pogson's Piano Sales & Service, 5 Waratah St., O'Connor	5268	Premise Match	120m	West
	PIANO TUNERS & REPAIRERS	Pogson's Piano Sales & Service, 5 Waratah St., O'Connor	5678	Premise Match	120m	West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records
Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
5	BUTCHERS-RETAIL	E. & R. Meat Service, Wattle St., Lyneham	1467	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen, Wattle St., Lyneham	2115	Road Match	0m
	MIXED BUSINESSES	Lyneham Delicatessen, Wattle St., Lyneham	4855	Road Match	0m
	FISH SHOPS	Lyneham Fish Market, Wattle St., Lyneham	2976	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market, Wattle St., Lyneham	3129	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Fruit Market, Wattle St., Lyneham	4743	Road Match	0m
	MOTOR ACCESSORIES & SPARE PARTS DEALERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	4913	Road Match	0m

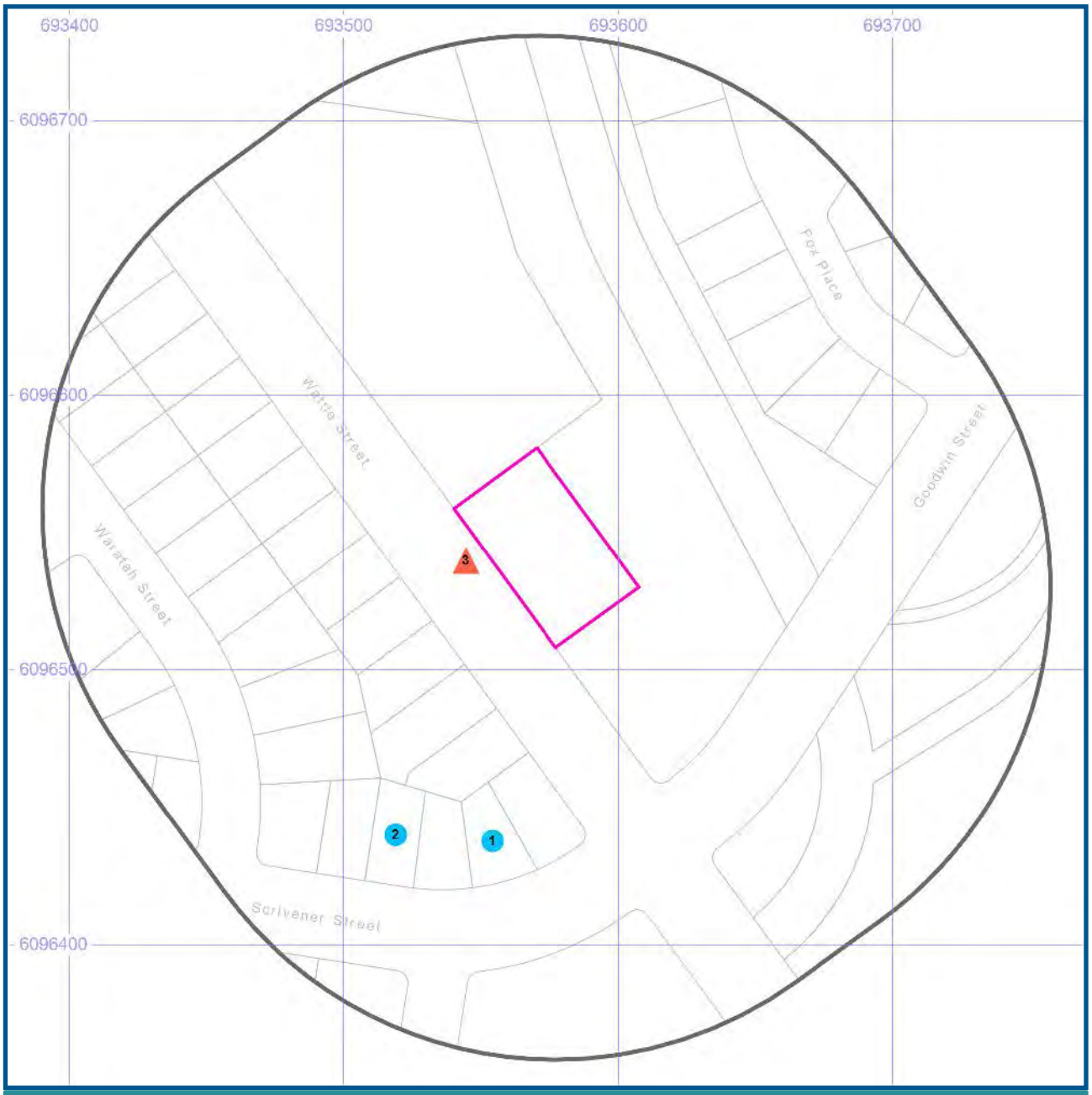
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
5	MOTOR CAR & TRUCK DEALERS-NEW & USED	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5013	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5139	Road Match	0m
	BEAUTY SALONS &/OR LADIES HAIRDRESSERS	Petite Paris, Wattle St., Lyneham	881	Road Match	0m
6	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Lyneham High School, Goodwin St., Lyneham	196	Road Match	53m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1961 Business Directory Records



Site Boundary

Buffer 150m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1961 Business Directory Records
Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	BUILDING ALTERATIONS & REPAIRS	McGrath, J., 4 Scrivener St., O'Connor, Canberra	1221	Premise Match	55m	South
	PLUMBERS, GASFITTERS & DRAINLAYERS	McGrath, James, 4 Scrivener St., O'Connor, Canberra	3694	Premise Match	55m	South
2	PAINTERS, PAPERHANGERS & DECORATORS	Brooks, H. Pty. Ltd., 8 Scrivener St., O'Connor, Canberra	3534	Premise Match	71m	South West

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records
Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	BUSINESS AGENTS & BROKERS	E. & R. Meat Service Wattle Street, Lyneham, Canberra	1239	Road Match	0m
	BUTCHERS-RETAIL	E. & R. Meat Service, Wattle St., Lyneham, Canberra	1252	Road Match	0m
	DELICATESSENS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	1625	Road Match	0m
	GROCERS & GENERAL STOREKEEPERS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	2571	Road Match	0m
	MILK VENDORS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	3153	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Delicatessen, Wattle St., Lyneham, Canberra	3134	Road Match	0m
	FISH MERCHANTS-WHOLESALE	Lyneham Fish market Wattle Street, Lyneham, Canberra	2049	Road Match	0m
	FISH MERCHANTS-RETAIL	Lyneham Fish Market, Wattle St., Lyneham, Canberra	2039	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market Wattle Street, Lyneham, Canberra	2204	Road Match	0m
	FRUITERERS & GREENGROCERS	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	2212	Road Match	0m
	MILK, FRUIT JUICE BARS & CONFECTIONERS	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	3135	Road Match	0m
	TOBACCONISTS-RETAIL	Lyneham Fruit Market, Wattle St., Lyneham, Canberra	4211	Road Match	0m
	GIFT SHOPS	Lyneham Pharmacy, Wattle St., Lyneham, Canberra	2365	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
3	DELICATESSENS	M.P.R. Superette, Wattle St., Lyneham, Canberra	1631	Road Match	0m
	FOODS FROZEN-SPECIALISTS	M.P.R. Superette, Wattle St., Lyneham, Canberra	2094	Road Match	0m
	GROCERS & GENERAL STOREKEEPERS	M.P.R. Superette, Wattle St., Lyneham., Canberra	2578	Road Match	0m
	BEAUTY SALONS WOR LADIES' HAIRDRESSERS	Petit Paris Beauty Salon, Wattle St., Lyneham, Canberra	949	Road Match	0m
	CHEMISTS-PHARMACEUTICAL	Rollason, Wattle Park, Lyneham, Canberra	1467	Road Match	0m
	WINE & SPIRIT MERCHANTS-RETAIL	Superette, Wattle St., Lyneham, Canberra	4403	Road Match	0m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

1950 Business Directory Records
Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records
Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

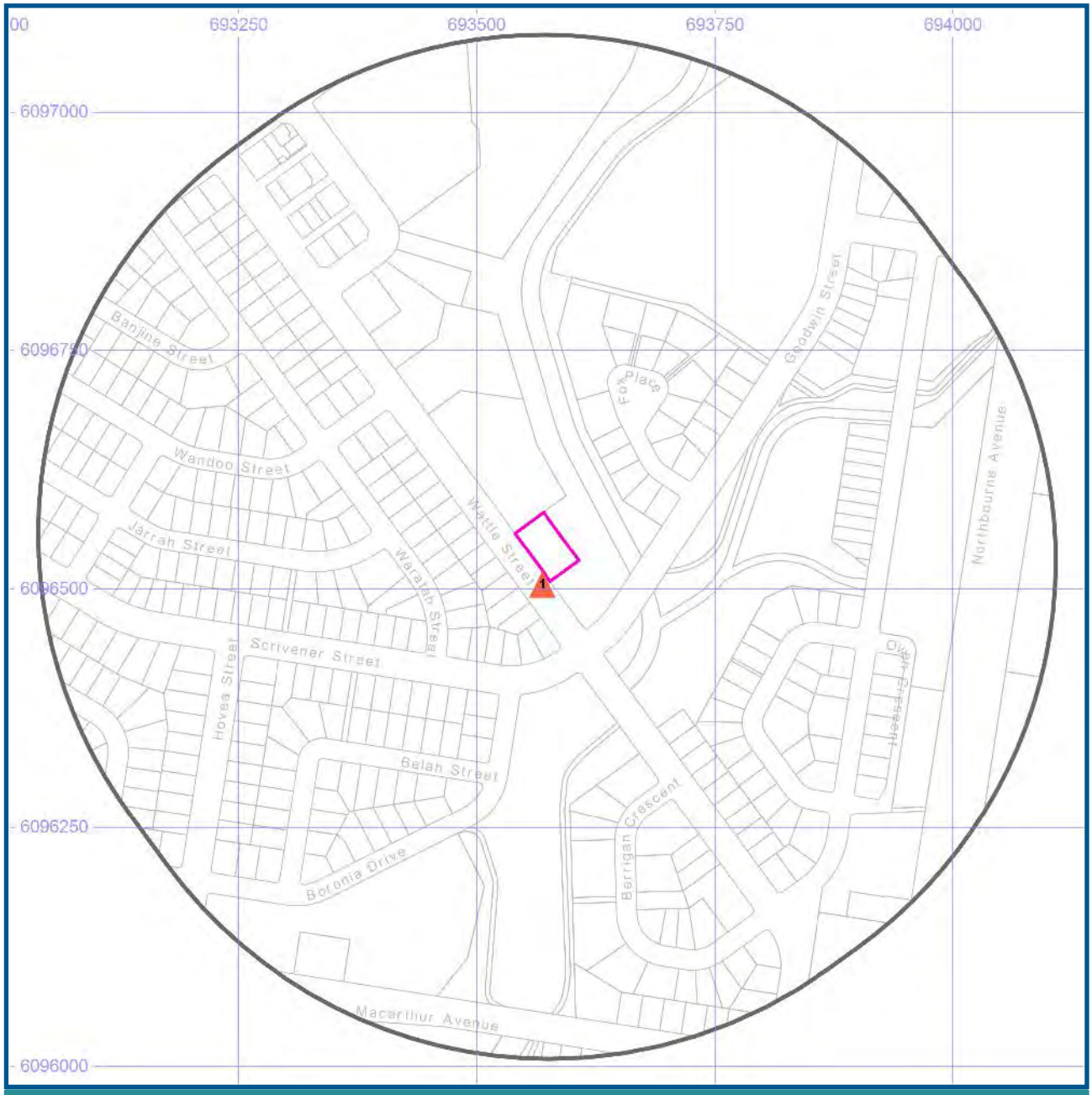
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

Dry Cleaners, Motor Garages & Service Stations



Site Boundary

Buffer 500m

Property Boundaries

Business directory records mapped to a specific premise

Business directory records mapped to a road intersection

Business directory records mapped to a road corridor

Business directory records mapped to a general area

Projected Coordinate System:
GDA94 MGA Zone 55

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © Environment, Planning and Sustainable Development Directorate 2019

Historical Business Directories

Wattle Street, Lyneham, ACT 2602

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
1	MOTOR GARAGES &/OR. ENGINEERS &/OR SERVICE STATIONS	Lyneham Service Centre. Wattle St., Lyneham., Canberra . (A.C.T.)	4875	1982	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Lyneham Motors Pty. Ltd., Wattle St., Lyneham	5139	1970	Road Match	0m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Aerial Imagery 2008

Wattle Street, Lyneham, ACT 2602



Scale:	Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 May 2019

0 25 50 100
Meters

Aerial Imagery 2002

Wattle Street, Lyneham, ACT 2602



Scale: 0 25 50 100 Meters

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Coordinate System: GDA 1994 MGA Zone 55

Date: 22 May 2019

Aerial Imagery 1997

Wattle Street, Lyneham, ACT 2602



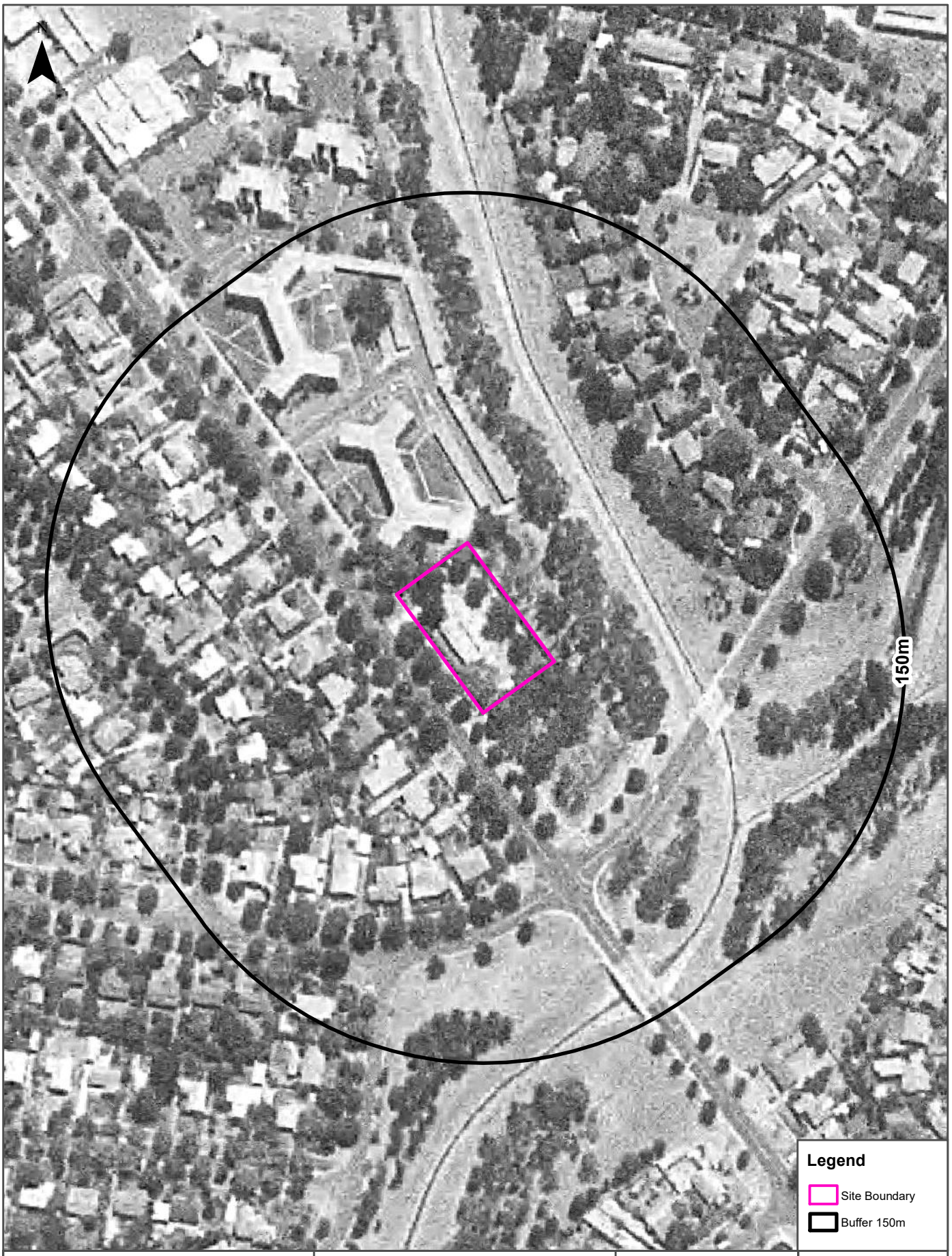
Aerial Imagery 1992

Wattle Street, Lyneham, ACT 2602



Aerial Imagery 1985

Wattle Street, Lyneham, ACT 2602



Aerial Imagery 1981

Wattle Street, Lyneham, ACT 2602



Scale:	Data Source Aerial Imagery:	Coordinate System:	Date: 23 May 2019
0 25 50 100 Meters	© Office of the Surveyor-General, ACT	GDA 1994 MGA Zone 55	

Aerial Imagery 1978

Wattle Street, Lyneham, ACT 2602



Aerial Imagery 1973

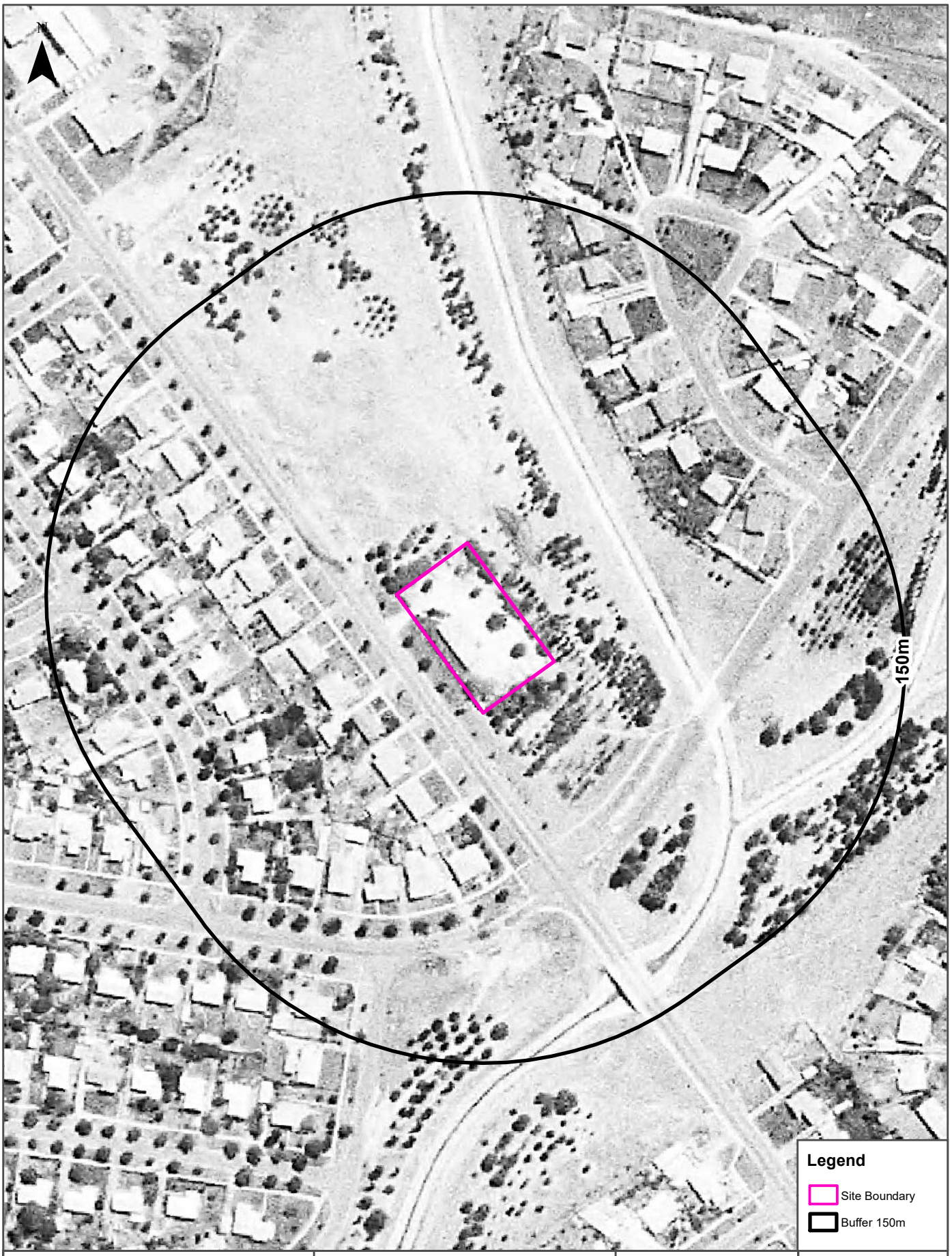
Wattle Street, Lyneham, ACT 2602



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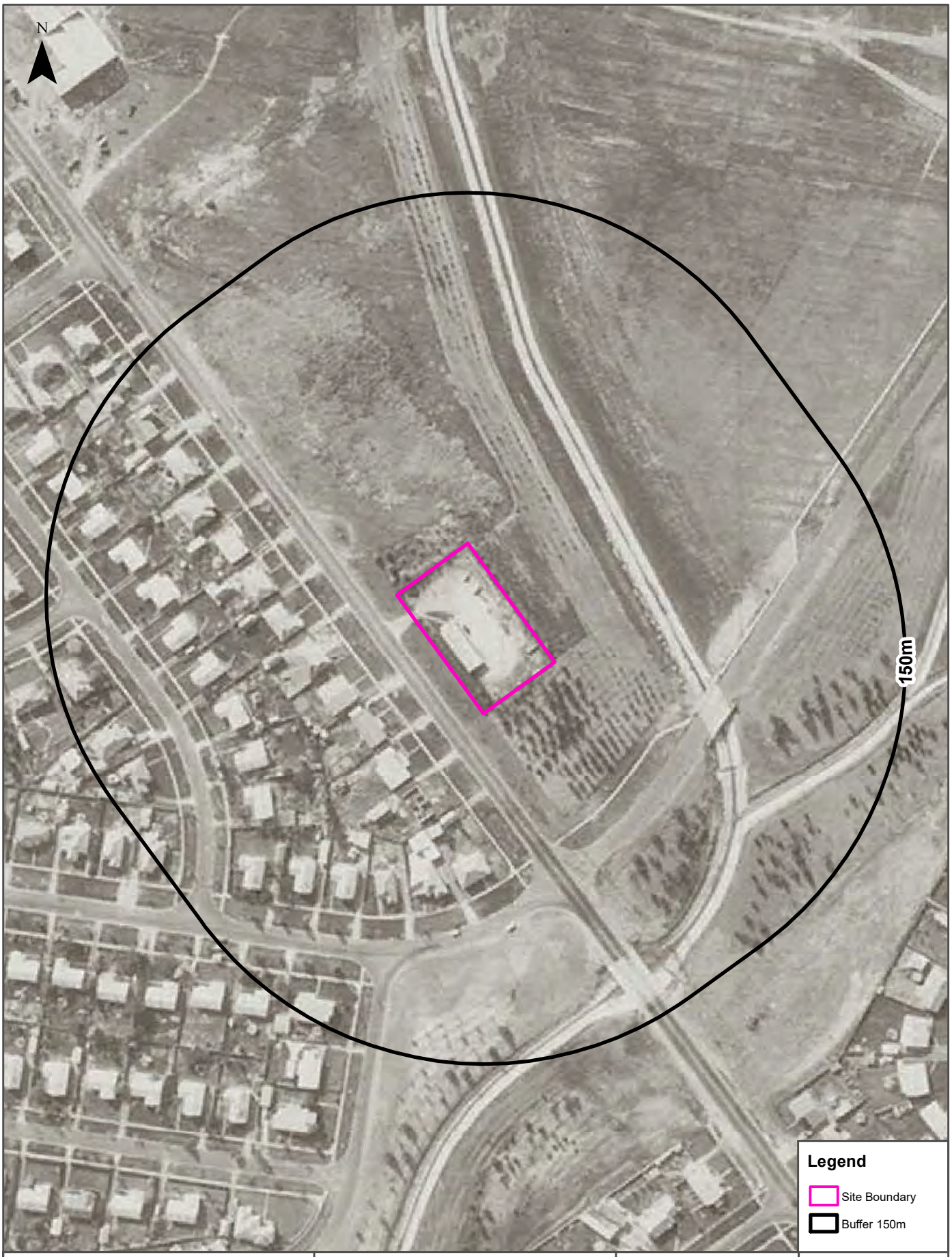
Aerial Imagery 1967

