Appendix I. Preliminary (desktop) land and groundwater contamination assessment

Prospect Hill EfW Plant

Land and Groundwater Desktop Contamination Assessment

IS305100 | Rev0

21 September 2020

Prospect Hill International Pty Ltd

Prospect Hill EfW Plant

Project No:	IS305100
Document Title:	Land and Groundwater Desktop Contamination Assessment
Document No.:	IS305100
Revision:	Rev0
Date:	21 September 2020
Client Name:	Prospect Hill International Pty Ltd
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File Name:	IS305100_Land and Groundwater Desktop Contamination Assessment_Rev0

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A	01-05-20	Draft	AM	01-05-20		
B	21-09-20	Revised Draft	AM		TB	
0	21-9-20	Revised Draft	AM		KM	

Executive Summary

Jacobs Group (Australia) Pty Ltd (Jacobs) has been engaged by Prospect Hill International Pty Ltd (Prospect Hill), to conduct a Land and Groundwater Contamination Desktop Assessment for the development of an Energy-from-Waste (EfW) plant at 164 – 200 McManus Road, Lara (Lots D and 3 PS710783E). The site is located within the Geelong Ring Road Employment Precinct (GREP), to the southwest of Lara Town Centre. The site is located within an Industrial 2 Zone (IN2Z) and is subject to a Design and Development Overlay – Schedule 18 to clause 43.02 (DDO18). The site is currently vacant with exposed soil and no visible above-ground structures.

The site is surrounded by a mix of industrial, agricultural and low-density residential use land. The area immediately north of the site boundary is within the Farming Zone (FZ) and the area to the northwest is zoned Rural Living (RLZ) under the Greater Geelong Planning Scheme (GGPS). This provides an informal buffer between this precinct and the township of Lara. Lots in the immediate east, west and south of the site are all within the Industrial 2 Zone (IN2Z). The nearest sensitive receptor is identified as a residential dwelling located approximately 300 metres north/northwest of the site. The boundary of the township of Lara is approximately 1.1 km north/northeast of the site.

The objective of the investigation was to:

- identify potential soil and groundwater contamination risks (issues and implications) to the proposed development that may exist as a result of current and/or historical activities at or around the site;
- present recommendations for in-field intrusive investigations to better understand potential contamination-related risks; and
- inform potential mitigation measures that can be implemented as part of the design process and subsequent construction activities.

The preliminary conceptual site layout for the proposed EfW Plant includes the following:

- Southwest section - an office block, a parking lot and a switch yard;
- East and southeast sections – bottom ash pre-treatment, processing and long-term storage facilities;
- Western boundary – the main plant, which includes a tipping hall and waste bunker, a boiler room, a steam turbine hall, cooling towers, a pump house and demineralised water plant, as well as a flue gas cleaning hall;
- Northwest section – a stormwater detention pond; and
- North and northeast sections – gate house and weighbridge, rainwater tanks and pump room, and a wastewater discharge holding pond.

The key findings of the desktop assessment are summarised below:

- Based on the site history, the site has never been developed and has remained vacant for over a century. It is possible the area has been used for agricultural purposes (cropping and grazing) which could have included pesticide and fertiliser use. The only other potential source of onsite contamination is stockpiled material of unknown origin evident across the site.
- Several potential offsite sources of contamination were identified in the vicinity of the site, including two gas storage and distribution facilities, a recycling centre, a transport warehouse and shipping container yard, agricultural and industrial chemical manufacturing plants and prescribed industrial waste management facilities.
- The most likely transport mechanism for contamination from offsite sources to impact the project (i.e. to be encountered at the site) is via groundwater; however, for properties adjoining the site, a lesser degree of contaminant transport via surface water is possible. Groundwater is anticipated to flow from west to east/ southeast toward Hovells Creek and Corio Bay respectively

A preliminary, qualitative risk assessment has been undertaken in order to identify the potential for these sources to impact the EfW site. Primary risks are considered to fall into four categories:

1) Risk to ecological values (Groundwater Dependent Ecosystems) in the vicinity of the site from proposed construction / operation;
2) Risk to human health during construction and / or operation of the proposed facility;
3) Risk to project due to waste disposal / clean-up requirements; and
4) Regulatory or 3rd party issues associated with the mobilisation of an existing contamination issue (primarily groundwater).

Assessment of potential contamination sources and potential related impacts to the project from this preliminary investigation indicates:

- There is a high potential for stockpiled material/fill to impact the project, in relation to waste classification and disposal or reuse;
- There is a moderate to high potential for impact to the project to occur due to contaminant migration from potential off-site sources west of the site (i.e. Shell LPG Terminal and Elgas LPG depot, along with associated underground pipelines);
- There is a moderate potential for impact to occur to the project due to potential contamination issues associated with historical use of the site for agriculture;
- There is a low to moderate potential for impact to the project to occur in relation to potential contamination associated with the transport warehouse and container yard adjoining the site to the east;
- There is low to moderate potential for impact to the project to occur in relation to sites further east and southeast, including a recycling facility and three agricultural and industrial chemical manufacturing plants. Although those potential sources are further from and downgradient of the site, there is potential for groundwater contamination to be present at those sites, and if so, a possibility that onsite dewatering may mobilise contamination towards the project site, or to third-party properties between those potential sources and the site, presenting regulatory and third-party risk to the project;
- There is a low potential for impact to occur to the project from potential contamination associated with a metal galvanising facility southwest of the site, and two prescribed industrial waste management (treatment, transport and disposal) facilities to the southeast of the site.

The conclusions listed above are considered preliminary in nature. Further investigation is recommended in order to reduce uncertainty in relation to potential risks identified during this initial phase of investigation.

Recommendations

On the basis of the findings obtained during the preliminary investigation, the following additional works are recommended:

- Site inspection to visually examine and assess the need for sampling and analysis of stockpiled material;
- Limited intrusive soil investigation in order to characterise the potential risks posed by soil contamination (if any) at the site;
- Installation of groundwater monitoring wells at selected locations around the site perimeter to assess the potential for contaminated groundwater to migrate onto the project area. It is recommended that this coincide with the geotechnical investigations and comprise at least three (3 no.) boreholes as follows:
  - One borehole at the point of maximum excavation depth (northwest section) to determine soil contamination with depth and confirm groundwater levels;
  - One borehole along the southwestern boundary near the LPG storage terminals to confirm (or otherwise) contaminant migration onto the site;
  - One borehole near the southeast boundary to monitor for potential mobilisation onto the site (or neighbouring properties) of volatile contaminant plumes from off-site sources due to on-site dewatering;

- Dewatering requirements should be considered prior to the investigation, to determine if a groundwater pumping test is needed to establish groundwater management requirements (water quality and volumes), and potential extent of drawdown effects during the construction and operation of the site;
- Soil samples would be submitted for laboratory testing to provide information on:
  - Soil chemistry to inform of potential human health risks to construction workers and potential soil reuse options in accordance with the National Environmental Protection Measures (NEPMs); and
  - Soil chemistry to inform the likely spoil classification for offsite disposal in accordance with EPA IWRG621.

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Important note about your report

The sole purpose of this report is to present a Land and Groundwater Contamination Desktop Assessment prepared by Jacobs for Prospect Hill International Pty Ltd (Prospect Hill) for the development of an Energy-from-Waste (EfW) plant at 164 – 200 McManus Road, Lara, Victoria. This report was produced in accordance with, and is limited to, the scope of services set out in the agreement between Jacobs and Prospect Hill. The scope of services, as described in this report, was developed with Prospect Hill.

All reports and conclusions that deal with sub-surface conditions are based on interpretation and judgement and as a result have a degree of uncertainty associated with them. You should be aware that this report contains interpretations and conclusions which are uncertain, due to the nature of the investigations. No study can investigate every risk, and even a rigorous assessment and/or sampling program may not detect all problem areas within a site.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by Prospect Hill and from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete, then it is possible that our observations and conclusions as expressed in this report may change.

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List of Abbreviations

Abbreviation	Description
EfW	Energy from Waste
GREP	Geelong Ring Road Employment Precinct
GGPS	Greater Geelong Planning Scheme
bgs	below ground surface
PSI	Preliminary Site Investigation
NEPC	National Environmental Protection Council
IWRG	Industrial Waste Regulatory Guidelines
EPA	Environment Protection Authority
VVG	Visualising Victoria's Groundwater
WMIS	Water Measurement Information System
AHD	Australian Height Datum
DELWP	Department of Environment, Land, Water & Planning
ASS	Acid sulfate soils
GSV	Geological Survey of Victoria
VAF	Victorian aquifer framework
LPG	Liquid Petroleum Gas
GRUZ	Groundwater Restricted Use Zone
PIW	Prescribed Industrial Waste
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended in 2013
CSM	Conceptual Site Model
CoPC	Contaminants of potential concern
BTEX	Benzene, toluene, ethylbenzene and xylene
CSM	Conceptual Site Model
OCP	Organochlorine pesticides
OPP	Organophosphate pesticides
PAHs	Polycyclic aromatic hydrocarbons
GDE	Groundwater dependent ecosystems
MAH	Mono aromatic hydrocarbons
VOCs	Volatile organic Compounds
NOx	Oxides of nitrogen
SOx	Oxides of Sulphur
CEMP	Construction Environmental Management Plan
SEPP	State Environmental Protection Policy

1. Introduction

Jacobs Group (Australia) Pty Ltd (Jacobs) has been engaged by Prospect Hill International Pty Ltd (Prospect Hill), to conduct a Land and Groundwater Desktop Assessment for the development of an Energy-from-Waste (EfW) plant at 164 – 200 McManus Road, Lara (Lots D and 3 PS710783E). The site is located within the Geelong Ring Road Employment Precinct (GREP), to the southwest of Lara Town Centre. The site is located within an Industrial 2 Zone (IN2Z) and is subject to a Design and Development Overlay – Schedule 18 to clause 43.02 (DDO18). The layout of the site is shown in **Figure 1.1**.

The area immediately north of the site boundary is within the Farming Zone (FZ), whereas the area northwest of the site is zoned Rural Living (RLZ) under the Greater Geelong Planning Scheme (GGPS). This provides an informal buffer between this precinct and the township of Lara. Lots in the immediate east, west and south of the site are all within the Industrial 2 Zone (IN2Z). The nearest sensitive receptor is a residential dwelling located approximately 300 metres north/northwest of the site and the boundary of the township of Lara is approximately 1.1 km north/northeast from the site.

Figure 1.1: Site of the proposed Energy from Waste Plant, showing approximate site boundary in red.

The key purpose of this desktop land and groundwater contamination assessment, is to identify potential for land or groundwater contamination issues to be encountered during the construction of the EfW plant. Contaminated land refers to soils, groundwater and ground gases where concentrations of hazardous chemicals exceed those specified in policies and regulations or are at such a concentration as to cause an unacceptable risk to human health or the environment or to materially impact the development being proposed.

At a practical level, the identification and management of contaminated land is a material consideration in the planning, construction and long term maintenance of many infrastructure projects, with four main themes identified in Table 1.1.

Table 1.1: Contaminated land themes and aspects for construction

Projects Theme	Aspect
Human health impacts	Health and safety of workers; wider public health issues

Projects Theme	Aspect
Environmental impacts	▪ Disturbance of ground and / or groundwater that is impacted with contaminants, resulting in potential migration of contaminants with consequential adverse impacts on the environment. ▪ Creation of contamination exposure pathways due to the proposed construction / development and potential adverse impacts on the environment.
Management of wastes	Sustainable management of: ▪ Construction related soils (i.e., spoil); ▪ Dewatered groundwater.
Building materials durability	Incompatibilities between the building materials and chemically aggressive ground conditions resulting in durability concerns.

This report summarises the work conducted and the results of the assessment, including the findings from a desktop review of information and provides recommendations for in-field investigations to inform any identified risks.

1.1 Background

The site proposed for the development of the EfW Plant comprises an area of approximately 16 hectares within an Industrial 2 Zone (IN2Z) of the GREP. At the northern edge of the site, the land is within the Farming Zone and has been partially reserved for a road and is affected by a Barwon Water pipeline easement. Immediately to the west of the site is land affected by Schedule 4 to Clause 42.01 Environmental Significance Overlay – Grasslands, within the Werribee Plains Hinterland of the GGPS. The subject site is within a designated bushfire prone area and special bushfire construction requirements may apply.

Currently, the site remains undeveloped and vacant with no visible aboveground structures. It is anticipated that the site development will require a statutory environmental approval from the Environment Protection Authority (EPA) and a Planning Permit from The City of Greater Geelong under the *Planning and Environment Act 1987*. If the construction works commence prior to 1 July 2021, the project will require a Works Approval under the *Environmental Protection Act 1970*. Projects commencing after this date will require a Development Licence assessed under the *Environment Protection Amendments Act 2018*.

The proposed development comprises an EfW Plant using conventional reciprocating grate combustion technology to process residual municipal solid waste (MSW), as well as supplementary commercial and industrial waste (C&I), to generate electrical power. The plant has a design capacity to process 400,000 tonnes of waste per annum, with two lines processing 200,000 tonnes per annum each.

The preliminary conceptual site layout indicates that the construction of the proposed EfW Plant includes the following:

- Southwest section - an office block, a parking lot and a switch yard;
- East and southeast sections – bottom ash pre-treatment, processing and long-term storage facilities;
- Western boundary – the main plant, which includes a tipping hall and waste bunker, a boiler room, a steam turbine hall, cooling towers, a pump house and demineralised water plant, as well as a flue gas cleaning hall;
- Northwest section – a stormwater detention pond; and
- North and northeast sections – gate house and weighbridge, rainwater tanks and pump room, and a wastewater discharge holding pond.

The preliminary design indicates that the construction of the proposed EfW plant would involve the excavation and removal of approximately 178,000 m^3 of sub-surface material, from a maximum anticipated excavation depth of 11 m below ground level (m bgl). It could not be determined if material (of unknown origin) stockpiled along the southern and northern boundary of the site may include chemical contaminants or other wastes.

The preliminary drawing of the proposed development is presented in **Appendix A**. The design and layout are subject to change.

1.2 Objective

The objective of the Land and Groundwater Contamination Desktop Assessment is to:

- Gain an understanding of the potential implications of land contamination on the feasibility of the proposed EfW project, in terms of impact on the environment or human health during or post-construction;
- Inform Prospect Hill of the identified potential soil and groundwater contamination related risks (issues and implications) that exist as a result of current and/or historical activities at, or in the vicinity of, the site;
- Develop a qualitative risk assessment through the identification of on and offsite sources of contamination (and types of contaminants), sensitive receptors, and potential transport and exposure pathways for each sensitive receptor in the context of the proposed construction; and
- Provide recommendations based on the findings of this desktop assessment regarding the need for a detailed (intrusive) field investigation to inform identified contamination-related risks.

This report details the results of the desktop investigation and recommendations for in-field investigations.

1.3 Scope of works

The scope of this preliminary assessment is limited to a desktop-based review of relevant publicly available information to establish site history as it relates to land use and associated activities at 164 – 200 McManus Rd, Lara and its immediate surrounds. No site visits or intrusive site investigations have been completed for this assessment.

The methodology for the contaminated land assessment included the completion of a preliminary site investigation (PSI) comprising a desktop review of available information including:

- Publicly available published information relevant to the project at or near the proposed development site;
- Historic site plans and information on historic and current site activities, as available;
- Proposed design and siting details;
- Publicly available information on the environmental site setting such as geology, hydrology and hydrogeology; and
- Current and historical aerial photographs.

1.4 Legislation, standards and guidelines

This desktop assessment has been prepared in general accordance with the following legislations and guidelines:

- *Environmental Protection Act 1970*
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (as revised 2013) Schedule B: Guideline on Investigation Levels for Soil and Groundwater (NEPC, 2013); AS4482.1 (2005) Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil: Part 1;
- AS4482.2 (1999) Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil: Part 2; and
- EPA Victoria Industrial Waste Regulatory Guidelines (IWRG) (EPA, 2009b).

2. Data sources

The desktop assessment included a review of publicly available information. This information was obtained from the following sources:

- A consolidated information report (Lotsearch™, 2020) commissioned by Jacobs for the site. This report included information such as:
- Historical aerial imagery
- Historical land use
- Title history
- EPA Victoria records
- The Visualising Victoria's Groundwater (VVG) website
- Water Measurement Information System (WMIS)
- Bureau of Meteorology groundwater dependent ecosystems (GDE) atlas
- Geological Survey of Victoria 1:63,360 scale Geelong Geological Map Sheet (1963)

The bulk of site information was obtained from a consolidated information report (Lotsearch™, 2020) and from the interactive hydrogeological web mapping on *Visualizing Victoria's Groundwater* website (www.vvg.org.au). The full consolidated information Report is provided in **Appendix B**. Other relevant sources such as Google Earth satellite imagery were also used as needed and available.

3. Site Setting

3.1 Site identification

The site of the proposed EfW Plant is located approximately 14 km north of Geelong and less than 3 km south of Lara town centre. The site is bounded by Production Way (under construction) to the north and McManus Road to the west, whereas adjacent properties make up the eastern and southern boundaries. A summary of the site information is presented in **Table 3.1**.

Table 3.1: Site information summary

Identification	Details
Street Address	164 – 200 McManus Road
Locality	Lara
Local Government Area	City of Greater Geelong
State	VIC
Legal identity	Lot D and 3, PS710783, property number 356712
Zoning	Industrial 2 Zone (IN2Z)
Planning Overlays	Schedule 18 to Clause 43.02 Design and Development Overlay (DDO18) – Geelong Ring Road Employment Precinct
Current constraints	The site is within a designated bushfire prone area. Potential for land contamination related constraints, including groundwater-related, is examined in this assessment
Ownership details	Prospect Hill International Pty Ltd
Approximate Area	16 hectares
Current land use	Industrial/commercial
Proposed future land use	Industrial/commercial

3.2 Surrounding land uses

Broadly, the site is surrounded by a mix of agricultural land, small to medium scale industrial facilities and low-density rural residential dwellings. The nearest residential developments are the town of Lara (approximately 1.1 km to the north) and the suburb of Corio, Geelong (1.7 km to the south). Bordering land uses are described in **Table 3.2**.

Table 3.2: Surrounding Land Use

Direction	Surrounding Land use
North	Farmland (plot APS710776)
South	Reserve (plot RES1PS710776); and a vacant/undeveloped industrial land (plots S4PS328477 and 3PS328477)
South East	Industrial chemicals manufacturing plants (Plots 2PS328477 and 1TP132804). Further southeast, there are two prescribed industrial waste management facilities

Direction	Surrounding Land use
East	Rocke Brothers Pty Ltd transport warehouse and shipping container yard consisting of an administrative building, a warehouse, truck parking lots, and a shipping container yard (lot 3PS710783). Further east, there is an agrochemical manufacturer (ACCENSI), a recycling centre (C & D Recycling Pty Ltd) and a fertiliser supply warehouse (Wengfu Australia).
West	Shell LPG Terminal (Lot 2LP38862) consisting of administrative buildings, above-ground storage tanks, underground gas pipelines and dams as well as vacant/undeveloped industrial land which forms the majority of the western boundary of the project site.

4. Ground Conditions Setting

4.1 Topography and drainage

The natural topography of the site is generally flat, with a gentle regional slope trending from west to east and southeast toward Hovells Creek and Corio Bay respectively. The ground surface elevation at the site ranges from approximately 16 to 22 m Australian Height Datum (AHD) (DELWP, 2020) with an onsite slope trending west and northwest. **Figure 4.1:** shows the regional topography and elevation contour at the site.

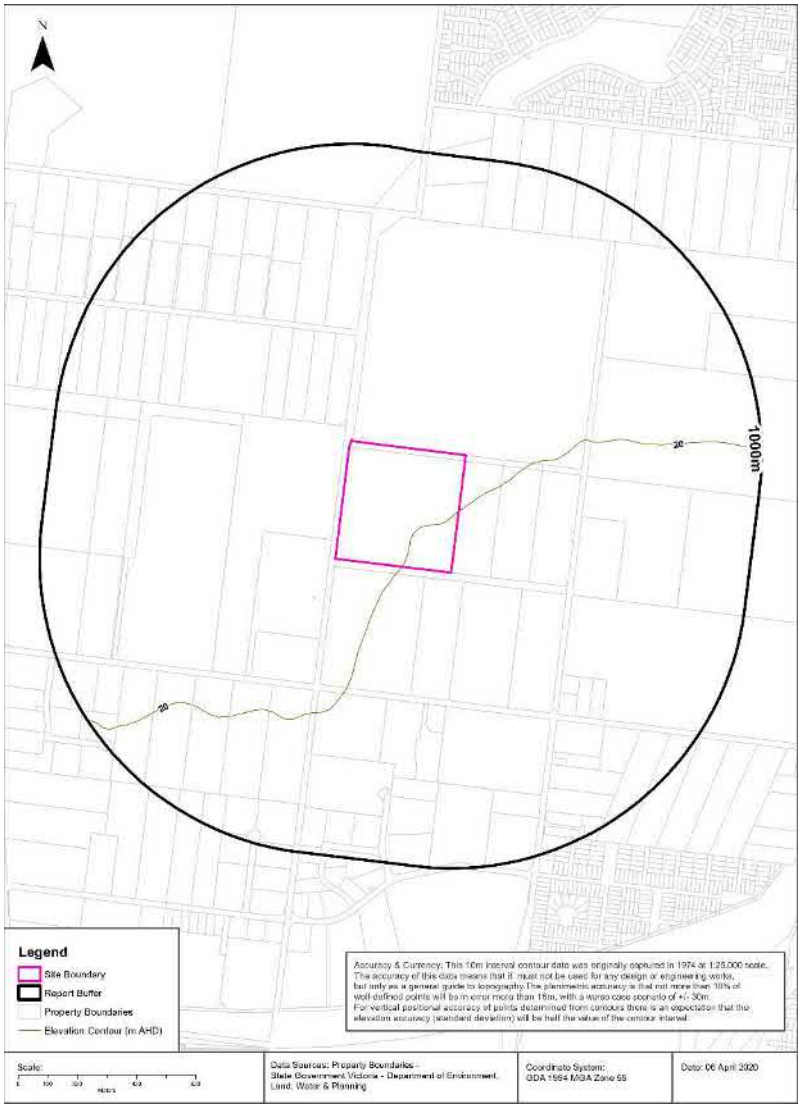


Figure 4.1: Regional Topography

The ground surface at the site appears to be natural material with extensive grass cover. However, review of public domain satellite imagery (Google Earth) shows significant ground disturbance has occurred since 2018 and many stockpiles are evident on the site; suggesting some fill material of unknown origin has been deposited. The material appears to be soil, however the nature and volume of the material has not been determined, and could include general construction or other waste material.