Wattle Street, Lyneham, ACT 2602



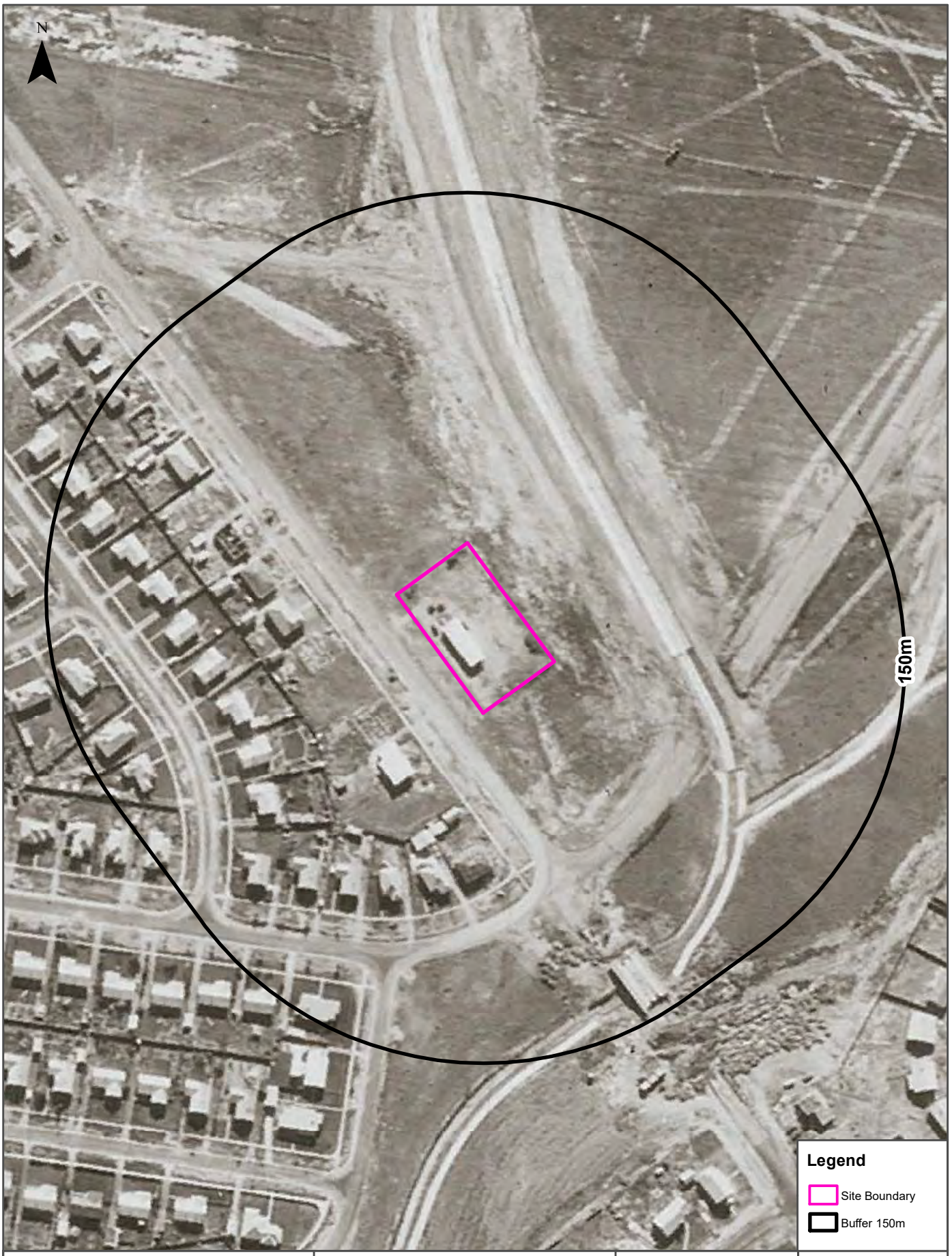
Aerial Imagery 1961

Wattle Street, Lyneham, ACT 2602



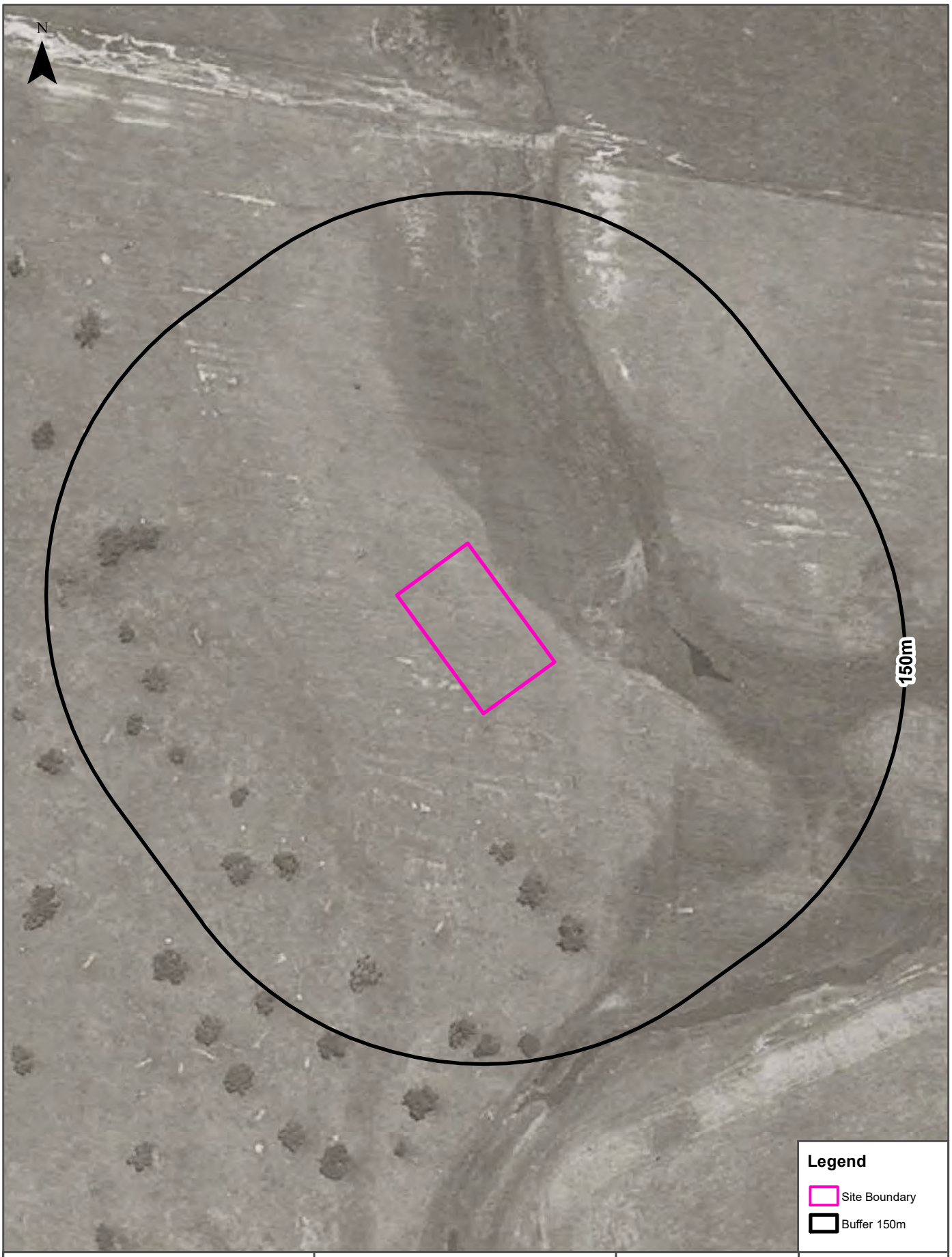
Aerial Imagery 1958

Wattle Street, Lyneham, ACT 2602



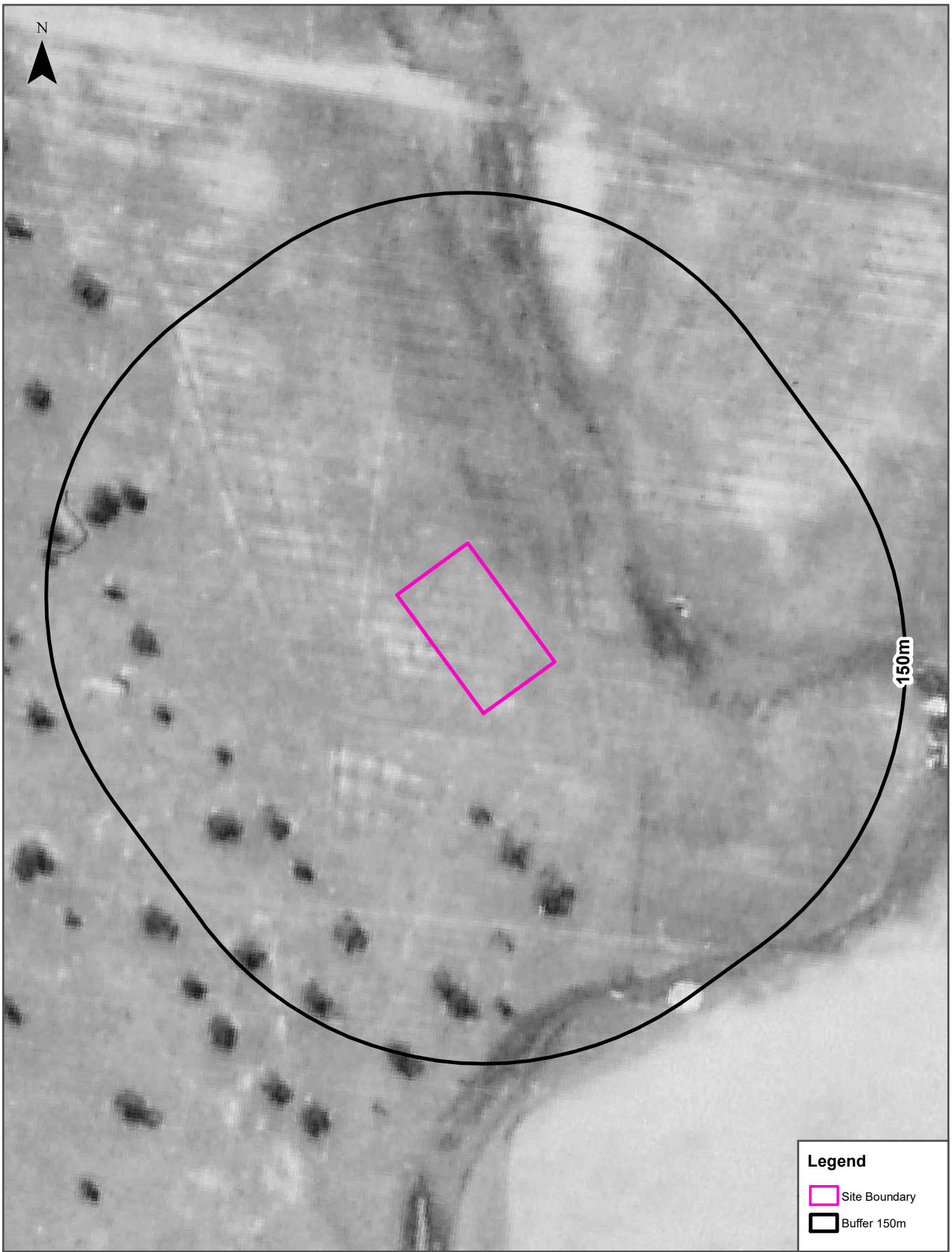
Aerial Imagery 1950

Wattle Street, Lyneham, ACT 2602



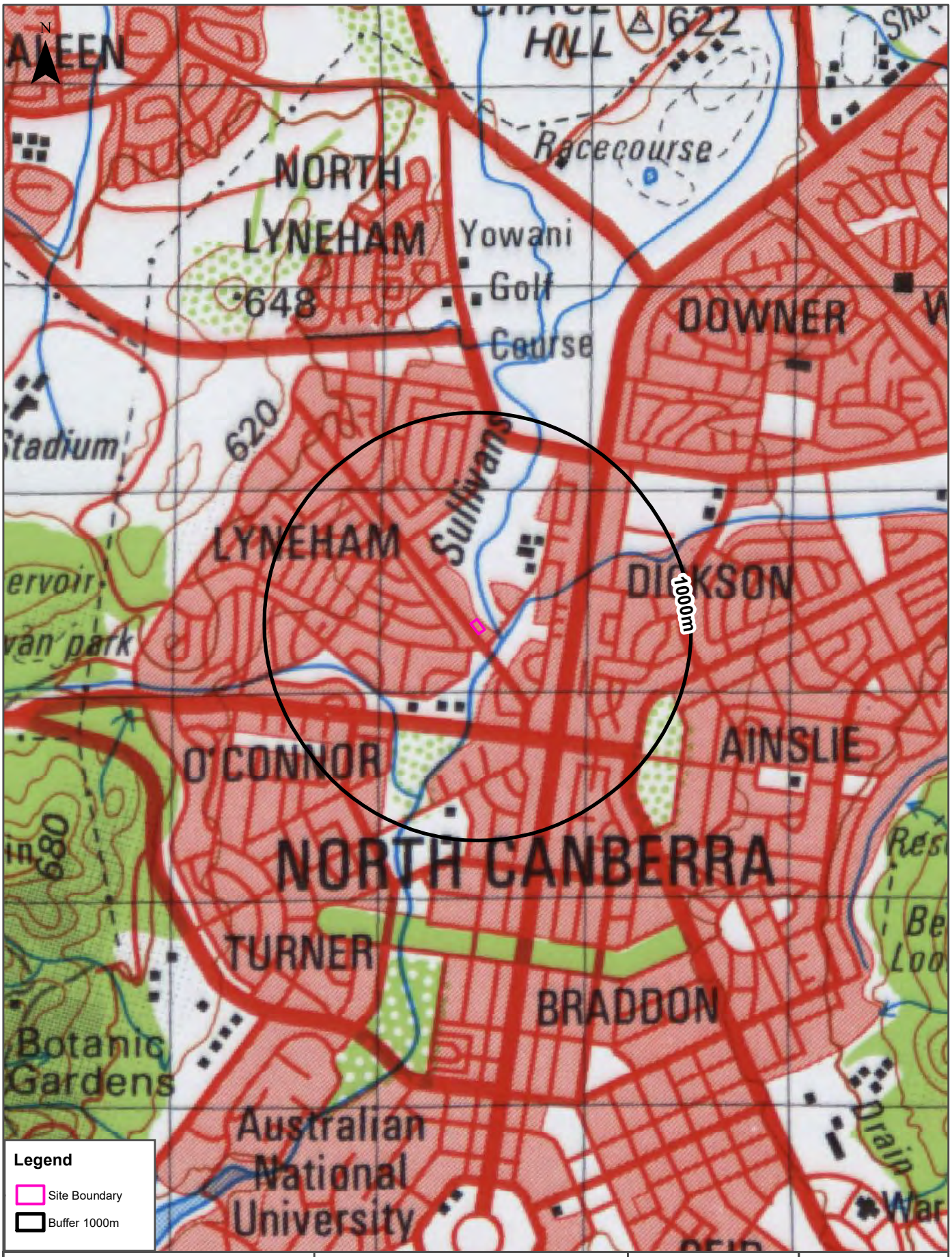
Aerial Imagery 1944

Wattle Street, Lyneham, ACT 2602



Historical Map 1987

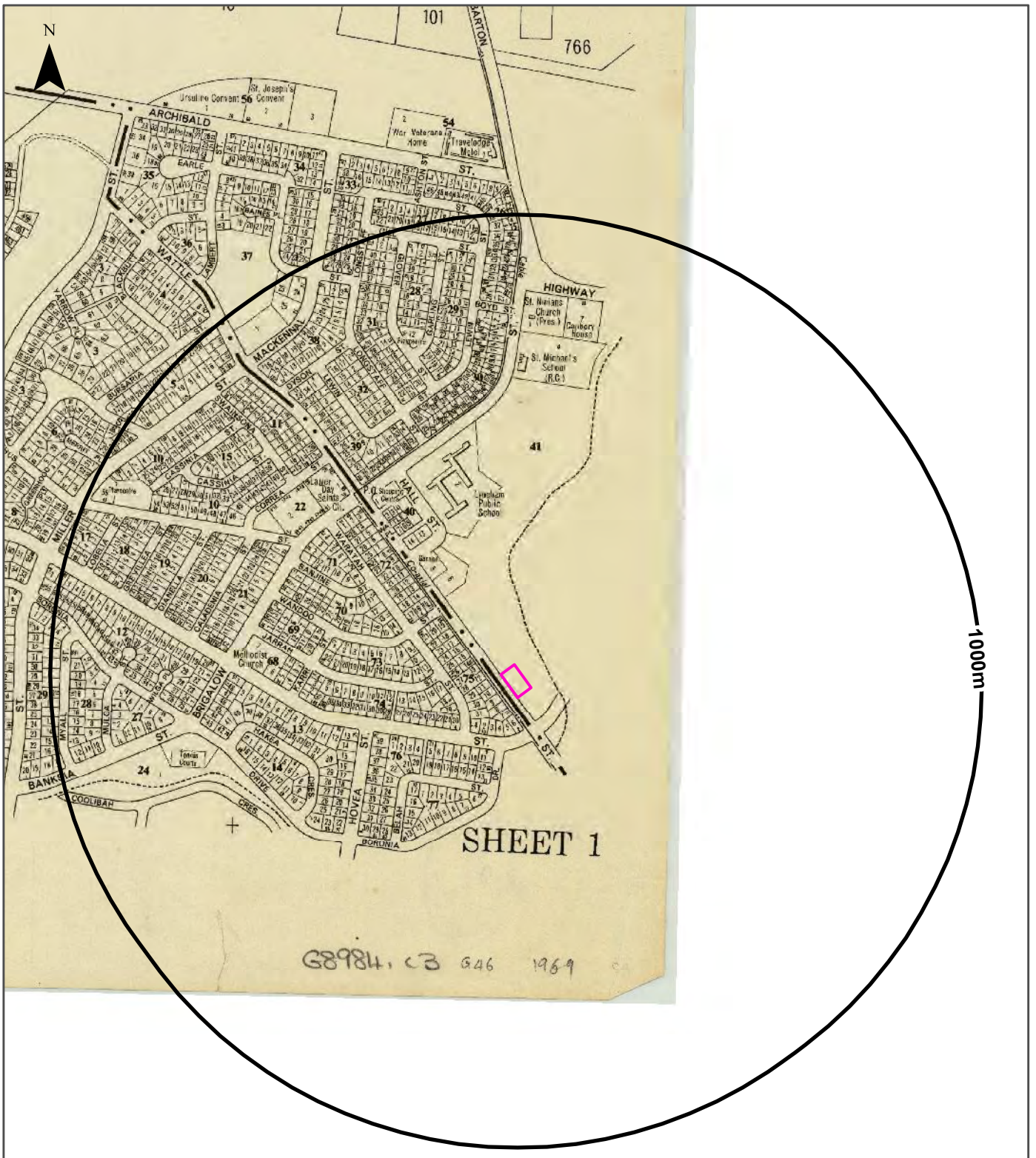
Wattle Street, Lyneham, ACT 2602



Scale: 0 175 350 700 Meters	Data Sources: National Topographic Map Series Commonwealth of Australia	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Historical Map 1969

Wattle Street, Lyneham, ACT 2602



Legend

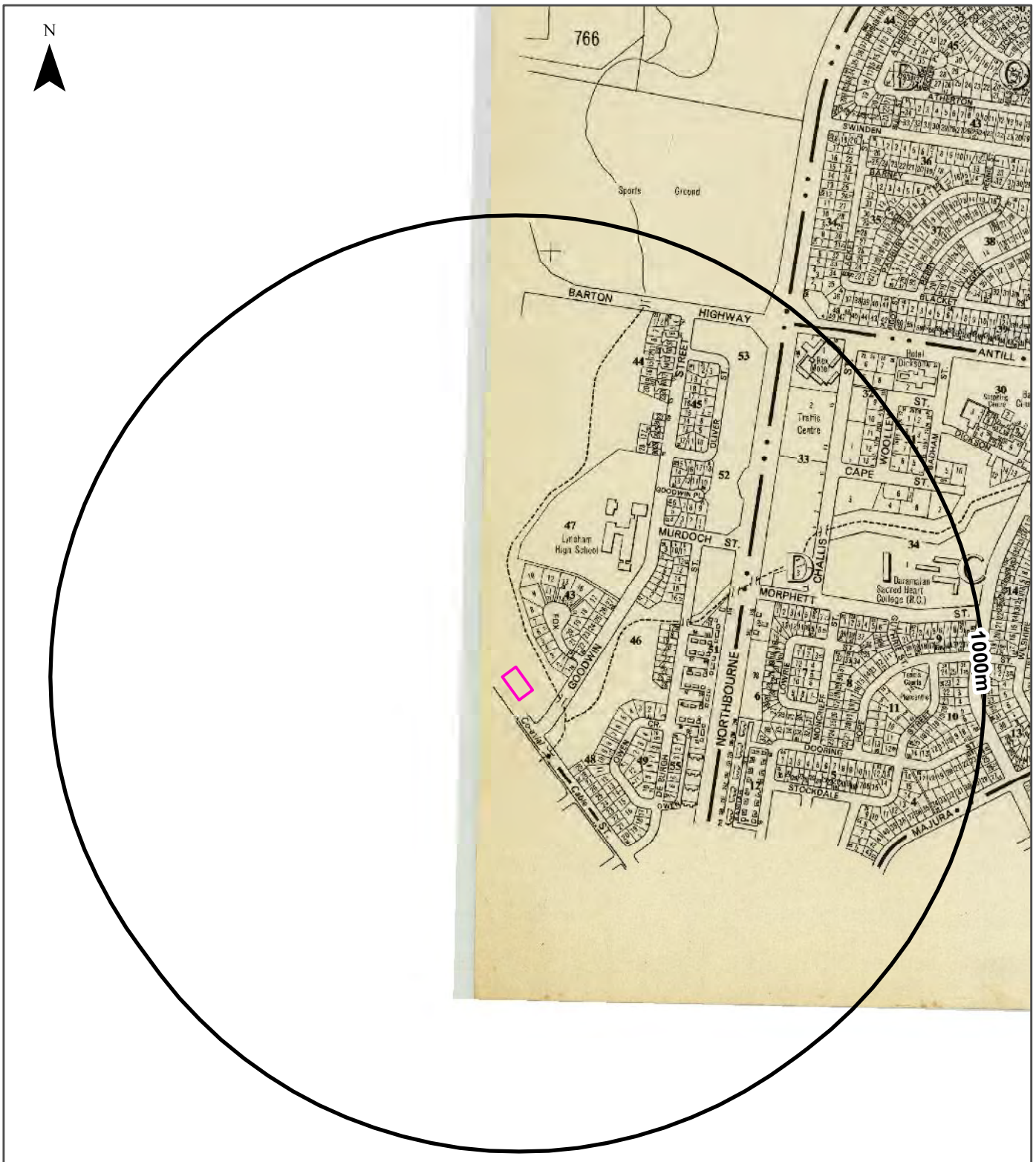
- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Parish of Queanbeyan ACTMapi © Australian Capital Territory	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

0 175 350 700
Meters

Historical Map 1969

Wattle Street, Lyneham, ACT 2602



Legend

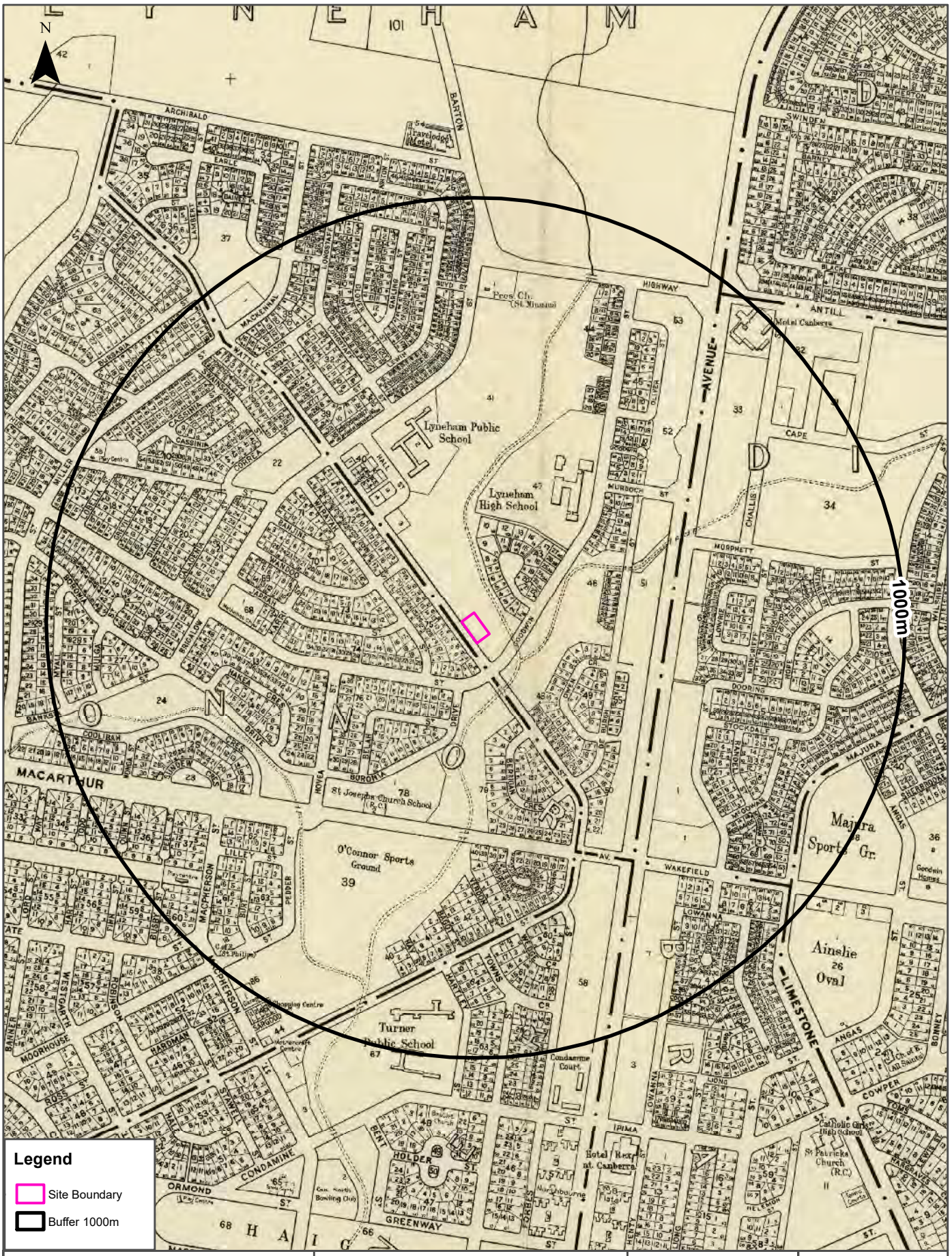
- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Parish of Queanbeyan ACTMapi © Australian Capital Territory	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

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Meters

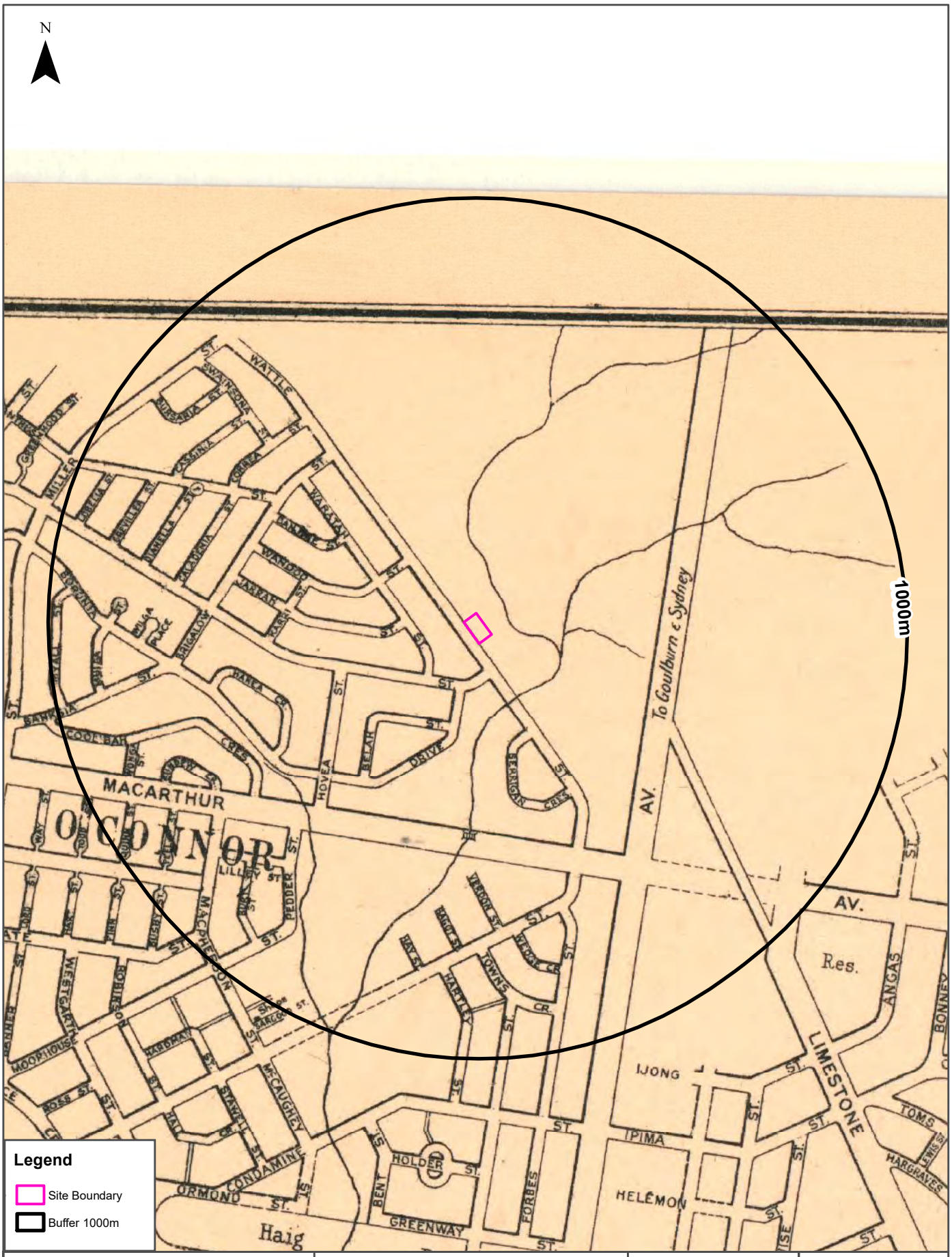
Historical Map 1960

Wattle Street, Lyneham, ACT 2602



Historical Map 1950

Wattle Street, Lyneham, ACT 2602



Scale: 0 150 300 600 Meters

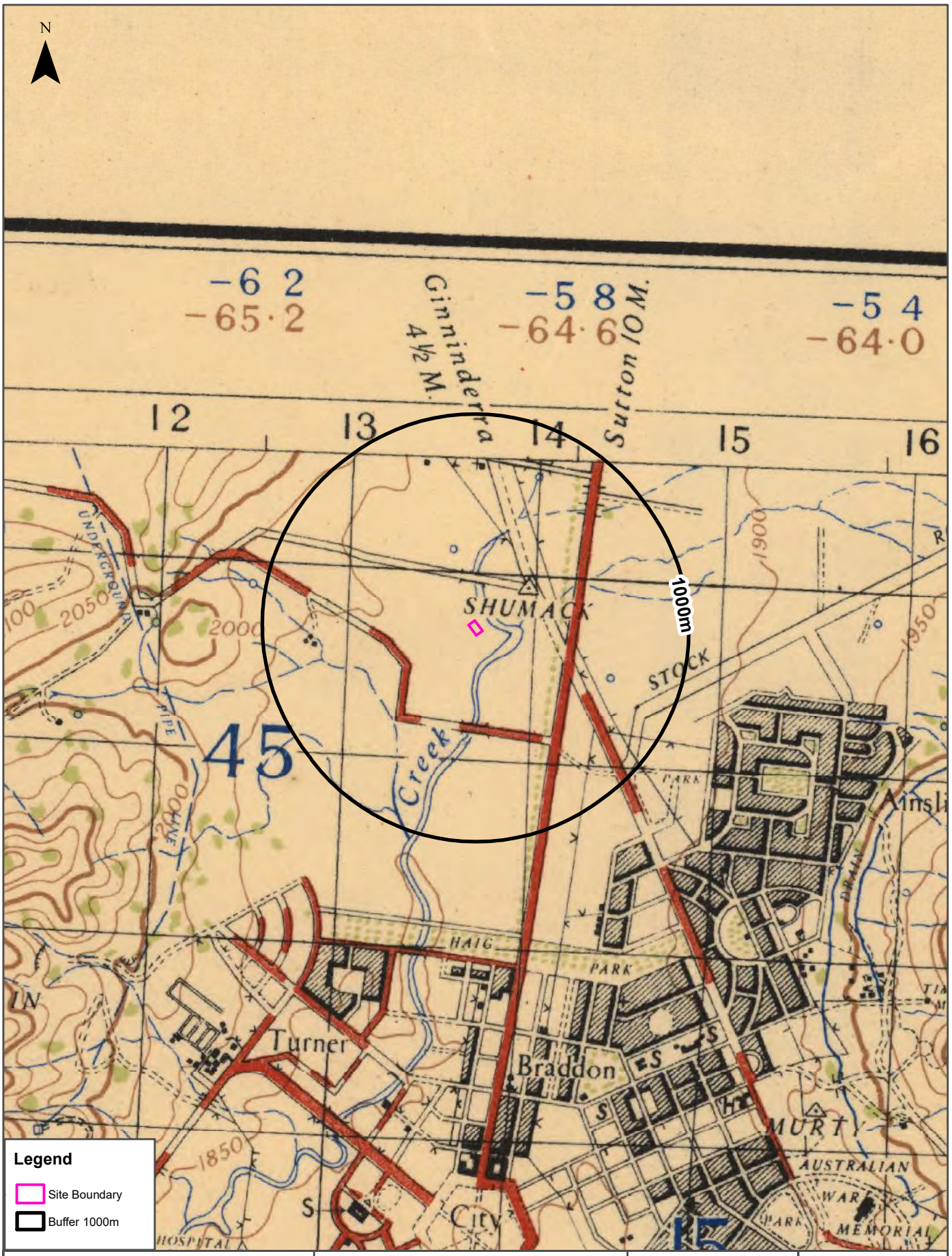
Data Sources: Canberra 1950
Compiled and drawn by Property & Survey Branch, Department of the Interior, Canberra, A.C.T.

Coordinate System:
GDA 1994 MGA Zone 55

Date: 23 May 2019

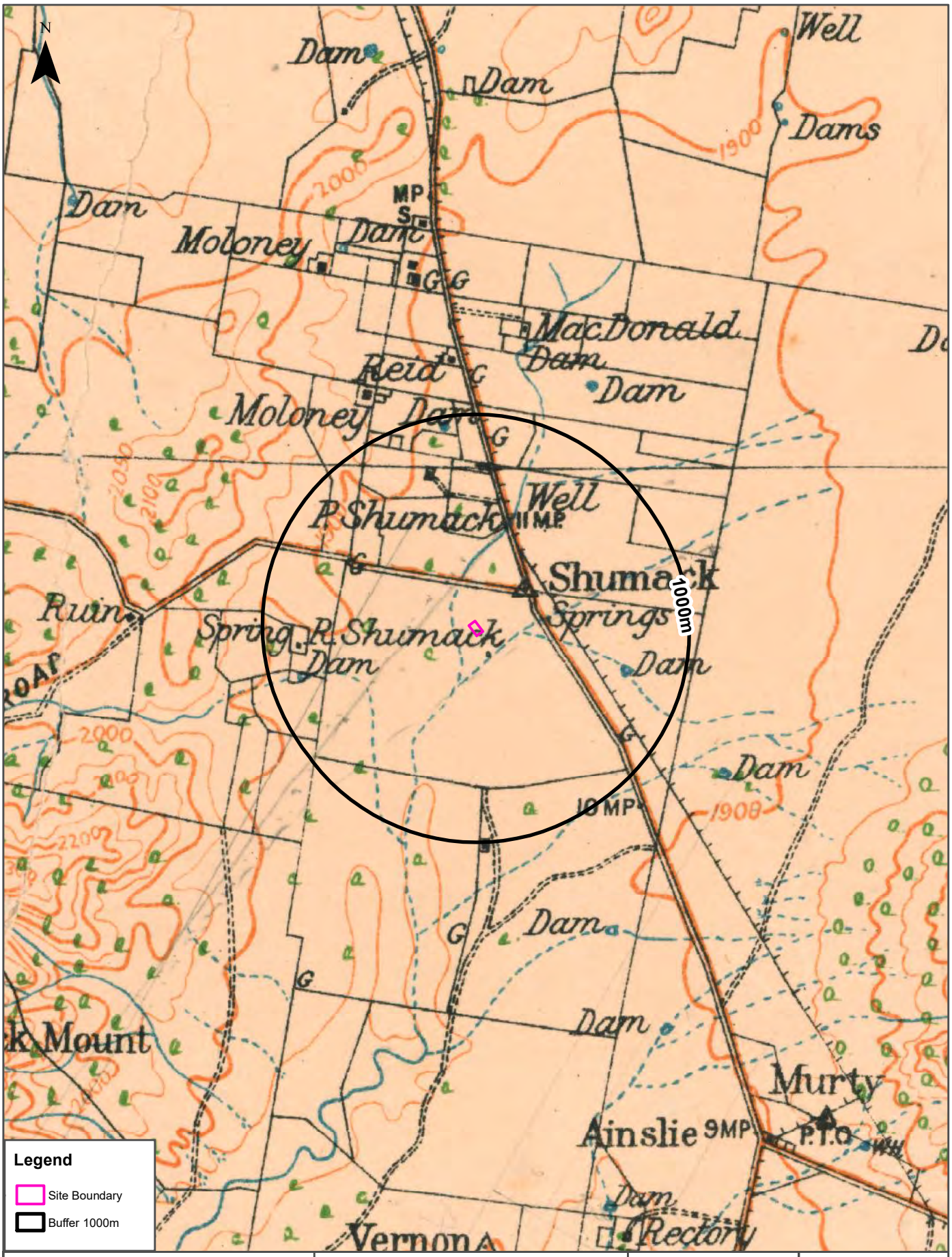
Historical Map c.1942

Wattle Street, Lyneham, ACT 2602



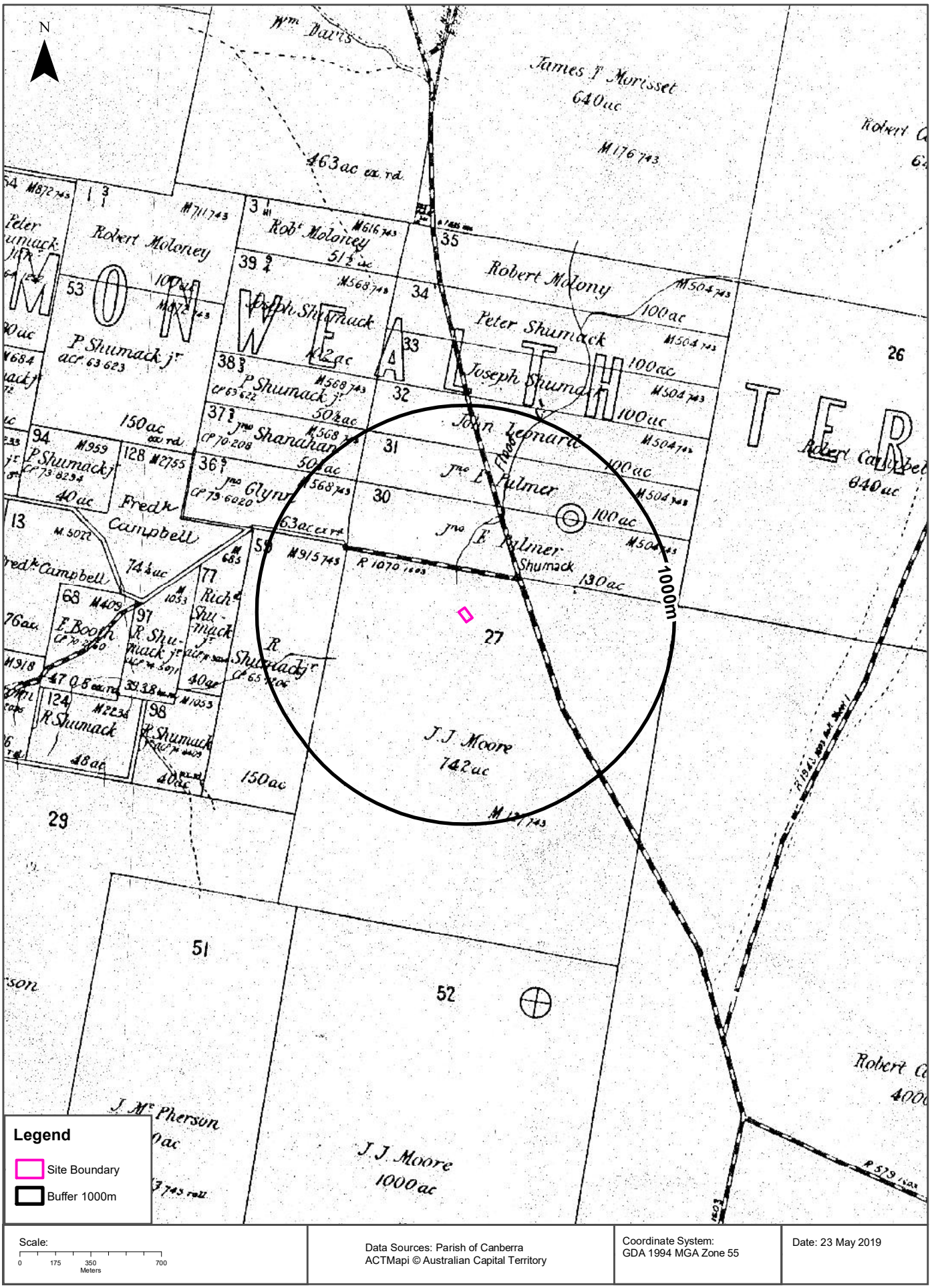
Historical Map c.1914

Wattle Street, Lyneham, ACT 2602



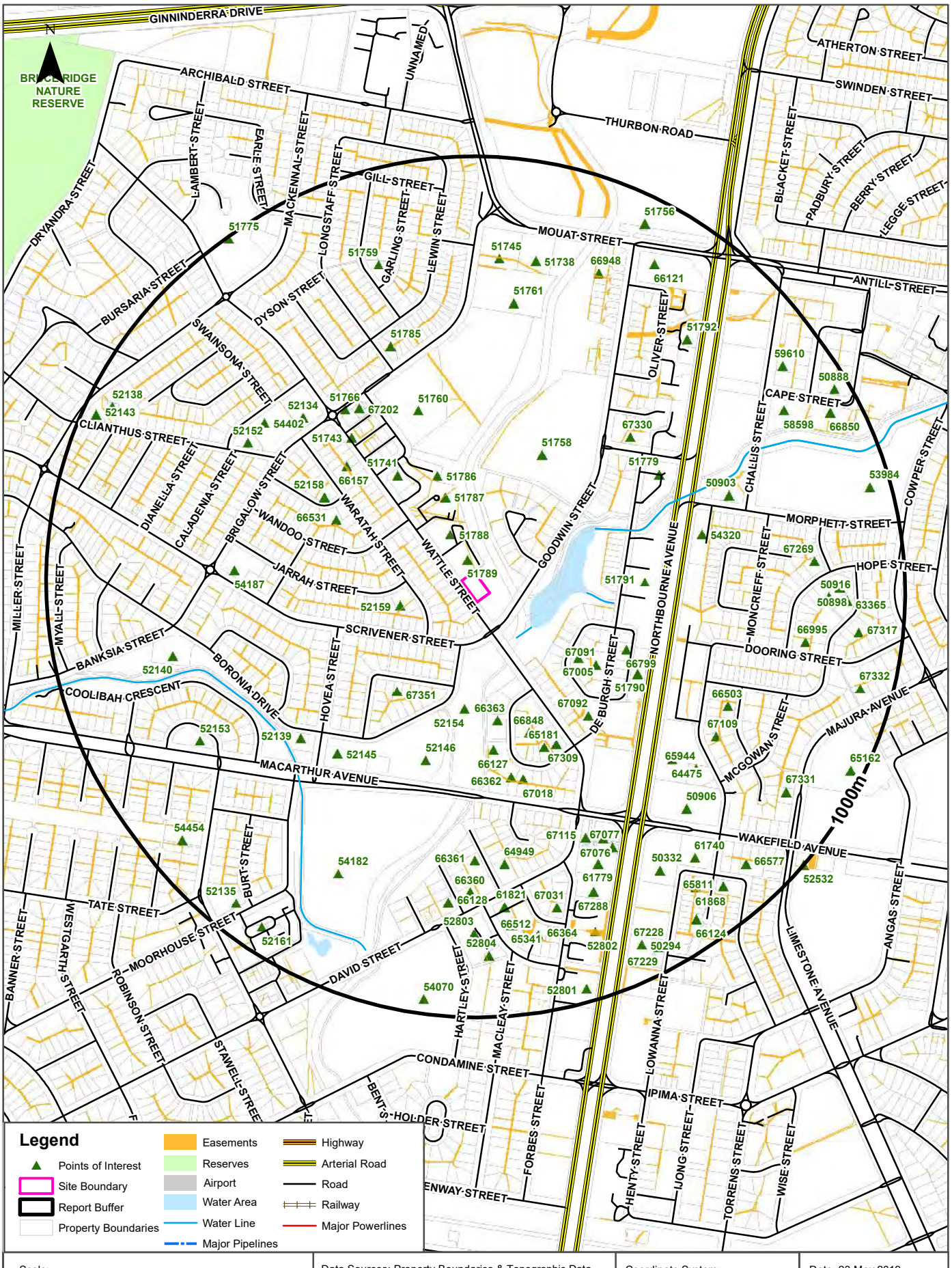
Historical Map 1912

Wattle Street, Lyneham, ACT 2602



Topographic Features

Wattle Street, Lyneham, ACT 2602



Topographic Features

Wattle Street, Lyneham, ACT 2602

Features of Interest

What Features of Interest exist within the report buffer?

Map Id	Feature Type	Name	Description	Distance	Direction
51789	BUILDING	Cotter Court	APARTMENT - FLATS, HOME UNITS	32m	North
51788	BUILDING	Corin Court	APARTMENT - FLATS, HOME UNITS	105m	North West
52159	BUILDING	Braemar Gardens	MULTI-UNIT DEVELOPMENT	159m	West
51787	BUILDING	Acacia Gardens	APARTMENT - FLATS, HOME UNITS	192m	North
51786	BUILDING	Somercotes Court	APARTMENT - FLATS, HOME UNITS	246m	North
52154	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Jandura Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	259m	South
67005	BUILDING	Cumberoona	MULTI-UNIT DEVELOPMENT	264m	South East
67351	BUILDING	Belah House	RETIREMENT COMPLEX, SPECIAL CARE ESTABLISHMENT	288m	South West
66363		Camera	UNCATEGORIZED	289m	South
51741	BUILDING	Garage	SERVICE STATION	295m	North West
67091	BUILDING	Glamorgan	MULTI-UNIT DEVELOPMENT	307m	South East
51758	BUILDING	Lyneham High School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	323m	North East
66531	BUILDING	Loft	MULTI-UNIT DEVELOPMENT	335m	North West
66848	BUILDING	Acadia	MULTI-UNIT DEVELOPMENT	338m	South
66799	BUILDING	Signature	MULTI-UNIT DEVELOPMENT	355m	South East
66127		Ajana Gardens	MULTI-UNIT DEVELOPMENT	358m	South
51791	BUILDING	Lyneham Flats	APARTMENT - FLATS, HOME UNITS	372m	East
67092	BUILDING	Coledale	MULTI-UNIT DEVELOPMENT	379m	South East
65181		Sorrento	MULTI-UNIT DEVELOPMENT	384m	South East
52158	BUILDING	Terang Gardens	MULTI-UNIT DEVELOPMENT	386m	North West
66157	BUILDING	Wattle Street Medical Practice	HEALTH FACILITY - BABY HEALTH CLINIC, CONSULTING ROOM	390m	North West
67309	BUILDING	Oakland	MULTI-UNIT DEVELOPMENT	391m	South East
52146	BUILDING	St Josephs Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	400m	South
51790	BUILDING	Owen Flats	APARTMENT - FLATS, HOME UNITS	404m	South East
51760	BUILDING	Lyneham Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	409m	North
66362	BUILDING	Echelon	MULTI-UNIT DEVELOPMENT	429m	South
51743	BUILDING	Lyneham Shops	COMMERCIAL USE	434m	North West
67018	BUILDING	Cobram	MULTI-UNIT DEVELOPMENT	440m	South
67202	BUILDING	Your GP Lyneham	HEALTH FACILITY - BABY HEALTH CLINIC, CONSULTING ROOM	479m	North West

Map Id	Feature Type	Name	Description	Distance	Direction
67330	BUILDING	North @ Lyneham	APARTMENT - FLATS, HOME UNITS	494m	North East
51779	BUILDING	Chalet Court	MULTI-UNIT DEVELOPMENT	496m	North East
52145	BUILDING	St Josephs Catholic Church	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	496m	South West
51766	BUILDING	PO	GOVERNMENT OFFICES	497m	North West
54320	BUILDING	Dickson Flats	APARTMENT - FLATS, HOME UNITS	528m	East
52139	BUILDING	Scout Hall	COMMUNITY USE	536m	South West
52134	BUILDING	Church of Latter Day Saints	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	546m	North West
54187	BUILDING	Uniting Church of Australia	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	547m	West
51785	BUILDING	Gidleigh Court	APARTMENT - FLATS, HOME UNITS	577m	North
64475	BUILDING	Pavilion On Northbourne	APARTMENT - FLATS, HOME UNITS	593m	South East
54402	BUILDING	Brigalow Court	MULTI-UNIT DEVELOPMENT	607m	North West
52152	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	611m	North West
50903	BUILDING	Ambulance Station	EMERGENCY SERVICES FACILITY - AMBULANCE STATION,CIVIL DEFENCE	619m	East
66361	BUILDING	Orana	MULTI-UNIT DEVELOPMENT	622m	South
67115	BUILDING	Edgeworth	RESIDENTIAL USE	624m	South East
64949	BUILDING	Vibe	MULTI-UNIT DEVELOPMENT	633m	South
66503	BUILDING	Ashby	MULTI-UNIT DEVELOPMENT	633m	South East
67109	BUILDING	Elimbah	MULTI-UNIT DEVELOPMENT	643m	South East
67076	BUILDING	Mid/Town	COMMERCIAL USE	645m	South East
51761	BUILDING	Brindabella Christian College	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	651m	North
65944		Aria Hotel Canberra	MULTI-UNIT DEVELOPMENT	651m	South East
67077	BUILDING	Mantra	MOTEL	673m	South East
61779	BUILDING	Monarch	MULTI-UNIT DEVELOPMENT	694m	South East
66360	BUILDING	Affinity	MULTI-UNIT DEVELOPMENT	699m	South
50906	BUILDING	Australian Broadcasting Commission	UNCATEGORIZED	702m	South East
52140		Tennis Courts	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	717m	West
66128		Shoreham	MULTI-UNIT DEVELOPMENT	727m	South
54182		Playing Fields	PLAYING FIELD - UNFENCED OVAL	735m	South West
52153	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	737m	South West
61821	BUILDING	The Berwick	MULTI-UNIT DEVELOPMENT	737m	South
67288	BUILDING	On Forbes	APARTMENT - FLATS, HOME UNITS	751m	South
51745	BUILDING	St Ninians Uniting Church	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	755m	North
51792	BUILDING	The Pines	APARTMENT - FLATS, HOME UNITS	756m	North East
67031	BUILDING	Zara Gardens	MULTI-UNIT DEVELOPMENT	760m	South
51738	BUILDING	Motor Inn	MOTEL	761m	North

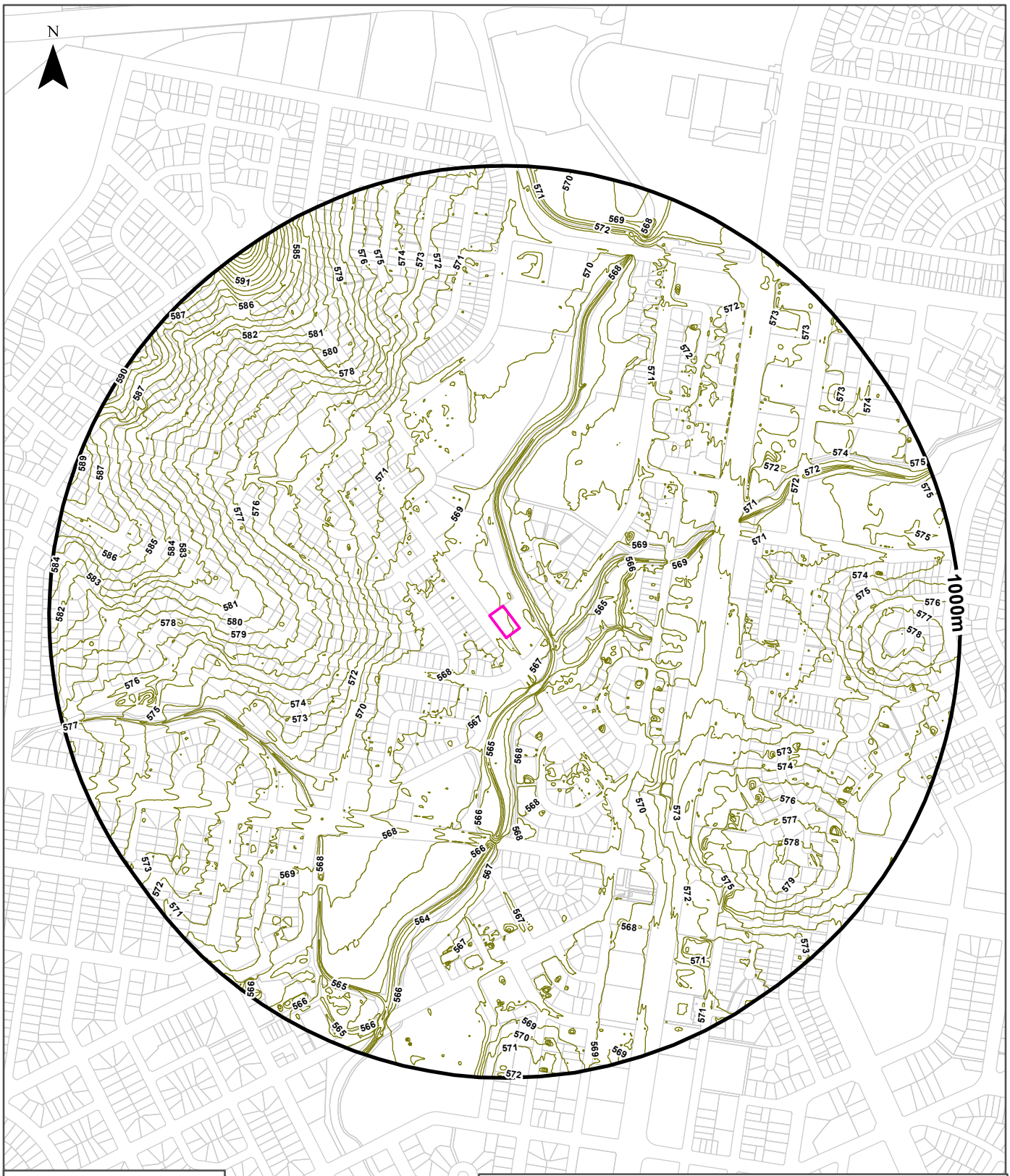
Map Id	Feature Type	Name	Description	Distance	Direction
66995	BUILDING	Otto Terraces	MULTI-UNIT DEVELOPMENT	767m	East
51759	BUILDING	Lyneham Pre-School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	773m	North
66948	BUILDING	Rostella	MULTI-UNIT DEVELOPMENT	777m	North
50332	BUILDING	John Overall Offices	CIVIC ADMINISTRATION - ACT LEGISLATIVE ASSEMBLY,CIVIC SQUARE	780m	South East
65341		Cabarita	MULTI-UNIT DEVELOPMENT	781m	South
67269	BUILDING	Indigo North	APARTMENT - FLATS, HOME UNITS	783m	East
52803	BUILDING	True North	MULTI-UNIT DEVELOPMENT	799m	South
61740	BUILDING	Valonia	MULTI-UNIT DEVELOPMENT	806m	South East
66512	BUILDING	Avion	MULTI-UNIT DEVELOPMENT	813m	South
50916	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	814m	East
66364	BUILDING	Wedge Gardens	MULTI-UNIT DEVELOPMENT	815m	South
58598		Coventry	MULTI-UNIT DEVELOPMENT	831m	North East
50898		Tennis Courts	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	840m	East
52802	BUILDING	Northgate Gardens	APARTMENT - FLATS, HOME UNITS	842m	South
52804	BUILDING	Beaufront Court	APARTMENT - FLATS, HOME UNITS	851m	South
66121		Axis Apartments	MULTI-UNIT DEVELOPMENT	856m	North East
67331	BUILDING	Majura Key	APARTMENT - FLATS, HOME UNITS	857m	South East
63365	BUILDING	Blue Gum Pre-school	UNCATEGORIZED	858m	East
61868	BUILDING	The Billington	MULTI-UNIT DEVELOPMENT	864m	South East
59610	BUILDING	Dame Pattie Menzies House	OFFICE - CHANCELLERY, DEPARTMENTAL OFFICES	889m	North East
67317	BUILDING	The Santana	RESIDENTIAL USE	891m	East
50294	BUILDING	Mining Industry House	OFFICE - CHANCELLERY, DEPARTMENTAL OFFICES	896m	South East
66577	BUILDING	Lowanna	MULTI-UNIT DEVELOPMENT	896m	South East
65811	BUILDING	Avanti	MULTI-UNIT DEVELOPMENT	902m	South East
54454	BUILDING	O'Connor Co-operative School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	912m	South West
67228	BUILDING	Deco Hotel	HOTEL	914m	South East
67332	BUILDING	Haus Lane	MULTI-UNIT DEVELOPMENT	919m	East
66850	BUILDING	Malabar	RESIDENTIAL USE	924m	North East
66124		Minnipa	MULTI-UNIT DEVELOPMENT	927m	South East
52135	BUILDING	St Philips C of E Church	PLACE OF WORSHIP - CHAPEL, CHURCH, MOSQUE, SHRINE, TEMPLE	928m	South West
51756	BUILDING	Toilets	COMMUNITY USE	930m	North East
52138	BUILDING	Guide Hall	COMMUNITY USE	938m	North West
52161	BUILDING	City Edge	APARTMENT - FLATS, HOME UNITS	938m	South West
67229	BUILDING	Artisan	RESIDENTIAL USE	938m	South East
53984	BUILDING	Daramalan College	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	947m	East
50888	BUILDING	Garage	SERVICE STATION	961m	North East

Map Id	Feature Type	Name	Description	Distance	Direction
52143	BUILDING	Pre-School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	965m	North West
54070	BUILDING	Turner Primary School	EDUCATIONAL ESTABLISHMENT - ADULT EDUCATION CENTRE, HIGH SCH	965m	South
65162	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Keith Tournier Enclosed Oval	OUTDOOR RECREATION FACILITY - ARCHERY, BOWLING GREEN	966m	South East
52801	BUILDING	Condamine Court	APARTMENT - FLATS, HOME UNITS	968m	South
51775	RESERVE,PARK,NATIONAL PARK,CONSERVATION PARK,COMMON	Park	PARKLAND - BOTANIC GARDENS AND PUBLIC ARBORETUM	994m	North West
52532	BUILDING	ACTEW Depot	MUNICIPAL DEPOT - PARKS MAINTENANCE DEPOT	998m	South East

Features of Interest Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Elevation Contours (2015 - 1m)

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundaries
- Elevation Contour (m)

Automatically generated 1m contours of the ACT derived from 1m hydro-flattened DEM. Major lakes and dams within the ACT were assigned an elevation to produce a hydro-flattened DEM. 1m DEMs derived from 4ppm and 8ppm LiDAR were used as the input DEMs and polygons of major water bodies were used to determine the extent of lakes within the DEM extent. The input DEM defines the classified Australian Height Datum (AHD) LiDAR point cloud data as a 1 meter Digital Elevation Model (DEM). The Water Features data were digitised in 1995 from the following map sources - 1:10,000 Plan Series, 1:2,500 Cadastre, 1:2,500 Detail, 1:1,000 Detail and traced from Topobase. The mean elevation of each of these polygons was used to hydro -flatten the corresponding water bodies in the DEM. Contours were generated from the DEM using ESRI ArcGIS Contour tool.

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Hydrogeology

Description of aquifers on-site:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Description of aquifers within the report buffer:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)
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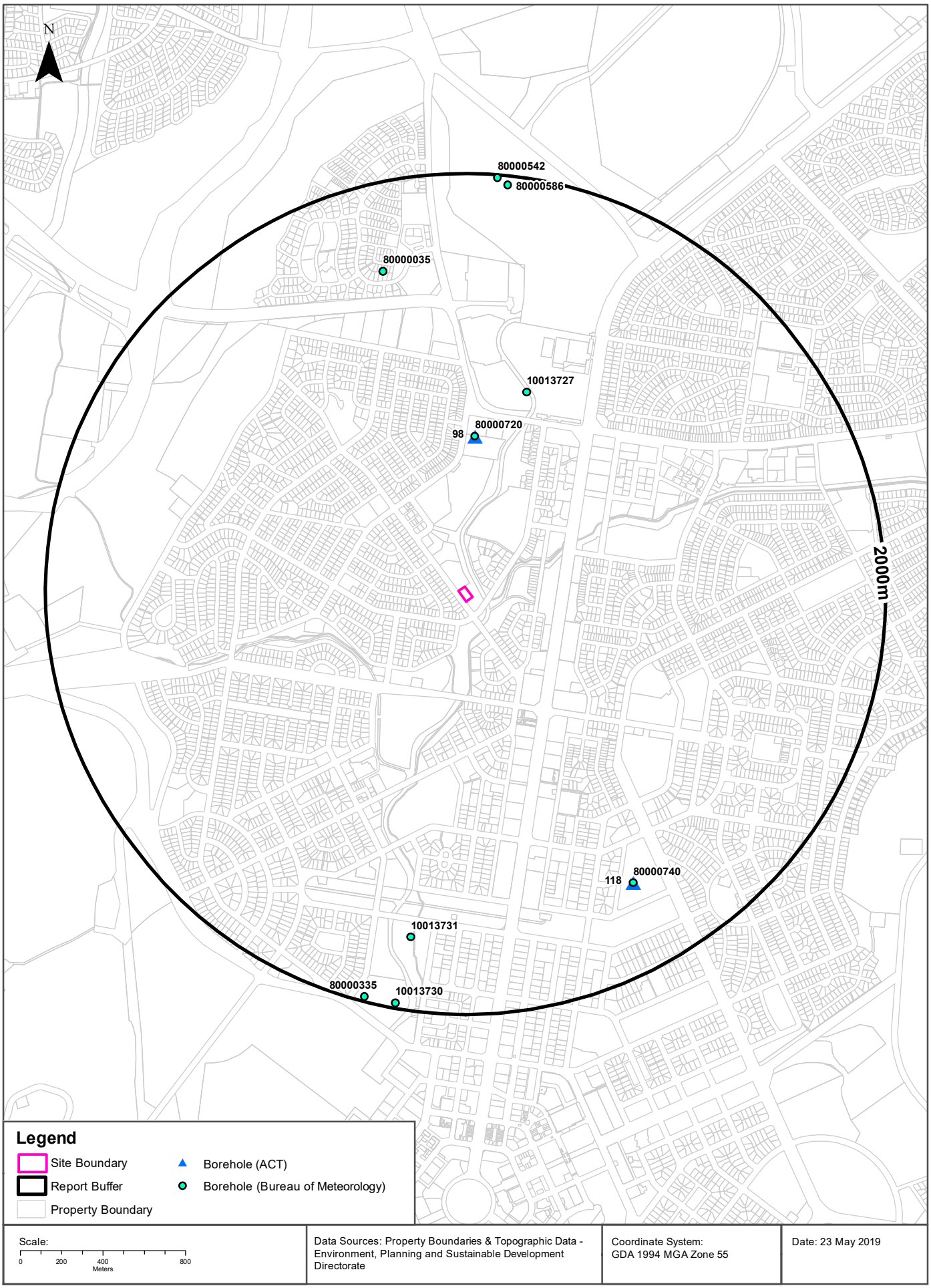
Hydrogeological Landscapes Units

Unit No	Landscape Name	Land Salinity	Stream Salinity	Stream EC	Salt Store	Salt Availability	Salt Mobility	Hazard Impact	Hazard Likelihood	Hazard Overall	Distance	Direction
23	Sullivans Creek	Low	Moderate	Moderate	Moderate	Moderate	Moderate	Limited	Moderate	Low	0m	Onsite

Hydrogeological Landscapes Units Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Groundwater Boreholes

Wattle Street, Lyneham, ACT 2602



Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Groundwater Boreholes (ACT)

Please note that this dataset does not include investigation and/or monitoring bores associated with possible contaminated sites in the search area. If you require more information please contact the Environmental Quality team via email environment.protection@act.gov.au or phone via Access Canberra 13 22 81.
Boreholes from an ACT Government Data Source within 2km of the site:

Bore Id	Bore Type	Method	Date	Bore Depth To	Bit Diameter	1st Water Intersection Depth From	1st Water Intersection Depth To	Final Static GW Level IM	1st Est Yield	Final Yield	Dist	Direction
98	Abstraction	Rotary	16/12/2003	72.00	175	60.0	66.0	14.00	2.25	2.25	728m	North
118	Abstraction	Rotary Hamme	21/08/2004	60.00	180	44.0	46.0		1.90	1.90	1584m	South East

Boreholes (ACT) Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Hydrogeology & Groundwater

Wattle Street, Lyneham, ACT 2602

Groundwater Boreholes (Bureau of Meteorology)

Boreholes (Bureau of Meteorology) within 2km of the site:

Hydro ID	State Bore ID	Drilled Date	Final Depth	Drilled Depth	Elevevation	Distance	Direction
80000720	273	16/12/2003	72.00	72.00	573.09	728m	North
10013727	410772				571.77	987m	North
80000035	20	01/01/1949	120.40	120.40	582.06	1575m	North
80000740	345	21/08/2004	60.00	60.00	577.41	1584m	South East
10013731	410775A				569.37	1648m	South
80000586	760				575.57	1954m	North
80000335	433	28/05/1976	49.80	49.80	562.86	1975m	South
10013730	410775				561.78	1975m	South
80000542	704	16/09/1983	100.52	100.52	578.98	1986m	North

Borehole Data Source : © Commonwealth of Australia (Bureau of Meteorology) . Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Driller's Logs (Bureau of Meteorology)

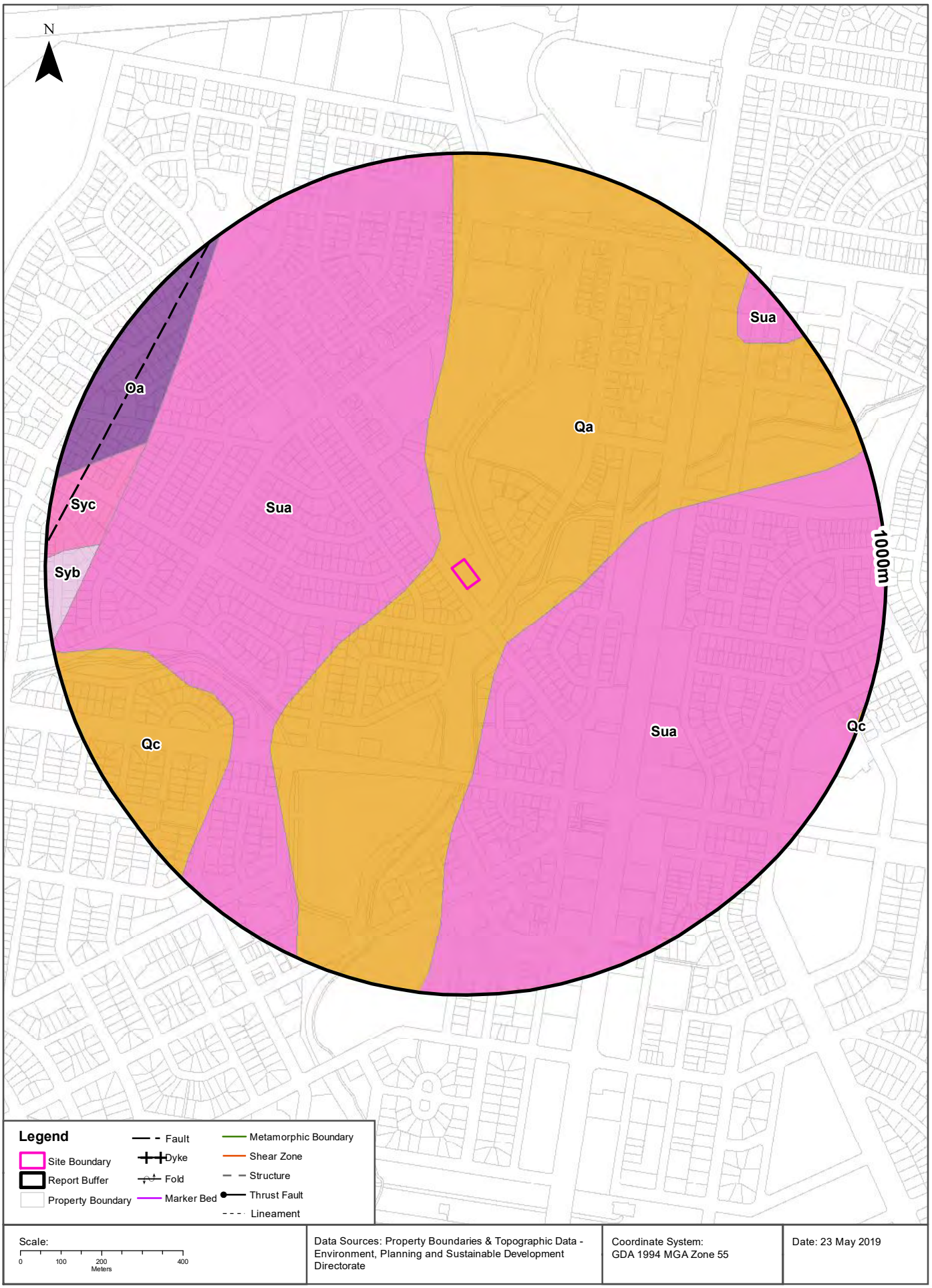
Drill log data relevant to the Boreholes (Bureau of Meteorology) within 2km of the site:

Hydro ID	State Bore ID	Drillers Log	Distance	Direction
80000586	760	0.00m-3.05m Extremely weathered rock	1954m	North
80000335	433	0.00m-4.60m Stiff clayey soil 4.60m-49.80m Moderately weathered	1975m	South
80000542	704	0.00m-1.04m Extremely weathered tuff and clays 1.04m-2.36m Interbedded hard limestone and calcite shales cavaties 2.36m-2.54m Highly weathered calcite shales	1986m	North

Drill Log Data Source: © Commonwealth of Australia (Bureau of Meteorology) .
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Geology 1:250,000

Wattle Street, Lyneham, ACT 2602



Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Geology

Wattle Street, Lyneham, ACT 2602

Geological Units (1:250,000 scale)

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Member	Era	Period	Dataset
Qa	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated	unknown			Cainozoic	Quaternary	1:250,000

What are the Geological Units within the report buffer?