There are no visible natural surface water bodies present at the site. Rainwater falling onto the site is likely to infiltrate into subsurface soils and migrate vertically into groundwater due to the extensive permeable natural

surfaces across the site. Surface runoff from the site is likely to be from east to the low-lying areas to the west/ northwest through natural drainage lines where it disperses or drains into municipal stormwater systems along Production Way (under construction) and McManus Road. These in turn discharge to the nearest natural watercourse, Hovells Creek approximately 2.9 km further east.

4.2 Geological setting

4.2.1 Geology

The Geological Survey of Victoria 1:63,360 scale Geelong Geological Map Sheet (GSV, 1963) indicates the site is underlain by Quaternary aged Newer Volcanics (Nv1) which form extensive volcanic plains across the region. Although the exact thickness of the basalts at the site has not been confirmed, Leonard (1992) reported regional thicknesses in excess of 150 m along pre-basaltic drainage lines and around 40 m over the interfluves and even thinner towards the Bay.

GSV (1963) describes the Newer Volcanics as being vesicular, highly weathered and comprised of iddingsite labradorite basalts, olivine labradorite basalts, and olivine basalts (Ballan type) which are Pliocene to Pleistocene in age. The Newer Volcanics are overlain by varying thickness of fill.

To the north / northeast of the site, the newer volcanics are overlain by Quaternary aged Freshwater Limestones (Q2) consisting of sandy clays and clays with carbonate concretions that outcrop over a fairly wide area near the township of Lara. They also outcrop in the valley of Hovells Creek upstream from the Princes highway. The expected surface geology in the vicinity of the project area is shown in **Figure 4.2**: .

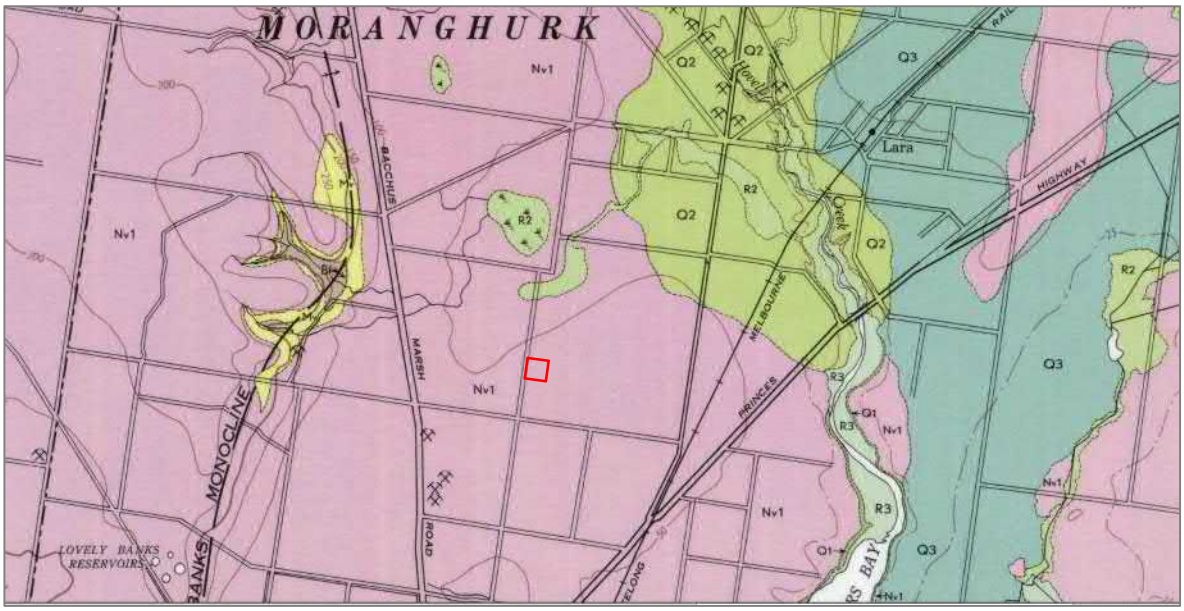


Figure 4.2: Regional Geology with approximate location of the subject site shown in red.

4.2.2 Acid sulfate soils

According to the Department of Environment and Primary Industries' Atlas of Acid Sulfate Soils (ASRIS, 2019), the possibility of encountering acid sulfate soils (ASS) within the site area is extremely low, with a 1–5% chance of occurrences in small localised areas. Additionally, the natural soils likely to be present at the site are predominantly derived from basalt, which have a low likelihood of ASS.

4.3 Hydrogeological setting

A review of records of registered groundwater monitoring wells within 2 km of the project area did not identify local depth to watertable and yielded only limited groundwater chemistry data. As such, the sections below primarily consider information from regional mapping available via the Visualizing Victoria's Groundwater (VVG, 2020) portal, the Water Measurement Information System (WMIS, 2020) and the Bureau of Meteorology Groundwater Dependent Ecosystems (GDEs) atlas (BOM, 2020).

4.3.1 Aquifers

The site is underlain by the Newer Volcanics fractured rock aquifer (identified as the Upper Tertiary / Quaternary Basalt Aquifer (code 101) under the Victorian Aquifer Framework (VAF)), which forms a major regional aquifer. The unit is mapped as having an approximate thickness between 33 and 35 m across the site, with a shallow water table <5 m below ground surface (bgs) (VVG, 2020). The groundwater regime in the Newer Volcanics aquifer is often complex due to the multi-layered nature of the system (Leonard, 1992). Similar aquifer systems are expected at the site consisting of several superimposed basalt flows that are often separated by thin clay and silt layers of low hydraulic conductivity. Groundwater in fractured rock aquifers typically occurs in fractures, joints, vesicular openings and in the contact zones between flows, as such, hydraulic conductivity can vary from highly permeable (20.2 m/day) to highly impermeable (0.09 m/day) depending on the degree of local fracturing.

Underlaying the Newer Volcanics aquifer is the Brighton Group aquifer which forms a discontinuous sheet-like formation of sand and silt (Leonard, 1992). Both the Newer Volcanics and Brighton Group aquifers are underlain and confined by the Fyansford (Newport) Formation which forms a low permeability aquitard across the region, with an approximate onsite thickness of 115 m (DWELP, 2020).

4.3.2 Depth to watertable

The depth to the watertable is mapped to be approximately <5 m bgs across the site, deepening to between 5 and 10 m bgs toward Hovells Creek, east of the site (VVG, 2020). Regional watertable mapping further suggests a prevailing groundwater flow direction from west to east/southeast toward Hovells Creek.

4.3.3 Salinity

Groundwater salinity in the area is mapped as ranging between 1,000 to 3,500 mg/L TDS. In accordance with the State Environment Protection Policy (SEPP) (Waters), the site falls within Segments A2, B and C. On that basis, groundwater at the site requires protection for the beneficial uses listed in **Table 4.1**.

Table 4.1: Beneficial Uses for Groundwater

Beneficial Use	A2 (601-1,200 mg/L)	B (1,201 – 3,100 mg/L)	C (3,101 – 5,400 mg/L)
Water dependent ecosystems and species	X	X	X
Potable water supply (acceptable)	X		
Potable mineral water supply	X	X	X
Agriculture and irrigation (irrigation)	X	X	
Agriculture and irrigation (stock watering)	X	X	X
Industrial and commercial	X	X	X
Water-based recreation (primary contact recreation)	X	X	X

Beneficial Use	A2 (601-1,200 mg/L)	B (1,201 – 3,100 mg/L)	C (3,101 – 5,400 mg/L)
Traditional Owner cultural values	X	X	X
Cultural and spiritual values	X	X	X
Buildings and structures	X	X	X
Geothermal properties	X	X	X

4.4 Registered groundwater users

A search of registered boreholes on the Department of Environment and Primary Industries Water Measurement Information System identified 10 registered groundwater bores within a 1 km radius of the site. Two of these bores are identified as State Observation Bores and have been excluded from further assessment. The remaining 8 groundwater bores (refer to **Table 4.2**) show the following use:

- One (1) bore – Domestic and Stock use;
- Two (2) bores – Stock use; and
- Five (5) bores – unknown use.

Table 4.2: Registered groundwater users

Bore ID	Use type	Distance from Site (m)	Direction
WRK988694	Unknown	373	South West
WRK988693	Unknown	442	South West
81404	Stock	446	North West
WRK988695	Unknown	554	South West
81410	Stock	840	North West
81402	Unknown	872	North West
81411	Unknown	962	North West
WRK989212	Stock & Domestic	984	North West

A further review of registered groundwater bores from the Department of Water, Environment and Land Planning's interactive mapping (VVG, 2020) indicates that 2 of the 5 bores identified as '*unknown use*' (WRK988694 and WRK988693) are located within the Shell LPG Terminal adjoining the Site to the southwest

4.5 Groundwater dependent ecosystems

The Groundwater Dependent Ecosystems (GDE) Atlas was queried as part of the consolidated information Report. The search identified two high potential terrestrial GDEs within 1 km of the project area based on a national assessment. No aquatic GDEs were identified within the search radius.

4.6 Groundwater considerations

Considering the indicated shallow water table at the site (<5 m bgs) and the proposed maximum excavation depth of 11 m bgs, groundwater is likely to be encountered during construction of the EfW plant and dewatering may be required. Although temporary dewatering at such a small scale is unlikely to cause long-term, regional-scale impacts to the groundwater flow regime, there is potential for mobilising existing groundwater contamination plumes, if they exist, associated with surrounding potentially contaminated properties. Potential issues include:

- Requirement to manage contamination arriving at the pumping point;
- Third party issues for owners of land between the current extent of contamination and the pumping point due to 'arrival' of contaminated groundwater to that area;
- Change to the human health risks associated with the current groundwater contamination locations, for instance, in relation to volatile contaminants having propensity to migrate upwards from groundwater to indoor air; and
- Regulatory issues (EPA Victoria) associated with causing and/or spreading groundwater contamination.

On the basis of identified potential off-site contamination sources, and the likelihood that groundwater will be encountered during construction, a further detailed investigation of groundwater both from a contamination and geotechnical perspectives should be considered.

5. Site history

5.1 Historical summary

A brief summary of the history of the site is provided as follows:

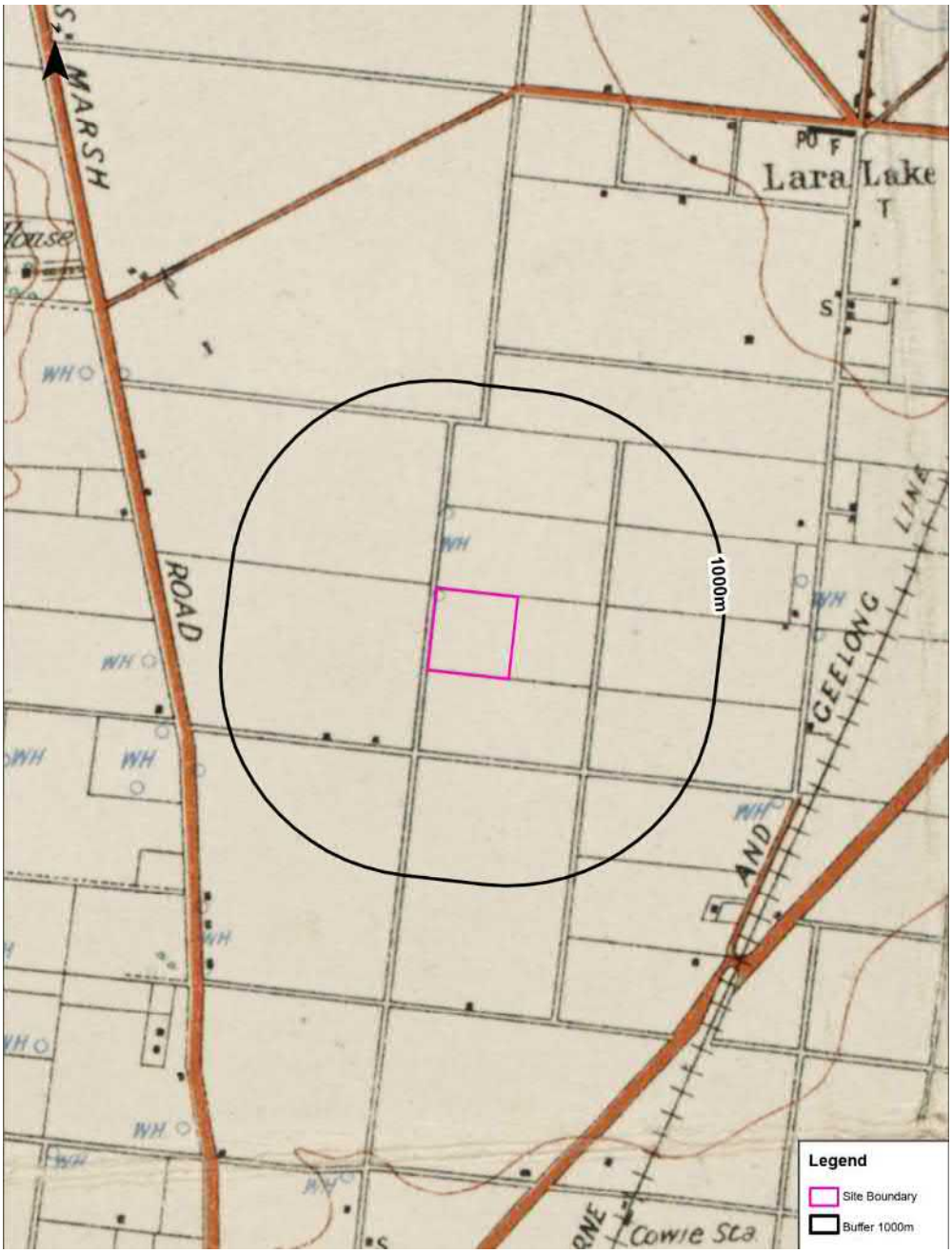
- Based on aerial photographs from between 1914 to 2019, the site has never been developed and remained vacant for over a century. It is believed to have been utilised for agricultural purposes (such as grazing) for most of its history.
- Although the site remained undeveloped for its entire history, aerial photographs show intermittent disturbance of the ground surface, alternating between grassed and ploughed/excavated surfaces.
- Historical title documents show the site has been under the proprietorship of Mr. Michael Broderick between 1855 and 1877, after which it was acquired and remained under the ownership of William and James Mathews until 1887. A William McClelland took over ownership of the site in1887 and sold it to a Ms. Jane Splatt in 1921. The site remained under the Splatt family until it was taken over by the Geelong Regional Commission who owned the land up until 1993. Once again, the land changed hands and became the property of the Greater Geelong City Council between 1993 and 2019. The site was Crown Land prior to being granted to Mr. Broderick in 1855.
- Prospect Hill International Pty Ltd purchased the land from the Greater Geelong City Council in October 2019.
- Review of publicly available photographic and documentary information suggests no current or historical potentially contaminating activities occurred on the site. However, some potentially contaminating activities have been identified in the immediate surroundings, including liquid petroleum gas (LPG) storage facilities and chemical manufacturing plants. The details are discussed with the aerial photographs below.

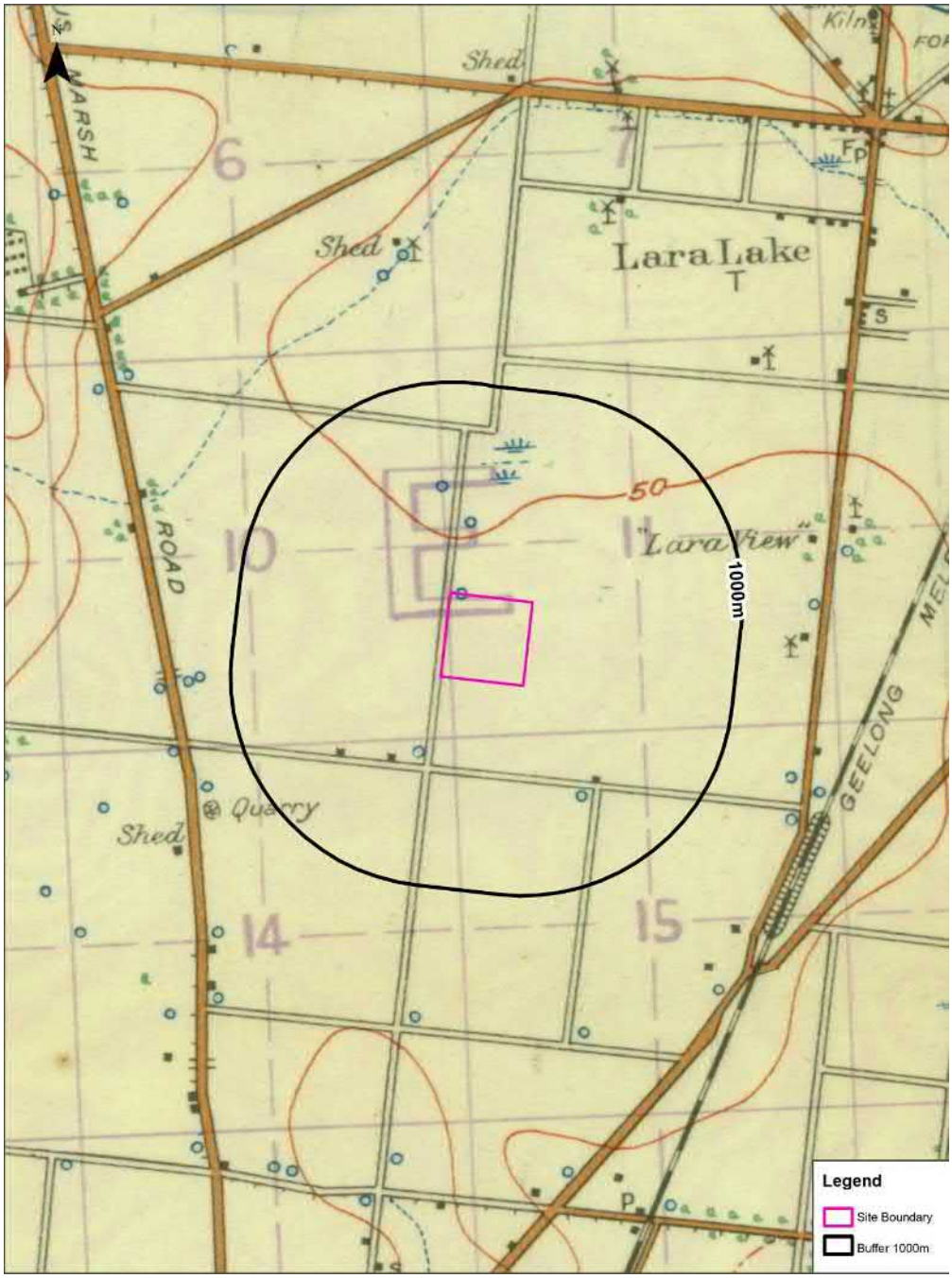
5.2 Review of historical aerial photographs

Jacobs obtained historical maps and aerial photographs for the site and surrounding areas from c.1914 to 2019. The imagery was captured by the Department of Environment, Land, Water & Planning (DELWP) using Vicmap Topographic Mapping Program. Several key images are provided as figures in **Table 5.1**.

Additional aerial images are presented in the Lotsearch™ report provided in **Appendix A**.