Symbol	Description	Unit Name	Group	Sub Group	Member	Era	Period	Dataset
Oa	Turbiditic sequence; sandstone, mudstone, shale; quartzite, quartz phyllite, phyllite, slate	Adaminaby Group	Adaminaby Group			Palaeozoic	Ordovician	1:250,000
Qa	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated	unknown			Cainozoic	Quaternary	1:250,000
Qc	Fanglomerate and poorly cemented conglomerate, gravel and sand: colluvium	unnamed	unknown			Cainozoic	Quaternary	1:250,000
Sua	Mudstone, siltstone, minor sandstone, limestone, hornfels, dacitic ignimbrite, and volcaniclastic sediments	Canberra Formation	unknown			Palaeozoic	Silurian	1:250,000
Syb	Sandstone, siltstone and minor shale	Black Mountain Sandstone	unknown			Palaeozoic	Silurian	1:250,000
Syc	Shale, mudstone, siltstone and minor sandstone	State Circle Shale	unknown			Palaeozoic	Silurian	1:250,000

Geological Structures (1:250,000 scale)

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

What are the Geological Structures within the report buffer?

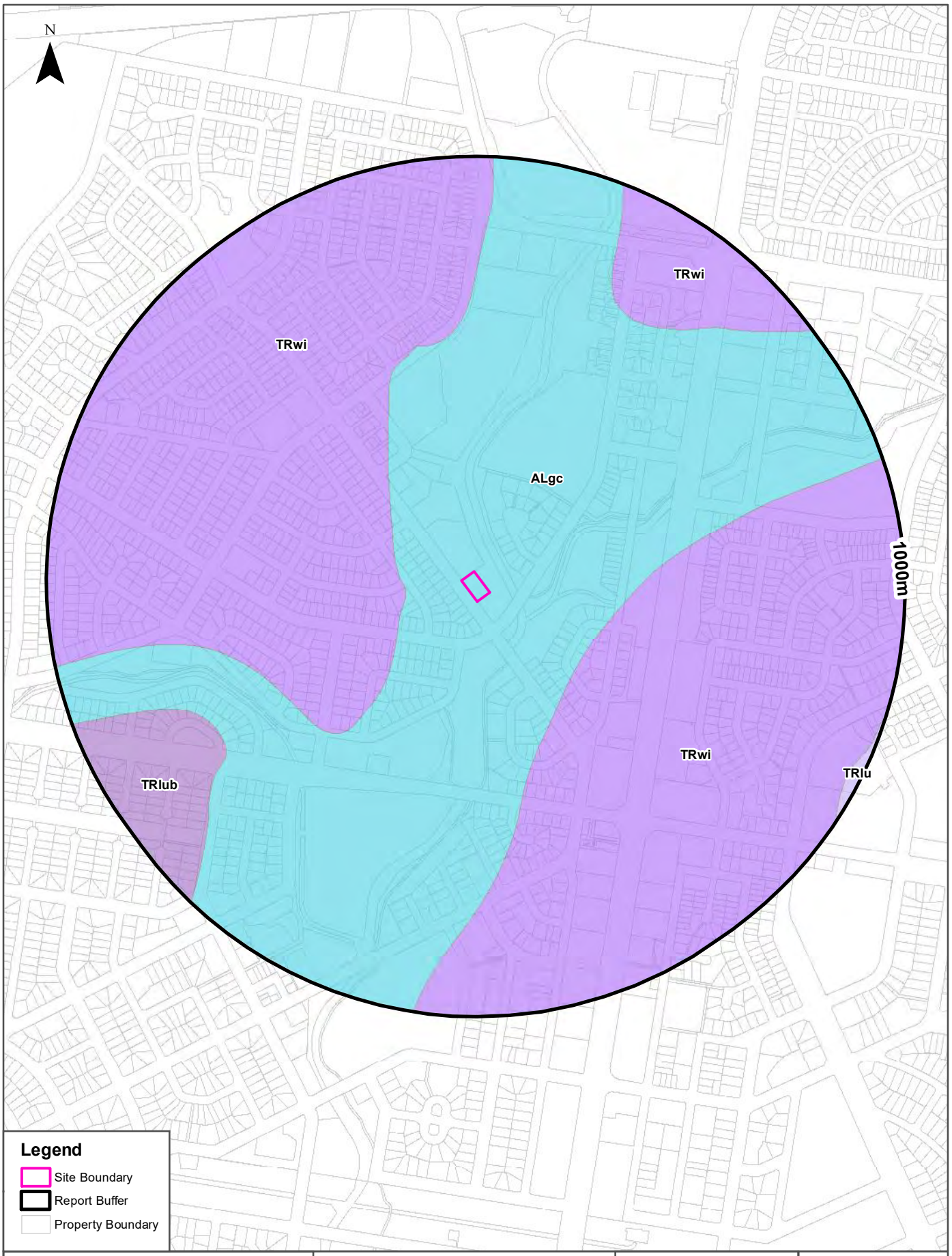
Feature	Name	Description	Map Sheet	Dataset
Fault		Fault, Accurate	SCRA	1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy

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Soil Landscapes

Wattle Street, Lyneham, ACT 2602



Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Soils

Wattle Street, Lyneham, ACT 2602

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALgc	GINNINDERRA CREEK		ALLUVIAL	Canberra	1:100,000

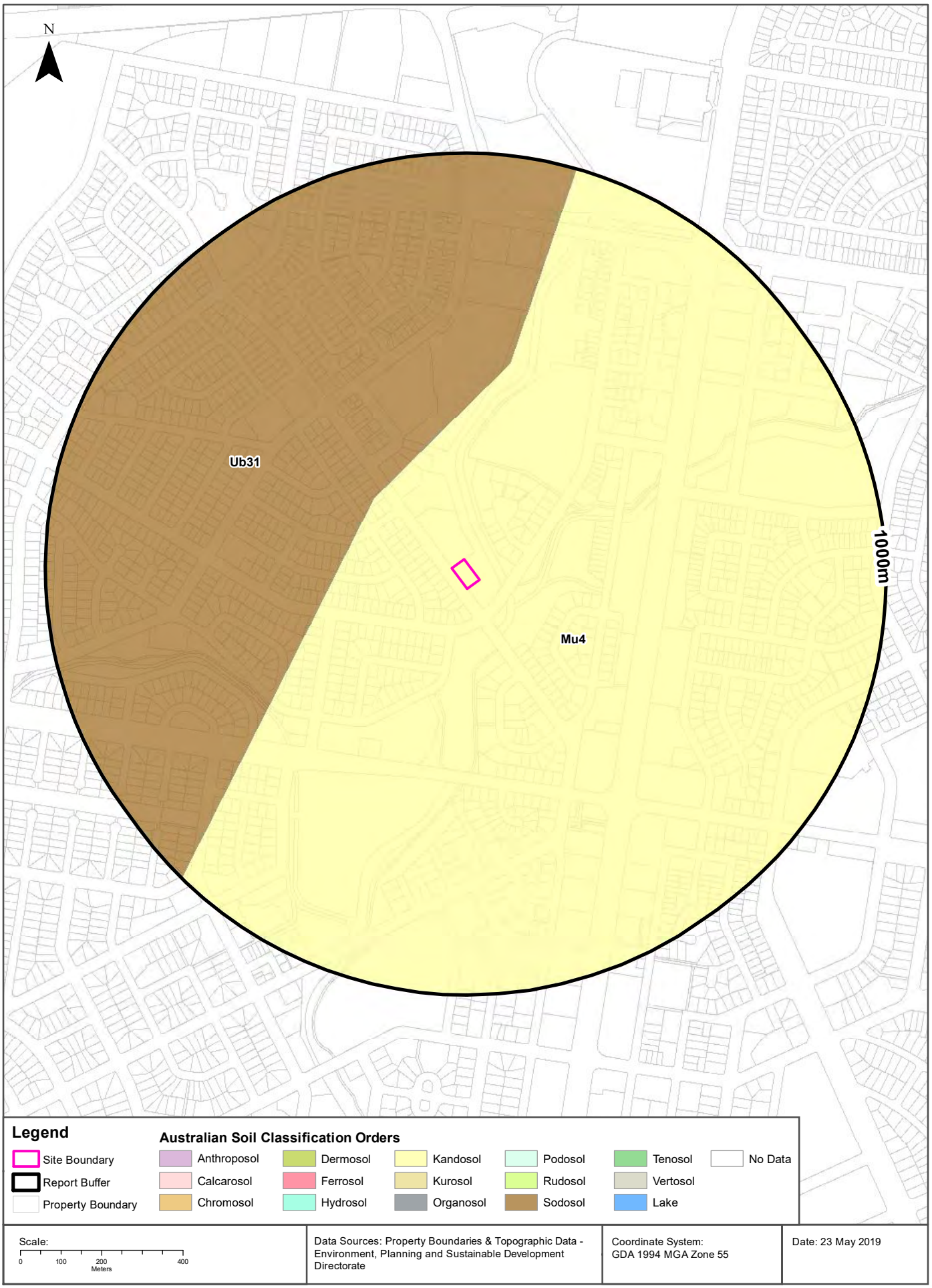
What are the Soil Landscapes within the report buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALgc	GINNINDERRA CREEK		ALLUVIAL	Canberra	1:100,000
TRlu	LUXOR		TRANSFERRAL	Canberra	1:100,000
TRlub	LUXOR variant b		TRANSFERRAL	Canberra	1:100,000
TRwi	WILLIAMSDALE		TRANSFERRAL	Canberra	1:100,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage
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Atlas of Australian Soils

Wattle Street, Lyneham, ACT 2602



Soil Landscapes

Wattle Street, Lyneham, ACT 2602

Atlas of Australian Soils

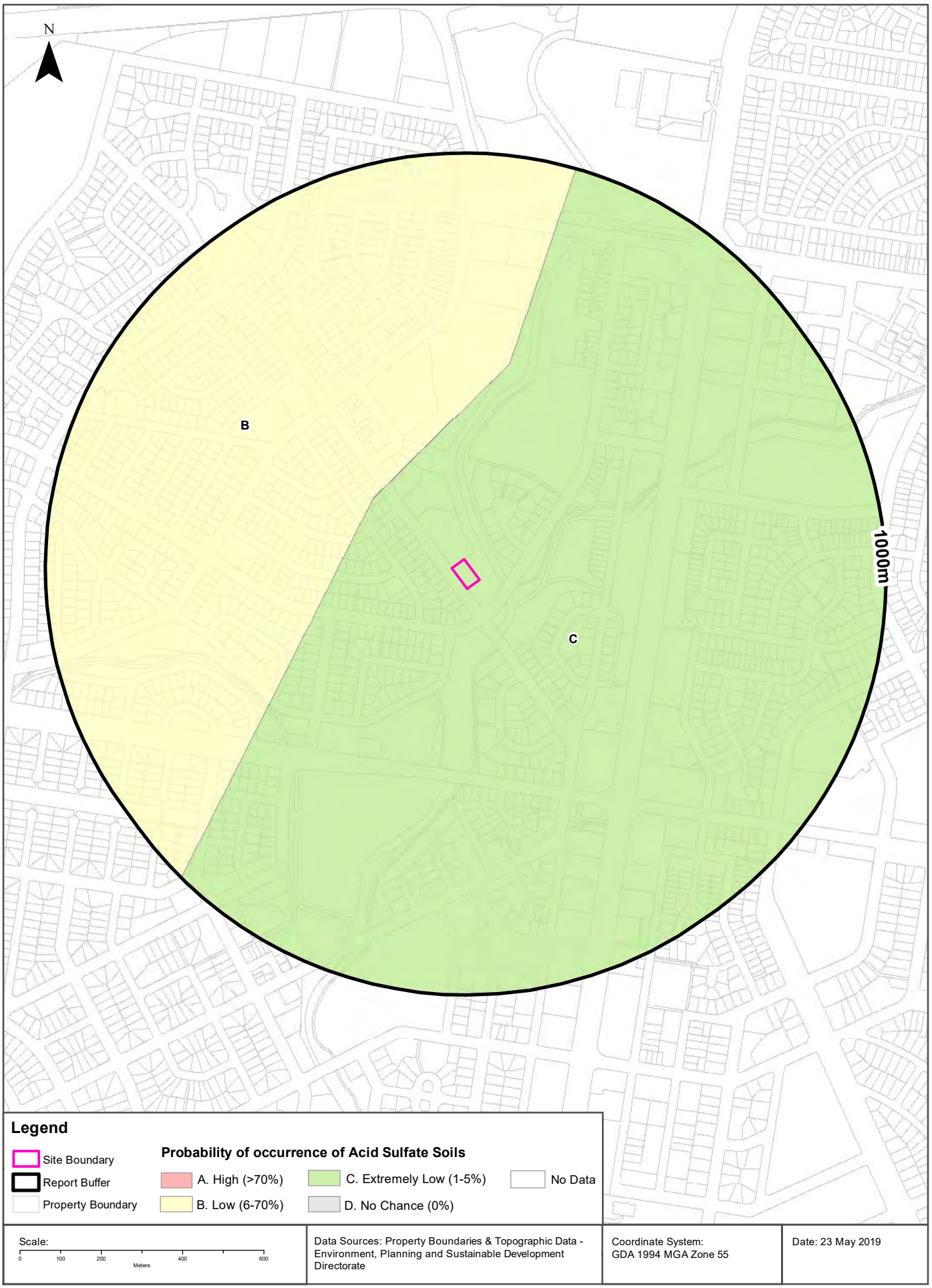
Australian soil types within the dataset buffer:

Symbol	Soil Order	Map Unit Description	Distance
Mu4	Kandosol	Gently to strongly undulating plains at moderate to low elevations (<2000 ft) with basins, stream terraces, and low residual hills and ridges; buried, layered soil materials are present: undulating plains of neutral leached red earths (Gn2.15) in the better-drained sites and yellow earths (Gn2.25) in intermediate drainage situations, with yellow leached earths (Gn2.75) often associated with hard neutral and/or alkaline yellow mottled soils (Dy3.42 and Dy3.43) in poorly drained areas, swampy sites, and seepage situations--all often with heavy clay D horizons below the solum. Associated are: low residual hills and ridges of (Dr2.22 and Dr2.42) or (Dy3.22 and Dy3.42) soils, with small areas of (Um4.2) soils and rock outcrops; basins of (Gn2.15 and Gn2.25) or (Dy3.42) soils; and stream terraces of variable width and development with (Um1) soils on present flood-plains, (Um6.11) soils on the youngest terraces, (Gn2.15, Gn2.25, and Gn2.75) in drainage sequence from well-drained to poorly drained sites on the next, and most extensive, terrace, adjacent to which sand sheets of (Uc1.2) soils may occur; (Dr2.42), (Dy3.42), and (Dy3.43) soils on remnants of the highest terrace, above which gravel fills and ironstone slabs may occur.	0m
Ub31	Sodosol	Low step-like range country--stepped rolling country with scarps, hills, and valleys: chief soils are hard neutral yellow and yellow mottled soils (Dy3.42), (Dy2.42), (Dy2.22), and (Dy3.22) with a variety of other (D) soils and some (Gn2) and (Um4) soils, generally associated as follows: irregularly spaced cuesta-like ranges with (i) moderate to steep scarps of rock outcrops, (Um4.1), (Dr3.42), (Dr2.22), and other (D) soils passing to (iia) long rolling back slopes of (Dy3.42), (Dy2.42), (Dy3.22) with (Dr2.22 and Dr2.42) and sometimes (Gn2.1 and Gn2.2) soils through the mid and upper slope positions, which in turn merge with (iib) undulating basins of (Dy3.42 and Dy3.43) soils sometimes with (Gn2.7) soils, and gullies of (Dy3.42) and/or (Gn2.7) and (Gn2.9) soils; this sequence may be broken by (iii) hills and mountains with slopes and/or scarps of (Um4.1), (Um4.2), (Dr2.21), (Dy3.41), and other (D) soils, also sometimes with belts of partially dissected upland basins of (Dy3.42) soils along the crests--i.e. with areas similar to (iib) but at a relatively higher elevation (compare unit Ub38); the whole area is traversed by (iv) narrow stream valleys of (Um1) soils on flood-plains, (Um6.11) and (Gn2) soils respectively on the next two terraces; and finally there are (v) minor occurrences of other soils, such as (Dr4.12) (e.g. Red Hill) and (Db3.12) on some basaltic areas. Saline patches are fairly common in low-lying situations, especially the (iib) areas.	250m

Atlas of Australian Soils: CSIRO
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Atlas of Australian Acid Sulfate Soils

Wattle Street, Lyneham, ACT 2602



Acid Sulfate Soils

Wattle Street, Lyneham, ACT 2602

Atlas of Australian Acid Sulfate Soils

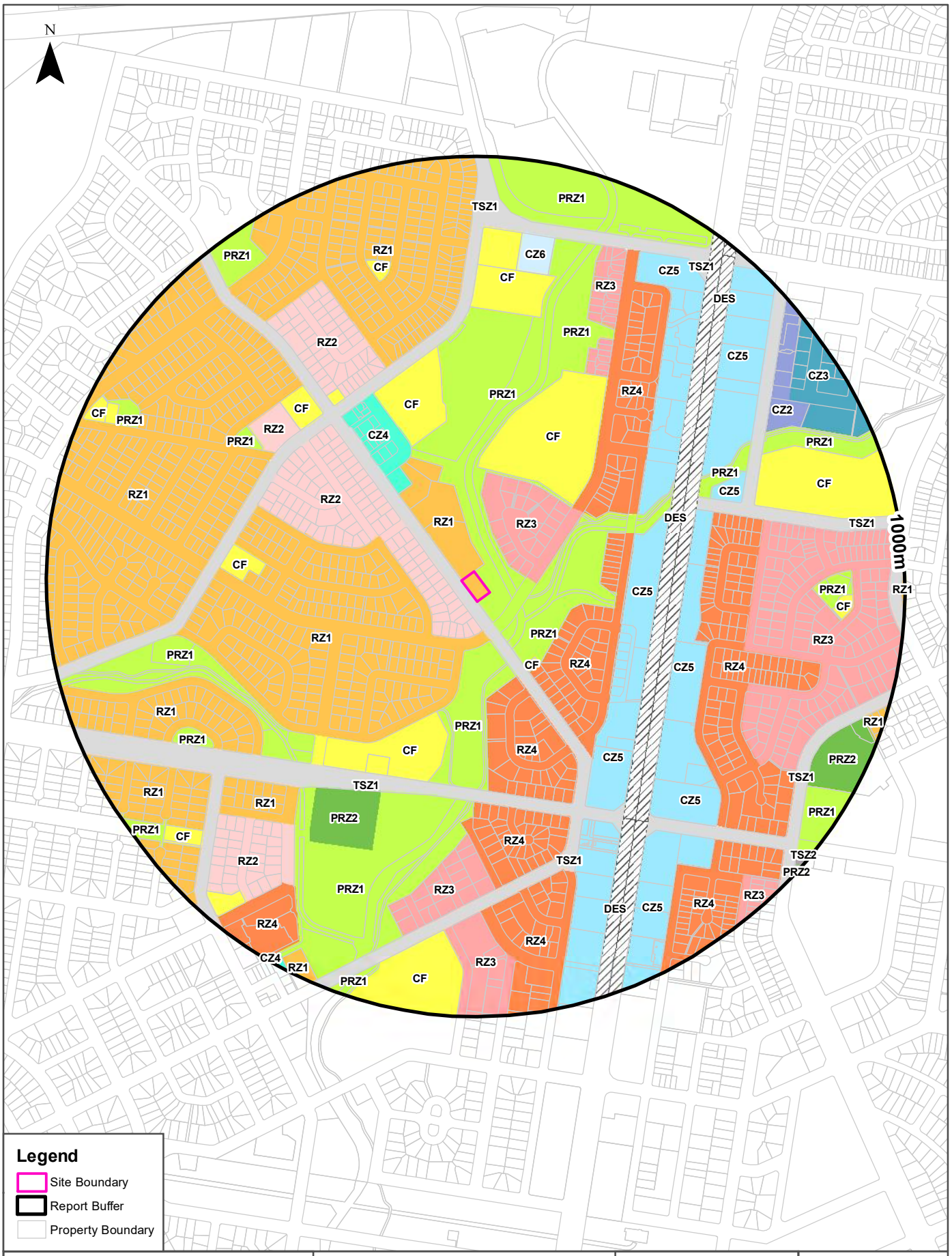
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m
B	Low Probability of occurrence. 6-70% chance of occurrence.	251m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO
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Territory Plan Zones

Wattle Street, Lyneham, ACT 2602



Territory Plan Zones

Wattle Street, Lyneham, ACT 2602

Territory Plan Zones

What Plan Zones exist within the report buffer?

Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	0m	Onsite
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	0m	North
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	0m	North
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	14m	West
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	29m	North West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	65m	West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	73m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	99m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	124m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	143m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	189m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	189m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	193m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	202m	South
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	245m	North East
CZ4	LOCAL CENTRE		TP 2008	NI2008-27	31/03/2008	258m	North West
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	279m	North East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	280m	South West
CZ4	LOCAL CENTRE		TP 2008	NI2008-27	31/03/2008	305m	North West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	322m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	335m	North
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	390m	South East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	398m	North East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	402m	North East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	428m	East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	459m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	471m	West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	477m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	480m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	481m	South
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	505m	East

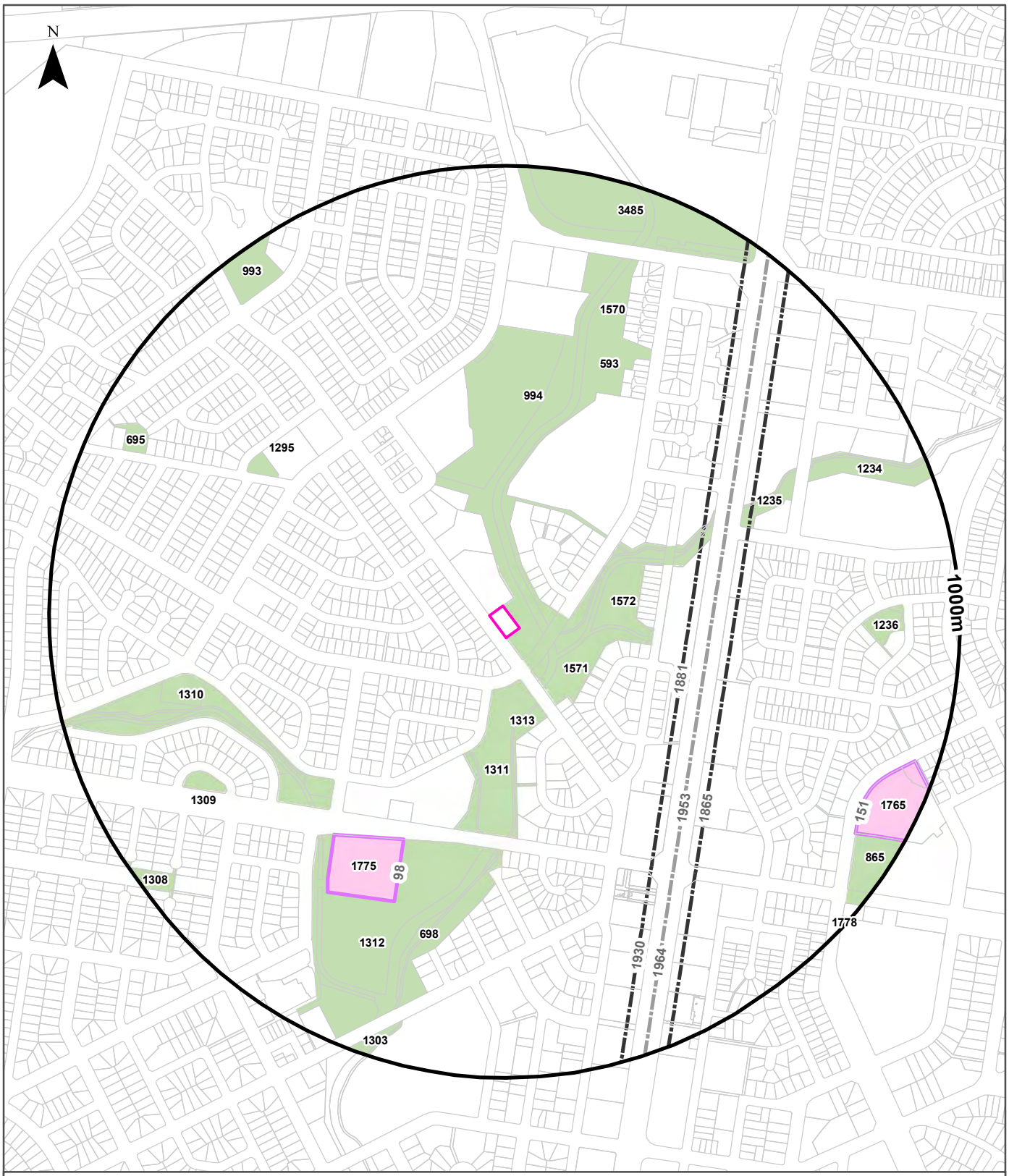
Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	506m	West
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	512m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	520m	North West
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	520m	North West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	521m	North West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	521m	North
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	529m	North West
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	532m	East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	532m	North
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	543m	West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	545m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	553m	North East
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	557m	South
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	559m	South
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	573m	North West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	577m	East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	579m	North East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	582m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	592m	West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	597m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	617m	South West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	623m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	627m	North
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	628m	South
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	649m	South
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	665m	North East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	670m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	671m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	677m	South
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	695m	South West
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	697m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	713m	South West
CZ6	LEISURE AND ACCOMMODATION		TP 2008	NI2008-27	31/03/2008	731m	North
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	734m	East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	734m	North
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	742m	South East
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	745m	South

Zone Code	Zone Name	Description	Variation	Gazettal Name	Gazettal Date	Distance	Direction
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	747m	South
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	762m	South West
CZ2	BUSINESS ZONE		TP 2008	NI2008-27	31/03/2008	765m	North East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	775m	East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	793m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	795m	South
CZ5	MIXED USE		TP 2008	NI2008-27	31/03/2008	799m	North East
RZ4	MEDIUM DENSITY RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	814m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	825m	East
CZ3	SERVICES ZONE		TP 2008	NI2008-27	31/03/2008	846m	North East
PRZ1	URBAN OPEN SPACE		327	CN2015-14	20/08/2015	853m	North
CZ3	SERVICES ZONE		TP 2008	NI2008-27	31/03/2008	854m	North East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	858m	South East
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	859m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	862m	North West
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	873m	South East
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	891m	North East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	891m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	893m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	899m	South
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	899m	South West
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	901m	North West
RZ3	URBAN RESIDENTIAL		TP 2008	NI2008-27	31/03/2008	910m	South East
PRZ1	URBAN OPEN SPACE		TP 2008	NI2008-27	31/03/2008	913m	South West
CF	COMMUNITY FACILITIES		TP 2008	NI2008-27	31/03/2008	913m	North West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	935m	South West
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	947m	East
DES	DESIGNATED		TP 2008	NI2008-27	31/03/2008	966m	North East
TSZ2	SERVICES		TP 2008	NI2008-27	31/03/2008	968m	South East
CZ4	LOCAL CENTRE	O'Connor Local Centre	TP 2008	NI2008-27	31/03/2008	968m	South West
TSZ1	TRANSPORT		TP 2008	NI2008-27	31/03/2008	981m	North East
PRZ2	RESTRICTED ACCESS RECREATION ZONE		TP 2008	NI2008-27	31/03/2008	985m	South East
RZ1	SUBURBAN		TP 2008	NI2008-27	31/03/2008	989m	East
RZ2	SUBURBAN CORE		TP 2008	NI2008-27	31/03/2008	994m	South West

Territory Plan Zones Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Territory Plan Overlays

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Inter-town Public Transport
- Main Avenues & Approach Routes
- Future Urban Areas
- Special Requirements
- National Land
- Kingston Foreshore
- Public Land
- Wilderness Area
- National Park
- Nature Reserve
- Special Purpose Reserve
- Urban Open Space
- Cemetery or Burial Ground
- Protection of Water Supply
- Lake
- Sport and Recreation Reserve
- National Land Proposed for Urban Development

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Territory Plan Overlays

Wattle Street, Lyneham, ACT 2602

Territory Plan Overlays (areas)

What Plan Overlays (areas) exist within the report buffer?

Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
994	Pe	Urban Open Space.	TP 2008	NI2008-27	0m	North
1311	Pe	Urban Open Space.	TP 2008	NI2008-27	99m	South
1571	Pe	Urban Open Space.	TP 2008	NI2008-27	124m	South East
1313	Pe	Urban Open Space.	TP 2008	NI2008-27	143m	South
1572	Pe	Urban Open Space.	TP 2008	NI2008-27	193m	East
1312	Pe	Urban Open Space.	TP 2008	NI2008-27	477m	South
698	Pe	Urban Open Space.	TP 2008	NI2008-27	480m	South
1310	Pe	Urban Open Space.	TP 2008	NI2008-27	506m	West
1775	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	512m	South West
593	Pe	Urban Open Space.	TP 2008	NI2008-27	521m	North
1235	Pe	Urban Open Space.	TP 2008	NI2008-27	553m	North East
1295	Pe	Urban Open Space.	TP 2008	NI2008-27	573m	North West
1570	Pe	Urban Open Space.	TP 2008	NI2008-27	644m	North
1309	Pe	Urban Open Space.	TP 2008	NI2008-27	713m	South West
1234	Pe	Urban Open Space.	TP 2008	NI2008-27	734m	East
1236	Pe	Urban Open Space.	TP 2008	NI2008-27	775m	East
3485	Pe	Urban Open Space.	327	CN2015-14	853m	North
695	Pe	Urban Open Space.	TP 2008	NI2008-27	862m	North West
1765	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	873m	South East
865	Pe	Urban Open Space.	TP 2008	NI2008-27	893m	South East
1303	Pe	Urban Open Space.	TP 2008	NI2008-27	899m	South
993	Pe	Urban Open Space.	TP 2008	NI2008-27	901m	North West
1308	Pe	Urban Open Space.	TP 2008	NI2008-27	913m	South West
1778	Pi	Sport and recreation reserve.	TP 2008	NI2008-27	985m	South East

Territory Plan Overlays (lines)

What Plan Overlays (lines) exist within the report buffer?