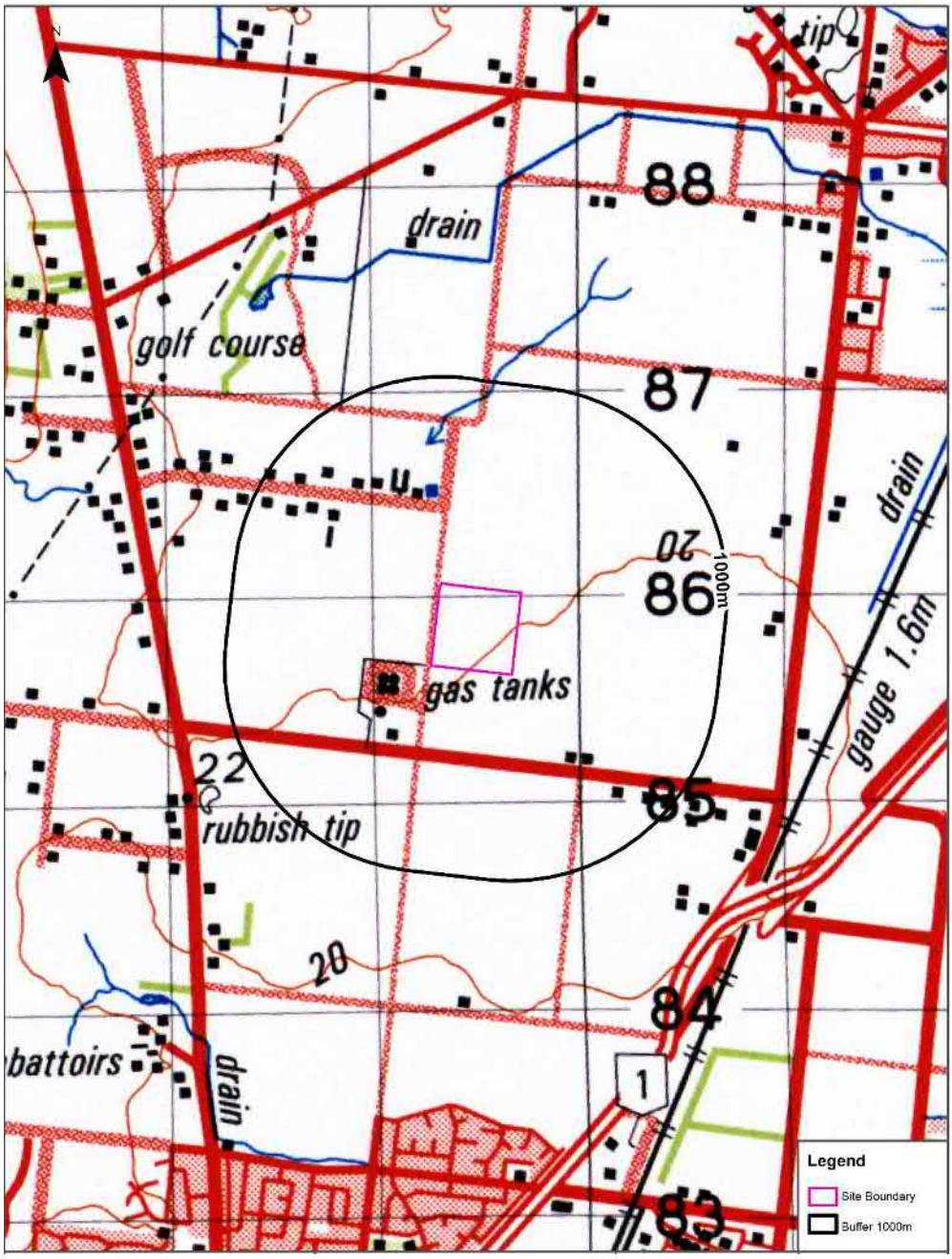
Table 5.1: Historical aerial photo review

Year	Details
1914 Lotsearch™	 Onsite: This 1:63,360 scale map from 1914 shows the site was part of a larger plot and undeveloped at the time. Surrounding areas: The presence of several waterholes (WH) in the surrounding areas suggests the area was largely farmland. A 1939 auction notice for Elcho Estate, northwest of the site, states the surrounding land has been used for mixed farming including cultivation of wheat, oats and barley as well as grazing sheep.

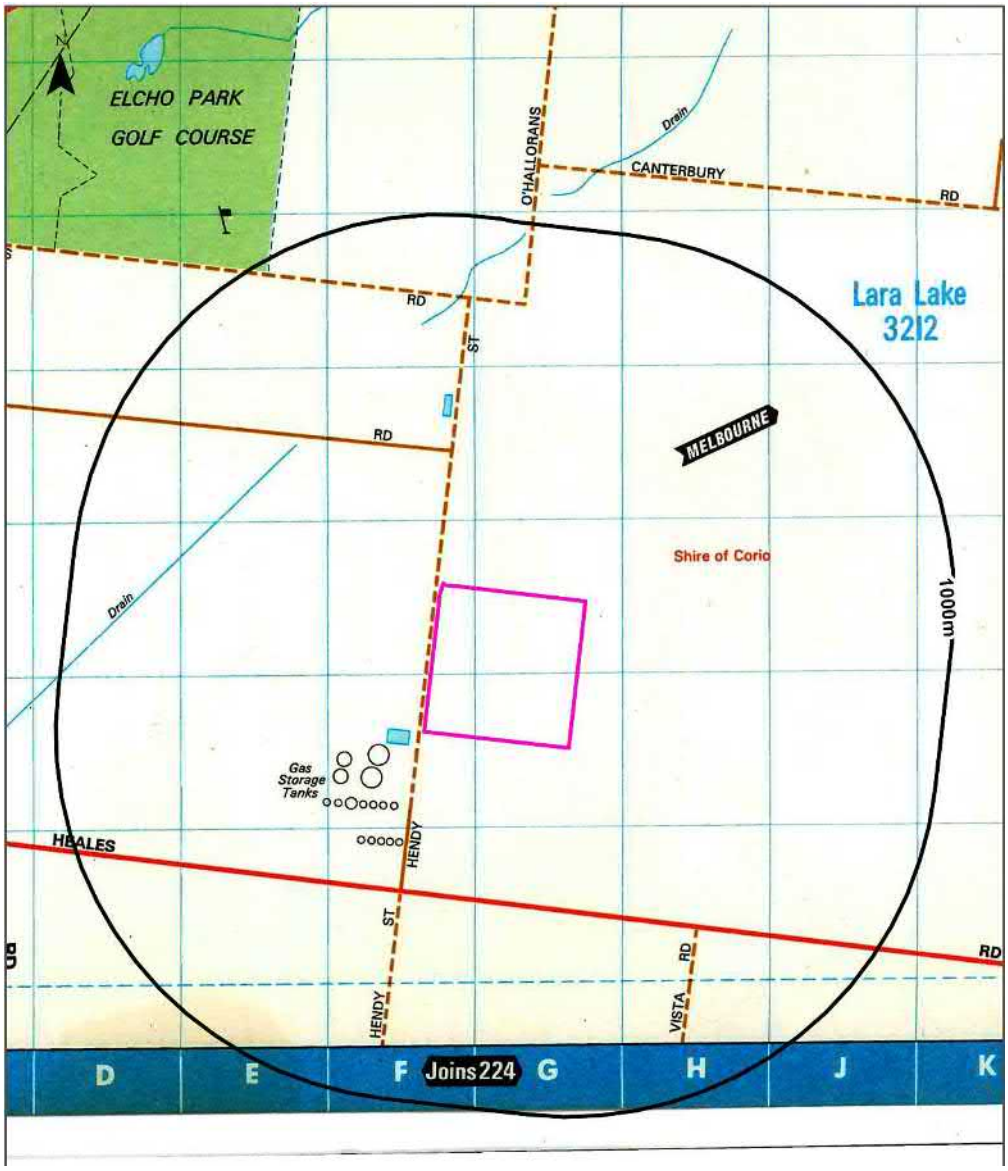
Year	Details
c. 1928 Lotsearch™	
	Onsite: No land use changes appear to have occurred since 1914. Surrounding areas: A quarry has been established adjacent Bacchus Marsh Road, just over a kilometre south west of the site. It also appears farming activities (most likely sheep grazing) have intensified in the area as shown by the presence of extensive water holes, sheds and windmills.

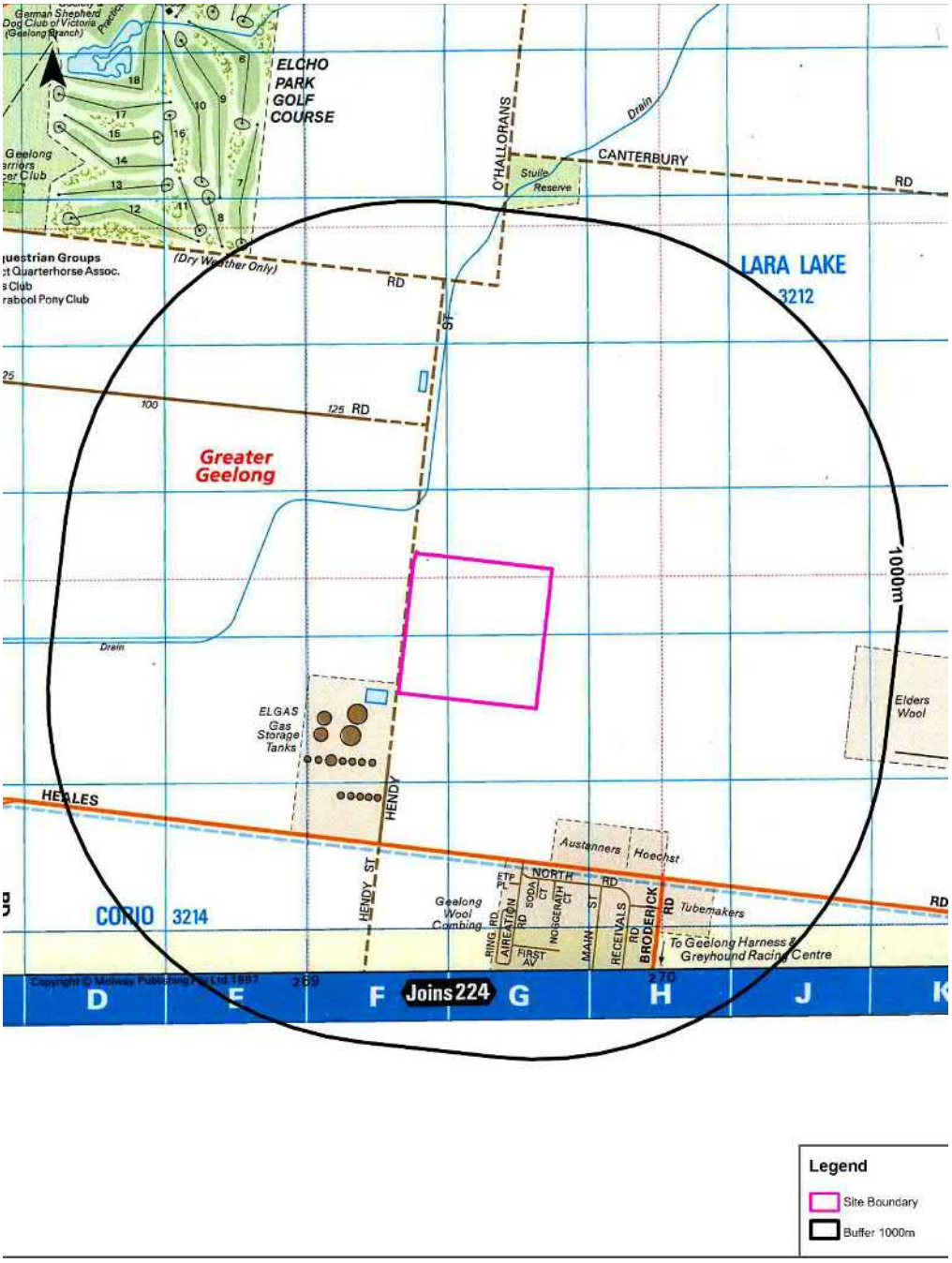
Year	Details
1947 Lotsearch™	 This aerial photograph of the site from 1947 shows that both the project site and the surrounding areas were yet undeveloped and most likely remained as farmlands.

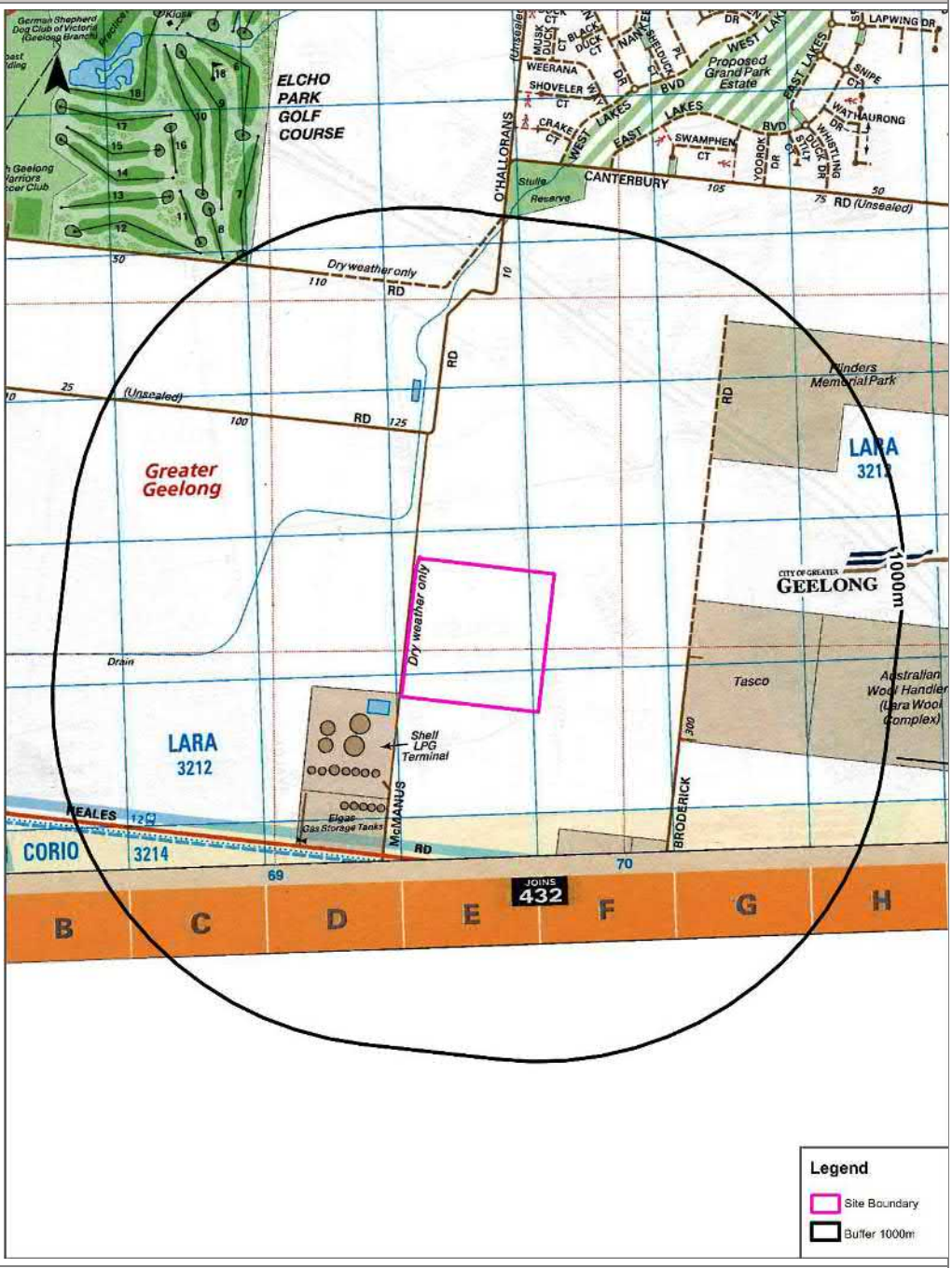
Year	Details
1963 Lotsearch™	
	Onsite: With the exception of ground disturbance which appears to be typical agricultural ploughing, no change of land use can be seen on the site. Surrounding areas: The Shell LPG Terminal (an LPG storage and distribution facility) has been developed 200 m to the southwest. Immediately south of the Shell Terminal is another LPG storage and distribution facility, currently operated by Elgas.

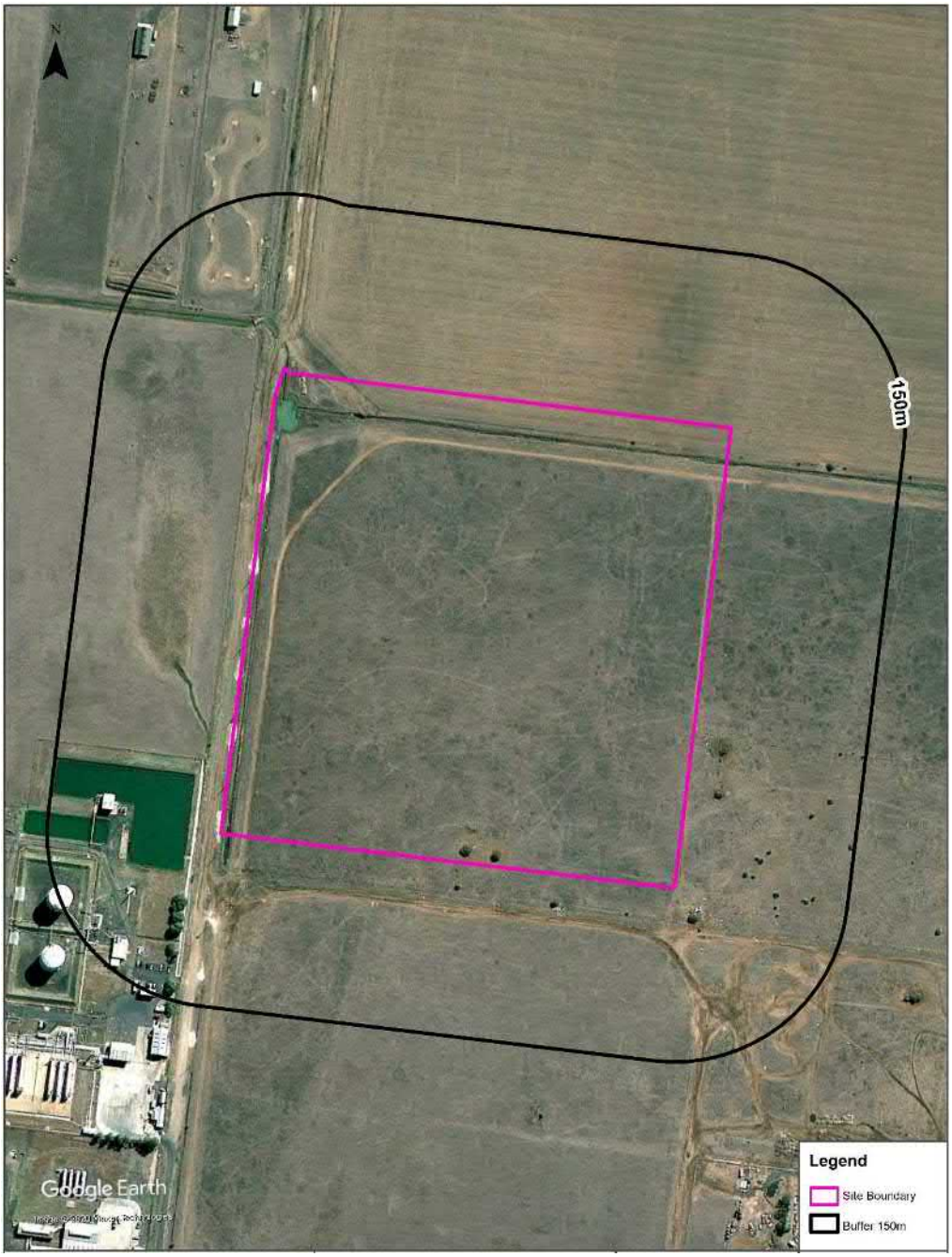
Year	Details
1975 Lotsearch™	
	Onsite: the site appears still undeveloped. Surrounding areas: by 1975, the surrounding areas have seen limited development with the establishment of a golf course (northwest) and a Shell LPG Terminal with 5 gas storage tanks just off the southwest boundary of the site. The quarry adjacent Bacchus Marsh Road further south-west of the site appears to have been decommissioned and turned into a rubbish tip.

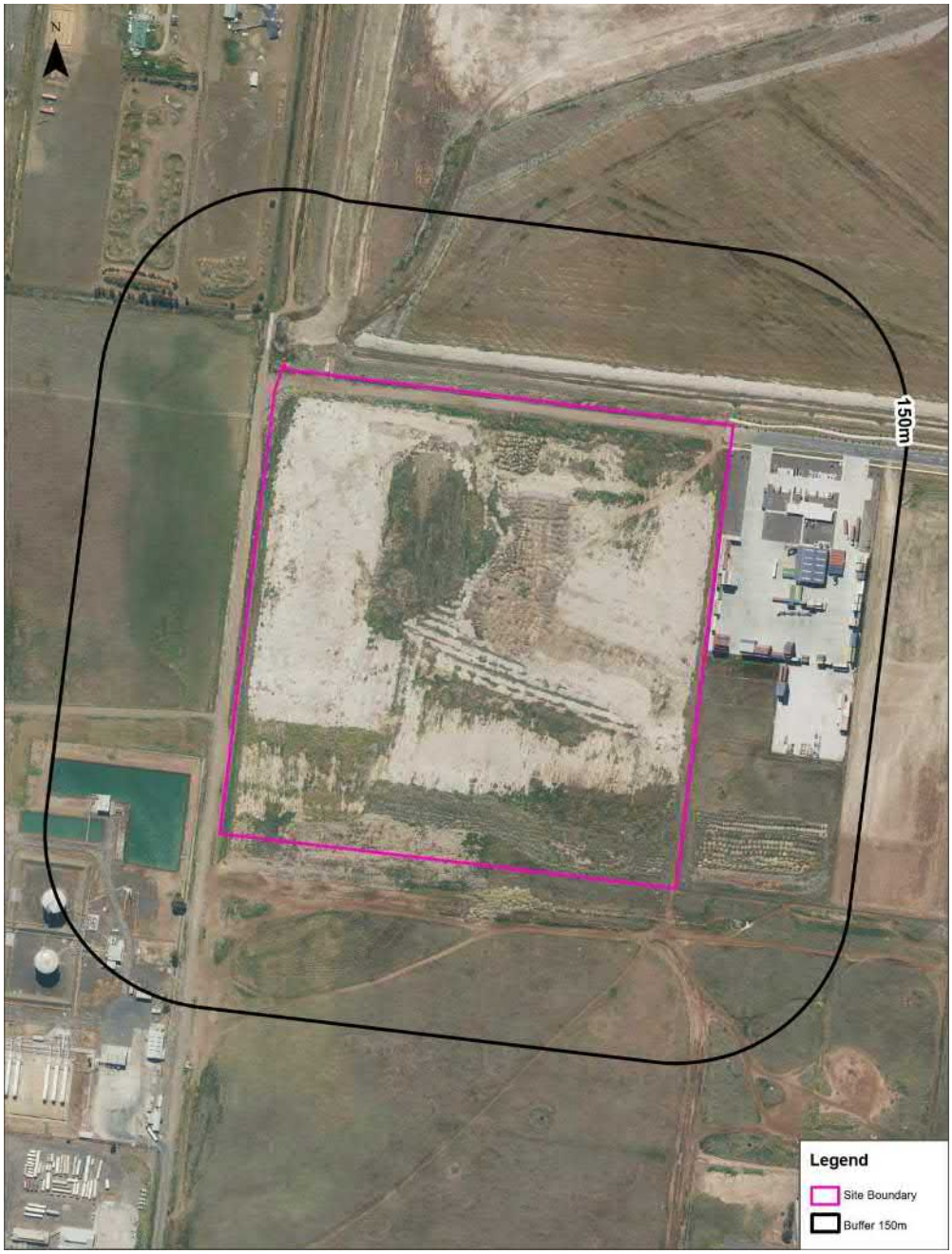
Year	Details
1978 Lotsearch™	
	While there are no changes onsite, this image shows the Shell Terminal has expanded further north with the installation of 2 large above-ground storage tanks. It is believed that a further 3 slightly smaller above-ground storage tanks have been installed as shown in the following image. These structures still remeain on site.

Year	Details
1978 Lotsearch™	
	Onsite: there are no indications of development on-site. Surrounding areas: this map from a 1978 Melway Street Directory shows the additional 3 storage tanks that were out of frame in the previous image. The smallest circles represent horizontal LPG storage tanks; and the blue rectangle shows a dam.

Year	Details
1998 Lotsearch™	 Onsite: remains undeveloped. Surrounding areas: by 1998, minor industrial developments are starting to emerge in the surrounding areas, particularly to the southeast, including a Wool Combing business, a metal workshop and a tannery. However, the rest of the surrounding area remains largely unchanged since the 1970s.

Year	Details
2009 Lotsearch™	 Onsite: No signs of development are visible. Surrounding areas: the area east of the site sees some development with the establishment of the now-defunct TASCO and the Australian Wool Handlers Complex. The current boundary of Lara is shown as a proposed residential estate north of the site. Note that Hendy Street is now called McManus Road and remains unpaved. Broderick Road has been extended further north of Heales Road.

Year	Details
2009 Lotsearch™	 A private residence has been built approximately 300 m to the northwest of the site. This property is identified from this assessment as the closest sensitive receptor to the site. The area north, south and east of the site remains undeveloped.

Year	Details
2018 Lotsearch™	
	Onsite: Extensive ground disturbance is visible on the site; however, it is unclear whether the mounds of material seen on the image are excavated from onsite or imported. Similar stockpiles are also visible on the Reserve adjacent the southern site boundary and on the neighbouring property to the east. From review of Google Earth satellite imagery, the majority of the material appears likely to be natural soil; however, there is some evidence of construction debris in the northern part of the site, as well as in the nature Reserve just outside of the southern boundary. Further assessment of material is required before reliable classification of the stockpiles can be made. Surrounding areas: The bordering property to the east has been developed into a warehouse and a concrete hardstand shipping container yard. The second property to the

Year	Details
	east also appears to be disturbed, indicating upcoming developments. The construction of a sealed road (Production Way) is completed up to the northeast boundary of the site Approximately 48 horizontal gas storage tanks of varying sizes can be seen at the Elgas property further southwest of the site. It is not known if any underground storage tanks (USTs) are present.
2019 Lotsearch™	
	Onsite: most of the stockpiled materials remain on site, but no development has occurred on the site. Surrounding areas: a large covered structure has been installed on the second property to the east of the site.

5.3 EPA records

A review of publicly available EPA Victoria records within 1 km of the site documented EPA pollution notices, audits, and groundwater zones with restricted use in the area, as well as EPA prescribed industrial waste storage, treatment and transport facilities (Lotsearch™, 2020). The following sections summarise EPA records detailed in the Lotsearch™ report found in **Appendix A.**

5.3.1 EPA Pollution Notices

EPA records were queried for priority sites and pollution notices within a 1 km radius of the site. The search results show there are no current EPA priority sites within the buffer zone. However, the search identified a total of 9 pollution notices (3 Clean Up Notices and 6 Pollution Abatement Notices) issued between August 2014 and March 2018. The details of EPA pollution notices within the buffer zone are given in **Table 5.2**.

Pollution abatement notices are issued under section 31A of the *Environment Protection Act 1970 (EP Act)* to prevent further occurrence of pollution or potential environmental risk through installation of risk controls and changes to onsite processes and practices. Clean up notices are issued under section 62A of the EP Act and are designed to prevent further contamination and impact on beneficial uses by removing waste, undertaking clean-up activities, managing pollution on an ongoing basis, or by changing the handling, storage or location of industrial or Prescribed Industrial Waste (PIW).

Table 5.2: Summary of EPA pollution notices (After Lotsearch™ Report, 2020 p 8) *

Notice Number	Notice type	Company	Address	Status	Date Issued	Distance from site (m)	Direction
90005284	Clean Up Notice	Greater Geelong City Council (Note this is the Shell LPG Terminal)	137 McManus Rd, Lara	Previous pollution notice	29/08/2014	20	South West
90008270	Clean Up Notice	C & D Recycling Pty Ltd	300 – 400 Broderick Rd, Lara	Current pollution notice	06/11/2017	416	East
90008099	Pollution Abatement Notice	C & D Recycling Pty Ltd	300 – 400 Broderick Rd, Lara	Current pollution notice	06/03/2018	416	East
90006933	Clean Up Notice	C & D Recycling Pty Ltd	300 – 400 Broderick Rd, Lara	Previous pollution notice	30/05/2016	416	East
90006719	Pollution Abatement Notice	Veolia Environmental Services	140 Broderick Rd, Lara	Previous pollution notice	23/02/2016	797	South East
90006718	Pollution Abatement Notice	Veolia Environmental Services	140 Broderick Rd, Lara	Previous pollution notice	25/02/2016	797	South East
90005568	Pollution Abatement Notice	Veolia Environmental Services	140 Broderick Rd, Lara	Previous pollution notice	08/12/2014	797	South East

Notice Number	Notice type	Company	Address	Status	Date Issued	Distance from site (m)	Direction
90006927	Pollution Abatement Notice	Ameropa Australia Pty Ltd	55 Heales Rd, Lara	Previous pollution notice	13/05/2016	921	South East
90006550	Pollution Abatement Notice	Impact Fertilisers Pty Ltd	55 Heales Rd, Lara	Previous pollution notice	10/12/2015	921	South East

** Due to pollution notices being revoked and removed from published lists this is not an exhaustive list of all past pollution notices.*

5.3.2 EPA Environmental Audits

Environmental Audits assess the nature and extent of harm, or risk of harm to the environment posed by a process, activity, waste, or substance. A Lotsearch query of EPA records showed there are no sites for which Environmental Audit Report is available within 2 km of the site.

5.3.3 EPA Groundwater Restricted Use Zones

No Groundwater Restricted Use Zones (GRUZ) were identified within 2 km radius of the site. The nearest GRUZ is a former service station located at 391-395 Princes Highway (Lot1 TP249115 and Lot 1 TP402827), approximately 3 km south of the site. The site was issued a Statement of Environmental Audit (CARMS: 63208-1) following the Auditor's determination that, despite the presence of residual dissolved phase hydrocarbon plumes on the site and adjacent property, the impacts are not considered to represent an unacceptable risk to site users or offsite maintenance workers with respect to direct contact. This site is downgradient of the project site and unlikely to affect the proposed development.

5.3.4 EPA Licensed Activities

The Victoria Unearthed interactive web mapping (DWELP, 2020) and Lotsearch™ results shows there are two EPA licenced activities within 2 km of the site. One of the businesses is a PIW treatment and storage facility located at 2/140 Broderick Rd, Lara, approximately 797 m southeast of the site.

The second licensed facility is a metal galvanising plant (Geelong Galvanising Pty Ltd) located at 360 Bacchus Marsh Rd, Corio; approximately 1.4 km southwest of the project site.

5.4 Dry Cleaners and Motor Garages

Lotsearch™ and business directory searches indicate there are no dry cleaners or motor garages within 2 km of the site.

5.5 Previous investigations

Jacobs is not aware of any other geotechnical or contamination investigation reports that exist that relate to the site.

6. Preliminary Conceptual Site Model

Jacobs has developed the following preliminary Conceptual Site Model (CSM) based on the information obtained during the desktop review, potential contamination associated with known historical and current site uses, and potential receptors to contamination during the development of the EfW plant.

According to the Amended NEPM (NEPC, 2013), the essential elements of a CSM are:

- Identification of potential contamination and sources;
- Identification of potential pathways and transport mechanisms;
- Identification of sensitive receptors;
- Assessment of potential and complete exposure pathways and preliminary risk assessment; and
- Data gap and uncertainty assessment.

The procedure to develop the preliminary CSM followed was generally in accordance with the Amended NEPM (NEPC, 2013) The CSM is described in the following sections.

6.1 Potential contamination and sources

Table 6.1 presents a summary of the potential sources of contamination (and associated Contaminants of Potential Concern (CoPC)) based on Jacobs' review of the history of the site and surrounding land use, including a ranking of potential for historical contamination issues being present at those sites, based on typical potential issues associated with such land uses. The table also presents an assessment of potential for the project to be impacted due to such contamination. Transport Mechanism

With the exception of the material stockpiled on the site, the most likely mechanism for contamination from potential offsite sources to impact the project (i.e. to be encountered at the site) is via groundwater. However, for properties adjoining the Site, a lesser degree of contaminant transport via surface water is possible.

6.2 Potential human receptors

Potential sensitive receptors at the site include:

- Construction workers at the site that may be exposed to contaminated soil or groundwater during the construction of the EfW plant;
- Local residents who may access potentially contaminated groundwater downstream of the project site;
- General site workers who may be exposed to contaminated soils or dust generated during construction activities;
- Offsite members of the public who may be exposed to contaminated soil and / or dust that may migrate from the site during construction

6.3 Pathways and exposure mechanisms

Identified potential pathways for contaminant exposure by identified receptors include the following:

- Ingestion of contaminated soils, dust or water (surface water or groundwater);
- Inhalation of dust, vapours and/or fibrous material (such as asbestos fibres); and / or
- Direct dermal contact with contaminated soils, dust or water.

6.4 Pollutant Linkages

A number of potential source-pathway-receptor linkages have been identified that warrant further investigation. A preliminary, qualitative risk assessment has been undertaken in order to identify the potential for these sources to impact the EfW site. Primary risks are considered to fall into four categories:

1) Risk to ecological values (GDEs) in the vicinity of the site from proposed construction / operation;
2) Risk to human health during construction and / or operation of the proposed facility;
3) Risk to project due to waste disposal / clean-up requirements; and
4) Regulatory or 3rd party issues associated with mobilisation of an existing contamination issue (primarily groundwater).

Table 6.1: Summary of potential contamination sources, contaminants of potential concern and potential for associated impacts to the project

Site activity/use	Description	Contaminants of Potential Concern (soil and groundwater)	Ranking of potential for site to be a source of contamination	Risk of a related impact to the project occurring[1]	Potential risks (Refer Section 6.5)
On-site potential sources					
Review of historical land use has indicated the project area remained undeveloped for over a century, and no documentary or photographic evidence was found to show potentially contaminating activities on site except for agricultural uses. As a result, the presence of onsite sources of contamination is deemed unlikely, although use of pesticides and or fertilisers is possible. More recently, aerial photographs from 2018 and 2019 (Lotsearch™) show the introduction of what appears to be stockpiled material/fill derived either from onsite excavations or as material imported onto the site. The material is deposited in small stockpiles across the site as well as on the Reserve immediately south of the site and the adjoining property to the east. Although no determination has been made as to the origin, nature or contents of the material, it appears to be a mix of soils and minor quantity of construction rubble. If these materials are proven to be imported, they should be considered as potentially contaminated and an on-site source of land and groundwater contamination.			High (a rating of high was given due to uncertainty with respect to the origin of fill material)	**High** potential for impact to occur	1, 2, 3
Historical use of the site for agriculture	The project site and the surrounding areas have a long history of agricultural use including cropping and grazing. Potential use of broadacre pesticides, herbicides and fertilisers is a potential on-site source of land and groundwater contamination	Organochloride pesticides (OCPs), Organophosphate pesticides (OPPs), Herbicides (e.g. triazine, atrazine, MCPA, bipyridyls, sulfonyl urea, chlorophenoxys), Nutrients (e.g. Nitrates), Metals (e.g. Al, As, Cd, Cu, Fe, Pb, Mg, K), insecticides (e.g. DDT, DDE, DDD, bifenthrin), Aldrin, Dieldrin, Toxaphene	Moderate	**Moderate** potential for impact to occur	1, 2 and 3
Off-site potential sources					
Shell LPG Terminal	A storage and distribution terminal for LPG is located less than 50 m from the southwestern boundary of the site. Historical photographs show the terminal existed since c. 1960s. A gas pipeline along McManus Rd directly connects the terminal to an oil refinery in Geelong. The presence of underground storage tanks (USTs) at this property is unknow. EPA records show the site has been issued a Pollution Notice (Clean up Notice) on at least one occasion.	TPH, MAHs (e.g. Benzene, toluene, ethylbenzene & xylenes), Metals (e.g. Pb, Zn, Cu, Ni, Cr, Cd, Ba, As, Hg), Cyanides, Acids (e.g. sulfuric), Alkalis, Methyl tertiary-butyl ether	**Moderate - High**	**Moderate to High** potential for impact to occur from migration of contaminants to site via surface and groundwater if dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**

Site activity/use	Description	Contaminants of Potential Concern (soil and groundwater)	Ranking of potential for site to be a source of contamination	Risk of a related impact to the project occurring[1]	Potential risks (Refer Section 6.5)
Elgas LPG depot	A second LPG storage and distribution facility is located 28 m southwest of the site. There are several above-ground gas storage tanks which may have leaked overtime. The presence of underground storage tanks (USTs) at this property is unknown.	TPH, MAHs (e.g. Benzene, toluene, ethylbenzene & xylenes), Metals (e.g. Pb, Zn, Cu, Ni, Cr, Cd, Ba, As, Hg), Cyanides, Acids (e.g. sulfuric), Alkalis, Methyl tertiary-butyl ether	**High**	**Moderate to High** potential for impact to occur from migration of contaminants to site via surface and groundwater if dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**
Warehouse and shipping container yard	The property adjoining the site to the east is a transport warehouse and shipping container yard (since sometime between 2009 and 2018). The type of goods stored/transported is currently unknown and the property has been added to this list due to its proximity to the project site and the uncertainties relating to the nature of its operations	Potentially contaminated soil and groundwater	**Moderate**	**Low to Moderate** Potential for impact to occur. Contaminant migration pathway considered to be via surface and groundwater if dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**
ACCENSI Agrochemical manufacturing	A crop protection chemicals manufacturer is located approximately 260 m to the east of the site. The facility produces a wide range of emulsifiable concentrates, suspension concentrates (flowables), powders, aqueous solutions, coated granules and amination-based reactions such as glyphosate and phenoxies.	Glyphosate, dioxins, OCPs, OPPs, herbicides (e.g. triazine, atrazine, MCPA, bipyridyls, sulfonyl ureas and chlorophenoxys), Metals (e.g. As, Hg, Cr, Cu, Zn, chloride/sulfate), Ammonium thiocyanate	**High**	**Low to Moderate** potential for impact to occur via contaminant migration through groundwater if dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**
Axieo industrial chemical manufacturing	Axieo is a specialty chemicals manufacturer located approximately 310 m southeast of site. The company website indicates the plant manufactures raw materials for a wide range of industrial chemicals ranging from construction and extractive industries to pharmaceuticals and agriculture.	Solvents (e.g. TCE, toluene oils, acetone, ethyl acetate, etc), Polyvinyl acetate, Phenols, Formaldehyde, Phthalate esters, PCBs, Phosphates and Nitrates, Urethane, Styrene, Metals (e.g. Cd, Cr, Co, Pb, Ti, Zn), MAHs, Cresols, Chlorinated hydrocarbons, Silicate compounds	**High**	**Low to Moderate** potential for impact to occur via contaminant migration through air dispersion and surface water runoff. Potential for existing contaminant plume migration via groundwater if dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**

Site activity/use	Description	Contaminants of Potential Concern (soil and groundwater)	Ranking of potential for site to be a source of contamination	Risk of a related impact to the project occurring[1]	Potential risks (Refer Section 6.5)
SNF organic polymers manufacturing	The manufacturing facility is located <500 m southeast of the site. A company brochure indicates the plant manufactures organic coagulants and flocculants such as Polyacrylamide (PAM) powders, beads and emulsions as well as super-absorbents (polyacrylate powders) for water treatment and a host of industries.	Acrylonitrile, Acrylamide, Sulphur oxides (Sox), Nitrogen oxides (NOx), Phosphorous, hydrocarbons, VOCs, metals (e.g. aluminium)	**High**	**Low to Moderate** potential for impact to occur via contaminant migration through air dispersion and surface water runoff. Potential volatile contaminant plume migration via groundwater if on-site dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**
C&D Recycling	C & D Recycling Pty Ltd, located approx. 200 m from the site, has been issued 2x Clean Up Notices and 1x Pollution Abatement Notice	Recycled materials unknown; potential asbestos and metals (e.g. Pb and Zn)	**High**	**Low to Moderate** potential for impact to occur via contaminant migration through surface water runoff or groundwater if dewatering temporarily alters direction of groundwater flow in the area.	**1, 2, 3, 4**
Prescribed Industrial Waste Management Facilities	Two EPA prescribed waste treatment, disposal and transport facilities (Veolia Environmental Services Pty Ltd and Sweeny Todd Waste Disposal Pty Ltd) are located approximately 797 m southeast of the site. EPA licence documents show the license holders store, thermally treat and transport/dispose of clinical and related waste and store photographic and dental amalgam waste.	Pathogenic substances and quarantine wastes, cosmetics and pharmaceutical waste, Metals (e.g. Cr, Ag, Hg, Se), Phosphate, Ammonium compounds, Potassium bromide, Sulphur compounds, Ethanol, Formaldehyde, carbamates, Thiocyanate	**Moderate**	**Low:** Unlikely for this source to directly impact the site due to distance from the site. However, there is risk of mobilising potentially existing contaminant plumes from this site onto neighbouring properties if on-site dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**

Site activity/use	Description	Contaminants of Potential Concern (soil and groundwater)	Ranking of potential for site to be a source of contamination	Risk of a related impact to the project occurring[1]	Potential risks (Refer Section 6.5)
Geelong Metal Galvanising	The licence holder (License # 1928) operates a hot dip steel galvanizing plant at 360 Bacchus Marsh Rd, Corio, approximately 1.4 km southwest of the site.	Metals (e.g. Al, Ba, Cd, Cr, Cu, Ni, Tn, Zn and Pb), solvents (e.g. 1,1,1-trichloroethane, tetrachloroethylene), Volatile Organic Compounds (VOCs), Chlorinated hydrocarbons, MAHs (e.g. Benzene, toluene), cyanide, Acids (e.g. sulfuric, hydrochloric, nitric and phosphoric)	**Moderate**	**Low:** Limited potential for impact to the site due to distance from site. However, there is risk of mobilising potentially existing contaminant plumes from this site onto neighbouring properties if on-site dewatering temporarily alters direction of groundwater flow in the area	**1, 2, 3, 4**

[1] A formal risk assessment has not been completed. The risk columns presented in **Table 3.1** represents the professional judgement of the Author/s based on a review of the background information available. Risks are identified as follows: Green = Low; Orange = Medium; Red = High.