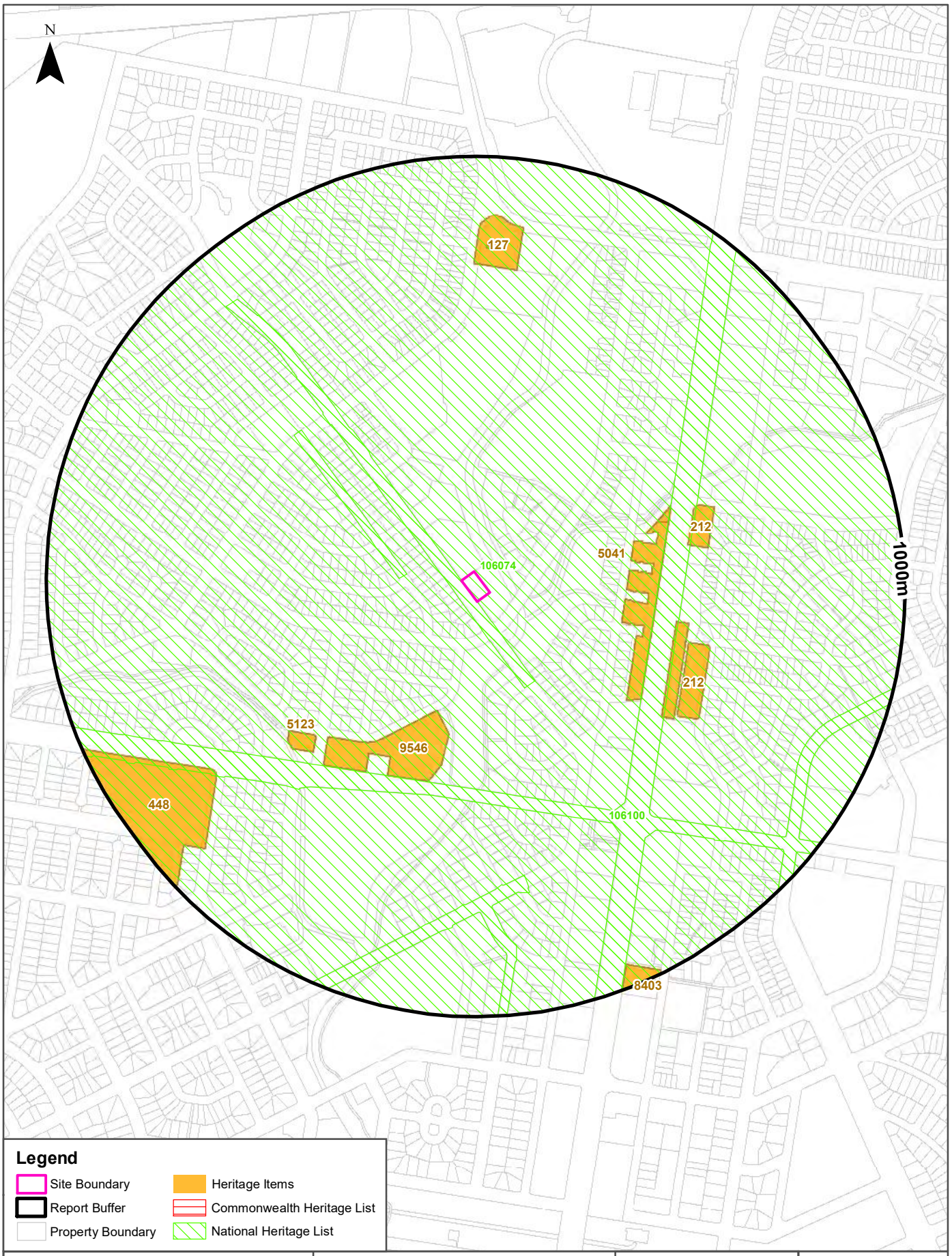
Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
1881	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	378m	East

Id	Overlay Code	Overlay Name	Variation	Gazettal Name	Distance	Direction
1953	IPT	Inter-town Public Transport.	TP 2008	NI2008-27	428m	North East
1865	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	479m	East
98	PUBLAN	Public Land	TP 2008	NI2008-27	512m	South West
1930	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	614m	South
1964	IPT	Inter-town Public Transport.	TP 2008	NI2008-27	649m	South
1928	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	684m	South
151	PUBLAN	Public Land	TP 2008	NI2008-27	873m	South East
1879	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	952m	North
20	PUBLAN	Public Land	TP 2008	NI2008-27	985m	South East
1866	MAAR	Main Avenues and Approach Routes	TP 2008	NI2008-27	992m	North East

Territory Plan Overlay Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Heritage Items

Wattle Street, Lyneham, ACT 2602



Heritage

Wattle Street, Lyneham, ACT 2602

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106074	Canberra and Surrounding Areas	Northbourne Av, Canberra ACT	8/01/000/0134	Historic	Minister considering decision within extended period		0m	Onsite
106100	Canberra - Central National Area and Inner Hills/ Canberra the Planned	Northbourne Av, Canberra ACT	8/01/000/0134	Historic	Minister considering decision within extended period		0m	Onsite

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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Heritage Sites

What Heritage SItes exist within the report buffer?

Map Id	Heritage Id	Name	Description	Status	Status Date	Location Type	Block Key	District	Division	Dist	Dir
9546	3361	St Josephs Catholic Church		Nominated for Provisional Registration		Historic		CANBERRA CENTRAL	O'CONNOR	280m	South West
5041	120	Northbourne Housing Precinct Representative Sample	Section 51 Block 8	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	322m	East
212	120	Northbourne Housing Precinct Representative Sample	Section 1 Block 4, Section 12 Block 1, Section 6 Block 41	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	435m	East
212	120	Northbourne Housing Precinct Representative Sample	Section 1 Block 4, Section 12 Block 1, Section 6 Block 41	Final Registration		Historic		CANBERRA CENTRAL	DICKSON	453m	South East

Map Id	Heritage Id	Name	Description	Status	Status Date	Location Type	Block Key	District	Division	Dist	Dir
5123	1721	13th Canberra Scout Hall	Section 24 Block 19	Final Registration		Historic		CANBERRA CENTRAL	O'CONNOR	506m	South West
127	205	St Ninian's Church	Section 41 Block 1	Final Registration		Historic		CANBERRA CENTRAL	LYNEHAM	731m	North
448	436	Tocumwal Housing Precinct	Section 33 Blocks 1-14, Section 34 Blocks 1-14, Section 35 Blocks 1-14, Section 36 Blocks 1-14, Section 37 Blocks 1-14, Section 54 Blocks 1-16, Section 55 Blocks 1-16, Section 56 Blocks 1-16, Section 59 Blocks 1-7 & 10-17, Section 60 Blocks 1 & 8-13, Sec	Final Registration		Historic		CANBERRA CENTRAL	O'CONNOR	751m	South West
8403	2821	The former AAA Building		Final Registration	14/04/2016	Restricted	11060030464	CANBERRA CENTRAL	BRADDON	944m	South East

Heritage Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Natural Hazards

Wattle Street, Lyneham, ACT 2602

Bushfire Prone Areas

What Bushfire Prone Areas exist within the report buffer?

Feature Id	Description	Distance	Direction
N/A	No records within buffer		

Bushfire Prone Area Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Abatement Zones

What Bushfire Abatement Zones exist within the report buffer?

Feature Id	Feature	Distance	Direction
N/A	No records within buffer		

Bushfire Abatement Zone Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Operational Plan - Access Management

What Bushfire Operational Plan - Access Management exist within the report buffer?

Map Id	Treatment	Distance	Direction
N/A	No records within buffer		

Bushfire Operational Plan Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Bushfire Operational Plan - Fuel Management

What Bushfire Operational Plan - Fuel Management exist within the report buffer?

Unique Id	Treatment	Hectares	Distance	Direction
N/A	No records within buffer			

Bushfire Operational Plan Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Flood (1 Percent Annual Exceedance Probability)

What Flood zone (1% AEP) exists within the report buffer?

Feature Id	Description	Distance	Direction
N/A	No records within buffer		

Flood Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Vegetation Communities

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundaries
- Alpine Complex
- Dry Sclerophyll Forests
- Freshwater Wetlands
- Forested Wetlands
- u52 Ribbon Gum
- u53 Mountain Gum
- u239 Alpine Ash
- Grassy Woodlands
- Grasslands
- APN, APE, ARB, EPN
- DNF, DNS, DNW
- EXF, EXS, EXW
- PLE Plantation exotic
- PWR Power easement
- EXG Exotic grassland
- NG Native grassland
- URB Urban and developed areas
- UOS Urban Open Space
- Sand
- Rock
- Water

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Vegetation Communities

What Vegetation Communities exist within the report buffer?

UMC Id	Community	Formation	"Keith" Vegetation Class	Mean Height	Canopy Cover	Distance	Direction
URB	Urban and developed areas_URB			8.40	15.73	0m	Onsite
UOS	Urban Open Space_UOS			11.42	19.54	0m	North
Water	Water			3.53	0.09	99m	East
UOS	Urban Open Space_UOS			12.77	46.78	99m	South
UOS	Urban Open Space_UOS			10.63	22.58	477m	South
UOS	Urban Open Space_UOS			11.34	36.76	506m	West
UOS	Urban Open Space_UOS			12.09	39.96	553m	North East
UOS	Urban Open Space_UOS			10.66	44.85	573m	North West
UOS	Urban Open Space_UOS			5.76	19.73	713m	South West
UOS	Urban Open Space_UOS			10.94	34.81	734m	East
UOS	Urban Open Space_UOS			7.96	30.39	775m	East
UOS	Urban Open Space_UOS			10.11	5.82	853m	North
UOS	Urban Open Space_UOS			13.56	37.23	862m	North West
UOS	Urban Open Space_UOS			11.75	21.27	873m	South East
Water	Water			8.04	9.99	887m	South West
UOS	Urban Open Space_UOS			12.08	48.78	899m	South
UOS	Urban Open Space_UOS			9.75	53.24	901m	North West
UOS	Urban Open Space_UOS			7.59	49.28	913m	South West
UOS	Urban Open Space_UOS			12.55	26.57	985m	South East

Vegetation Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Vegetation Subformation

Wattle Street, Lyneham, ACT 2602



Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Dry Forest
- Dry heath shrubland complex
- Former Pine Plantation Post 2003
- Grassland
- Lakes / Water
- Modified grassland / Urban vegetation complex
- Montane Woodland
- Plantation / Arboretum
- Riparian Woodland
- Subalpine Woodland
- Upland Montane Forest
- Urban
- Wet Forest
- Wetlands
- Woodland

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate

Coordinate System: GDA 1994 MGA Zone 55

Date: 23 May 2019

Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Vegetation Subformation

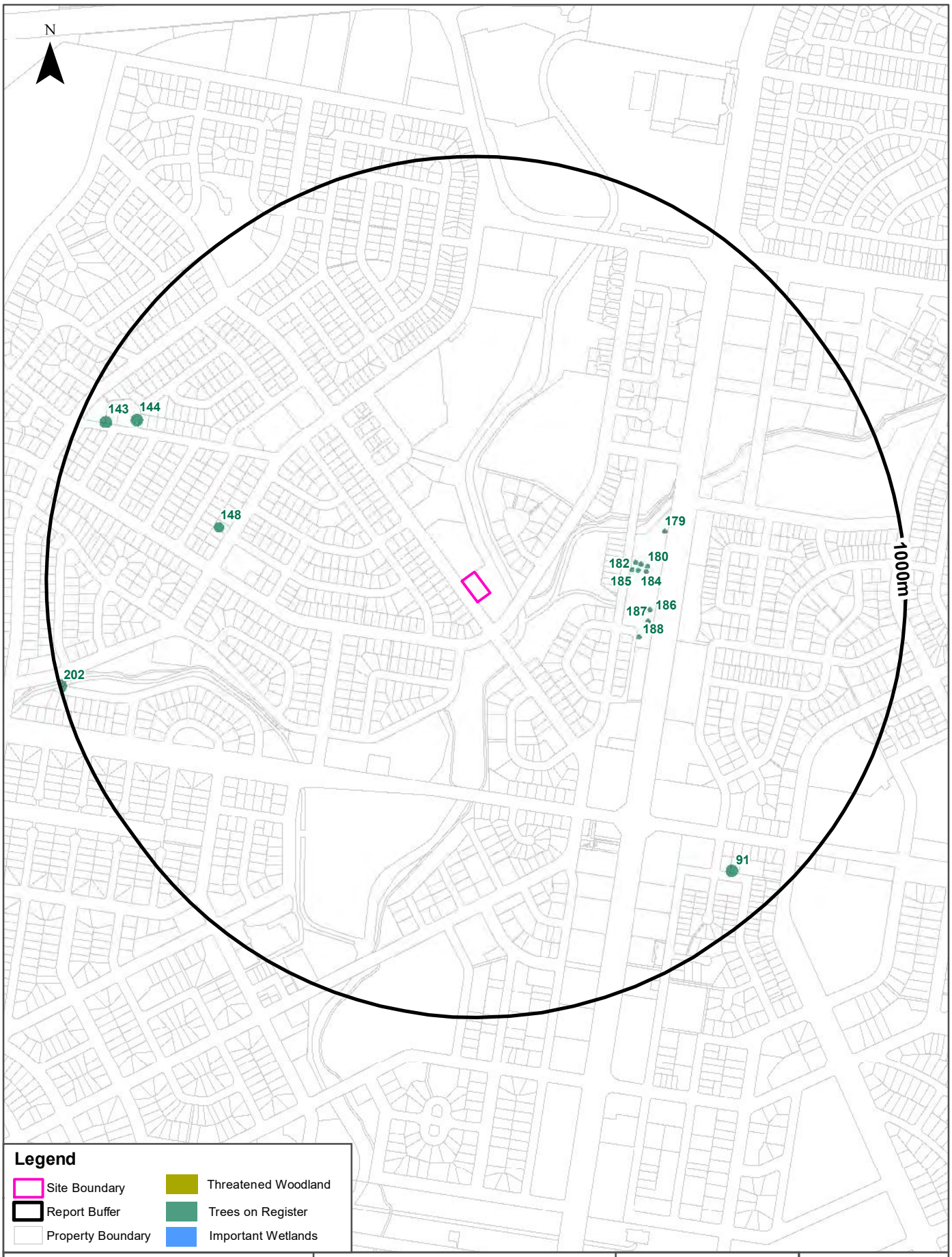
What Vegetation Subformations exist within the report buffer?

Object Id	Subformation	Distance	Direction
13	Urban	0m	Onsite
6	Modified grassland / Urban vegetation complex	0m	South West

Vegetation Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Ecological Constraints - Threatened Woodland, Wetlands &Tree Register

Wattle Street, Lyneham, ACT 2602



Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries & Topographic Data - Environment, Planning and Sustainable Development Directorate	Coordinate System: GDA 1994 MGA Zone 55	Date: 23 May 2019

Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Threatened Woodland

What ACT Listed Threatened Woodland exists within the report buffer?

Feature Id	Community	EPBCStatus	ACT Status	Distance	Direction
N/A	No records within buffer				

Threatened Woodland Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Tree Register

What Trees on the ACT register exists within the report buffer?

Feature Id	Genus	Species	Tree Ref	Tree Height	Status	Date Edit	Distance	Direction
185	Quercus	macrocarpa	PTR204-Group	14.0	REGISTERED	06/01/2019	338m	East
182	Quercus	macrocarpa	PTR204-Group		REGISTERED	06/01/2019	350m	East
184	Quercus	macrocarpa	PTR204-Group	14.0	REGISTERED	06/01/2019	353m	East
181	Quercus	macrocarpa	PTR204-Group	16.0	REGISTERED	06/01/2019	362m	East
188	Quercus	robur	PTR203	14.0	REGISTERED	06/01/2019	366m	East
183	Quercus	macrocarpa	PTR204-Group	17.0	REGISTERED	06/01/2019	371m	East
180	Quercus	macrocarpa	PTR204-Group	16.0	REGISTERED	06/01/2019	377m	East
187	Cedrus	atlantica	PTR202	17.7	REGISTERED	06/01/2019	378m	East
186	Cedrus	atlantica	PTR201	17.0	REGISTERED	06/01/2019	379m	East
179	Quercus	robur	PTR200	17.0	REGISTERED	06/01/2019	438m	East
148	Quercus	palustris	PTR229	26.0	PROVISIONAL	06/01/2019	587m	West
144	Eucalyptus	melliodora	PTR078	26.0	REGISTERED	06/01/2019	858m	North West
91	Cornus	florida	PTR133	8.0	REGISTERED	06/01/2019	870m	South East
143	Eucalyptus	melliodora	PTR079	26.0	REGISTERED	06/01/2019	923m	North West
202	Eucalyptus	melliodora	PTR030	32.0	REGISTERED	06/01/2019	983m	West

Tree Register Data Source: ACT Government Creative Commons 4.0 © https://creativecommons.org/licenses/by/4.0/

Important Wetlands

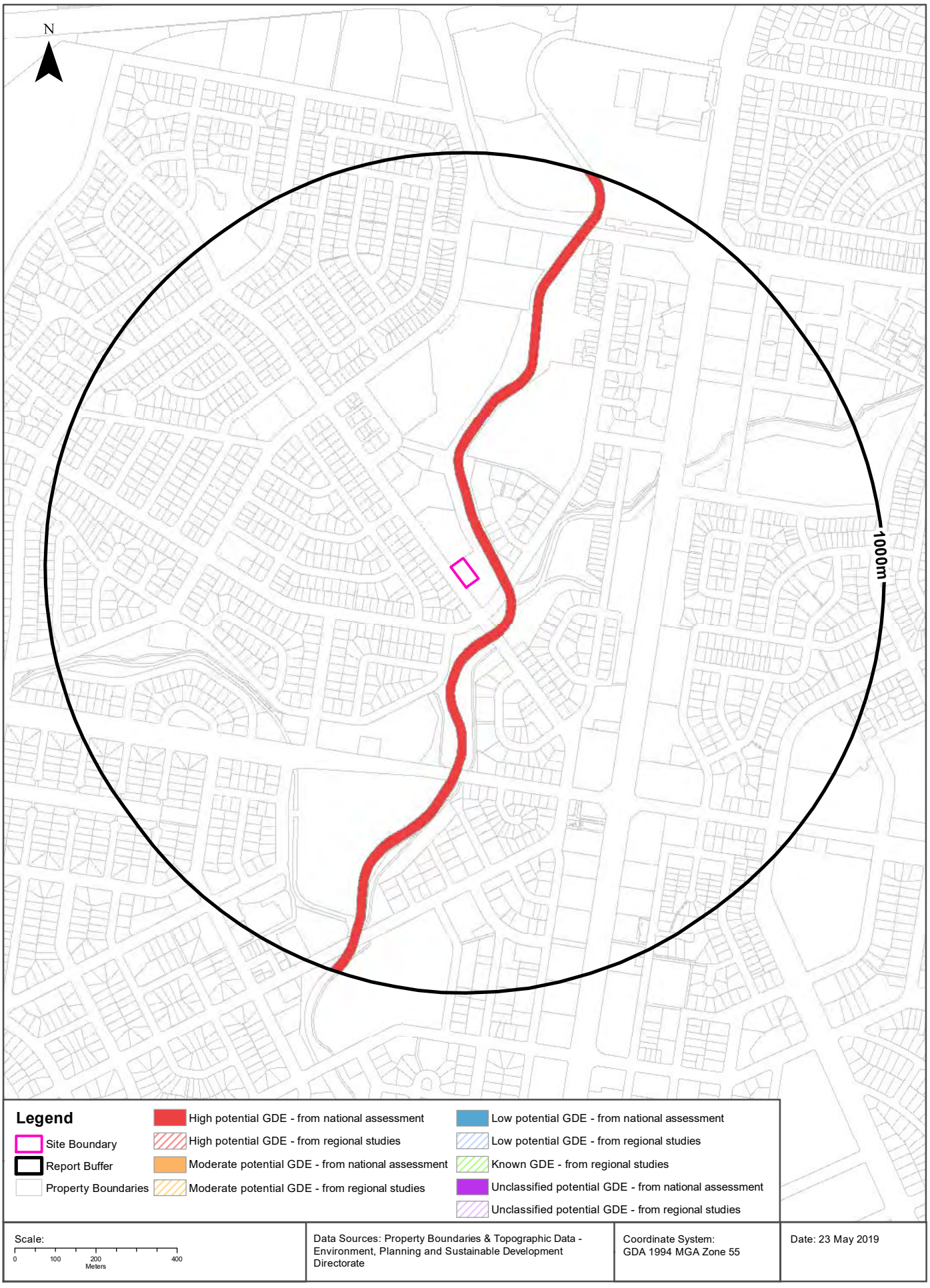
What Wetlands exist within the report buffer?

Feature Id	Name	Distance	Direction
N/A	No records within buffer		

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Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Wattle Street, Lyneham, ACT 2602



Ecological Constraints

Wattle Street, Lyneham, ACT 2602

Groundwater Dependent Ecosystems Atlas

GDEs within the dataset buffer:

Type	Name	GDE Potential	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Aquatic		High potential GDE - from national assessment	8	Upland plains with separating strike-aligned hills, closed lake basins.	River		40m	South

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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Ecological Constraints

Wattle Street, Lyneham, ACT 2602

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Litoria castanea	Yellow-spotted Tree Frog	Critically Endangered	Not Sensitive	Endangered	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Ardenna pacificus	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pedionomus torquatus	Plains-wanderer	Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Vulnerable	Category 3	Vulnerable	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Delma impar	Striped Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus aggregata	Black Gum	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Lepidium pseudopapillosum	Formbe Peppercress	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Leucochrysum albicans subsp. tricolor	Hoary Sunray	Not Listed	Not Sensitive	Endangered	
Plantae	Flora	Rutidosis leptorrhynchoides	Button Wrinklewort	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Swainsona recta	Small Purple-pea	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
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Appendix D

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
62.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	50	100
Urban residential and open public spaces	200	580
Commercial and industrial	380	990

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
9.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	130	130
Urban residential and open public spaces	230	400
Commercial and industrial	340	660

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
62.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Enter organic carbon content (%OC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	80	95
Urban residential and open public spaces	140	250
Commercial and industrial	200	360

Inputs
Select contaminant from list below
DDT
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	DDT generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	3	3
Urban residential and open public spaces	180	180
Commercial and industrial	640	640

Inputs
Select contaminant from list below
Naphthalene
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Naphthalene generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
62.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	120	270
Urban residential and open public spaces	370	960
Commercial and industrial	570	1400

Appendix E

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Chris Gunton	Manager	Huong Crawford
Client	LANTERRA CONSULTING PTY LTD	Laboratory	SGS Alexandria Environmental
Address	PO BOX 3626 WESTON ACT 2611	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	(Not specified)	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	Chris.Gunton@lanterra.com.au	Email	au.environmental.sydney@sgs.com
Project	**P19099 Wattle Street Lyneham**	SGS Reference	**SE200769 R0**
Order Number	(Not specified)	Date Received	05 Dec 2019
Samples	18	Date Reported	13 Dec 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

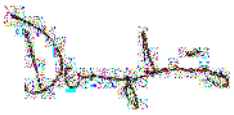
Sample #1: A portion of the sample supplied has been sub-sampled for asbestos analysis in soil according to SGS In-house procedures. We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied. SGS Environmental Services recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.
%clay subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146. CE143550

SIGNATORIES



Akheeqar BENIAMEEN
Chemist



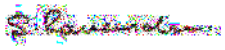
Dong LIANG
Metals/Inorganics Team Leader



Huong CRAWFORD
Production Manager



Ly Kim HA
Organic Section Head



Ravee SIVASUBRAMANIAM
Hygiene Team Leader



Shane MCDERMOTT
Inorganic/Metals Chemist

Parameter	Units	LOR	Sample Number: SE200769.001 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH1 0.0-0.2	SE200769.002 Soil 02 Dec 2019 BH1 0.5-0.6	SE200769.003 Soil 02 Dec 2019 BH2 0.0-0.2	SE200769.004 Soil 02 Dec 2019 BH2 0.5-0.6
VOC's in Soil Method: AN433 Tested: 6/12/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**78**	**90**	**77**	**79**
d8-toluene (Surrogate)	%	-	**79**	**72**	**77**	**81**
Bromofluorobenzene (Surrogate)	%	-	**74**	**69**	**72**	**76**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 6/12/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**78**	**90**	**77**	**79**
d8-toluene (Surrogate)	%	-	**79**	**72**	**77**	**81**
Bromofluorobenzene (Surrogate)	%	-	**74**	**69**	**72**	**76**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE200769.001 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH1 0.0-0.2	SE200769.002 Soil 02 Dec 2019 BH1 0.5-0.6	SE200769.003 Soil 02 Dec 2019 BH2 0.0-0.2	SE200769.004 Soil 02 Dec 2019 BH2 0.5-0.6
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 6/12/2019						
TRH C10-C14	mg/kg	20	<20	<20	**34**	<20
TRH C15-C28	mg/kg	45	<45	<45	**85**	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	**120**	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	**59**	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	**59**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 6/12/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**73**	**71**	**76**	**73**
2-fluorobiphenyl (Surrogate)	%	-	**80**	**79**	**91**	**80**
d14-p-terphenyl (Surrogate)	%	-	**79**	**78**	**85**	**80**
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019						
Phenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	<1	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
4-nitrophenol	mg/kg	1	<1	<1	<1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	<1	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dinitrophenol	mg/kg	2	<2	<2	<2	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2	<2	<2

Parameter	Units	LOR	Sample Number: SE200769.001 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH1 0.0-0.2	SE200769.002 Soil 02 Dec 2019 BH1 0.5-0.6	SE200769.003 Soil 02 Dec 2019 BH2 0.0-0.2	SE200769.004 Soil 02 Dec 2019 BH2 0.5-0.6
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019 (continued)						
Surrogates						
2,4,6-Tribromophenol (Surrogate)	%	-	**91**	**78**	**87**	**89**
d5-phenol (Surrogate)	%	-	**89**	**81**	**89**	**92**
OC Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**74**	**70**	**77**	**76**
OP Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**80**	**79**	**91**	**80**
d14-p-terphenyl (Surrogate)	%	-	**79**	**78**	**85**	**80**

Parameter	Units	LOR	Sample Number: SE200769.001 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH1 0.0-0.2	SE200769.002 Soil 02 Dec 2019 BH1 0.5-0.6	SE200769.003 Soil 02 Dec 2019 BH2 0.0-0.2	SE200769.004 Soil 02 Dec 2019 BH2 0.5-0.6
PCBs in Soil Method: AN420 Tested: 6/12/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**74**	**70**	**77**	**76**
pH in soil (1:5) Method: AN101 Tested: 9/12/2019						
pH	pH Units	0.1	-	-	**7.6**	-
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 9/12/2019						
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	-	-	**47**	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 7/12/2019						
Arsenic, As	mg/kg	1	**2**	**5**	**3**	**6**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	**11**	**21**	**7.0**	**18**
Copper, Cu	mg/kg	0.5	**5.2**	**9.3**	**5.2**	**13**
Nickel, Ni	mg/kg	0.5	**3.5**	**6.4**	**2.7**	**6.8**
Lead, Pb	mg/kg	1	**31**	**18**	**40**	**15**
Zinc, Zn	mg/kg	2	**34**	**20**	**48**	**20**
Mercury in Soil Method: AN312 Tested: 7/12/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05

Parameter	Units	LOR	Sample Number: SE200769.001 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH1 0.0-0.2	SE200769.002 Soil 02 Dec 2019 BH1 0.5-0.6	SE200769.003 Soil 02 Dec 2019 BH2 0.0-0.2	SE200769.004 Soil 02 Dec 2019 BH2 0.5-0.6
Moisture Content Method: AN002 Tested: 6/12/2019						
% Moisture	%w/w	1	**1.8**	**6.0**	**2.0**	**7.8**
Fibre Identification in soil Method: AN602 Tested: 10/12/2019						
FibreID						
Asbestos Detected	No unit	-	No	-	No	-
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	-	<0.01	-
Particle sizing of soils by sieving Method: AN005 Tested: 13/12/2019						
Passing 75µm*	%w/w	1	-	-	**19**	-
Retained 75µm*	%w/w	1	-	-	**81**	-
Particle sizing of soils <75µm by hydrometer Method: AN005 Tested: 13/12/2019						
Clay (<0.002mm)*	%w/w	0.1	-	-	**8.0**	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE200769.005 Soil 02 Dec 2019 BH3 0.0-0.2	SE200769.006 Soil 02 Dec 2019 BH3 0.5-0.6	SE200769.007 Soil 02 Dec 2019 BH4 0.0-0.2	SE200769.008 Soil 02 Dec 2019 BH4 0.5-0.6
VOC's in Soil Method: AN433 Tested: 6/12/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**80**	**83**	**84**	**82**
d8-toluene (Surrogate)	%	-	**81**	**84**	**85**	**84**
Bromofluorobenzene (Surrogate)	%	-	**76**	**80**	**80**	**79**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 6/12/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**80**	**83**	**84**	**82**
d8-toluene (Surrogate)	%	-	**81**	**84**	**85**	**84**
Bromofluorobenzene (Surrogate)	%	-	**76**	**80**	**80**	**79**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE200769.005 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH3 0.0-0.2	SE200769.006 Soil 02 Dec 2019 BH3 0.5-0.6	SE200769.007 Soil 02 Dec 2019 BH4 0.0-0.2	SE200769.008 Soil 02 Dec 2019 BH4 0.5-0.6
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 6/12/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 6/12/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**74**	**71**	**70**	**71**
2-fluorobiphenyl (Surrogate)	%	-	**84**	**80**	**80**	**79**
d14-p-terphenyl (Surrogate)	%	-	**80**	**77**	**78**	**79**
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019						
Phenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	<1	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
4-nitrophenol	mg/kg	1	<1	<1	<1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	<1	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dinitrophenol	mg/kg	2	<2	<2	<2	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2	<2	<2

Parameter	Units	LOR	Sample Number: SE200769.005 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH3 0.0-0.2	SE200769.006 Soil 02 Dec 2019 BH3 0.5-0.6	SE200769.007 Soil 02 Dec 2019 BH4 0.0-0.2	SE200769.008 Soil 02 Dec 2019 BH4 0.5-0.6
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019 (continued)						
Surrogates						
2,4,6-Tribromophenol (Surrogate)	%	-	**90**	**78**	**82**	**84**
d5-phenol (Surrogate)	%	-	**88**	**71**	**71**	**74**
OC Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**77**	**77**	**80**	**84**
OP Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**84**	**80**	**80**	**79**
d14-p-terphenyl (Surrogate)	%	-	**80**	**77**	**78**	**79**

Parameter	Units	LOR	Sample Number: SE200769.005 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH3 0.0-0.2	SE200769.006 Soil 02 Dec 2019 BH3 0.5-0.6	SE200769.007 Soil 02 Dec 2019 BH4 0.0-0.2	SE200769.008 Soil 02 Dec 2019 BH4 0.5-0.6
PCBs in Soil Method: AN420 Tested: 6/12/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**77**	**77**	**80**	**84**
pH in soil (1:5) Method: AN101 Tested: 9/12/2019						
pH	pH Units	0.1	-	-	-	-
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 9/12/2019						
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	-	-	-	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 7/12/2019						
Arsenic, As	mg/kg	1	**6**	**7**	**4**	**8**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	**14**	**29**	**13**	**22**
Copper, Cu	mg/kg	0.5	**10**	**9.9**	**6.1**	**13**
Nickel, Ni	mg/kg	0.5	**8.0**	**8.9**	**5.3**	**8.7**
Lead, Pb	mg/kg	1	**24**	**24**	**14**	**22**
Zinc, Zn	mg/kg	2	**50**	**27**	**27**	**24**
Mercury in Soil Method: AN312 Tested: 7/12/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05

Parameter	Units	LOR	Sample Number: SE200769.005 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH3 0.0-0.2	SE200769.006 Soil 02 Dec 2019 BH3 0.5-0.6	SE200769.007 Soil 02 Dec 2019 BH4 0.0-0.2	SE200769.008 Soil 02 Dec 2019 BH4 0.5-0.6
Moisture Content Method: AN002 Tested: 6/12/2019						
% Moisture	%w/w	1	**6.6**	**5.6**	**6.1**	**7.8**
Fibre Identification in soil Method: AN602 Tested: 10/12/2019						
FibreID						
Asbestos Detected	No unit	-	No	-	No	-
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	-	<0.01	-
Particle sizing of soils by sieving Method: AN005 Tested: 13/12/2019						
Passing 75µm*	%w/w	1	-	-	-	-
Retained 75µm*	%w/w	1	-	-	-	-
Particle sizing of soils <75µm by hydrometer Method: AN005 Tested: 13/12/2019						
Clay (<0.002mm)*	%w/w	0.1	-	-	-	-

Parameter	Units	LOR	Sample Number: SE200769.009 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH5 0.0-0.2	SE200769.010 Soil 02 Dec 2019 BH5 0.5-0.6	SE200769.011 Soil 02 Dec 2019 BH6 0.0-0.2	SE200769.012 Soil 02 Dec 2019 BH6 0.5-0.6
VOC's in Soil Method: AN433 Tested: 6/12/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**84**	**79**	**123**	**119**
d8-toluene (Surrogate)	%	-	**85**	**80**	**100**	**95**
Bromofluorobenzene (Surrogate)	%	-	**80**	**75**	**94**	**90**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 6/12/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**84**	**79**	**123**	**119**
d8-toluene (Surrogate)	%	-	**85**	**80**	**100**	**95**
Bromofluorobenzene (Surrogate)	%	-	**80**	**75**	**94**	**90**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE200769.009 Soil 02 Dec 2019 BH5 0.0-0.2	SE200769.010 Soil 02 Dec 2019 BH5 0.5-0.6	SE200769.011 Soil 02 Dec 2019 BH6 0.0-0.2	SE200769.012 Soil 02 Dec 2019 BH6 0.5-0.6
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 6/12/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 6/12/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**73**	**68**	**74**	**71**
2-fluorobiphenyl (Surrogate)	%	-	**83**	**76**	**80**	**78**
d14-p-terphenyl (Surrogate)	%	-	**82**	**74**	**79**	**78**
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019						
Phenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	<1	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
4-nitrophenol	mg/kg	1	<1	<1	<1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	<1	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
2,4-dinitrophenol	mg/kg	2	<2	<2	<2	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2	<2	<2

Parameter	Units	LOR	Sample Number: SE200769.009 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH5 0.0-0.2	SE200769.010 Soil 02 Dec 2019 BH5 0.5-0.6	SE200769.011 Soil 02 Dec 2019 BH6 0.0-0.2	SE200769.012 Soil 02 Dec 2019 BH6 0.5-0.6
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019 (continued)						
Surrogates						
2,4,6-Tribromophenol (Surrogate)	%	-	**86**	**80**	**84**	**80**
d5-phenol (Surrogate)	%	-	**91**	**74**	**79**	**70**
OC Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**84**	**83**	**81**	**85**
OP Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**83**	**76**	**80**	**78**
d14-p-terphenyl (Surrogate)	%	-	**82**	**74**	**79**	**78**

Parameter	Units	LOR	Sample Number: SE200769.009 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH5 0.0-0.2	SE200769.010 Soil 02 Dec 2019 BH5 0.5-0.6	SE200769.011 Soil 02 Dec 2019 BH6 0.0-0.2	SE200769.012 Soil 02 Dec 2019 BH6 0.5-0.6
PCBs in Soil Method: AN420 Tested: 6/12/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**84**	**83**	**81**	**85**
pH in soil (1:5) Method: AN101 Tested: 9/12/2019						
pH	pH Units	0.1	-	-	-	-
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 9/12/2019						
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	-	-	-	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 7/12/2019						
Arsenic, As	mg/kg	1	**7**	**6**	**8**	**9**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	**7.7**	**16**	**14**	**27**
Copper, Cu	mg/kg	0.5	**22**	**7.9**	**8.8**	**14**
Nickel, Ni	mg/kg	0.5	**3.9**	**6.2**	**6.2**	**13**
Lead, Pb	mg/kg	1	**41**	**14**	**16**	**39**
Zinc, Zn	mg/kg	2	**49**	**16**	**22**	**23**
Mercury in Soil Method: AN312 Tested: 7/12/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05

Parameter	Units	LOR	Sample Number: SE200769.009 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH5 0.0-0.2	SE200769.010 Soil 02 Dec 2019 BH5 0.5-0.6	SE200769.011 Soil 02 Dec 2019 BH6 0.0-0.2	SE200769.012 Soil 02 Dec 2019 BH6 0.5-0.6
Moisture Content Method: AN002 Tested: 6/12/2019						
% Moisture	%w/w	1	**2.4**	**5.9**	<1.0	**8.7**
Fibre Identification in soil Method: AN602 Tested: 10/12/2019						
FibreID						
Asbestos Detected	No unit	-	No	No	No	No
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01
Particle sizing of soils by sieving Method: AN005 Tested: 13/12/2019						
Passing 75µm*	%w/w	1	-	-	-	-
Retained 75µm*	%w/w	1	-	-	-	-
Particle sizing of soils <75µm by hydrometer Method: AN005 Tested: 13/12/2019						
Clay (<0.002mm)*	%w/w	0.1	-	-	-	-

Parameter	Units	LOR	Sample Number: SE200769.013 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH6 1.0-1.1	SE200769.014 Soil 02 Dec 2019 BH7 0.0-0.2	SE200769.015 Soil 02 Dec 2019 BH7 0.5-0.6	SE200769.016 Soil 02 Dec 2019 BH8 0.0-0.2
VOC's in Soil Method: AN433 Tested: 6/12/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	-	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	-	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**121**	**121**	-	**123**
d8-toluene (Surrogate)	%	-	**98**	**98**	-	**99**
Bromofluorobenzene (Surrogate)	%	-	**92**	**90**	-	**92**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	-	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	-	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 6/12/2019						
TRH C6-C10	mg/kg	25	<25	<25	-	<25
TRH C6-C9	mg/kg	20	<20	<20	-	<20
Surrogates						
d4-1,2-dichloroethane (Surrogate)	%	-	**121**	**121**	-	**123**
d8-toluene (Surrogate)	%	-	**98**	**98**	-	**99**
Bromofluorobenzene (Surrogate)	%	-	**92**	**90**	-	**92**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	-	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	-	<25

Parameter	Units	LOR	Sample Number: SE200769.013 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH6 1.0-1.1	SE200769.014 Soil 02 Dec 2019 BH7 0.0-0.2	SE200769.015 Soil 02 Dec 2019 BH7 0.5-0.6	SE200769.016 Soil 02 Dec 2019 BH8 0.0-0.2
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 6/12/2019						
TRH C10-C14	mg/kg	20	<20	<20	-	<20
TRH C15-C28	mg/kg	45	<45	<45	-	<45
TRH C29-C36	mg/kg	45	<45	<45	-	<45
TRH C37-C40	mg/kg	100	<100	<100	-	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	-	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	-	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	-	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	-	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 6/12/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	-	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	-	**0.3**
Anthracene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	-	**0.6**
Pyrene	mg/kg	0.1	<0.1	<0.1	-	**0.7**
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	**0.4**
Chrysene	mg/kg	0.1	<0.1	<0.1	-	**0.5**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	**0.4**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	**0.3**
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	-	**0.6**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	**0.3**
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	**0.4**
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	-	**0.7**
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	-	**0.8**
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	-	**0.8**
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	-	**4.5**
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	-	**4.5**
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**73**	**71**	-	**77**
2-fluorobiphenyl (Surrogate)	%	-	**80**	**81**	-	**87**
d14-p-terphenyl (Surrogate)	%	-	**81**	**82**	-	**90**
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019						
Phenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	-	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	-	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5	-	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
4-nitrophenol	mg/kg	1	<1	<1	-	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	-	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	-	<0.5
2,4-dinitrophenol	mg/kg	2	<2	<2	-	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2	-	<2

Parameter	Units	LOR	Sample Number: SE200769.013 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH6 1.0-1.1	SE200769.014 Soil 02 Dec 2019 BH7 0.0-0.2	SE200769.015 Soil 02 Dec 2019 BH7 0.5-0.6	SE200769.016 Soil 02 Dec 2019 BH8 0.0-0.2
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019 (continued)						
Surrogates						
2,4,6-Tribromophenol (Surrogate)	%	-	**78**	**83**	-	**81**
d5-phenol (Surrogate)	%	-	**73**	**89**	-	**84**
OC Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	-	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	-	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	-	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	-	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	-	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	-	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	-	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	-	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	-	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	-	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**80**	**79**	-	**77**
OP Pesticides in Soil Method: AN420 Tested: 6/12/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	-	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	-	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	-	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	-	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	-	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	-	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	-	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	-	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**80**	**81**	-	**87**
d14-p-terphenyl (Surrogate)	%	-	**81**	**82**	-	**90**

Parameter	Units	LOR	Sample Number: SE200769.013 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH6 1.0-1.1	SE200769.014 Soil 02 Dec 2019 BH7 0.0-0.2	SE200769.015 Soil 02 Dec 2019 BH7 0.5-0.6	SE200769.016 Soil 02 Dec 2019 BH8 0.0-0.2
PCBs in Soil Method: AN420 Tested: 6/12/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**80**	**79**	-	**77**
pH in soil (1:5) Method: AN101 Tested: 9/12/2019						
pH	pH Units	0.1	-	-	**6.4**	-
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 9/12/2019						
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	-	-	**78**	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 7/12/2019						
Arsenic, As	mg/kg	1	**7**	**8**	-	**4**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	-	<0.3
Chromium, Cr	mg/kg	0.5	**21**	**13**	-	**11**
Copper, Cu	mg/kg	0.5	**10**	**18**	-	**13**
Nickel, Ni	mg/kg	0.5	**9.5**	**22**	-	**5.3**
Lead, Pb	mg/kg	1	**25**	**12**	-	**17**
Zinc, Zn	mg/kg	2	**21**	**20**	-	**28**
Mercury in Soil Method: AN312 Tested: 7/12/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	-	<0.05

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE200769.013 Soil 02 Dec 2019 BH6 1.0-1.1	SE200769.014 Soil 02 Dec 2019 BH7 0.0-0.2	SE200769.015 Soil 02 Dec 2019 BH7 0.5-0.6	SE200769.016 Soil 02 Dec 2019 BH8 0.0-0.2
Moisture Content Method: AN002 Tested: 6/12/2019						
% Moisture	%w/w	1	**8.6**	**1.7**	**6.0**	**2.2**
Fibre Identification in soil Method: AN602 Tested: 10/12/2019						
FibreID						
Asbestos Detected	No unit	-	No	No	-	No
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	-	<0.01
Particle sizing of soils by sieving Method: AN005 Tested: 13/12/2019						
Passing 75µm*	%w/w	1	-	-	**84**	-
Retained 75µm*	%w/w	1	-	-	**16**	-
Particle sizing of soils <75µm by hydrometer Method: AN005 Tested: 13/12/2019						
Clay (<0.002mm)*	%w/w	0.1	-	-	**11**	-

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
VOC's in Soil Method: AN433 Tested: 6/12/2019				
Monocyclic Aromatic Hydrocarbons				
Benzene	mg/kg	0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1
Polycyclic VOCs				
Naphthalene	mg/kg	0.1	<0.1	<0.1
Surrogates				
d4-1,2-dichloroethane (Surrogate)	%	-	**116**	**128**
d8-toluene (Surrogate)	%	-	**93**	**104**
Bromofluorobenzene (Surrogate)	%	-	**87**	**96**
Totals				
Total Xylenes	mg/kg	0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 6/12/2019				
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20
Surrogates				
d4-1,2-dichloroethane (Surrogate)	%	-	**116**	**128**
d8-toluene (Surrogate)	%	-	**93**	**104**
Bromofluorobenzene (Surrogate)	%	-	**87**	**96**
VPH F Bands				
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 6/12/2019				
TRH C10-C14	mg/kg	20	<20	**26**
TRH C15-C28	mg/kg	45	<45	**70**
TRH C29-C36	mg/kg	45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210
TRH F Bands				
TRH >C10-C16	mg/kg	25	<25	**45**
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	**45**
TRH >C16-C34 (F3)	mg/kg	90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 6/12/2019				
Naphthalene	mg/kg	0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8
Surrogates				
d5-nitrobenzene (Surrogate)	%	-	**80**	**71**
2-fluorobiphenyl (Surrogate)	%	-	**87**	**86**
d14-p-terphenyl (Surrogate)	%	-	**87**	**79**
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019				
Phenol	mg/kg	0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5
4-nitrophenol	mg/kg	1	<1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
Speciated Phenols in Soil Method: AN420 Tested: 6/12/2019 (continued)				
2,4-dinitrophenol	mg/kg	2	<2	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2
Surrogates				
2,4,6-Tribromophenol (Surrogate)	%	-	**87**	**85**
d5-phenol (Surrogate)	%	-	**94**	**94**
OC Pesticides in Soil Method: AN420 Tested: 6/12/2019				
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1
Surrogates				
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**79**	**75**

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
OP Pesticides in Soil Method: AN420 Tested: 6/12/2019				
Dichlorvos	mg/kg	0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7
Surrogates				
2-fluorobiphenyl (Surrogate)	%	-	**87**	**86**
d14-p-terphenyl (Surrogate)	%	-	**87**	**79**
PCBs in Soil Method: AN420 Tested: 6/12/2019				
Arochlor 1016	mg/kg	0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1
Surrogates				
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**79**	**75**
pH in soil (1:5) Method: AN101 Tested: 9/12/2019				
pH	pH Units	0.1	-	-

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 9/12/2019				
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	-	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 7/12/2019				
Arsenic, As	mg/kg	1	**7**	**3**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	**19**	**6.4**
Copper, Cu	mg/kg	0.5	**13**	**5.8**
Nickel, Ni	mg/kg	0.5	**7.3**	**2.5**
Lead, Pb	mg/kg	1	**17**	**35**
Zinc, Zn	mg/kg	2	**22**	**40**
Mercury in Soil Method: AN312 Tested: 7/12/2019				
Mercury	mg/kg	0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 6/12/2019				
% Moisture	%w/w	1	**9.2**	**3.6**
Fibre Identification in soil Method: AN602 Tested: 12/12/2019				
FibreID				
Asbestos Detected	No unit	-	-	-
SemiQuant				
Estimated Fibres*	%w/w	0.01	-	-

Parameter	Units	LOR	Sample Number: SE200769.017 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: BH8 0.5-0.6	Sample Number: SE200769.018 Sample Matrix: Soil Sample Date: 02 Dec 2019 Sample Name: QC1
Particle sizing of soils by sieving Method: AN005 Tested: 13/12/2019				
Passing 75µm*	%w/w	1	-	-
Retained 75µm*	%w/w	1	-	-
Particle sizing of soils <75µm by hydrometer Method: AN005 Tested: 13/12/2019				
Clay (<0.002mm)*	%w/w	0.1	-	-

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Conductivity and TDS by Calculation - Soil **Method: ME-(AU)-[ENV]AN106**

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
Conductivity of Extract (1:5 dry sample basis)	LB189347	µS/cm	1	6%	102%

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB189370	mg/kg	0.05	<0.05	0%	98%	121%

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB189287	%w/w	1	8 - 15%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Alpha BHC	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Lindane	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Heptachlor	LB189282	mg/kg	0.1	<0.1	0%	80%	75%
Aldrin	LB189282	mg/kg	0.1	<0.1	0%	90%	85%
Beta BHC	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Delta BHC	LB189282	mg/kg	0.1	<0.1	0%	95%	89%
Heptachlor epoxide	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDE	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Gamma Chlordane	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Chlordane	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
trans-Nonachlor	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Dieldrin	LB189282	mg/kg	0.2	<0.2	0%	94%	88%
Endrin	LB189282	mg/kg	0.2	<0.2	0%	89%	80%
o,p'-DDD	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDT	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Beta Endosulfan	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
p,p'-DDD	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB189282	mg/kg	0.1	<0.1	0%	67%	65%
Endosulfan sulphate	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Aldehyde	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Methoxychlor	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Ketone	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Isodrin	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Mirex	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Total CLP OC Pesticides	LB189282	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB189282	%	-	73%	2 - 5%	81%	79%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dichlorvos	LB189282	mg/kg	0.5	<0.5	0%	101%	93%
Dimethoate	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
Diazinon (Dimpylate)	LB189282	mg/kg	0.5	<0.5	0%	87%	76%
Fenitrothion	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Malathion	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB189282	mg/kg	0.2	<0.2	0%	82%	86%
Parathion-ethyl (Parathion)	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Bromophos Ethyl	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Methidathion	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
Ethion	LB189282	mg/kg	0.2	<0.2	0%	69%	71%
Azinphos-methyl (Guthion)	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Total OP Pesticides*	LB189282	mg/kg	1.7	<1.7	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
2-fluorobiphenyl (Surrogate)	LB189282	%	-	91%	4 - 7%	85%	89%
d14-p-terphenyl (Surrogate)	LB189282	%	-	91%	5 - 10%	81%	84%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB189282	mg/kg	0.1	<0.1	0%	98%	99%
2-methylnaphthalene	LB189282	mg/kg	0.1	<0.1	0 - 2%	NA	NA
1-methylnaphthalene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB189282	mg/kg	0.1	<0.1	0%	103%	105%
Acenaphthene	LB189282	mg/kg	0.1	<0.1	0%	106%	103%
Fluorene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB189282	mg/kg	0.1	<0.1	0 - 17%	105%	109%
Anthracene	LB189282	mg/kg	0.1	<0.1	0%	100%	102%
Fluoranthene	LB189282	mg/kg	0.1	<0.1	0%	101%	100%
Pyrene	LB189282	mg/kg	0.1	<0.1	0%	105%	108%
Benzo(a)anthracene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Chrysene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(b&j)fluoranthene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(k)fluoranthene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(a)pyrene	LB189282	mg/kg	0.1	<0.1	0%	107%	108%
Indeno(1,2,3-cd)pyrene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Dibenzo(ah)anthracene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB189282	mg/kg	0.1	<0.1	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB189282	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB189282	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB189282	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Total PAH (18)	LB189282	mg/kg	0.8	<0.8	0%	NA	NA
Total PAH (NEPM/WHO 16)	LB189282	mg/kg	0.8	<0.8			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB189282	%	-	86%	5 - 9%	77%	78%
2-fluorobiphenyl (Surrogate)	LB189282	%	-	91%	4 - 7%	85%	89%
d14-p-terphenyl (Surrogate)	LB189282	%	-	91%	5 - 10%	81%	84%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arochlor 1016	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1221	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1232	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1242	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1248	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1254	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1260	LB189282	mg/kg	0.2	<0.2	0%	80%	80%
Arochlor 1262	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1268	LB189282	mg/kg	0.2	<0.2	0%	NA	NA
Total PCBs (Arochlors)	LB189282	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB189282	%	-	73%	2 - 5%	71%	73%

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH	LB189347	pH Units	0.1	1%	99%

Speciated Phenols in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Phenol	LB189282	mg/kg	0.5	<0.5	0%	99%	87%
2-methyl phenol (o-cresol)	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
3/4-methyl phenol (m/p-cresol)	LB189282	mg/kg	1	<1	0%	NA	NA
Total Cresol	LB189282	mg/kg	1.5	<1.5	0%	NA	NA
2-chlorophenol	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
2,4-dimethylphenol	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
2,6-dichlorophenol	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
2,4-dichlorophenol	LB189282	mg/kg	0.5	<0.5	0%	89%	80%
2,4,6-trichlorophenol	LB189282	mg/kg	0.5	<0.5	0%	84%	76%
2-nitrophenol	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
4-nitrophenol	LB189282	mg/kg	1	<1	0%	NA	NA
2,4,5-trichlorophenol	LB189282	mg/kg	0.5	<0.5	0%	NA	NA
2,3,4,6/2,3,5,6-tetrachlorophenol	LB189282	mg/kg	1	<1	0%	NA	NA
Pentachlorophenol	LB189282	mg/kg	0.5	<0.5	0%	70%	70%
2,4-dinitrophenol	LB189282	mg/kg	2	<2	0%	NA	NA
4-chloro-3-methylphenol	LB189282	mg/kg	2	<2	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
2,4,6-Tribromophenol (Surrogate)	LB189282	%	-	109%	2 - 3%	94%	92%
d5-phenol (Surrogate)	LB189282	%	-	113%	1 - 6%	97%	92%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB189361	mg/kg	1	<1	1 - 3%	102%	79%
Cadmium, Cd	LB189361	mg/kg	0.3	<0.3	0%	119%	71%
Chromium, Cr	LB189361	mg/kg	0.5	<0.5	2 - 17%	98%	80%
Copper, Cu	LB189361	mg/kg	0.5	<0.5	0 - 12%	102%	78%
Nickel, Ni	LB189361	mg/kg	0.5	<0.5	1 - 14%	100%	78%
Lead, Pb	LB189361	mg/kg	1	<1	3 - 21%	103%	50%
Zinc, Zn	LB189361	mg/kg	2	<2.0	7 - 16%	98%	73%

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB189282	mg/kg	20	<20	0 - 11%	90%	100%
TRH C15-C28	LB189282	mg/kg	45	<45	0 - 8%	78%	90%
TRH C29-C36	LB189282	mg/kg	45	<45	0%	83%	90%
TRH C37-C40	LB189282	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB189282	mg/kg	110	<110	0%	NA	NA
TRH >C10-C40 Total (F bands)	LB189282	mg/kg	210	<210	0%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16	LB189282	mg/kg	25	<25	0 - 22%	88%	98%
TRH >C10-C16 - Naphthalene (F2)	LB189282	mg/kg	25	<25	0 - 22%	NA	NA
TRH >C16-C34 (F3)	LB189282	mg/kg	90	<90	0%	75%	75%
TRH >C34-C40 (F4)	LB189282	mg/kg	120	<120	0%	110%	NA

VOC's in Soil Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB189278	mg/kg	0.1	<0.1	0%	85%	81%
Toluene	LB189278	mg/kg	0.1	<0.1	0%	86%	82%
Ethylbenzene	LB189278	mg/kg	0.1	<0.1	0%	85%	82%
m/p-xylene	LB189278	mg/kg	0.2	<0.2	0%	85%	83%
o-xylene	LB189278	mg/kg	0.1	<0.1	0%	85%	82%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB189278	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB189278	%	-	80%	9 - 45%	85%	81%
d8-toluene (Surrogate)	LB189278	%	-	81%	9 - 23%	88%	83%
Bromofluorobenzene (Surrogate)	LB189278	%	-	77%	7 - 23%	83%	79%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes	LB189278	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX	LB189278	mg/kg	0.6	<0.6	0%	NA	NA

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Soil **Method: ME-(AU)-[ENV]AN433**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB189278	mg/kg	25	<25	0%	69%	67%
TRH C6-C9	LB189278	mg/kg	20	<20	0%	70%	69%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB189278	%	-	80%	9 - 45%	85%	81%
d8-toluene (Surrogate)	LB189278	%	-	81%	9 - 23%	88%	83%
Bromofluorobenzene (Surrogate)	LB189278	%	-	77%	7 - 23%	83%	79%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB189278	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB189278	mg/kg	25	<25	0%	62%	60%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN005	The particle size distribution of a soil is determined by wet sieving, using a maximum of 900 mL of deionised water to sieve all fractions down to 75 µm. Referenced to AS1289.3.6.1 and AS1141.11.
AN005	Following wet sieving of the sample,(particles smaller than 75 µm) a dispersing solution is added and a hydrometer is used to measure sedimentation. Soil density is determined and the percentage of each size fraction calculated. Referenced to AS1289.3.6.3.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable ’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

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CHAIN OF CUSTODY & ANALYSIS REQUEST

Page 1 of 2

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email:
au.samplereceipt.sydney@sgs.com

Company Name:	Lanterra Consulting Pty Ltd	Project Name/No:	P19099 – Wattle Street Lyneham
Address:	Unit 4, 19 Trenerry Street	Purchase Order No:	
	Weston, ACT, 2611	Results Required By:	**Standard TAT**
		Telephone:	0432 324 348
Contact Name:	Chris Gunton	Facsimile:	
		Email Results:	Chris.gunton@lanterra.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	Asbestos	CL15 – TRH, BTEX, PAH, OCP, OPP, PCB, Phenol, Metals	pH, CEC, %clay										
BH1 0.0-0.2	2/12/19	1		X		1	X	X											**No Ziploc bag for this sample, please test asbestos from jar.**
BH1 0.5-0.6	2/12/19	2		X		1		X											
BH2 0.0-0.2	2/12/19	3		X		1	X	X	X										
BH2 0.5-0.6	2/12/19	4		X		1		X											
BH3 0.0-0.2	2/12/19	5		X		1	X	X											
BH3 0.5-0.6	2/12/19	6		X		1		X											SE 200769
BH4 0.0-0.2	2/12/19	7		X		1	X	X											
BH4 0.5-0.6	2/12/19	8		X		1		X											
BH5 0.0-0.2	2/12/19	9		X		1	X	X											
BH5 0.5-0.6	2/12/19	10		X		1	X	X											

Relinquished By: S Ellis	Date/Time: 2/12/19	Received By:	Date/Time 05/12/19 @ 11am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: Yes/ No	Temperature: Ambient / Chilled	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No: Lante MPP140
	Comments:		

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email:
au.samplereceipt.sydney@sgs.com

Company Name:	Lanterra Consulting Pty Ltd	Project Name/No:	P19099 – Wattle Street Lyneham
Address:	Unit 4, 19 Trenerry Street	Purchase Order No:	
	Weston, ACT, 2611	Results Required By:	**Standard TAT**
		Telephone:	0432 324 348
Contact Name:	Chris Gunton	Facsimile:	
		Email Results:	Chris.gunton@lanterra.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	Asbestos	CL15 – TRH, BTEX, PAH, OCP, OPP, PCB, Phenol, Metals	pH, CEC, %clay	TRH, BTEX, PAH, Metals												
BH6 0.0-0.2	2/12/19	11		X		1	X	X														
BH6 0.5-0.6	2/12/19	12		X		1	X	X														
BH6 1.0-1.1	2/12/19	13		X		1	X	X														
BH7 0.0-0.2	2/12/19	14		X		1	X	X														
BH7 0.5-0.6	2/12/19	15		X		1			X													
BH8 0.0-0.2	2/12/19	16		X		1	X	X														
BH8 0.5-0.6	2/12/19	17		X		1		X														
QC1	2/12/19	18		X		1		X														
QC2	2/12/19			X		1				X												Please forward to Envirolab

Relinquished By: SLoos	Date/Time: 2/12/19	Received By: B. Gunton	Date/Time 05/12/19 @ 11am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes) No	Temperature: (Ambient) / Chilled	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No: Lante MPP140
	Comments:		

SAMPLE RECEIPT ADVICE

SE200769

CLIENT DETAILS

Contact	Chris Gunton
Client	LANTERRA CONSULTING PTY LTD
Address	PO BOX 3626 WESTON ACT 2611
Telephone	(Not specified)
Facsimile	(Not specified)
Email	Chris.Gunton@lanterra.com.au
Project	**P19099 Wattle Street Lyneham**
Order Number	(Not specified)
Samples	18

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 5/12/2019
Report Due	Thu 12/12/2019
SGS Reference	**SE200769**

SUBMISSION DETAILS

This is to confirm that 18 samples were received on Thursday 5/12/2019. Results are expected to be ready by COB Thursday 12/12/2019.
Please quote SGS reference SE200769 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	18 Soil
Date documentation received	5/12/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	13.6°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

%clay subcontracted to SGS Cairns, 2/58 Comport St, Portsmith QLD 4870, NATA Accreditation Number: 2562, Site Number: 3146.