- *Green: No further investigations recommended, beyond required EPA sampling to meet spoil categorisation requirements, and assuming that effective controls are implemented through a CEMP*
- *Orange: Further investigations are recommended to confirm understanding of potential project risks but can be incorporated into future geotechnical or hydrogeological investigation programs / or can be deferred and completed as part of detailed design or construction activities by the Contractor.*
- *Red: Further investigations are likely critical for understanding potential project risks and should be completed as soon as possible and might require a specific scope to be developed.*

6.5 Uncertainty Assessment

This preliminary investigation is the first step in a tiered approach to assessing risks from contaminated land. The preliminary risk assessment presented here relies largely on review of documentary information, and thus, it is largely predictive and consequently relatively uncertain.

Ground investigation is recommended to parallel any proposed geotechnical testing with a view to validating and refining the CSM and reducing this uncertainty; this is described in more detail in the S**ection 7**.

7. Conclusions and recommendations

7.1 Conclusion

Based on the findings of the desktop contamination assessment, Jacobs concludes that further assessment is required to determine the nature and extent of potential contamination and waste classification of spoil.
A number of potential sources of contamination along, with potential migration pathways have been identified at, or in the vicinity of, the site.

A preliminary, qualitative risk assessment has been undertaken in order to identify the potential for these sources to impact the EfW project; presented as **Table 6.1**. The qualitative risk assessment indicates one identified risk item ranked high; two risk items ranked moderate to high; one risk items ranked moderate; five risk items ranked low to moderate; and two risk items ranked low in respect potential for impact to the EfW project.

Primary risks are considered to fall into four categories:

1) Risk to ecological values (GDEs) in the vicinity of the site from proposed construction / operation;
2) Risk to human health during construction and / or operation of the proposed facility;
3) Risk to project due to waste disposal / clean-up requirements; and
4) Regulatory or 3rd party issues associated with mobilisation of an existing contamination issue (primarily groundwater).

Assessment of potential contamination sources and potential related impacts to the project from this indicated from this preliminary investigation are summarised as follows.

Potential on-site source of contamination

Based on the available information, the site has never been developed and has remained vacant for over a century. It is possible the site has been used at some stage for some agricultural use (cropping and grazing) which could have included pesticide and fertiliser use. The only other potential onsite source of contamination may be the stockpiled material of unknow origin, which is evident across the site.

- There is a high potential for stockpiled material/fill to impact the project, in relation to waste classification and disposal or reuse;
- There is a moderate potential for impact to occur to the project due to potential contamination issues associated with historical use of the site for agriculture.

Potential offsite sources of contamination

Several potential offsite sources of contamination were identified in the vicinity of the site. The most likely transport mechanism for contamination from potential offsite sources to impact the project (i.e. to be encountered at the site) is via groundwater, and to lesser degree via surface water from adjacent propoerties.

Identified potential off-site sources include:

- Two Liquid Petroleum storage and distribution facilities consisting of underground pipeline and several above-ground storage tanks;
- A transport warehouse and shipping container yard;
- A recycling facility;
- An agrochemical manufacturing plant;
- Two industrial chemicals manufacturers; and
- Prescribed Industrial Waste Management (treatment, storage, disposal and transport) facilities.

Potential impacts to the project indicated from this preliminary investigation are as follows:

- There is a moderate to high potential for impact to the project to occur due to contaminant migration from potential off-site sources west of the site (i.e. Shell LPG Terminal and Elgas LPG depot, along with associated underground pipelines).
- There is a low to moderate potential for impact to the project to occur in relation to potential contamination from the transport warehouse and container yard adjoining the site to the east.
- There is a low to moderate potential for impact to the project to occur from sites further east and southeast, including a recycling facility and three agricultural and industrial chemical manufacturing plants. Although these potential sources are further from and downgradient of the site, there is potential for groundwater contamination to be present at those sites. It is possible that onsite dewatering may mobilise such contamination to the project site, or to third-party properties between those potential sources and the site, presenting regulatory and third-party risk to the project.
- There is a low potential for impact to occur to the project from potential contamination at a metal galvanising facility southwest of the site, and two prescribed industrial waste management facilities (treatment, transport and disposal) to the southeast of the site.

The conclusions listed above are considered preliminary in nature. Further investigation is recommended in order to reduce uncertainty in relation to potential risks identified during this initial phase of investigation. Recommendations for further works are detailed in the section below.

7.2 Recommendations for further works

On the basis of the findings obtained during the preliminary investigation, the following additional works are recommended to be undertaken at the site:

- Site inspection to visually examine and assess the need for sampling and analysis of fill stockpiles;
- Limited intrusive soil investigation in order to further characterise potential risks posed by soil contamination (if any) at the site;
- Installation of groundwater monitoring wells at selected locations around the site perimeter to assess the potential for contaminated groundwater to migrate onto the project area. It is recommended that this coincide with geotechnical investigations and comprise at least 3 boreholes across the site as follows:
  - 1 borehole at the point of maximum excavation depth (Northwest section) to determine soil contamination with depth and confirm groundwater levels;
  - 1 borehole along the southwestern boundary near the LPG storage terminals to confirm (or otherwise) contaminant migration onto the site;
  - 1 borehole near the southeast boundary to monitor for potential mobilisation onto the site (or neighbouring properties) of volatile contaminant plumes from off-site sources due to on-site dewatering;
- Design dewatering requirements should be considered prior to undertaking the investigation, to determine if a groundwater pumping test is required to establish groundwater management requirements (water quality and yield (volumes)), and potential extent of drawdown effects during construction and operation of the site.
- Soil samples would be submitted for laboratory testing to provide information on:
  - Soil chemistry to inform of potential human health risks to construction workers and potential soil reuse options in accordance with the National Environmental Protection Measures (NEPMs); and
  - Soil chemistry to inform the likely spoil classification for offsite disposal in accordance with EPA IWRG621.

8. References

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AS4482.2, 1999. Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil: Part 2.

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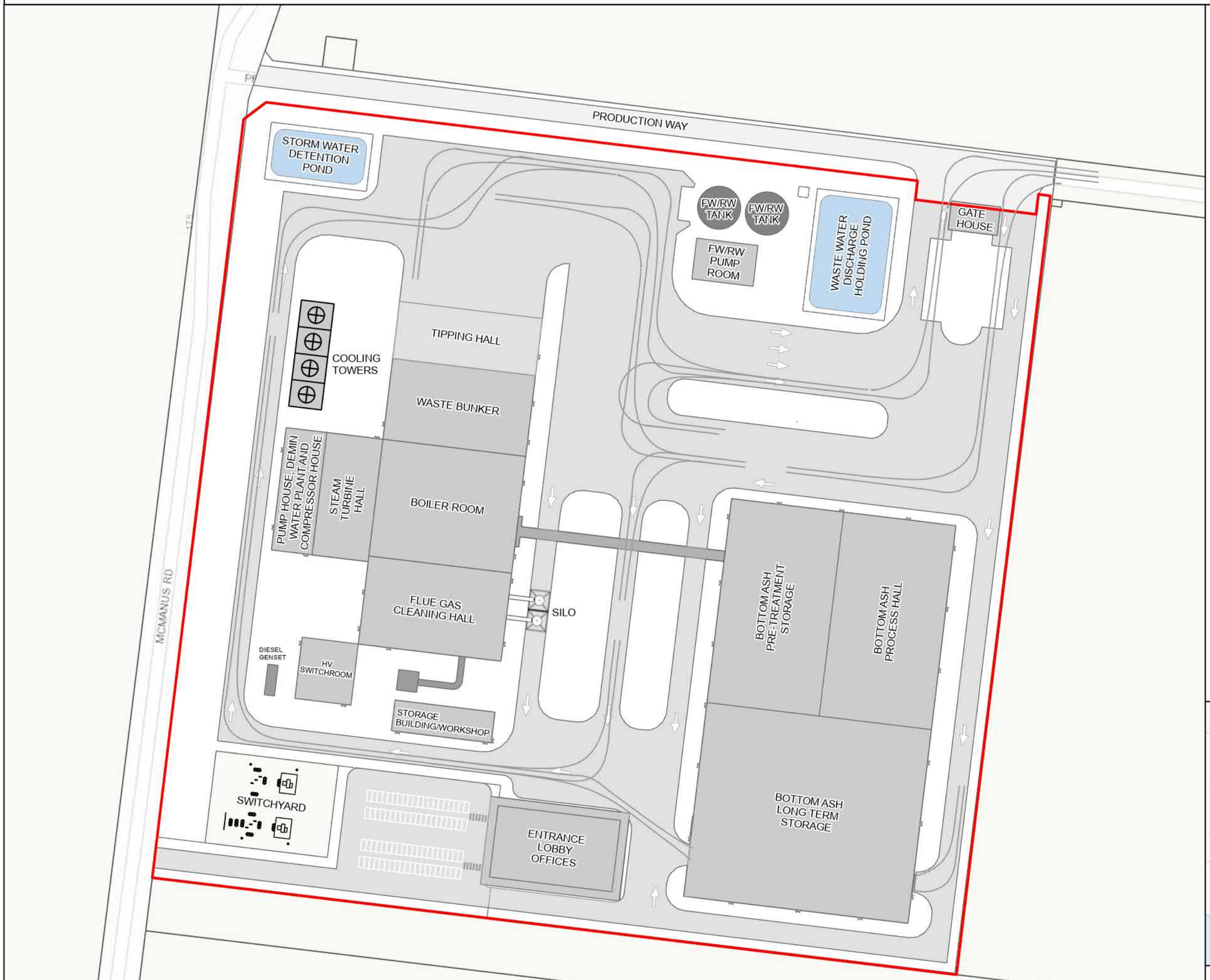
Visualizing Victoria's Groundwater VVG, 2020

Water Measurement Information System (WMIS), 2020

Appendix A. Concept Design Drawing

Figure 7.1: Site layout

Prospect Hill Energy from Waste | PROSPECT HILL INTERNATIONAL



Project site

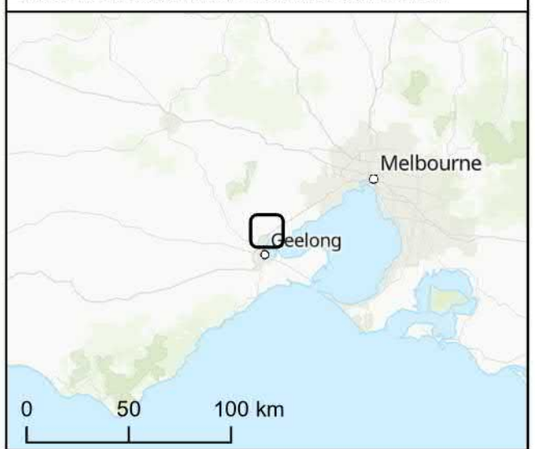
N

A3
1:1,800

IS305100
GDA 1994 MGA Zone 55

0 25 50 m

DATA SOURCES
© Commonwealth of Australia (Geoscience Australia) Geodata Topo 250k Series 3; Vicmap Data © State of Victoria; Jacobs.
Vicmap, Esri, HERE, Garmin, USGS, Vicmap, Esri, HERE, Garmin, FAO, NOAA, USGS



Jacobs

Path: J:\IE\Projects\03_Southern\IS305100\Spatial\ArcPro\IS305100\IS305100_Environmental.aprx\IS305100-CRTO-000092_Figure_07_1_Site_Layout_A3_Landscape
Created by WARDA on 18/09/2020

Appendix B. Lotsearch™ report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Address: 164-200 McManus Road, Lara, VIC 3212

Date: 06 Apr 2020 19:21:34

Reference: LS011906 EP

Dataset Listing

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

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features in Buffer
Topographic and Cadastre data	State Government Victoria - Department of Environment, Land, Water & Planning	20/03/2020	20/03/2020	Monthly	-	-	-	-
Current EPA Priority Sites	Environment Protection Authority (Vic)	18/03/2020	18/03/2020	Monthly	1000	0	0	0
Former EPA Priority Sites & other Remedial Notices	Environment Protection Authority (Vic)	04/11/2019	04/11/2019	Monthly	1000	0	1	9
EPA PFAS Site Investigations	Environment Protection Authority (Vic)	20/03/2020	10/10/2019	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	12/02/2020	12/02/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	12/02/2020	12/02/2020	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	20/03/2020	20/03/2020	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	03/04/2020	03/04/2020	Monthly	2000	0	0	0
EPA Environmental Audit Reports	Environment Protection Authority (Vic)	03/04/2020	03/04/2020	Monthly	1000	0	0	0
EPA Groundwater Zones with Restricted Uses	Environment Protection Authority (Vic)	03/04/2020	03/04/2020	Monthly	1000	0	0	0
Current EPA Licensed Activities	Environment Protection Authority (Vic)	18/03/2020	18/03/2020	Monthly	1000	0	0	1
Former EPA Licensed Activities	Environment Protection Authority (Vic)	18/03/2020	18/03/2020	Monthly	1000	0	0	0
EPA Works Approvals	Environment Protection Authority (Vic)	20/03/2020	20/03/2020	Monthly	1000	0	0	1
National Waste Management Facilities Database	Geoscience Australia	12/02/2020	07/03/2017	Quarterly	1000	0	0	0
Statewide Waste and Resource Recovery Infrastructure Plan Facilities	State Government Victoria - Department of Sustainability	27/11/2014	31/12/2012	None planned	1000	0	0	0
EPA Prescribed Industrial Waste	Environment Protection Authority (Vic)	31/07/2019	31/07/2019	Quarterly	1000	0	0	3
EPA Victorian Landfill Register	Environment Protection Authority (Vic)	07/01/2020	06/01/2020	Quarterly	1000	0	0	0
Former Gasworks	Various historical sources collated by Lotsearch	15/08/2017	15/08/2017	Not required	1000	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	05/02/2020	15/03/2012	Quarterly	1000	0	0	0
Historical Business Directories (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150	0	0	0
Historical Business Directories (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150	-	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500	0	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500	-	0	1
Features of Interest	State Government Victoria - Department of Environment, Land, Water & Planning	05/02/2020	05/02/2020	Quarterly	1000	0	1	13
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Groundwater Salinity	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	29/08/2012	Unknown	0	1	-	-
Depth to Watertable	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	29/08/2012	Unknown	0	1	-	-

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features in Buffer
Surface Elevation	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	23/09/2013	Unknown	0	1	-	-
Basement Elevation	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	23/09/2013	Unknown	0	1	-	-
Groundwater Boreholes WMIS	State Government Victoria - Department of Environment, Land, Water & Planning	20/03/2020	20/03/2020	Quarterly	2000	0	0	26
Groundwater Boreholes Earth Resources Database	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	27/07/2018	17/02/2010	As required	2000	0	0	9
Groundwater Boreholes Fed Uni	Federation University Australia	21/12/2017	07/01/2014	As required	2000	0	0	24
Historical Mining Activity - Shafts	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	18/10/2018	20/07/2018	As required	1000	0	0	0
Geological Units 1:50,000	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000	1	-	3
Geological Structures 1:50,000	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000	0	-	0
Dykes and Marker Beds 50k	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000	0	-	0
Shear zones 250k	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000	0	-	0
Atlas of Australian Soils	ABARES	19/05/2017	17/02/2011	As required	1000	1	1	1
Victorian Soil Type Mapping	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	24/08/2017	21/03/2016	Unknown	1000	2	2	3
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Coastal Acid Sulfate Soils	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	28/03/2017	30/03/2011	None planned	1000	0	0	0
Planning Scheme Zones	State Government Victoria - Department of Environment, Land, Water & Planning	17/03/2020	11/03/2020	Monthly	1000	2	3	7
Planning Scheme Overlay	State Government Victoria - Department of Environment, Land, Water & Planning	17/03/2020	11/03/2020	Monthly	1000	1	4	7
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	04/02/2020	31/07/2018	Quarterly	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	04/02/2020	20/11/2019	Quarterly	1000	0	0	0
Victorian Heritage Register	State Government Victoria - Department of Environment, Land, Water & Planning	04/02/2020	04/02/2020	Quarterly	1000	0	0	0
Cultural Heritage Sensitivity	State Government Victoria - Department of Premier and Cabinet	12/02/2020	12/02/2020	Quarterly	1000	0	0	2
Bushfire Prone Area	State Government Victoria - Department of Transport, Planning and Local Infrastructure	07/01/2020	10/09/2019	Quarterly	1000	1	1	1
Fire History	State Government Victoria - Department of Environment, Land, Water & Planning	05/02/2020	31/08/2019	Quarterly	1000	0	0	0
Flood - 1 in 100 Year Modelled Flood Extent	State Government Victoria - Department of Environment, Land, Water & Planning	05/02/2020	31/12/2014	Quarterly	1000	0	1	1
Victorian Coastal Inundation Sea Level Rise	State Government Victoria - Department of Environment, Land, Water & Planning	10/04/2018	24/10/2017	Unknown	1000	0	0	0
Native Vegetation (Modelled 2005 Ecological Vegetation Classes)	State Government Victoria - Department of Environment, Land, Water & Planning	13/01/2015	31/12/2005	None planned	1000	1	1	3
Ramsar Wetland Areas in Victoria	State Government Victoria - Department of Environment, Land, Water & Planning	28/03/2017	24/06/2013	None planned	1000	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	1
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	3

Site Diagram

164-200 McManus Road, Lara, VIC 3212

Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 158215m^2

Total Perimeter: 1593m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Where there are multiple lots of the same plan and parcel, a single label will be shown with an asterisk in front. Please use Lassi to verify which specific lots are associated with this parcel.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale:

0 25 50 100
Meters

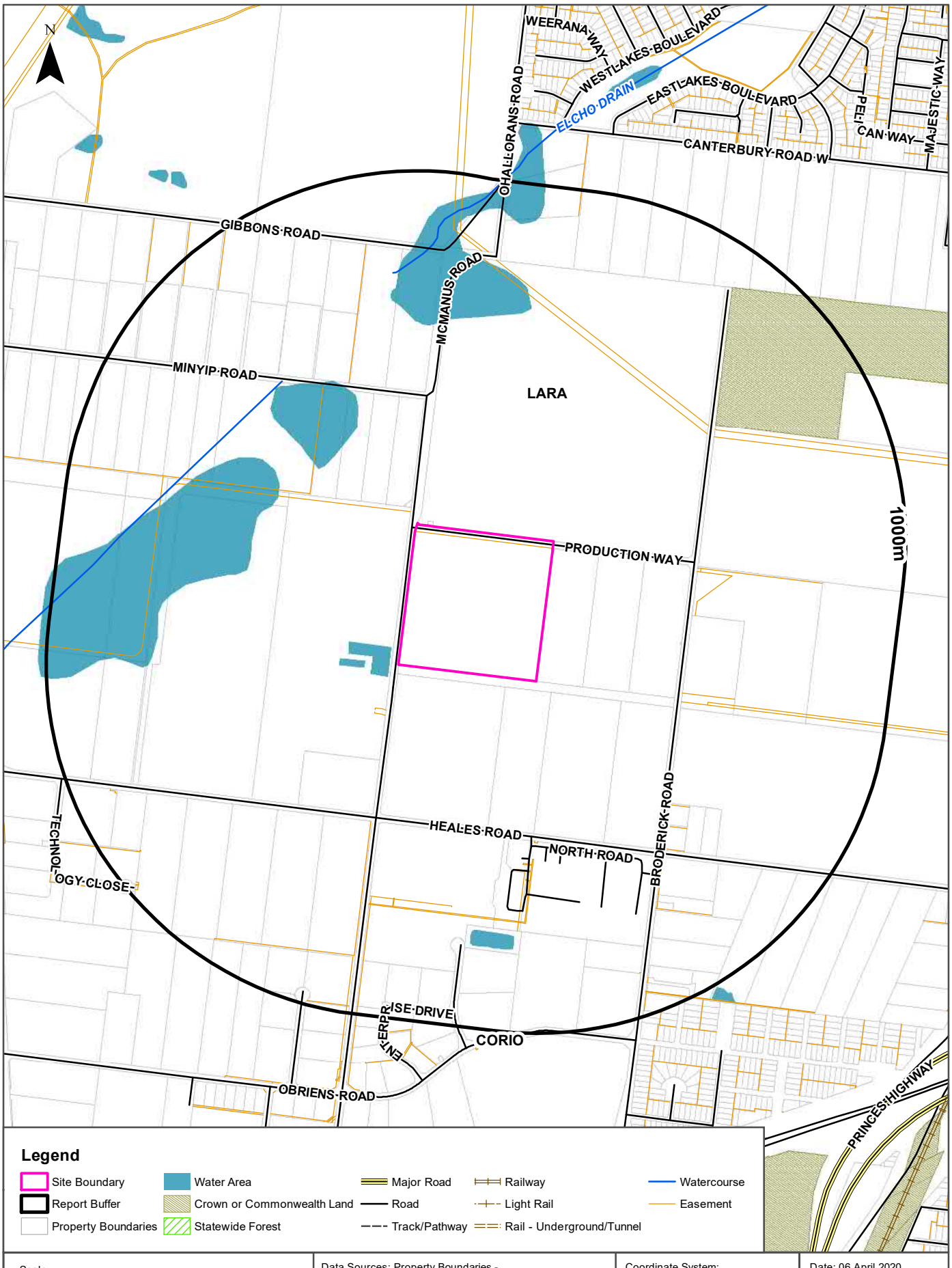
Data Sources: Aerial Imagery: © Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 55