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SAMPLE RECEIPT ADVICE

SE200769

CLIENT DETAILS

Client LANTERRA CONSULTING PTY LTD

Project P19099 Wattle Street Lyneham

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Speciated Phenols in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH1 0.0-0.2	29	14	26	11	18	10	11	7
002	BH1 0.5-0.6	29	14	26	11	18	10	11	7
003	BH2 0.0-0.2	29	14	26	11	18	10	11	7
004	BH2 0.5-0.6	29	14	26	11	18	10	11	7
005	BH3 0.0-0.2	29	14	26	11	18	10	11	7
006	BH3 0.5-0.6	29	14	26	11	18	10	11	7
007	BH4 0.0-0.2	29	14	26	11	18	10	11	7
008	BH4 0.5-0.6	29	14	26	11	18	10	11	7
009	BH5 0.0-0.2	29	14	26	11	18	10	11	7
010	BH5 0.5-0.6	29	14	26	11	18	10	11	7
011	BH6 0.0-0.2	29	14	26	11	18	10	11	7
012	BH6 0.5-0.6	29	14	26	11	18	10	11	7
013	BH6 1.0-1.1	29	14	26	11	18	10	11	7
014	BH7 0.0-0.2	29	14	26	11	18	10	11	7
016	BH8 0.0-0.2	29	14	26	11	18	10	11	7
017	BH8 0.5-0.6	29	14	26	11	18	10	11	7
018	QC1	29	14	26	11	18	10	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE200769

CLIENT DETAILS

Client LANTERRA CONSULTING PTY LTD

Project P19099 Wattle Street Lyneham

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity and TDS by Calculation - Soil	Fibre Identification in soil	Mercury in Soil	Moisture Content	Particle sizing of soils by sieving	pH in soil (1:5)	Total Recoverable Elements in Soil/Waste
001	BH1 0.0-0.2	-	2	1	1	-	-	7
002	BH1 0.5-0.6	-	-	1	1	-	-	7
003	BH2 0.0-0.2	1	2	1	1	2	1	7
004	BH2 0.5-0.6	-	-	1	1	-	-	7
005	BH3 0.0-0.2	-	2	1	1	-	-	7
006	BH3 0.5-0.6	-	-	1	1	-	-	7
007	BH4 0.0-0.2	-	2	1	1	-	-	7
008	BH4 0.5-0.6	-	-	1	1	-	-	7
009	BH5 0.0-0.2	-	2	1	1	-	-	7
010	BH5 0.5-0.6	-	2	1	1	-	-	7
011	BH6 0.0-0.2	-	2	1	1	-	-	7
012	BH6 0.5-0.6	-	2	1	1	-	-	7
013	BH6 1.0-1.1	-	2	1	1	-	-	7
014	BH7 0.0-0.2	-	2	1	1	-	-	7
015	BH7 0.5-0.6	1	-	-	1	2	1	-
016	BH8 0.0-0.2	-	2	1	1	-	-	7
017	BH8 0.5-0.6	-	-	1	1	-	-	7
018	QC1	-	-	1	1	-	-	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE200769

CLIENT DETAILS

Client LANTERRA CONSULTING PTY LTD

Project P19099 Wattle Street Lyneham

SUMMARY OF ANALYSIS

No.	Sample ID	Particle sizing of soils <75µm by hydrometer
003	BH2 0.0-0.2	1
015	BH7 0.5-0.6	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

PID Calibration Certificate

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-114173

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		92ppm Isobutylene		SY245		90.4ppm

Calibrated by: Sarah Lian

Calibration date: 21/11/2019

Next calibration due: 19/05/2020

Appendix G

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BOREHOLE LOG BH1

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 1.0
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693569.4 mE 6096559.5 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH1 0.0-0.2	Y	Soil	0.2		GC	D	Gravelly SAND: pale yellow to brown-grey, loose		567.8
						SM	D	SILT: orange brown, soft		
0.0	BH1 0.5-0.6	Y	Soil	0.4						567.6
				0.6						567.4
				0.8						567.2
				1				EOH @ 1.0m - Target Depth		567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 18 Dec 2019

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BOREHOLE LOG BH2

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 0.6
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693557.5 mE 6096554.7 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
12.7	TP2 0.0-0.2	Y	Soil	0.2		GC	D	Gravelly SAND: Yellow brown - yellow grey, loose		567.8
				0.4		SM	D M	Sandy SILT: Orange brown, soft		567.6
0.0	TP2 0.5-0.6	Y	Soil	0.6						567.4
								EOH at 0.6 m - Refusal of Auger		
				0.8						567.2
				1						567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

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BOREHOLE LOG BH3

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 0.6
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693570.6 mE 6096572.7 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH3 0.0-0.2	Y	Soil	0.2		SM	D	Sandy SILT: brown, loose, soft	Topsoil	567.8
				0.4		SM	D	SILT: orange brown, soft		567.6
0.0	BH3 0.5-0.6	Y	Soil	0.6						567.4
								EOH at 0.6 m - Target Depth		
				0.8						567.2
				1						567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 18 Dec 2019

lanterra consulting

BOREHOLE LOG BH4

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 0.6
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693600.0 mE 6096530.7 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH4 0.0-0.2	Y	Soil	0.2		SM	D	Gravelly silty SAND: grey brown, loose, soft		567.8
				0.4		SM	D	SILT: orange brown, soft		567.6
0.0	BH4 0.5-0.6	Y	Soil	0.6						567.4
								EOH at 0.6 m - Target Depth		
				0.8						567.2
				1						567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 18 Dec 2019

lanterra consulting

BOREHOLE LOG BH5

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 1.0
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693581.3 mE 6096552.4 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH5 0.0-0.2	Y	Soil	0.2		SM	D	Gravelly silty SAND: grey brown, loose, soft		567.8
				0.4		SM	D	Sandy SILT: grey brown, loose, trace gravel		567.6
0.0	BH5 0.5-0.6	Y	Soil	0.6						567.4
				0.8		SM	D	SILT: Orange brown, soft		567.2
				1						567
								EOH at 1.0 m - Target Depth		
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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BOREHOLE LOG BH6

PROJECT NUMBER P19099	**DRILLING DATE** 2/12/2019	**COORDINATES** 693581.3 mE 6096552.4 mN
PROJECT NAME DSI Wattle Street Lyneham	**TOTAL DEPTH** 1.5	**COORD SYS** MGA / GDA 95
CLIENT Cardno (ACT/NSW) Pty Ltd	**SAMPLE METHOD** Auger	**SURFACE ELEVATION** 568 m AHD
ADDRESS Block 14 Section 41, Lyneham	**DIAMETER** 300 mm	
	CONTRACTOR Ground Control ACT Pty Ltd	

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH6 0.0-0.2	Y	Soil	0.2		SM	D	Silty gravelly SAND: grey, yellow brown, loose		567.8
				0.4		SM	D	SILT: Orange brown, soft, trace clay		567.6
0.0	BH6 0.5-0.6	Y	Soil	0.6						567.4
				0.8						567.2
0.0	BH6 1.0-1.1	Y	Soil	1						567
				1.2						566.8
				1.4						566.6
				1.6				EOH at 1.5 m - Target Depth		566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

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BOREHOLE LOG BH7

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 0.6
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693587.1 mE 6096519.2 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH7 0.0-0.2	Y	Soil	0.2		SM	D	Silty sandy GRAVEL: grey, loose, soft		567.8
				0.4		SM	D	SILT: orange brown, soft		567.6
0.0	BH7 0.5-0.6	Y	Soil	0.6						567.4
								EOH at 0.6 m - Target Depth		
				0.8						567.2
				1						567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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lanterra consulting

BOREHOLE LOG BH8

PROJECT NUMBER P19099
PROJECT NAME DSI Wattle Street Lyneham
CLIENT Cardno (ACT/NSW) Pty Ltd
ADDRESS Block 14 Section 41, Lyneham

DRILLING DATE 2/12/2019
TOTAL DEPTH 0.6
SAMPLE METHOD Auger
DIAMETER 300 mm
CONTRACTOR Ground Control ACT Pty Ltd

COORDINATES 693570.6 mE 6096572.7 mN
COORD SYS MGA / GDA 95
SURFACE ELEVATION 568 m AHD

COMMENTS

LOGGED BY SM
CHECKED BY CG

PID (ppm)	Sample Number	Analysed	Sample Type	Depth (m)	Graphic Log	USCS	Moisture	Material Description Surface: Gravel	Additional Observations	Elevation (m)
0.0	BH8 0.0-0.2	Y	Soil	0.2		SM	D	Gravelly silty SAND: orange grey to brown, loose, soft		567.8
				0.4		SM	D	Sandy SILT: orange brown, loose		567.6
0.0	BH8 0.5-0.6	Y	Soil	0.6				EOH at 0.6 m - Target Depth		567.4
				0.8						567.2
				1						567
				1.2						566.8
				1.4						566.6
				1.6						566.4
				1.8						566.2
				2						566
				2.2						565.8
				2.4						565.6
				2.6						565.4
				2.8						565.2

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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APPENDIX

F

STAMPED PRESCRIBED CONDITIONS

PRESCRIBED CONDITIONS FOR ASSOCIATED WORKS

LYNEHAM BLOCK 29 (previously 14) SECTION 41

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EPSDD

1. This lease is conditional upon the lessee designing and constructing at the lessee's cost, works associated with the lease that are to become assets of either the Transport Canberra & City Services (TCCS), Icon Water Limited, or Evoenergy. Icon Water in all matters associated with the operation of the Water and Sewerage networks. Construction materials are to be treated in accordance with the 'Development Control Code for Best Practice Waste Management in the ACT'. All works to be handed over to TCCS including roads, stormwater and landscape works shall be designed in accordance with the current version of the 'Municipal Infrastructure Design Standards' and constructed to the current version of 'Municipal Infrastructure Technical Specifications'.

2. The associated works required are design and construction of:

    a) relocation of approximately 144m DN450 trunk sewer main around the north and east block boundary which includes excavation and reinstatement for 4m deep sewer line including removal and disposal of existing sewer line ;

    b) a new 80mm hydrant

    c) any other works required by TCCS as a result of an audit on submitted plans for design approval; and

    including all ancillary works and fittings required to complete the associated works.

3. Prior to redevelopment of the site a site specific unexpected finds protocol (UFP) must be prepared by a suitably qualified environmental consultant and implemented during site development works. The UFP must include, amongst other things, appropriate procedures for the identification, assessment, management, validation and disposal of potential contamination at the site and contractor induction procedures into the use of the UFP.

    Note: Where remediation and validation is required at the site under the UFP the site validation report must be forwarded to the EPA for review and endorsement prior to occupancy of the site.

    All soil subject to disposal from the site must be assessed in accordance with EPA Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT.

    No soil is to be disposed from site without EPA approval.

4. The lessee shall engage a Chartered Engineer and/or Landscape Architect to design and supervise construction of relevant associated works. For the purposes of this lease, 'Chartered Engineer' and 'Landscape Architect' means persons prequalified with ACT Government for value of works appropriate for this project.

5. Wattle Street, Goodwin Street, concrete chanel and the surrounding soft landscaped and paved areas are public assets under the control of TCCS and will be required to

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remain open to pedestrian and vehicular traffic throughout the construction period. No construction works or movement of construction traffic will be permitted to be carried out within the public domain without a TCCS approved 'Landscape Management and Protection Plan' prepared in accordance with 'Reference Document 04'.The 'Landscape Management and Protection Plan' will address all issues related to TCCS including provisions for public safety, construction access, protection and reinstatement of existing infrastructure and soft landscape assets including grass, shrubs and trees.

6. The lessee shall ensure that all site related vehicles, including staff and delivery vehicles and those involved in associated off-site works, are accommodated on the block or in an area approved by the Territory. Any building activities that may require the short term utilisation of unleased Territory land adjacent to the development site are to be approved by Licensing and Compliance Section of the City Services in Land Management and Planning Division (TCCS). An 'Application to Use a Public Place for construction activities' must be accompanied by the approved 'Landscape Management and Protection Plan' when it is submitted.

7. A detailed 'Parking Plan' illustrating how all construction/demolition vehicles and equipment and construction workers' vehicles will be accommodated within the site. This plan is to be submitted to and approved by the Director, Place Co-ordination, TCCS prior to the commencement of any works on site. Failure to obtain an 'Approved Parking Plan' or failure to adhere to an 'Approved Parking Plan' by the developer or his agents/employees will see a formal stop work order being issued by Utilities, Land & Lease Regulation Section of Construction Services Branch within Access Canberra.

8. The design submission shall be provided with a design report and design certification, together with associated supporting documentation verifying and validating the design submission to 'AS/NZS ISO 9001: 2016', the TCCS 'Ref 06A – Requirements for Design Review Submission – Infill Developments' and quality system requirements for roadworks, concrete footpaths, paving, Traffic Control Devices, stormwater drainage and public landscaping works shall be submitted to, and a 'Letter of Design Review' obtained from, Director, Place Co-ordination, TCCS prior to the commencement of construction works. The designer must include proposed demolition of existing public assets including removal of trees. No trees are to be removed from the verge of any block prior to the issue of the 'Letter of Design Review'. The submission should comply with the requirements of the current version of the 'Municipal Infrastructure Design Standards' and the 'Standard Specification for Urban Infrastructure Works', good design practice and planning intent. It is the responsibility of the lessee to provide a Dilapidation Report and advise the Director, Place Co-ordination, TCCS of any pre-existing damage to paved and unpaved verges, roads and road verge areas.

9. Landscape design drawings are to fully show all proposed landscape works, including planting species and details, and is to include grassing specification and all typical detail sections for both soft and hard treatments. The consultant is to ensure that all clearances from existing street and open space trees to structures are in accordance with the standards for clearances indicated on the 'Landscape Management and Protection Plan'.

10. The lessee remains responsible for the reinstatement of any damage caused by the lessee to existing infrastructure outside the block boundary. All reinstatement works shall comply with the requirements of the current version of 'Design Standards for Urban Infrastructure' and the 'Municipal Infrastructure Technical Specifications', good design practice and planning intent and shall be certified by a prequalified Chartered Engineer.

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11. Any works constructed on the verge including public utility services are not to unduly impact on tree feeder root systems. All verges are to be protected in accordance with the approved 'Landscape Management and Protection Plan'. Minimum clearances to trees from excavation for these works will be in accordance with plans approved by the Director, Place Co-ordination, TCCS during the processing of the relevant Development Application.

12. Any design and documentation for water supply and sewerage works shall be submitted to and approved by Icon Water prior to the commencement of construction of the associated works. The design and documentation shall be in accordance with 'Icon Waters' Water Supply and Sewerage Standards, Release 2, Amendment 5, August 2019, the TCCS 'Municipal Infrastructure Technical Specifications' and any revision of these documents. The developer is not to commence work on water supply and sewer mains until the design has been approved by Icon Water. The developer is to provide Work As Executed drawings as required by Icon Water.

13. The relocation or removal of existing Evoenergy electrical infrastructure (not including TCCS street-light assets) will be carried out by Evoenergy at the lessee's expense. The lessee will be responsible to liaise with Evoenergy in relation to the installation / extension of the electricity networks to electrically service the proposed development and may be required to fund the associated costs for these works. It may be necessary for Evoenergy to install a substation on the site to provide electricity supply. The requirement to include a substation on site will be determined by Evoenergy when the proponent submits the electrical load details of the development to Evoenergy.

14. The lessee may be required to install additional or non-standard earthing (if a substation is found to be within 100 meters of any special location or other safety risk e.g. child-care centre, children's play equipment, public pool, lake, for the safety of all facility users, particularly children)

15. The lessee is reminded that Evoenergy may have other existing electricity assets on the site and a Location Advice should be obtained from Dial Before You Dig (telephone 1100) prior to commencement of any construction activities.

16. The lessee shall lodge a 'Deed of Unconditional Undertaking', using the prescribed proforma, in the amount of $530,200 (five hundred and thirty thousand two hundred dollars) including GST prior to the execution of the lease. The undertaking may be reduced (if requested) to $36,000 (thirty six thousand dollars) including GST on Practical Completion of all the works if supported by TCCS and Icon Water. The remainder of the undertaking will be released on Final Completion of every part of the associated works.

17. The lessee will be responsible for practical completion of works within 48 months of the commencement of the lease and prior to the occupation of the premises.

18. If the associated works are not completed within the time specified for Practical Completion in Clause 17 above, or defects not rectified within the time specified for Final Completion, then the Environment, Planning and Sustainable Development Directorate (EPSDD) may exercise its right in accordance with the 'Deed of Unconditional Undertaking' to the extent to which money derived from the 'Deed of Unconditional Undertaking' is deemed to be necessary for the completion and rectification of the associated works. Such money shall be forfeited to (EPSDD).

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19. The lessee shall prior to and during the construction of the associated works seek and arrange for the inspection and approval of the works by TCCS and Icon Water representatives, in accordance with those authorities' procedures. The lessee shall have a competent representative present on the site at all periods during which there are any activities relating to the execution of the associated works.

20. Practical Completion of the associated works shall be deemed to have occurred when the lessee lodges with the Director, Urban Renewal (EPSDD), the 'Certificates of Operational Acceptance' issued by TCCS and the 'Provisional Certificate of Operation' issued by Icon Water.

21. Final Completion of the associated works shall be deemed to have occurred when the lessee lodges with the Director, Urban Renewal (EPSDD), the 'Certificates of Final Acceptance' issued by TCCS and the 'Certificate of Operation' issued by Icon Water. The 'Certificate of Final Acceptance' will be issued by the respective agencies on satisfactory completion of defects at the end of the Defects Liability Period (DLP). The DLP for all assets to be handed over to TCCS except soft landscape works (trees, shrubs, grass) shall be 52 weeks commencing from the issue of the 'Certificate of Operational Acceptance'. The soft landscape works shall be subjected to a minimum of 13 weeks Consolidation Period before applying for the issue of the 'Certificate of Final Acceptance' for these works. Twelve (12) months DLP applies to Icon Water Limited works.

22. Work-as-Executed Quality Records for the roadworks, stormwater, driveways, street lights and landscape works are to be in accordance with TCCS 'Standard Requirements for Documentation – Reference Documents 7, 8 and 11' and lodged with the Director, Place Co-ordination, TCCS with the application for a 'Certificate of Operational Acceptance'.

23. Work-as-Executed Quality Records for the sewers and water supply mains are to be in accordance with Icon Water requirements. Work as Executed drawings and records asset data lists are to be submitted to Icon Water with the application for the 'Provisional Certificate of Operation'.

24. The lessee shall take out and keep current insurance policies in respect of all the normal risks involved in its construction of the associated work. These include, but are not limited to, public liability insurance, workers compensation insurance and professional indemnity insurance.

25. The insurance policies shall be taken out in the name of the lessee or its primary contractor and the interests of the Commonwealth, Icon Water and the Territory noted on the policies.

26. The site investigation report together with the results of the contamination land search and any further advice by EPA must be taken into consideration in the works specified through these prescribed conditions for associated works on unleased Territory Land.

27. Correspondence to EPSDD should be addressed to:
    Executive Branch Manager
    Urban Renewal
    Environment, Planning & Sustainable Development Directorate
    GPO Box 158 Canberra ACT 2601
    Tel: 6207 1923
    Fax: 6207 1925

28. Correspondence to Evoenergy regarding electricity should be addressed to:

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EPSDD

Kedar Vedanti
Technical Team Leader
Evoenergy Distribution
Postal Address: GPO Box 366 Canberra ACT 2601
Location Address: Cnr Oakden & Anketell Streets Greenway ACT 2900
Tel: 6293 5880
Fax: 6293 5851

29. Correspondence to Icon Water Limited regarding Water and Sewerage should be addressed to:
Team Leader, Developer Services
Icon Water
GPO Box 366 CANBERRA CITY ACT 2601
Tel: 6180 6013

30. Correspondence to TCCS should be addressed to:
Mr Gabriel Joseph
Director, Place Coordination
Transport Canberra & City Services,
GPO Box 158 Canberra ACT 2601
Tel: 6207 6581
Fax: 6207 7484

31. Correspondence to EPA should be addressed to:
EPAPlanningLiaison@act.gov.au
Office of the Environment Protection Authority (EPA)
Access Canberra | Chief Minister Treasury and Economic Development Directorate| ACT
Phone: 02 207 5642 |Email: EPAPlanningLiaison@act.gov.au
470 Northbourne Avenue, Dickson | GPO Box 158 Canberra ACT 2601
www.act.gov.au/accessCBR

APPENDIX

G

ICON WATER – IN PRINCIPLE SUPPORT

Cardno (NSW/ACT) Pty Ltd | ABN 95 001 145 035
Level 2, 14 Wormald Street
Symonston ACT 2609
Tel: 02 6112 4500 Fax: 02 6112 4599
Web: www.cardno.com.au

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ACT Government
Environment, Planning and Sustainable Development

ACT GOVERNMENT - EPSDD

SEWER DESIGN WORK
BLOCK 14, SECTION 41, LYNEHAM, ACT

COVER SHEET, DRAWING LIST AND LOCALITY PLAN
December 2020



LOCALITY PLAN
NTS

SCHEDULE OF DRAWINGS	
DRAWING No.	DESCRIPTION
50521009-100	COVER SHEET, DRAWING LIST AND LOCALITY PLAN
50521009-105	GENERAL NOTES AND LEGEND
50521009-110	GENERAL ARRANGEMENT PLAN
50521009-115	DEMOLITION PLAN
50521009-116	SEWER PLAN
50521009-117	LONG SECTION

PROGRESS STAMP (IN PRINCIPLE)

icon WATER

- This design has been reviewed against Icon Water's *Water Supply and Sewerage Standards*.
- Icon Water confirms this design can proceed to the Development Application / Building Application process. A separate application to Icon Water is required to obtain a Statement of Compliance (Building Approval)
- This stamp is not approval of the design - a separate application for Design Acceptance is required once the DA/BA process is complete. This will require an Estate Services Plan (new developments) or an External Services Plan (existing developments).
- This design must be resubmitted to Icon Water if there are any changes to relevant information, including site conditions.
- The proposed development may require payment of a charge under the *Water and Sewerage Capital Contributions Code*.

Craig Allen	23/12/2020	F2019-010479
Hydraulic Asset Acceptance Officer	Date	File #

DATE PLOTTED: 21 December 2020 9:40 AM BY : MARIO QUITORIANO
CAD File: N:\Projects\505\FY21\009_Lyneham B14 S41 Sewer Design Work\Drawings\50521009-100-CS.dwg

50521009-100
Drawing Number

2
Revision

DATE PLOTTED: 21 December 2020 9:47 AM BY : MARIO QUITORIANO

GENERAL NOTES - SEWER

1. DESIGN LEVELS SHOWN ARE AHD.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR URBAN INFRASTRUCTURE.
3. ALL WORK ASSOCIATED WITH SEWERAGE SHALL BE IN ACCORDANCE WITH ICON WATER WATER SUPPLY AND SEWERAGE STANDARDS, REVISION -CURRENT, AMENDMENT 1, ISSUE DATE - 30 AUGUST 2019.
4. EXISTING SERVICES HAVE BEEN PLOTTED FROM DBYD AND "WORK-AS-EXECUTED" DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE EXACT LOCATION AND LEVELS OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK AND OBTAIN CLEARANCES FROM RELEVANT SERVICE AUTHORITIES.
5. ALL CONSTRUCTION WORK SHALL BE CO-ORDINATED WITH ADJACENT CONTRACTS.
6. ALL SERVICE PIT COVERS LOCATED IN FOOTPATHS OR HARD LANDSCAPED VERGES SHALL BE CLASS C GATIC COVERS UNO AND BE INFILLED WITH THE SAME MATERIAL AS SURROUNDING MATERIAL.
7. MOUNDING AT COVER LEVEL OF PROPOSED MAINTENANCE HOLES TO BE MAX. 1:10 GRADE FOR A MIN. OF 3m WIDE ON UPHILL SIDE OR TO ADJACENT PIPE MOUNDING. MAINTAIN 3m RADIUS PLATFORM AROUND MAINTENANCE HOLE.
8. SURFACES WHICH LIE OUTSIDE THE GENERAL LIMITS OF LANDSCAPING AND RESTORATION WHICH ARE DISTURBED DURING THE CONSTRUCTION OF THE WORKS SHALL BE RESTORED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE, TO AT LEAST THEIR PRE-CONSTRUCTON CONDITION. THESE SURFACES INCLUDE BUT ARE NOT NECESSARILY LIMITED TO, PAVEMENTS, PAVING, GRASSING ETC.
9. INSTANT STRIP PACKER HEAD AND VIBRATED VERTICALLY CAST CONCRETE PIPES AND SIMILARLY MANUFACTURED CONCRETE PIPES SHALL NOT BE USED.
10. ALL BACKFILLING UNDER ROAD, CARPARK PAVEMENTS AND PAVING SHALL BE IN ACCORDANCE WITH ICON WATER STANDARD SPECIFICATION AND STD DRG No SD-2101-C.
11. SEWER PIPE MATERIAL SHALL BE OF THE FOLLOWING GRADES:
    a) uPVC SOLID WALL SN8 GRADE IN ACCORDANCE WITH AS/NZS1260. Ø100 PIPES TO BE SN10 SOLVENT WELDED, Ø150 PIPES TO BE RUBBER RING JOINTED OR SOLVENT WELDED. PIPES GREATER THAN Ø150 TO BE RUBBER RING JOINTED. ALL uPVC PIPES SHALL BE SOLVENT WELDED ON CURVED ALIGNMENTS
    b) SEWER DICL PIPE SHALL BE TYPE "SR" SULPHATE RESISTING CEMENT WITH A TRI-CALCIUM ALUMINATE CONTENT NOT GREATER THAN 5%, OR TYPE "LH" LOW HEAT CEMENT.A SACRIFICIAL CEMENT THICKNESS OF 10mm CONCRETE IS REQUIRED ON THE INSIDE OF THE PIPE.
    c) POLYPROPYLENE NON-PRESSURE PIPE SN8 OR GREATER TO CURRENT AS5065.
12. SCOUR AND TRENCH STOPS FOR SEWER PIPES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ICON WATER STD DRG No SD-2104-D.
13. FOR SEWER BENCHING DETAILS REFER ICON WATER STD DRG No SD-2208-D.
14. ALL SEWER MAINTENANCE HOLES TO HAVE CLASS 'C' COVERS, UNO.
15. ALL SEWER TIES TO BE uPVC SN10 AND BROUGHT TO THE SURFACE WITH A STANDARD ICON WATER RISER AND CAPPED AS DETAILED ON ICON WATER STD DRG. No. SD-2005-D.
16. ALL SEWER STUBS ARE TO BE END CAPPED IN ACCORDANCE WITH ICON WATER STD DRG No. SD-2005-D.
17. CONNECTIONS TO EXISTING LIVE SEWER TO BE UNDERTAKEN BY ICON WATER. CONTRACTOR TO PROVIDE MATERIALS FOR CONNECTIONS Ø300 AND GREATER, CARRY OUT ALL NECESSARY EXCAVATION AND PAY ALL FEES.
18. DICL PIPE AND FITTINGS Ø225 AND LARGER SHALL BE SLEEVED IN POLYETHYLENE AND COMPLY WITH AS3680-2008 AND AS3681-2008
19. ALL mPVC PIPE FITTINGS SHALL COMPLY WITH ICON WATER DESIGN GUIDELINES.
20. SEWER HOUSE CONNECTION BRANCHES SHALL BE 100mm DIAMETER UNLESS SHOWN OTHERWISE.
21. TERMINATION OF TIES SHALL BE FOR:-
    SEWER: IN ACCORDANCE WITH ICON WATER STD DRG No SD-2005-D, SD-2006-D EXCEPT THAT WHERE THE TIE IS
    NOT AT THE LOWEST POINT ON THE BLOCK, THE MINIMUM GRADE SHALL BE 2%, COVER AT
    THE BOUNDARY OF AT LEAST 600mm.
22. COVER LEVELS SHOWN ARE FOR GUIDANCE ONLY AND SHALL BE CONFIRMED ON SITE.
23. THE CONTRACTOR SHALL ALLOW TO CONSTRUCT THE STRUCTURE COVERS ON A PLANE TO SUIT THE FINAL SURFACE PLANE. STRUCTURES TO BE CAST IN-SITU.
24. SEWER EASEMENTS FOR SINGLE SERVICE TO BE 2.5m WIDE.
25. ALL WORKS ON THE EXISTING SEWER NETWORK SHALL BE UNDERTAKEN BY ICON WATER AT THE CONTRACTOR'S EXPENSE.

SEWER STRUCTURE NOTATION

MH	DENOTES MAINTENANCE HOLE. REFER TO ICON WATER STD DRG No. SD-2201-D AND SD-2203-D
HDMH	DENOTES MAINTENANCE HOLE WITH HEAVY DUTY CLASS 'D' COVER
BHDMH	DENOTES MAINTENANCE HOLE WITH HEAVY DUTY CLASS 'D' BOLT DOWN COVER
OSMH	OFFSET MAINTENANCE HOLE
BVR	DENOTES BURIED VERTICAL RISER
DE	DENOTES DEAD END CAPPED FOR FUTURE CONNECTION
VD	DENOTES EXTERNAL DROP REFER TO ICON WATER STD DRG No SD-2202-D
03 / S01	SEWER STRUCTURE '3' SEWER LINE '01'
	ALL STRUCTURE COVERS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH AS3996 : 2006

REINSTATEMENT OF TRENCHES

1. ALL TRENCHES SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATION. SURFACE FINISHES SHALL BE REINSTATED TO MATCH WITH EXISTING ABUTTING SURFACES WITHOUT STEPPING AND LIPPING.

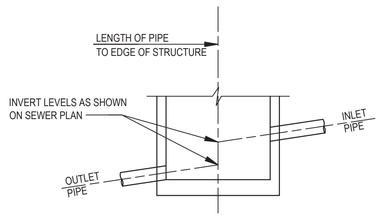
VERGE MANAGEMENT

1. THERE SHALL BE NO PARKING, SITE SHEDS, SITE AMENITIES, BILLBOARDS OR STORAGE OF MATERIALS ON THE VERGE OR FLOODWAY OPEN SPACE UNDER ANY CIRCUMSTANCES. PROTECT ALL GRASSLAND, TREES AND SHRUBS OUTSIDE THE WORKS AREA FROM DAMAGE.
2. ANY WORKS THAT ALTER OR DISTURB GRASSED FLOODWAYS, VERGE AREAS, MEDIANS OR OTHER OPEN AREAS MUST BE REINSTATED TO EXISTING CONDITION BY THE PERSON(S) RESPONSIBLE FOR THE DISTURBANCE IN ACCORDANCE WITH THE CANBERRA LANDSCAPE GUIDELINES.
3. FENCING TO PROTECT EXISTING VERGE (REFER LEGEND)
   - FENCING TO BE ERECTED ON COMMENCEMENT OF SITE WORK AND REMOVED AT COMPLETION OF COMMENCEMENT OF VERGE RESTORATION.
   - THE FENCE IS TO REMAIN CONTINUOUS THROUGHOUT THE PROJECT, EXCEPT WHERE SERVICE TRENCHING OCCURS.
   - REALIGN FENCE TO PROVIDE LANE FOR SERVICE TRENCHING BUT RE-ERECT FENCE TO ENCLOSE TREES BEFORE TRENCHING COMMENCES AND ON COMPLETION OF TRENCHING RETURN TO ORIGINAL FENCE ALIGNMENT.
   - NO ACTIVITY SHALL BE CARRIED OUT WITHIN 2m OF A TREE.
4. VERGE RESTORATION IS TO BE OVERSEEN BY A LANDSCAPE ARCHITECT.
5. PARKS CONSERVATION AND LANDS (PCL) Ph 62077386 OR 62076026 TO BE CONTACTED PRIOR TO THE COMMENCEMENT OF SITE WORKS TO OBTAIN CERTIFICATE OF COMPLIANCE FOR THE VERGE MANAGEMENT PLAN ON COMMENCEMENT AND COMPLETION OF VERGE RESTORATION
6. ANY WORKS THAT ALTER OR DISTURB GRASSED VERGE AREAS, MEDIANS OR OTHER OPEN AREAS MUST BE REINSTATED TO EXISTING CONDITION BY THE PERSON(S) RESPONSIBLE FOR THE DISTURBANCE IN ACCORDANCE WITH THE CANBERRA LANDSCAPE GUIDELINES AND TO THE SATISFACTION OF (PCL). IF THE DRYLAND GRASS MIXTURE USED CONTAINS TALL FESCUE, IT IS TO BE DWARF TYPE TALL FESCUE. THE RECOMMENDED DRYLAND GRASS MIXTURES ARE SPECIFIED IN THE CITY PARKS (PCL) TURF MANAGEMENT MANUAL.
7. THE FENCE IS TO REMAIN CONTINUOUS THROUGHOUT THE PROJECT, EXCEPT WHERE SERVICE TRENCHING OCCURS. THE FENCE IS TO RE-ALIGNED TO PROVIDE A LANE FOR SERVICE TRENCHING THEN RE-ALIGNED TO ENCLOSE TREES BEFORE TRENCHING COMMENCES AND ON COMPLETION OF TRENCHING, RETURN TO ORIGINAL FENCE ALIGNMENT.
8. EXISTING TREES:
   - ALL TREES ARE TO BE RETAINED AND KEPT UNDAMAGED UNLESS SHOWN OTHERWISE
   - EXISTING CROWN CLEARANCE NOT TO BE ALTERED
   - ENSURE CONSTRUCTION EQUIPMENT CAN PASS BENEATH LOWEST LIMB, THROUGH DRIVEWAY ACCESS
   - CROWNS AND APEX OF CANOPY NOT TO BE ALTERED OR REDUCED
   - ENSURE LIFTING EQUIPMENT AND LOAD CAN CLEAR HEIGHT AND WIDTH OF TREE CROWN WITHOUT DAMAGE TO THE CROWN
   - ANY SERVICE CONNECTIONS WITHIN 2m OF AN EXISTING TREE CANOPY TO BE APPROVED BY PCL
   - EXCAVATION THAT OCCURS WITHIN THE DRIP ZONE OF A TREE MUST BE APPROVED AND IS TO BE RESTRICTED TO ONE SIDE OF THE TREE ONLY.