Date: 06 April 2020

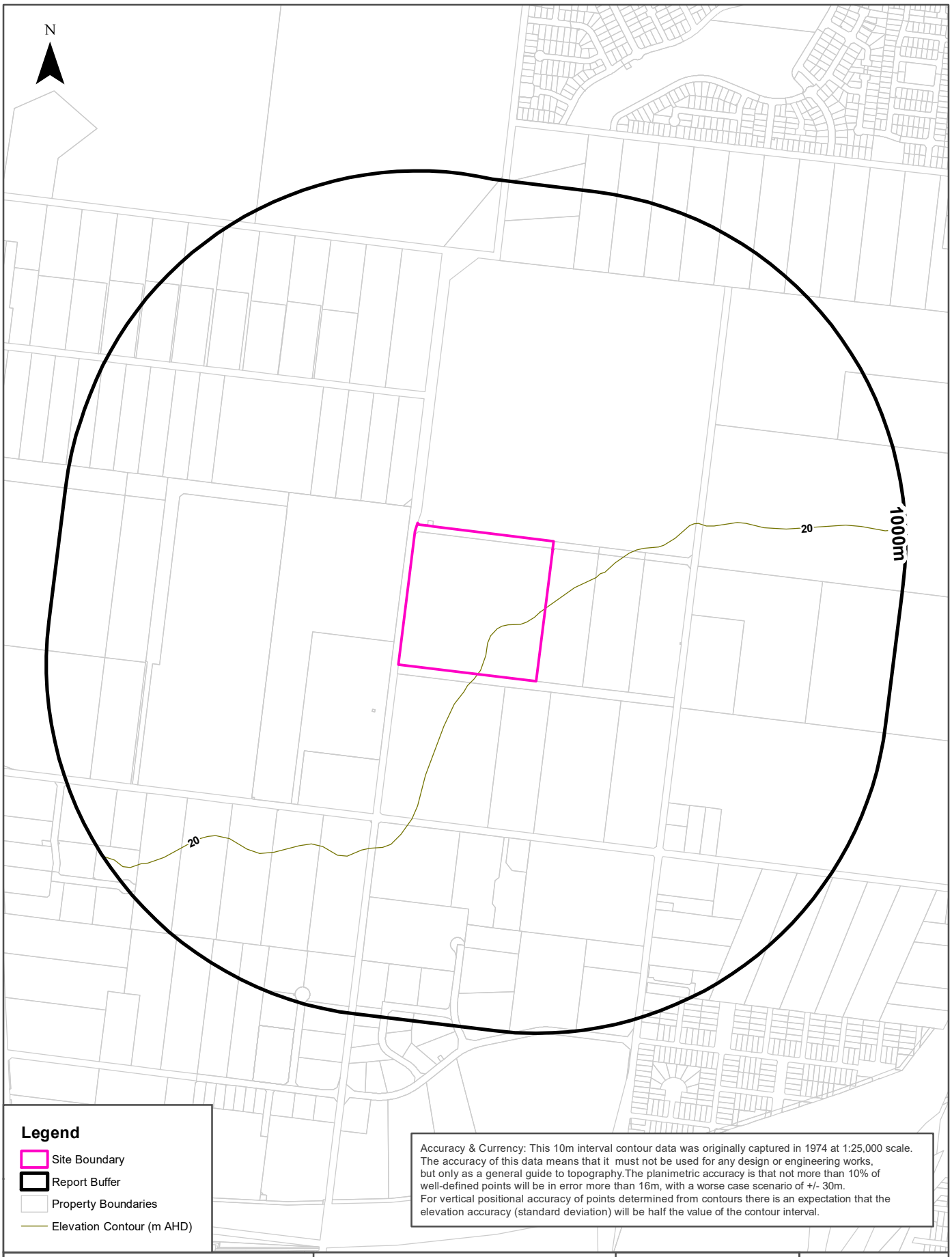
Topographic Data

164-200 McManus Road, Lara, VIC 3212



Elevation Contours (m AHD) 10m Interval at 1:25,000

164-200 McManus Road, Lara, VIC 3212



EPA Records - Priority Sites & Pollution Notices

164-200 McManus Road, Lara, VIC 3212

EPA Priority Sites & Pollution Notices

164-200 McManus Road, Lara, VIC 3212

Current EPA Priority Sites Register

Sites on the current EPA priority sites register that exist within the dataset buffer:

Notice No	Address	Suburb	Issue	Loc Conf	Dist (m)	Direction
N/A	No records in buffer					

Priority Sites Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Former EPA Priority Sites & Other Pollution Notices

Sites within the dataset buffer that have been issued a Pollution Notice:
Note. Due to pollution notices being revoked and removed from published lists this is not an exhaustive list of all past pollution notices.

Notice No	Notice Type	Company	Address	Suburb	Status	Issue	Date Issued	Loc Conf	Dist	Dir
90005284	Clean Up Notice	GREATER GEELONG CITY COUNCIL	137 MCMANUS RD	LARA	Previous Pollution Notice		29/08/2014	Premise Match	20m	South West
90008270	Clean Up Notice	C & D RECYCLING PTY LTD [LARA]	300-400 BRODERICK RD LARA VIC 3212	LARA	Current Pollution Notice		06/11/2017	Premise Match	416m	East
90008099	Pollution Abatement Notice	C & D RECYCLING PTY LTD [LARA]	300-400 BRODERICK RD	LARA	Current Pollution Notice		06/03/2018	Premise Match	416m	East
90006933	Clean Up Notice	C & D RECYCLING PTY LTD [LARA]	300-400 BRODERICK RD	LARA	Previous Pollution Notice		30/05/2016	Premise Match	416m	East
90006719	Pollution Abatement Notice	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD [CORIO]	140 BRODERICK RD	CORIO	Previous Pollution Notice		23/02/2016	Premise Match	797m	South East
90006718	Pollution Abatement Notice	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD [CORIO]	140 BRODERICK RD	CORIO	Previous Pollution Notice		25/02/2016	Premise Match	797m	South East
90005568	Pollution Abatement Notice	VEOLIA ENVIRONMENTAL SERVICES	140 BRODERICK RD	CORIO	Previous Pollution Notice		08/12/2014	Premise Match	797m	South East
90006927	Pollution Abatement Notice	Ameropa Australia Pty Ltd [CORIO]	55 HEALES RD	CORIO	Previous Pollution Notice		13/05/2016	Premise Match	921m	South East
90006550	Pollution Abatement Notice	Impact Fertilisers Pty Ltd [CORIO]	55 Heales Rd.	CORIO	Previous Pollution Notice		10/12/2015	Premise Match	921m	South East

Pollution Notice Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

PFAS Investigation & Management Programs

164-200 McManus Road, Lara, VIC 3212

EPA PFAS Site Investigations

Sites being investigated by the EPA for PFAS contamination within the dataset buffer:

Map ID	Site Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

EPA PFAS Site Investigations Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Defence PFAS Investigation & Management Program Investigation Sites

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Investigation & Management Program Management Sites

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
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	Location Confidence	Distance	Direction
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

164-200 McManus Road, Lara, VIC 3212

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 Records

164-200 McManus Road, Lara, VIC 3212

EPA Environmental Audits

EPA environmental audit records that exist within the dataset buffer:
Note. Please click on CARMS No. to activate a hyperlink to online documentation. If link does not work, documentation may still be accessible via the EPA Interaction Portal.

CARMS No	Transaction No	Site	Address	Suburb	Date Complete	Audit Category	Loc Conf	Distance	Direction
N/A	No records in buffer								

Environmental Audit Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

EPA Records

164-200 McManus Road, Lara, VIC 3212

EPA Groundwater Zones with Restricted Uses

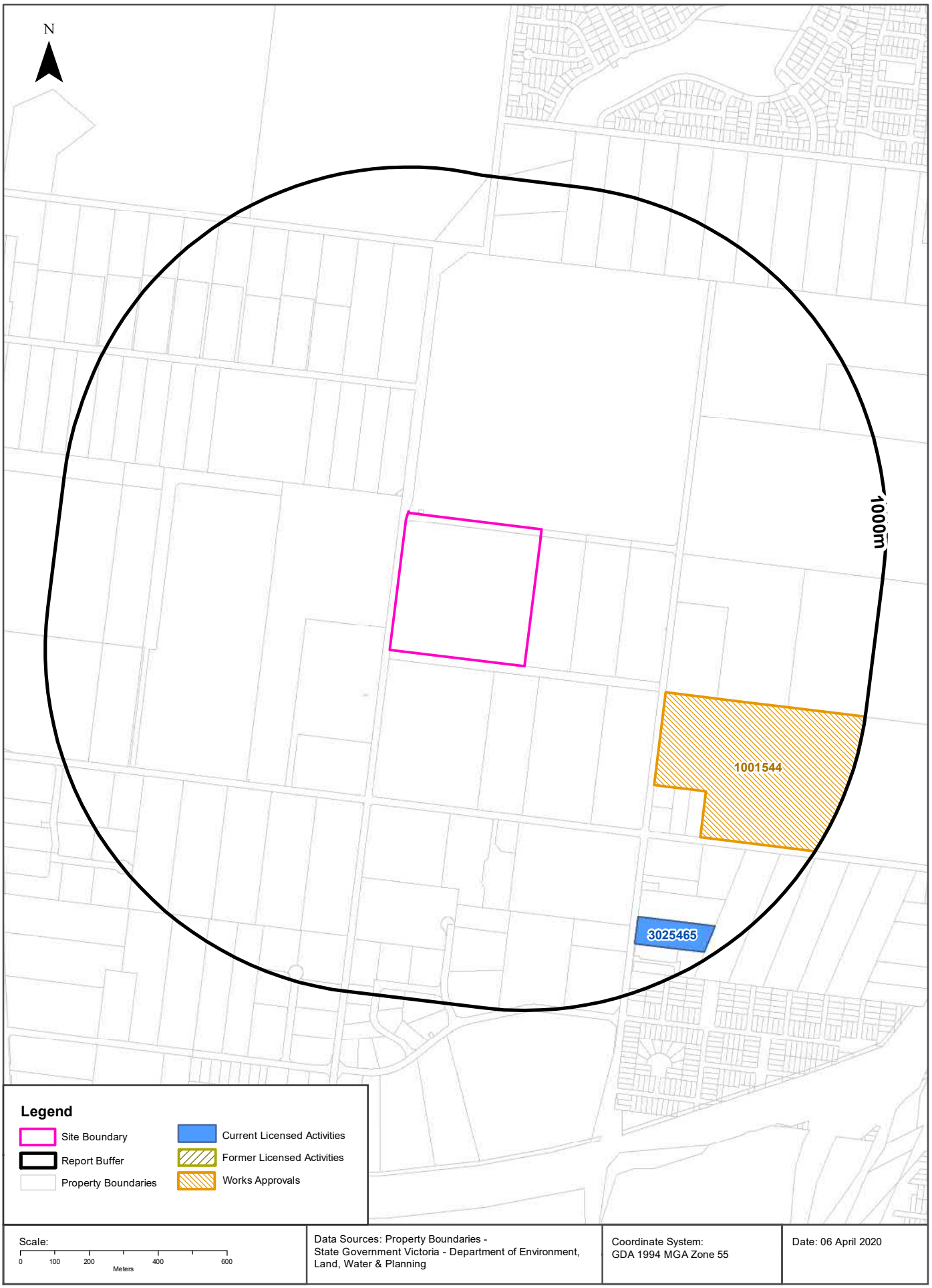
EPA GQRUZ records that exist within the dataset buffer:
Note. Please click on CARMS No. to activate a hyperlink to online documentation.

CARMS No	EPA Id	Site History	Site Address	Restricted Uses	Status	Loc Conf	Distance	Direction
N/A	No records in buffer							

Environmental GQRUZ Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

EPA Records - Licensed Activities & Works Approvals

164-200 McManus Road, Lara, VIC 3212



EPA Activities

164-200 McManus Road, Lara, VIC 3212

EPA Licensed Activities

EPA licensed activities that exist within the dataset buffer:

Trans No	Licence No	Licence Type	Organisation	Premise Ref	Premise Address 1	Premise Address 2	Activities	Loc Conf	Dist (m)	Direction
3025465	10414	Licence	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD [CORIO]		2 140 BRODERICK RD	CORIO	A01 Prescribed Industrial Waste Management	Premise Match	797m	South East

Licensed Activity Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Former EPA Licensed Activities

Former EPA licensed activities that exist within the dataset buffer:

Licence No	Organisation	Premise Address	Suburb	Activities	Loc Conf	Dist (m)	Direction
N/A	No records in buffer						

Former Licensed Activity Data Custodian: State Government Victoria - Environmental Protection Authority (EPA)

EPA Works Approvals

EPA works approvals that exist within the dataset buffer:

Transaction No	Status	Approval No	Organisation	Premise Address	Suburb	Scheduled Categories	Loc Conf	Dist (m)	Direction
1001544	Approved/ Issued	102836	SNF (AUSTRALIA) PTY LTD [LARA]	270-298 BRODERICK RD LARA VIC 3212	LARA	G01 Chemical Works	Premise Match	416m	South East

Works Approvals Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

Waste Management Facilities & Landfills

164-200 McManus Road, Lara, VIC 3212

Waste Management Facilities & Landfills

164-200 McManus Road, Lara, VIC 3212

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Australian Government Geoscience Australia

Statewide Waste and Resource Recovery Infrastructure Plan Facilities

Statewide Waste and Resource Recovery Infrastructure Plan Facilities within the dataset buffer:

Map Id	Owner	Site Name	Address	Suburb	Category	Sub Category	Loc Conf	Distance	Direction
N/A	No records in buffer								

SWRRIPF Data Source: State Government Victoria - Department of Sustainability

EPA Prescribed Industrial Waste

EPA Prescribed Industrial Waste treaters, disposers and permitted transporters within the dataset buffer:

Map Id	Company Name	Address	Suburb	Treatment /Disposal	Transport	Accredited Agent	EPA List Status	Loc Conf	Dist' (m)	Direct
591	SWEENEY TODD WASTE DISPOSAL PTY LTD [CORIO]	UNIT 2 140 BRODERICK RD	CORIO VIC 3214	No	Yes	Yes	Current EPA List	Premise Match	797m	South East
2764	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	2 140 BRODERICK RD	CORIO VIC 3214	No	Yes	Yes	Current EPA List	Premise Match	797m	South East
773	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD [CORIO]	2 140 BRODERICK RD	CORIO VIC 3214	Yes	Yes	Yes	Current EPA List	Premise Match	797m	South East

Prescribed Industrial Waste Data Source: State Government Victoria - Environment Protection Authority (EPA)

EPA Victorian Landfill Register

EPA Victorian Landfill Register sites within the dataset buffer:

Landfill Register No.	Site	Address	Operating Status	Est. Year Of Closure	Waste type	Loc Conf	Dist' (m)	Direction
No records in buffer								

EPA Victorian Landfill Register Data Source: State Government Victoria - Environment Protection Authority (EPA)

Former Gasworks and Liquid Fuel Facilities

164-200 McManus Road, Lara, VIC 3212

Former Gasworks

Former Gasworks identified from various historical sources within the dataset buffer:
Note - As this is a dataset collated from various historical sources, it is not an exhaustive list of all former Gasworks

Map Id	Site Name	Date Opened	Year Closed	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Collated from various historical sources

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Direction
N/A	No records in buffer										

National Liquid Fuel Facilities Data Source: Geoscience Australia

Historical Business Directories

164-200 McManus Road, Lara, VIC 3212

Business Directory Records 1905-1991
Premise or Road Intersection Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, 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						

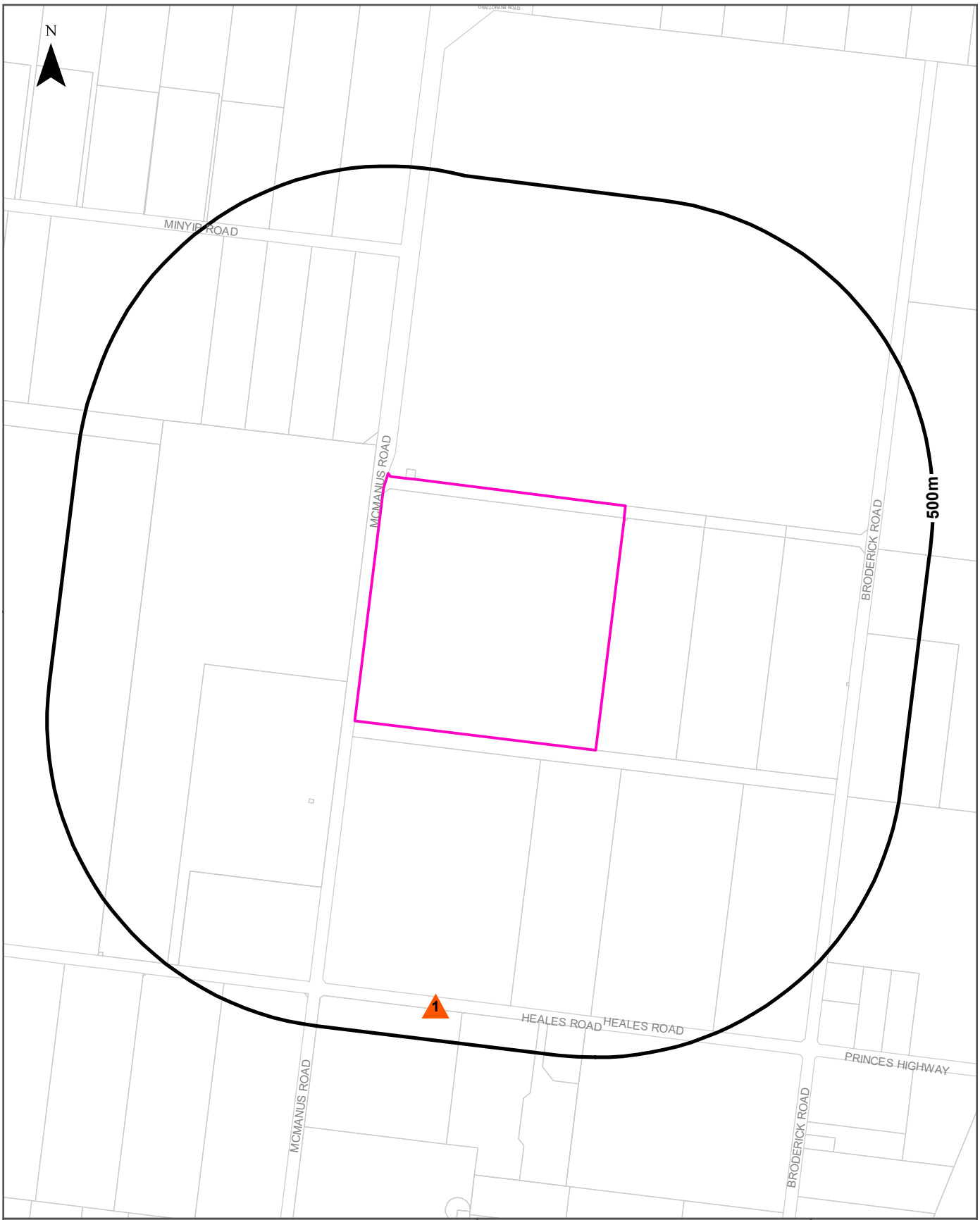
Business Directory Records 1905-1991
Road or Area Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, 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
	No records in buffer					

Dry Cleaners, Motor Garages & Service Stations

164-200 McManus Road, Lara, VIC 3212



Legend

- Site Boundary
- Buffer 500m
- Property Boundary
- 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

Scale: 0 120 240 360 480 Meters

Coordinate System: GDA 1994 MGA Zone 55

Date: 06 April 2020

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018
Sands & McDougall's Directory - Digitised by State Library Victoria
Property Boundaries © State Government Victoria - Dept. of Environment, Land, Water & Planning 2020

Historical Business Directories

164-200 McManus Road, Lara, VIC 3212

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from Sands & McDougall's Directories and 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						

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories and Sands & McDougall's 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 & Service Stations.	Corio Maintenance & Repairs., Heales Rd. Corio. 3214	63437	1991	Road Match	438m