   WHERE EXCAVATION IS APPROVED THE FOLLOWING MEASURES ARE TO BE ADOPTED FOR TREE PROTECTION:
   - DO NOT SEVER LARGE ROOTS (>50mm DIA.) CLOSER THAN HALFWAY FROM THE DRIPLINE TO THE TRUNK. ALL ROOTS MUST BE CUT CLEANLY WITH EQUIPMENT SPECIFICALLY DESIGNED TO CUT ROOTS OR OTHER PRUNING EQUIPMENT.
   - ROOTS EXPOSED DURING EXCAVATION MUST BE PROTECTED FROM DESICCATION. KEEP LIGHTLY WATERED OR COVER WITH HESSIAN WHICH MUST BE KEPT MOIST.
   - WATER TREES WHICH HAVE HAD DISTURBANCE IN THEIR ROOT ZONE. THE AMOUNT AND FREQUENCY OF WATER NEEDS TO BE ADAPTED TO THE TREES' REQUIREMENT, BASED ON SEASONAL CONDITIONS.

EROSION AND SEDIMENT CONTROL NOTES

1. ALL MEASURES SHALL GENERALLY BE IN ACCORDANCE WITH THE 'ENVIRONMENTAL PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT', MARCH 2011 AND ENVIRONMENT ACT REQUIREMENTS.
2. THE CONTRACTOR SHALL PREPARE AND GAIN APPROVAL FOR AN ENVIRONMENTAL MANAGEMENT PLAN FOR THE WORKS INCLUDING ALL STAGED WORKS.
3. PROVIDE FILTER ROLLS TO ALL NEW AND EXISTING SUMPS AND STRAW BALES TO ALL NEW AND EXISTING HEADWALLS WITHIN THE VICINITY OF THE WORKS DURING CONSTRUCTION.
4. REMOVE STABILISED CONSTRUCTION ACCESS AT COMPLETION OF THE WORKS AND REINSTATE ALL ADJACENT AREAS.



DETAIL OF FALL THROUGH SEWER MANHOLES

NOT TO SCALE

SITE COMPOUND NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FACILITY TO A SIZE THAT WILL PERFORM IN A MANNER WHICH SATISFIES THE REQUIREMENTS OF THE APPROVED ENVIRONMENTAL MANAGEMENT PLAN.
2. STABILISED CONSTRUCTION ENTRANCE/EXIT MATERIAL - CRUSHED ROCK 50mm TO 75mm NOMINAL SIZE PLACED ON HIGH STRENGTH GEOTEXTILE FABRIC.
3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ADJACENT DRIVEWAY AND STREETS. THIS MAY REQUIRE PERIODIC TOP DRESSING OF THE ENTRANCE WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEARANCE OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO ROADS MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR.
4. DIVERT RUNOFF AWAY FROM ACCESS POINT.

TRAFFIC AND PEDESTRIAN MANAGEMENT

1. THE CONTRACTOR SHALL PROVIDE SAFE AND UNRESTRICTED ACCESS THROUGHOUT THE CONSTRUCTION PERIOD FOR PEDESTRIANS,CYCLISTS AND VEHICLES TO LOCAL TRAFFIC ONLY.
2. THE CONTRACTOR SHALL ENSURE TRAFFIC AND PEDESTRIANS ARE PROTECTED FROM CONSTRUCTION VEHICLES, DUST, WATER AND OTHER NUISANCE BY MEANS OF TEMPORARY SCREENS, BARRIERS, SIGNAGE AND FENCING.
3. THE CONTRACTOR SHALL PREPARE AND GAIN APPROVAL FOR A TEMPORARY TRAFFIC MANAGEMENT PLAN, FOLLOWING ENDORSEMENT FROM THE SUPERINTENDENT.

TRAFFIC CONTROL DEVICES

1. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH AS1742, EXCEPT WHERE MODIFIED BY "STANDARD TRAFFIC CONTROL DEVICE DRAWINGS" - ACT DEPARTMENT OF URBAN SERVICES.
2. MANUFACTURE/ERECT/INSTALL ALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE SPECIFICATION AND DRAWINGS.
3. LONG LIFE MATERIAL (LLM) SUCH AS THERMOPLASTICS, COLD APPLIED PLASTIC CEMENT BASED PRODUCTS CAPABLE OF HAVING QUARTZ APPLIED, SHALL BE USED FOR PAVEMENT MARKINGS AND LINES IN ACCORDANCE WITH "STANDARD TRAFFIC CONTROL DEVICE DRAWINGS" - ACT DEPARTMENT OF URBAN SERVICES.

SEWER PIPE NOTATION

EXISTING	NEW	
610.23	610.23	UPSTREAM INVERT LEVEL
150 PVC	150 PVC	PIPE DIAMETER, MATERIAL
3.20 m	3.20 m	PIPE LENGTH
3.75 %	3.75 %	PIPE GRADE
310.110	310.110	DOWNSTREAM INVERT LEVEL

REFERENCE DRAWINGS

FOR STANDARD REFERENCE DRAWINGS REFER TO,

1. ACT GOVERNMENT - URBAN SERVICES - DESIGN STANDARDS FOR URBAN INFRASTRUCTURE STANDARD DRAWINGS.
2. ICON WATER, WATER SUPPLY AND SEWERAGE DESIGN STANDARDS.

SURVEY NOTATION

- SIGN
- B — BOLLARD
- I — IRRIGATION CONTROL BOX
- SK — STOP COCK
- FLOOR LEVEL
- V — VENT
- COVER LEVEL
- C — COMMS POST

LEGEND

EXISTING

- eS — SEWER / SEWER MANHOLE
- eSW — STORMWATER PIPE / SW MANHOLE; STORMWATER SUMP
- EXISTING SWALE /CUTOFF DRAIN
- FH, eW — WATER / METER PIT / GATE VALVE; DOUBLE AIR VALVE / FIRE HYDRANT
- eEo/h — ELECTRICAL O/H (SERVICE LINE)
- eE — ELECTRICAL U/G (SERVICE LINE)
- eLVo/h — OVERHEAD (LOW VOLTAGE)
- eHVo/h — ELECTRICAL OVER HEAD HIGH VOLTAGE
- eSL — ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- eG — GAS / REDUCER / VALVE / END CAP
- eT — TELSTRA / ACCESS CHAMBER / PILLAR
- eiiNET — EXISTING iiNET
- eNBN — EXISTING NBN
- EXISTING TREES TO BE RETAINED
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR

PROPOSED

- BOUNDARY OF PROPOSED WATER AND SEWER WORK
- BLOCK BOUNDARY
- TS — PROPOSED TRUNK SEWER / MANHOLE

PROGRESS STAMP (IN PRINCIPLE)

- This design has been reviewed against Icon Water's *Water Supply and Sewerage Standards*.
- Icon Water confirms this design can proceed to the Development Application / Building Application process. A separate application to Icon Water is required to obtain a Statement of Compliance (Building Approval)
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- The proposed development may require payment of a charge under the *Water and Sewerage Capital Contributions Code*.

Craig Allen — Hydraulic Assessment Acceptance Officer — 23/12/2020 (Date) — F2019-010479 (File #)

Rev.	Date	Description	Des.	Verif.	Appd.
2	21/12/2020	RESUBMISSION FOR PRINCIPLE SUPPORT	HF	JS	JS
1	28/08/2020	DRAFT ONLY	HF	JS	JS

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Drawn	MPQ	Date 18/06/2019
Checked	JS	Date 18/06/2019
Designed	HF	Date 18/06/2019
Verified	JS	Date 18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SEWER DESIGN WORK — BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: GENERAL NOTES AND LEGEND
Status: FOR INFORMATION ONLY — NOT TO BE USED FOR CONSTRUCTION PURPOSES
Datum: AHD | Date: 21/12/2020 | Scale: | Size: A1
Drawing Number: 50521009-105 | Revision: 2

XREFs:
CAD File: N:\Projects\505\FY21\009_Lyneham B14 S41 Sewer Design Work\Drawings\50521009-105-GNL.dwg

DATE PLOTTED: 21 December 2020 11:52 AM BY - JOHN SUTCLIFFE

CONSTRUCT NEW 1200 SEWER MANHOLE OVER EXISTING LINE. CONNECTIONS AND DISCONNECTION BY ICON WATER AT CONTRACTOR'S EXPENSE.

DEPTH AND PHYSICAL LOCATION OF ALL EXISTING SERVICES TO BE CONFIRMED DURING DETAILED DESIGN

EXISTING PWWF = ~135L/s TO BE PUMPED DURING CUT OVER AT CONTRACTORS EXPENSE

TRENCH SHORING TO BE USED WHERE BENCHING WIDTH CANNOT BE ACHIEVED

PROPOSED Ø450 TRUNK SEWER

PROPOSED 1050MH
E210715.003
N606709.296

EXISTING RETAINING WALL

EXISTING WIRE FENCE

PROPOSED Ø450 TRUNK SEWER

EXISTING SEWER

RECONSTRUCT 1050 SEWER MANHOLE OVER EXISTING LINE. CONNECTIONS AND DISCONNECTION BY ICON WATER AT CONTRACTOR'S EXPENSE.

DEPTH AND PHYSICAL LOCATION OF ALL EXISTING SERVICES TO BE CONFIRMED DURING DETAILED DESIGN

EXISTING WATER REFILLING STATION

EXISTING DN100 SEWER TIE TO BE RETAINED (DEPTH ~600mm)

EXISTING DN50 WATER TIE TO BE RETAINED (DEPTH ~450mm)

EXISTING QS SUMP TO BE RETAINED

SECTION 41
BLOCK 14
FUTURE REDEVELOPMENT BY OTHERS
(TOTAL AREA 2359m²)

COTTER COURT

BLOCK BOUNDARY

COMMUNITY PATH

GOODWIN ST

WATTLE ST

WATTLE STREET

NORTH

LEGEND

BLOCK BOUNDARY

EXISTING

- SEWER / SEWER MANHOLE
- TRUNK SEWER MAIN
- STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
- WATER / METER PIT / GATE VALVE DOUBLE AIR VALVE / FIRE HYDRANT
- ELECTRICAL U/G (STREET LIGHT)
- ELECTRICAL OVER HEAD HIGH VOLTAGE
- ELECTRICAL O/H (SERVICE LINE)
- OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- TELSTRA / ACCESS CHAMBER / PILLAR
- OPTUS / COMMUNICATION PIT
- GAS / REDUCER / VALVE / END CAP
- EXISTING iiNET
- EXISTING TRANSACT
- EXISTING NBN
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL
- EXISTING HARDSTAND (TOTAL AREA=1079.1m²)
- EXISTING BUILDING / GARAGE / CONTAINERS
- EXISTING WATER FILLING STATION
- EXISTING TREES TO BE RETAINED (INDICATIVE LOCATION)
- EXISTING TREES TO BE REMOVED (INDICATIVE LOCATION)

PROPOSED

- PROPOSED TRUNK SEWER

PROGRESS STAMP (IN PRINCIPLE)

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Craig Allen — 23/12/2020 — F2019-010479
Hydraulic Asset Acceptance Officer — Date — File #

0 5 10 15 20 25m
SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	21/12/2020	RESUBMISSION FOR PRINCIPLE SUPPORT	HF	JS	JS
1	28/08/2020	DRAFT ONLY	HF	JS	JS

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		Date
Drawn	MPQ	18/06/2019
Checked	JS	18/06/2019
Designed	HF	18/06/2019
Verified	JS	18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD
Project: SEWER DESIGN WORK
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: GENERAL ARRANGEMENT PLAN

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

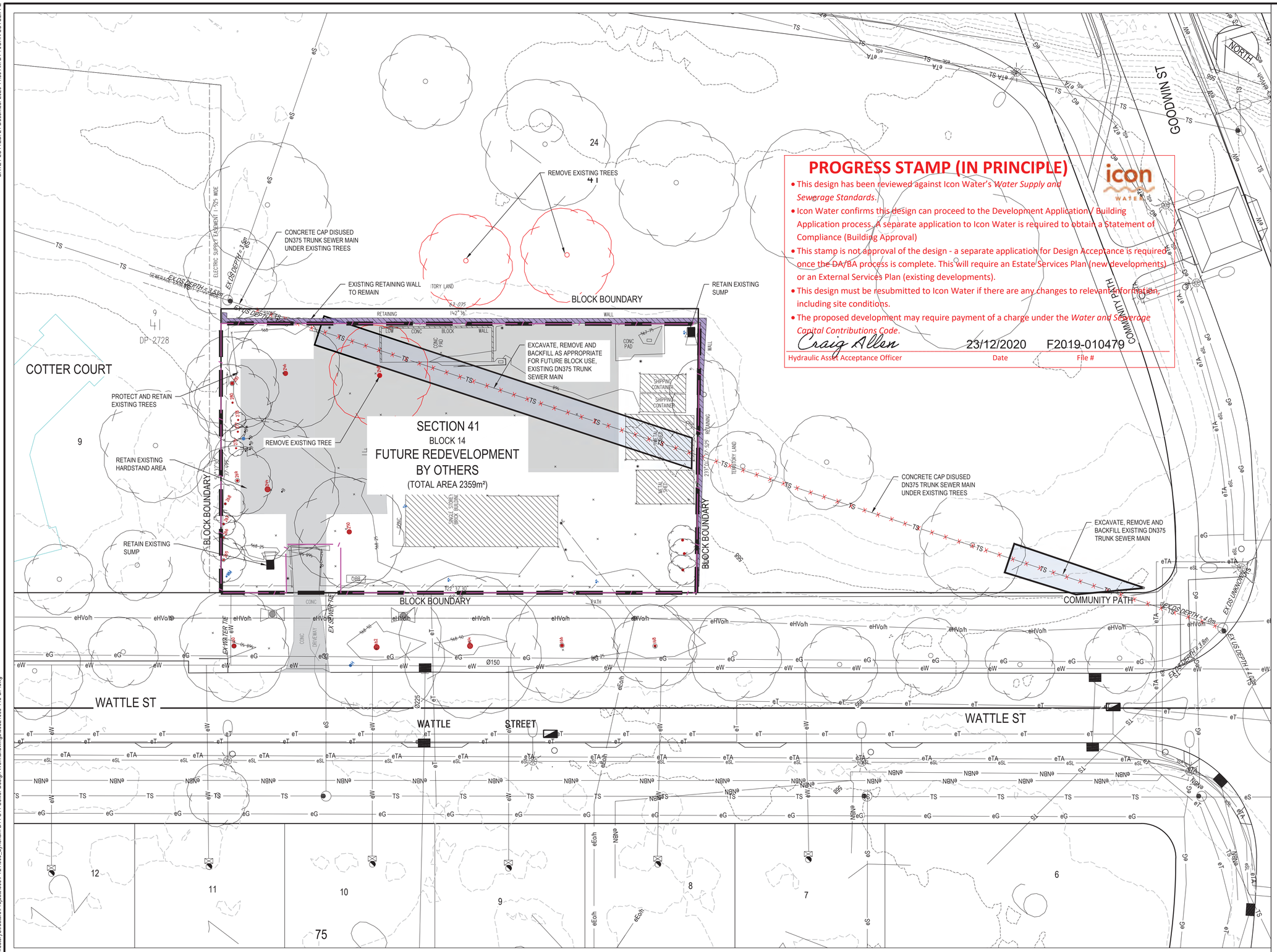
Datum	Date	Scale	Size
AHD	21/12/2020	1:250m	A1

Drawing Number: 50521009-110
Revision: 2

XREFs: \\RB_LYNE_URB_OCON_X-TCD-156-XD_AERIAL-LYNEHAM_Existing Cont_X_50519072-SIR-ES_X-Trees_EX_SURVEY
CAD File: \\cardno.corp\global\AU\NSW\Directory\Structure\Projects\505\FY21\009_Lyneham B14 S41 Sewer Design Work\Drawings\50521009-110-GA.dwg

DATE PLOTTED: 21 December 2020 11:39 AM BY - JOHN SUTCLIFFE

XREF's: URB_LYNE; URB_OCON; X-TCD-156-XD; Existing Cont; X-Trees; AERIAL-LYNEHAM; X_50519072-SIR-ES; EX_SURVEY
CAD File: \\cardno.corp\global\AU\NSW\Director\Structure\Projects\50\5F\Y21009_Lyneham B14 S41 Sewer Design Work\Drawings\50521009-115-DP.dwg



PROGRESS STAMP (IN PRINCIPLE)

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Craig Allen — 23/12/2020 — F2019-010479

Hydraulic Asset Acceptance Officer — Date — File #

LEGEND

BLOCK BOUNDARY

EXISTING

- SEWER / SEWER MANHOLE
- TRUNK SEWER MAIN
- STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
- WATER / METER PIT / GATE VALVE DOUBLE AIR VALVE / FIRE HYDRANT
- ELECTRICAL U/G (STREET LIGHT)
- ELECTRICAL OVER HEAD HIGH VOLTAGE
- ELECTRICAL O/H (SERVICE LINE)
- OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- TELSTRA / ACCESS CHAMBER / PILLAR
- OPTUS / COMMUNICATION PIT
- GAS / REDUCER / VALVE / END CAP
- EXISTING iiNET
- EXISTING TRANSACT
- EXISTING NBN
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL
- EXISTING TREES TO BE RETAINED (INDICATIVE LOCATION)

DEMOLISH

- TRUNK SEWER MAIN (CONCRETE CAP AND ABANDON)
- TRUNK SEWER MAIN (EXHUME)
- EXISTING TREES TO BE REMOVED (INDICATIVE LOCATION)

0 5 10 15 20 25m

SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	21/12/2020	RESUBMISSION FOR PRINCIPLE SUPPORT	HF	JS	JS
1	28/08/2020	DRAFT ONLY	HF	JS	JS

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Drawn	MPQ	Date 18/06/2019
Checked	JS	Date 18/06/2019
Designed	HF	Date 18/06/2019
Verified	JS	Date 18/06/2019
Approved	JS	18/06/2019

Client: ACT GOVERNMENT - EPSDD

Project: SEWER DESIGN WORK
BLOCK 14, SECTION 41, LYNEHAM, ACT

Title: DEMOLITION PLAN

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Date	Scale	Size
AHD	12/21/2020	1:250m	A1

Drawing Number: 50521009-115

Revision: 2

DATE PLOTTED: 21 December 2020 12:06 PM BY - JOHN SUTCLIFFE

XREFs: URB_LYNE; URB_OCON; X-TCD-156-XD. Existing Cont; X-Trees; X_50519072-SIR-ES; EX_SURVEY
CAD File: \\cardno.corp\global\AU\NSW\Directory\Structure\Projects\5050\FY21009_Lyneham B14 S41 Sewer Design Work\Drawings\50521009-116-SE.dwg

PROGRESS STAMP (IN PRINCIPLE)

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Craig Allen — 23/12/2020 — F2019-010479

Hydraulic Asset Acceptance Officer | Date | File #

564.63
225 -'4'
69.2 m
0.49 %
564.290

564.127
450 -'4'
66.8 m
0.27 %
563.945

563.942
450 -'4'
79.8 m
0.28 %
563.720

564.53
375 -'4'
135.3 m
0.30 %
564.130

BLOCK 24
SECTION 41
(URBAN OPEN SPACE)

PROPOSED 1050MH
E210715.003
N606709.296

RECONSTRUCT 1200 SEWER MANHOLE OVER EXISTING LINE. CONNECTIONS AND DISCONNECTION BY ICON WATER AT CONTRACTOR'S EXPENSE.

RECONSTRUCT 1050 SEWER MANHOLE OVER EXISTING LINE. CONNECTIONS AND DISCONNECTION BY ICON WATER AT CONTRACTOR'S EXPENSE.

EXISTING SERVICES TO BE POTHOLED AT SEWER CROSSING DURING DETAILED DESIGN STAGE

REINSTATE EXISTING CONCRETE FOOTPATH FOLLOWING COMPLETION OF WORKS.

EX GAS DEPTH = 3.5m

EX GAS DEPTH = 1.4m

EX GAS DEPTH = 5.8m

EX WATER T/E

EX SEWER T/E

ELECTRIC SUPPLY EASEMENT 1-2x5 WIDE

SEWERAGE EASEMENT 1 WIDE

COTTER COURT

DP 2728

SECTION 41
BLOCK 14
FUTURE REDEVELOPMENT
BY OTHERS
(TOTAL AREA 2359m²)

WATTLE ST

COMMUNITY PATH

GOODWIN ST

COMMUNITY PATH

TERRITORY LAND

RETAINING WALL

STONE RETAINING WALL

LOW CONC BLOCK WALL

CONC PAD

SHIPPING CONTAINER

METAL SHED

SINGLE STOREY BRICK BUILDING

CONC DRIVEWAY

PATH

LEGEND

- TS — PROPOSED TRUNK SEWER
- 568 — EXISTING CONTOURS
- EXISTING TREE TO BE RETAINED

EXISTING

- eS — SEWER / SEWER MANHOLE
- TS — TRUNK SEWER MAIN
- eSW — STORMWATER PIPE / SW MANHOLE / QS SUMP / SUMP
- eW — WATER / METER PIT / GATE VALVE DOUBLE AIR VALVE
- eSL — ELECTRICAL U/G (STREET LIGHT)
- eHVo/h — ELECTRICAL OVER HEAD HIGH VOLTAGE
- eEo/h — ELECTRICAL O/H (SERVICE LINE)
- eSLo/h — OVERHEAD (STREET LIGHT)
- ELECTRICAL POLE/STREETLIGHT/ STREETLIGHT OUTREACH
- eT — TELSTRA / ACCESS CHAMBER / PILLAR
- eO — OPTUS / COMMUNICATION PIT
- eG — GAS / REDUCER / VALVE / END CAP
- eiiNET — EXISTING iiNET
- eTA — EXISTING TRANSACT
- eNBN — EXISTING NBN
- EXISTING 1.8m WIRE FENCE
- EXISTING RETAINING WALL

GENERAL NOTES:

1. FOR HYDRAULIC SERVICES LEGEND AND NOTES REFER DRG No. 50521009-105.

SEWER NOTES:

1. ALL SEWER PIPES TO BE RRJ UNO.
2. MINIMUM HORIZONTAL CLEARANCE BETWEEN OUTSIDE DIAMETER OF SEWER STRUCTURES & PIPE TO OTHER SERVICES IS 600mm.

0 5 10 15 20 25m
SCALE 1:250 @A1

Rev.	Date	Description	Des.	Verif.	Appd.
2	21/12/2020	RESUBMISSION FOR PRINCIPLE SUPPORT	HF	JS	JS
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Checked	JS	Date 18/06/2019
Designed	HF	Date 18/06/2019
Verified	JS	Date 18/06/2019
Approved	JS	18/06/2019

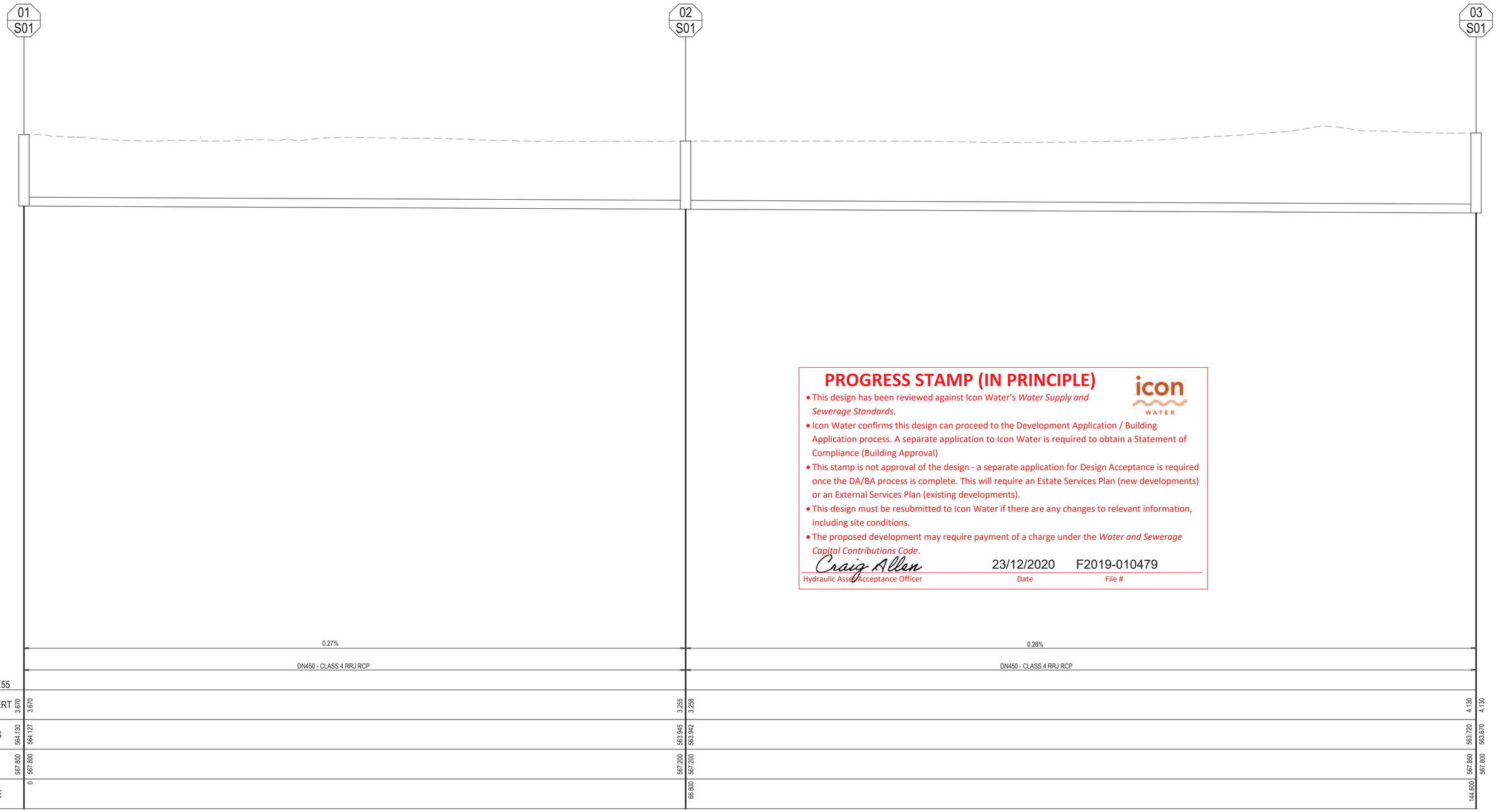
Client: ACT GOVERNMENT - EPSDD
Project: SEWER DESIGN WORK
BLOCK 14, SECTION 41, LYNEHAM, ACT
Title: SEWER PLAN AND LONG SECTION

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Date	Scale	Size
AHD	12/21/2020	1:250m	A1

Drawing Number: 50521009-116
Revision: 2

DATE PLOTTED: 21 December 2020 12:07 PM BY - JOHN SUTCLIFFE



PROGRESS STAMP (IN PRINCIPLE)

- This design has been reviewed against Icon Water's *Water Supply and Sewerage Standards*.
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Craig Allen — 23/12/2020 — F2019-010479

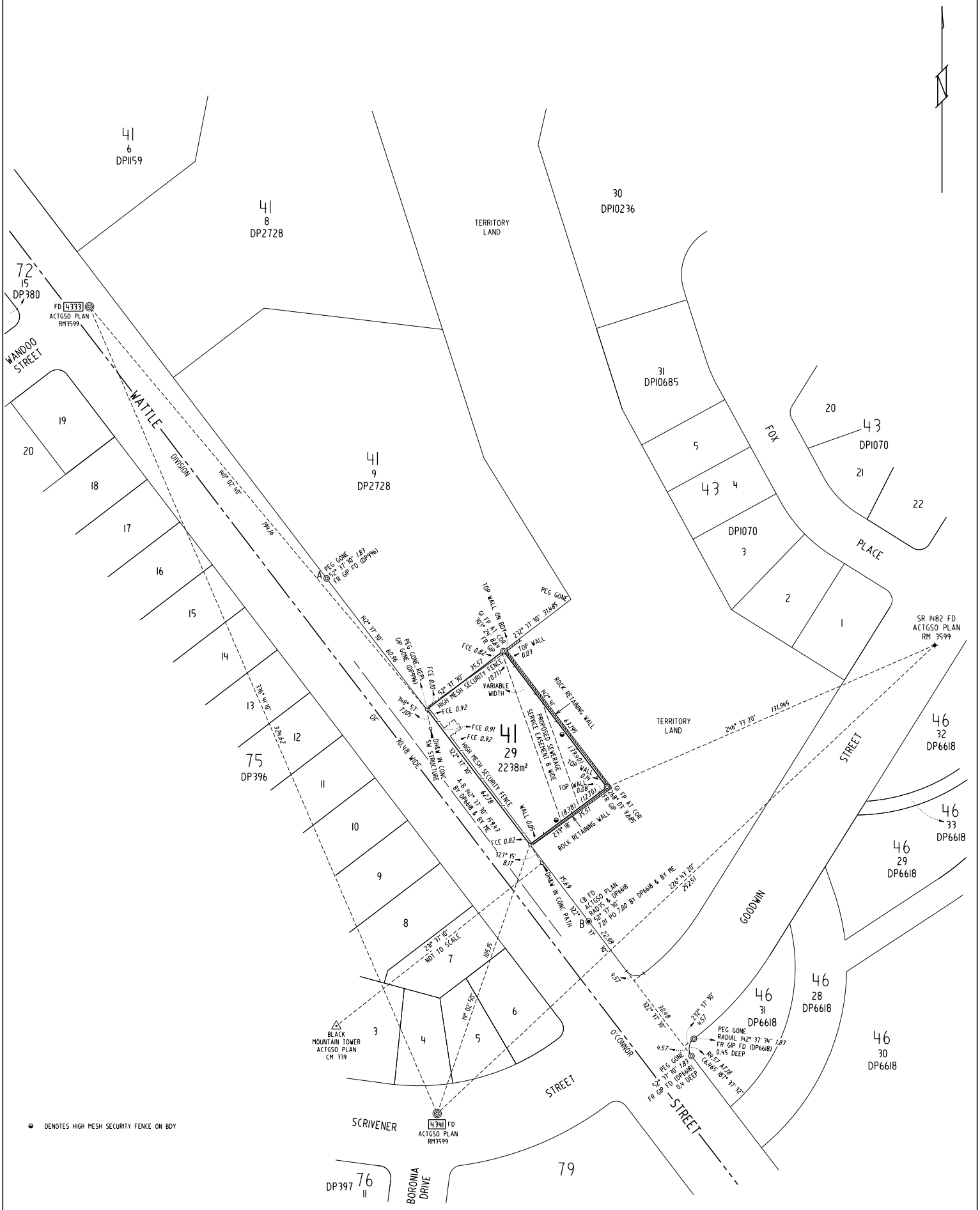
Hydraulic Assessment Acceptance Officer — Date — File #

| | | |

APPENDIX

H

SURVEY PLAN



REFERENCE MARKS

Denotes GIP in road 1.83 radially from TP
" CB " " 1.83 " " TP
" PLAQUE IN KERB
" DEEP DRIVEN ROD
" DH&W IN KERB
(Except as otherwise shown)

Azimuth: A-B (Strom)

All Easements are 2.5 metres wide (Except as otherwise shown)

Ref: AQ80/2774

REPORT LODGED WITH SURVEYOR-GENERAL OF THE ACT

I ANTHONY QUINN of ANTHONY QUINN SURVEYS PTY LTD, CANBERRA a surveyor registered under the Surveyors Act 2007 hereby certify that the survey represented on this plan is accurate and has been made in accordance with the Surveyors Practice Directions and was completed on 4 SEPTEMBER 2020

1 December 2020 (Signature)

Surveyor registered under the Surveyors Act 2007

I certify that this plan is the plan prepared in accordance with the Districts Act 2002

7 December 2020

Surveyor-General of the ACT

PLAN OF
BLOCK 29 SECTION 41

DIVISION: LYNEHAM
DISTRICT: CANBERRA CENTRAL

AUSTRALIAN CAPITAL TERRITORY

SCALE 1:750

0 10 20 40 60 METRES

DEPOSITED PLAN

*JH

X22149