Aerial Imagery 2019

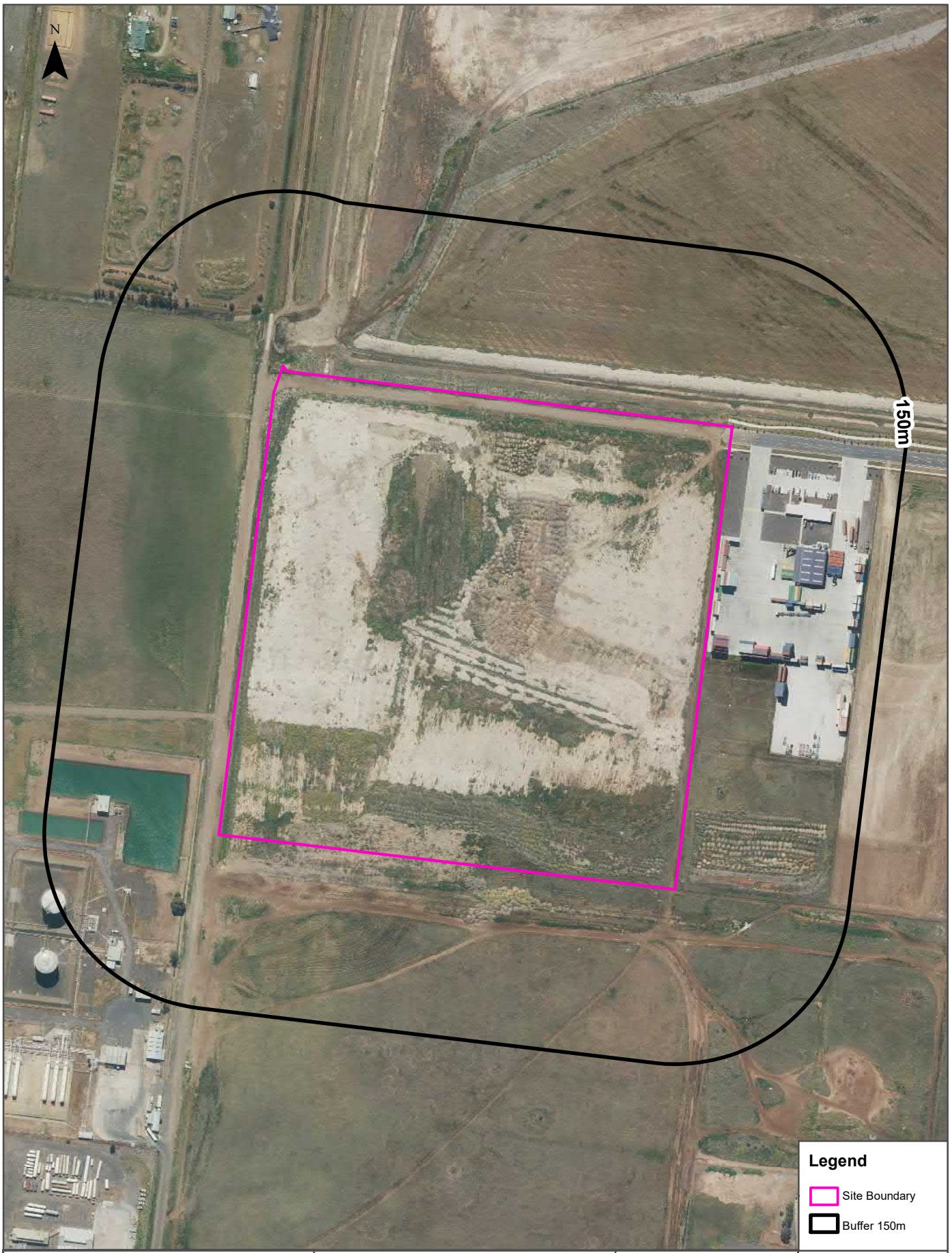
164-200 McManus Road, Lara, VIC 3212

Scale:	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

0 50 100 150 200
Meters

Aerial Imagery 2018

164-200 McManus Road, Lara, VIC 3212

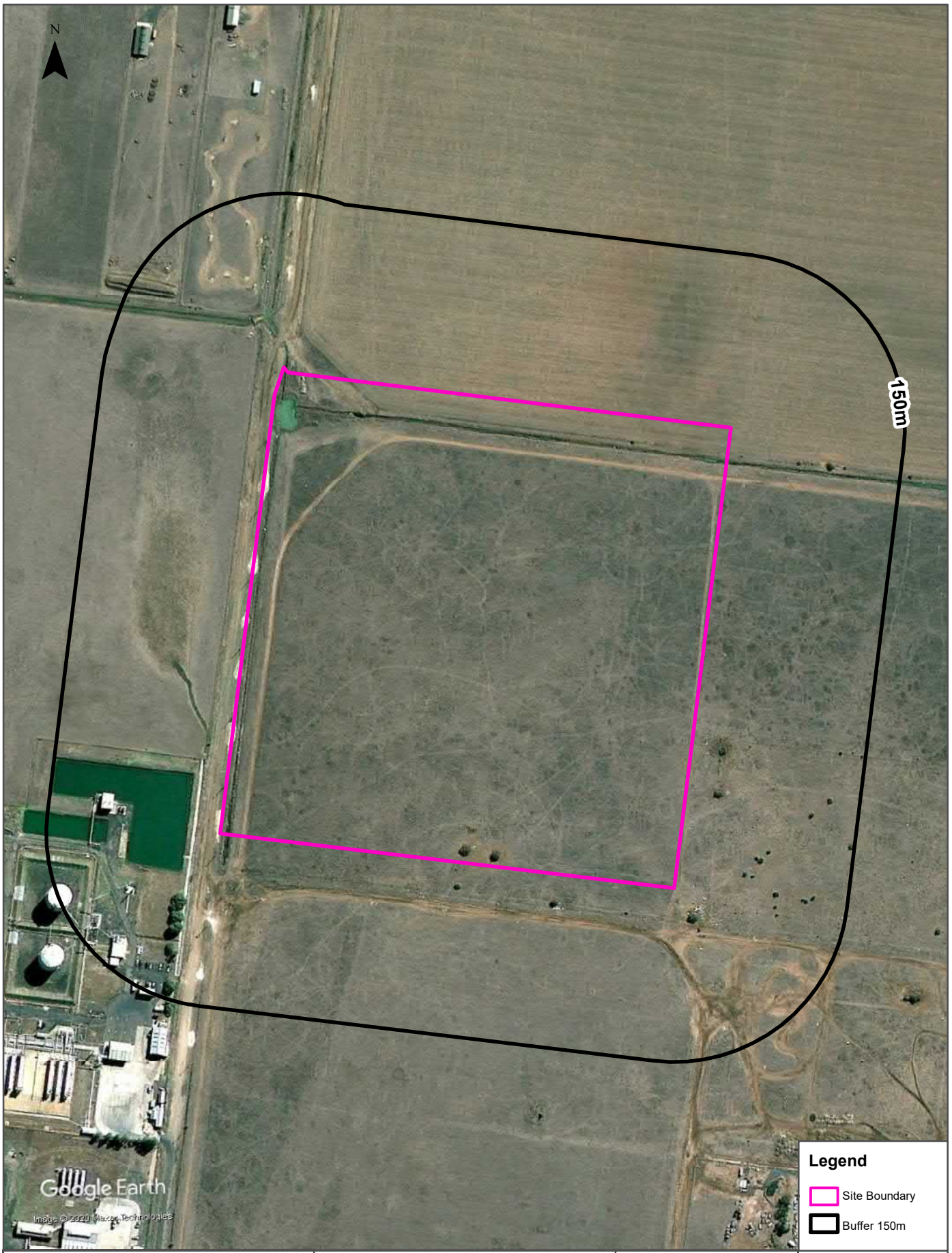


Scale:	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

0 50 100 150 200
Meters

Aerial Imagery 2009

164-200 McManus Road, Lara, VIC 3212



Scale: 0 50 100 150 200 Meters

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Coordinate System: GDA 1994 MGA Zone 55

Date: 07 April 2020

Aerial Imagery 2002

164-200 McManus Road, Lara, VIC 3212

Scale: 0 50 100 150 200 Meters

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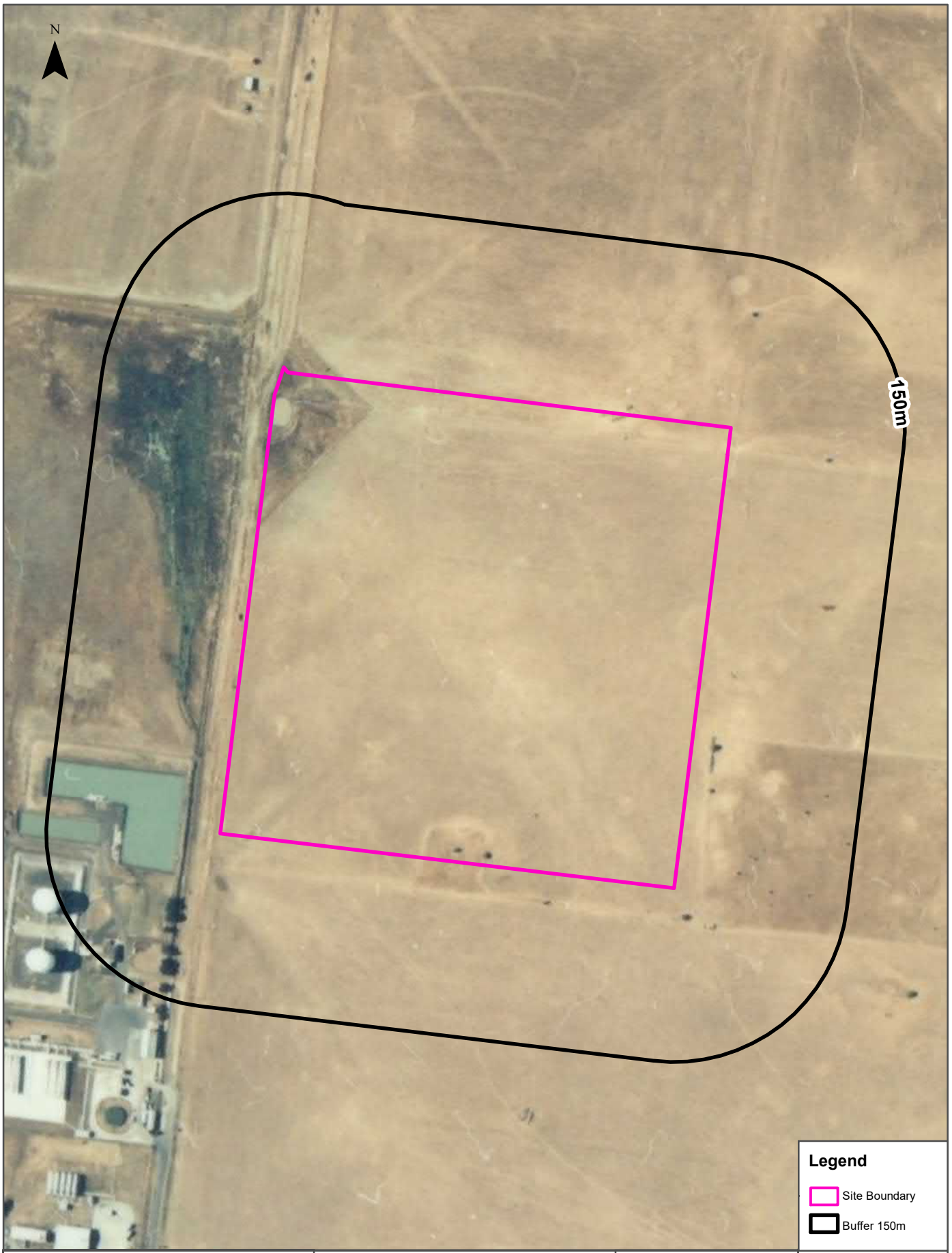
Coordinate System: GDA 1994 MGA Zone 55

Date: 07 April 2020

Aerial Imagery 1990

164-200 McManus Road, Lara, VIC 3212



Aerial Imagery 1984

164-200 McManus Road, Lara, VIC 3212

Aerial Imagery 1978

164-200 McManus Road, Lara, VIC 3212

Aerial Imagery 1963

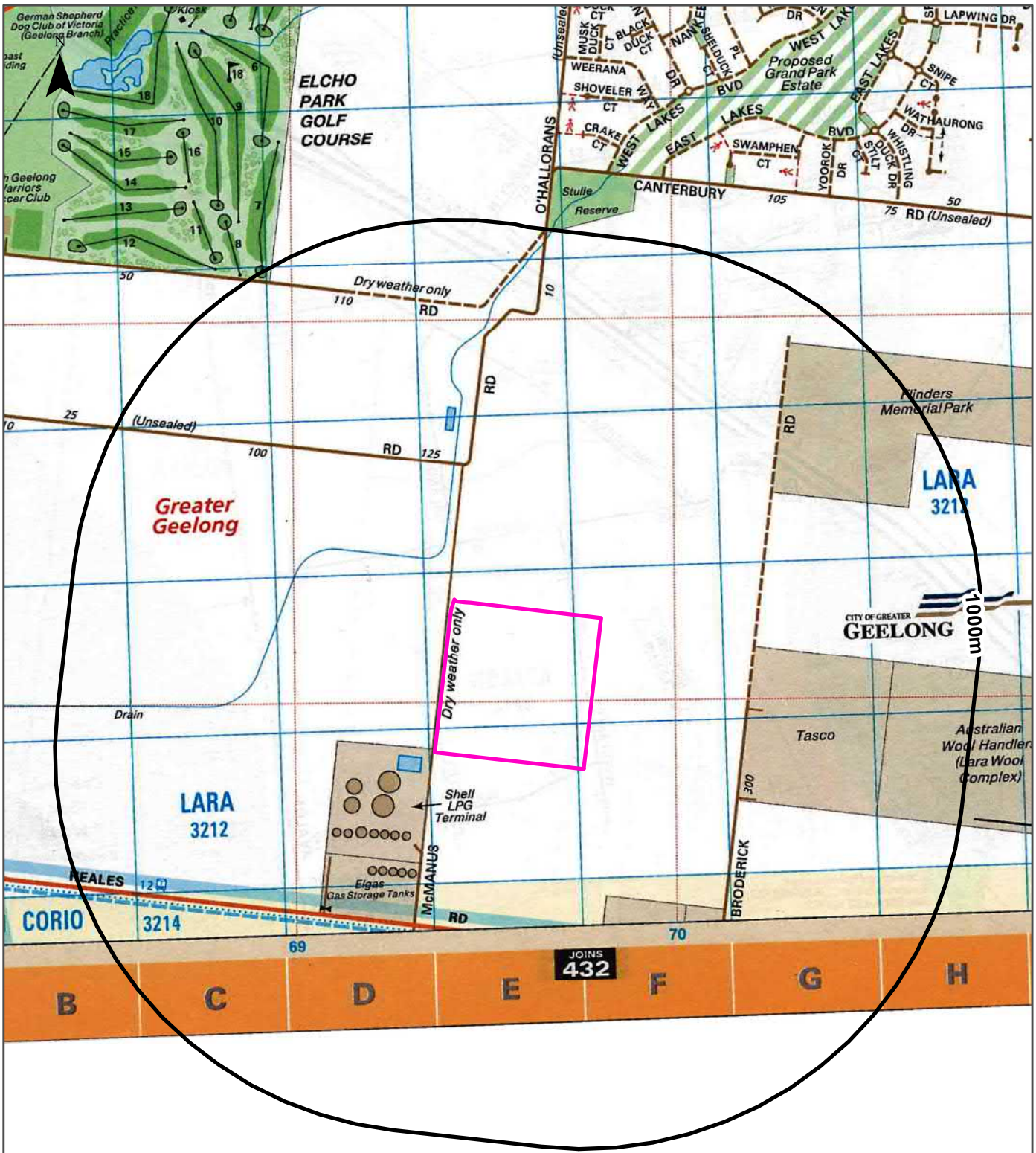
164-200 McManus Road, Lara, VIC 3212

Aerial Imagery 1947

164-200 McManus Road, Lara, VIC 3212

Historical Map 2009

164-200 McManus Road, Lara, VIC 3212



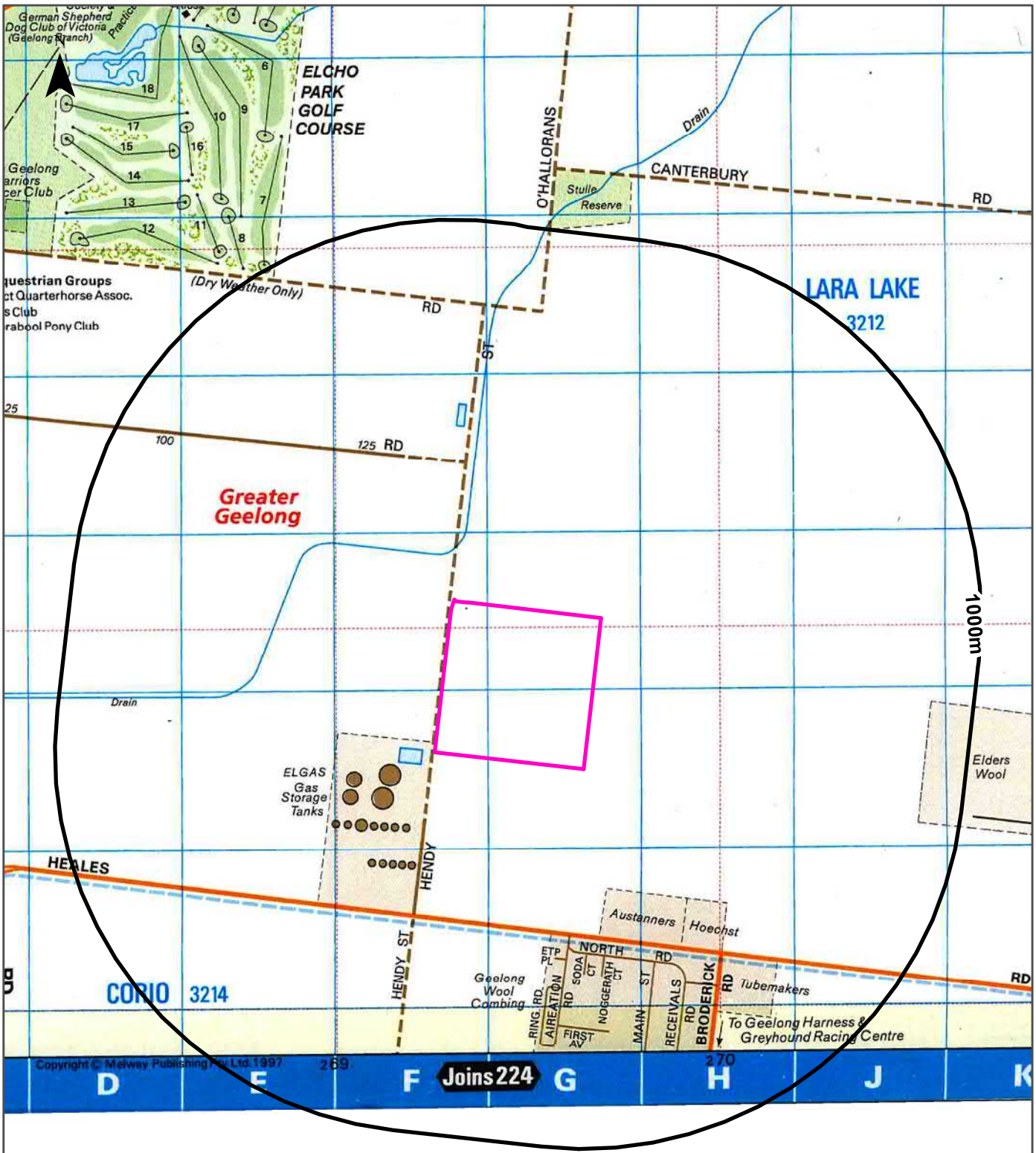
Legend

- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Maps reproduced from 2009, Edition 36 of the Melway Street Directory	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

Historical Map 1998

164-200 McManus Road, Lara, VIC 3212



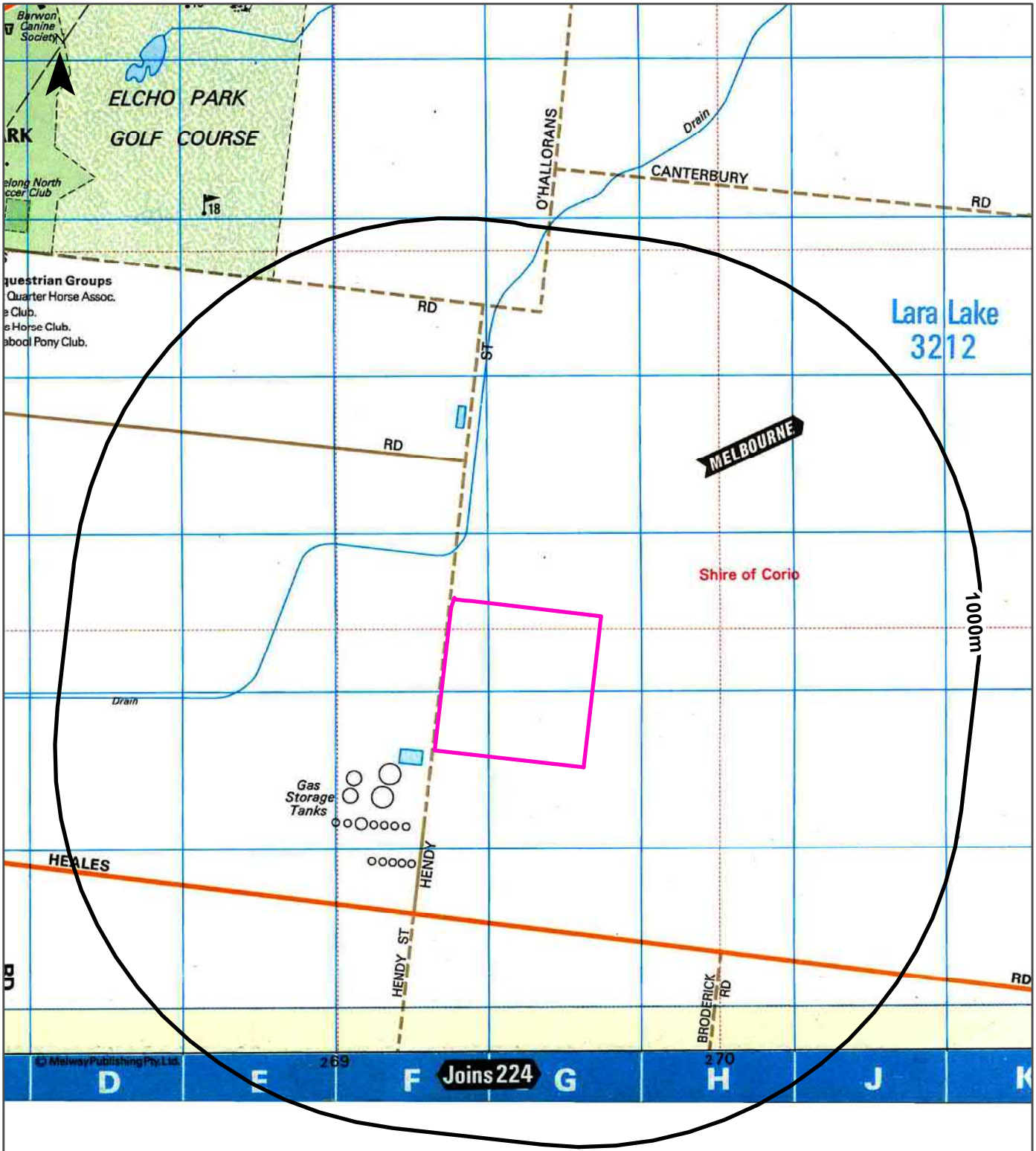
Legend

- Site Boundary
- Buffer 1000m

Scale:	Data Sources: Maps reproduced from 1998, Edition 26 of the Melway Street Directory	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

Historical Map 1986

164-200 McManus Road, Lara, VIC 3212



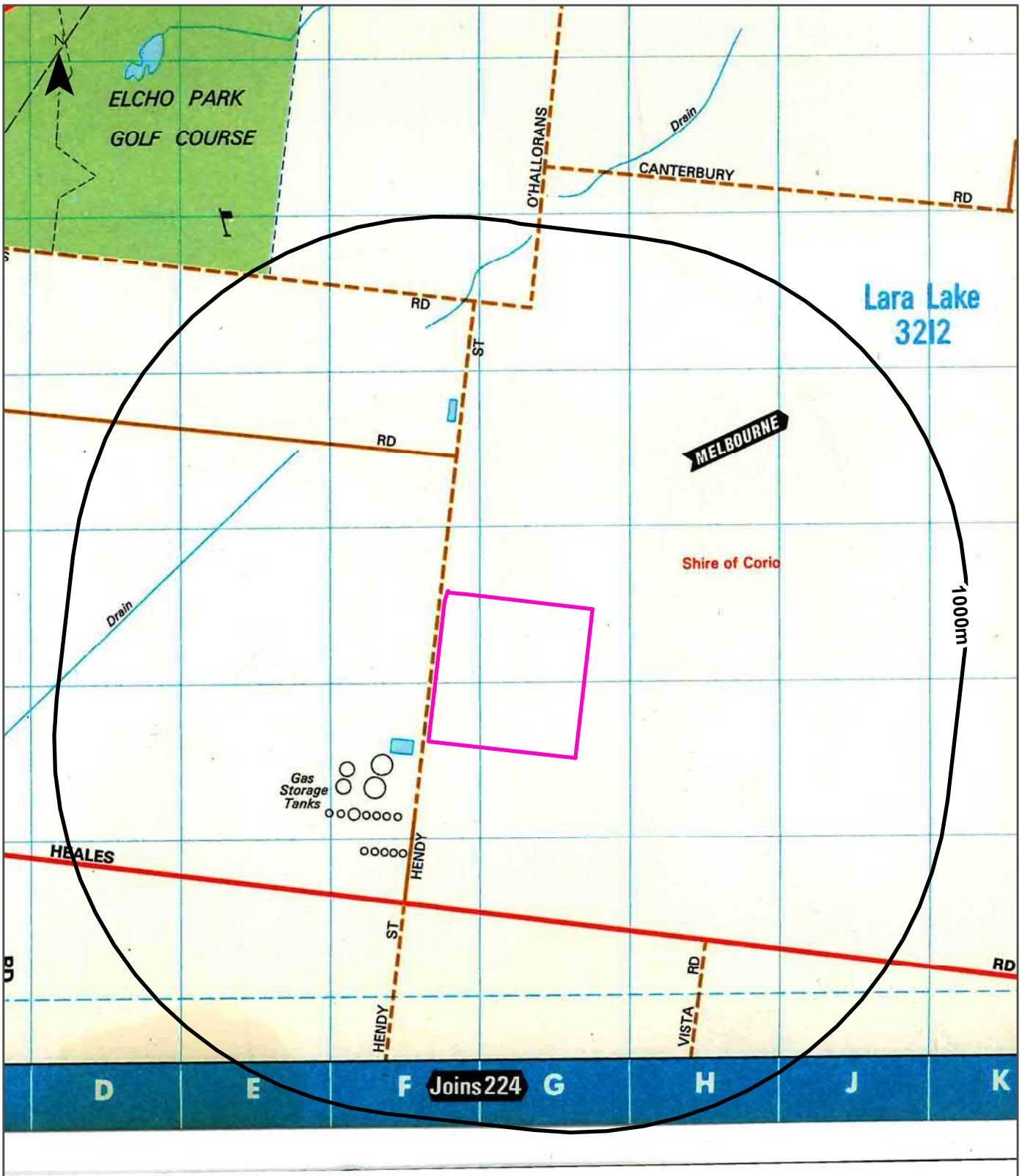
Legend

- Site Boundary
- Buffer 1000m

Scale: 0 100 200 400 600 Meters	Data Sources: Maps reproduced from 1986, Edition 16 of the Melway Street Directory	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

Historical Map 1978

164-200 McManus Road, Lara, VIC 3212



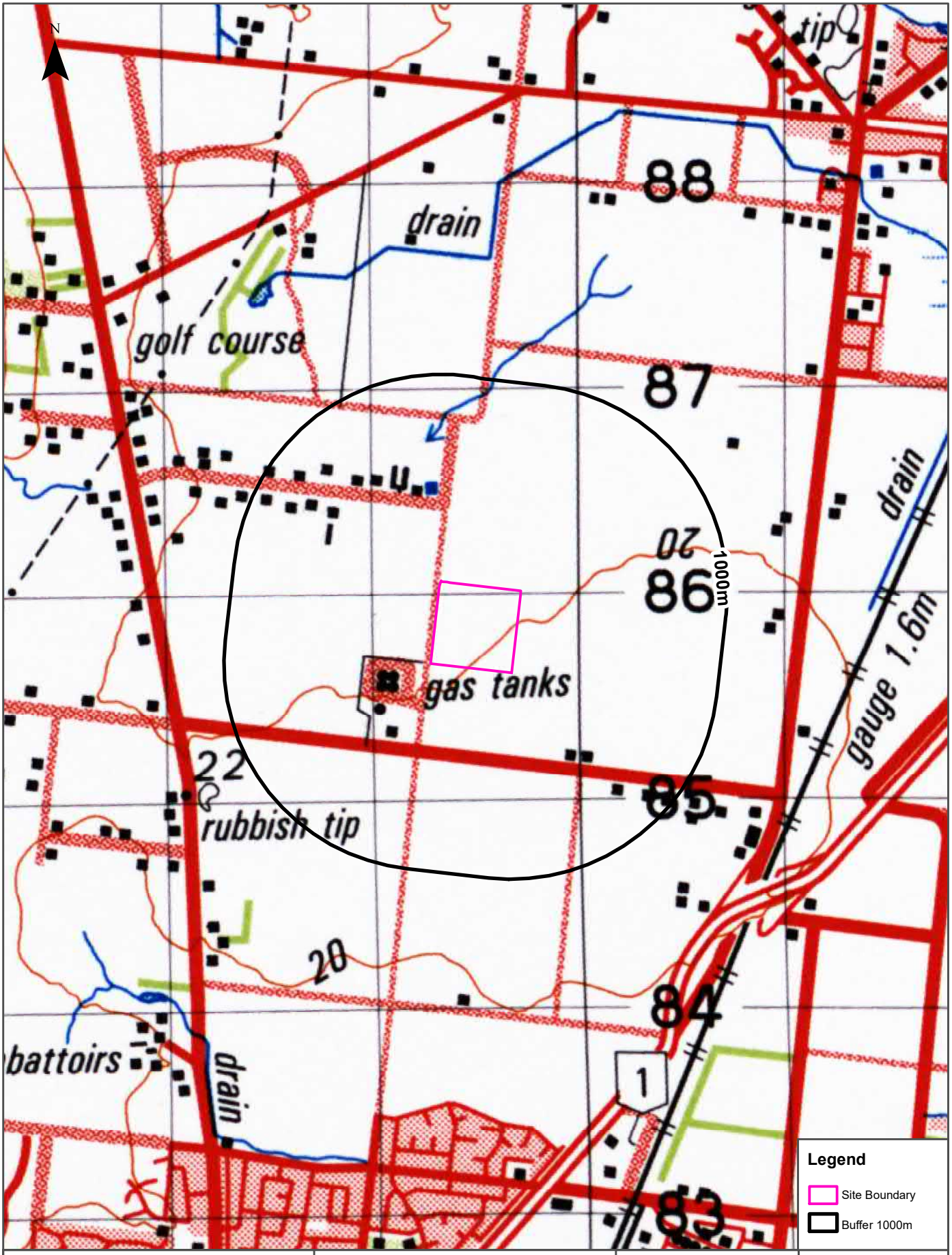
Legend

- Site Boundary
- Buffer 1000m

Scale: 0 100 200 400 600 Meters	Data Sources: Maps reproduced from 1978, Edition 11 of the Melway Street Directory	Coordinate System: GDA 1994 MGA Zone 55	Date: 06 April 2020

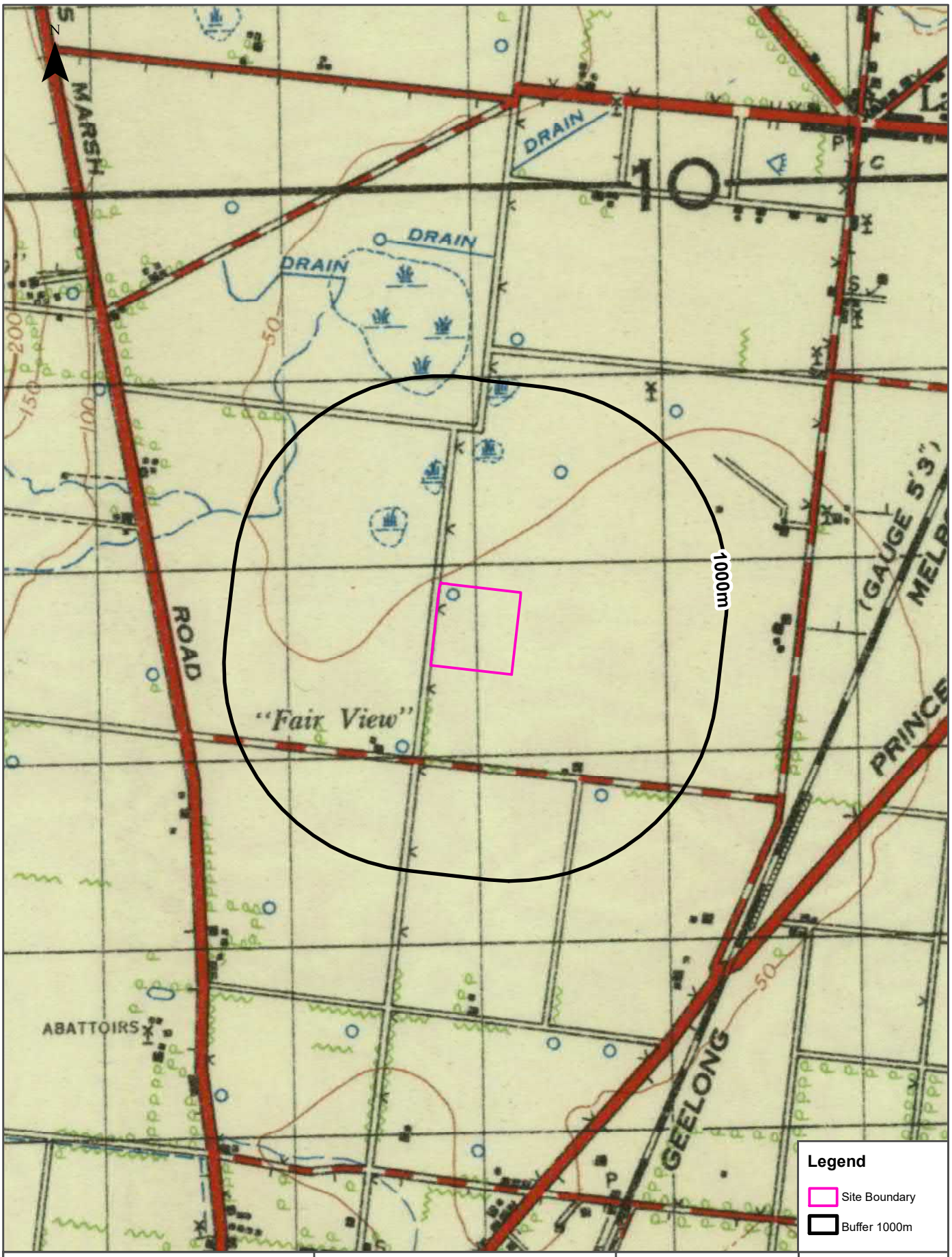
Historical Map 1975

164-200 McManus Road, Lara, VIC 3212



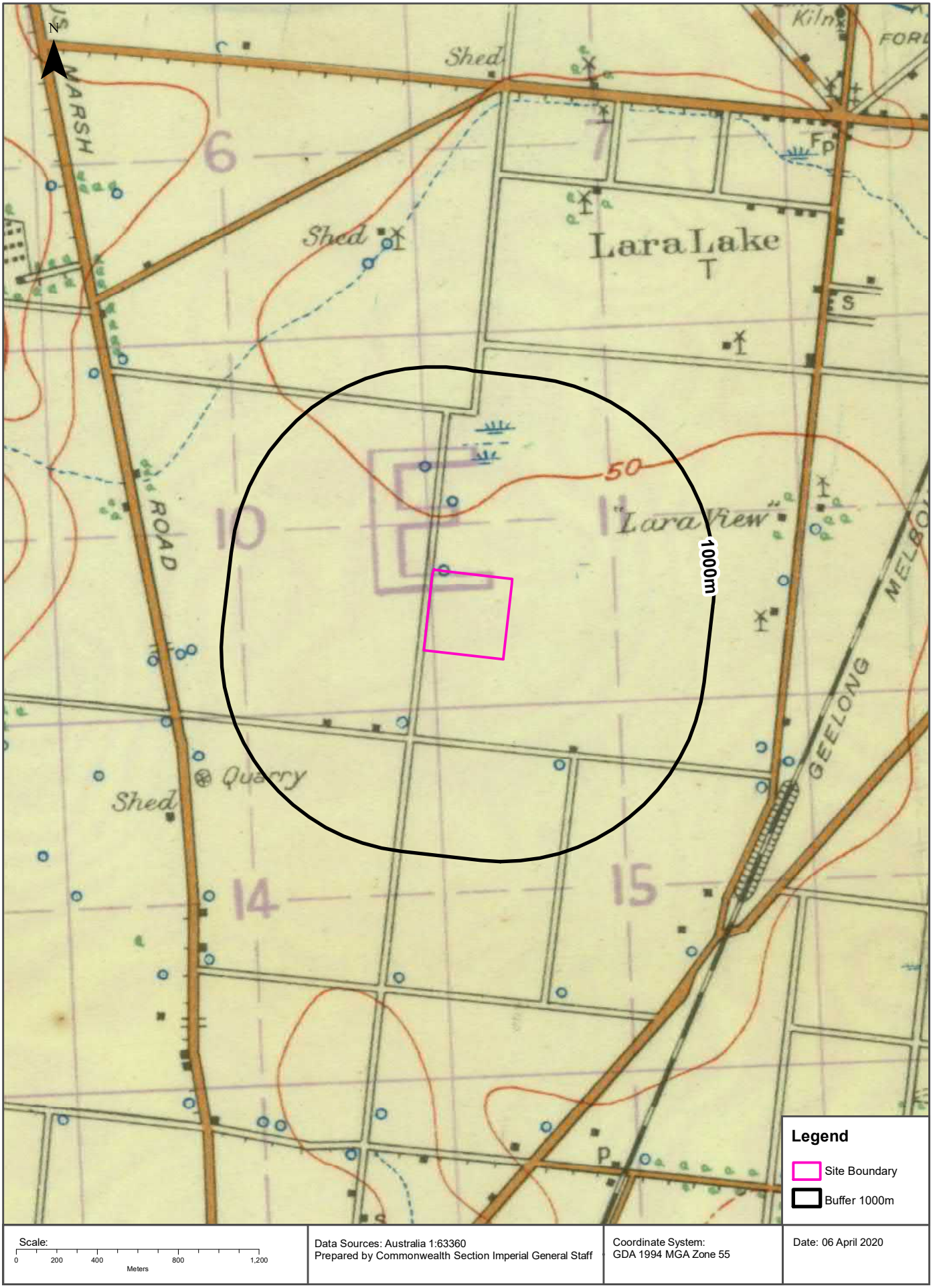
Historical Map c.1955

164-200 McManus Road, Lara, VIC 3212



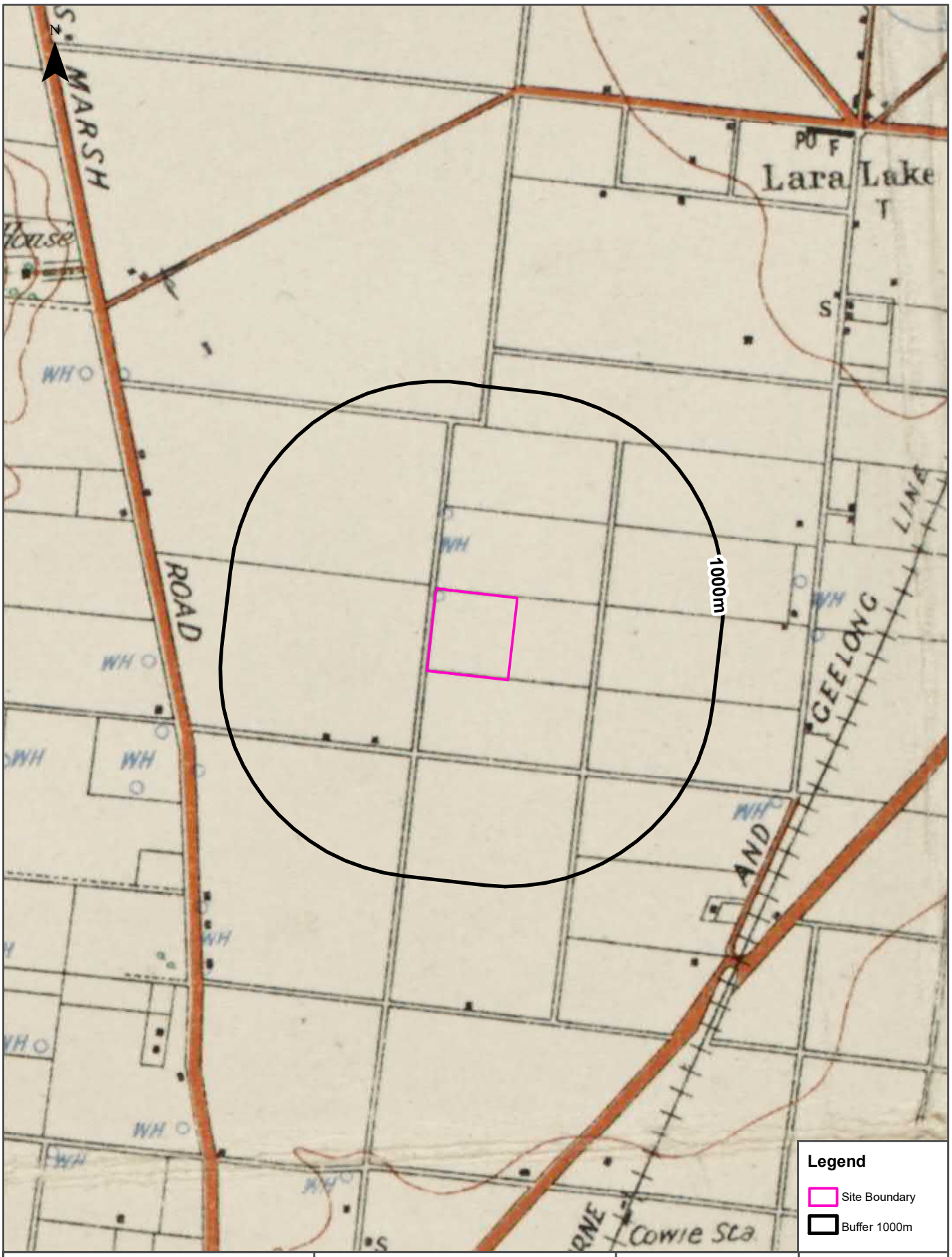
Historical Map c.1928

164-200 McManus Road, Lara, VIC 3212



Historical Map c.1914

164-200 McManus Road, Lara, VIC 3212



Scale: 0 200 400 800 1,200 Meters

Data Sources: Australia 1:63360
Prepared by Commonwealth Section Imperial General Staff

Coordinate System:
GDA 1994 MGA Zone 55

Date: 06 April 2020

Features of Interest

164-200 McManus Road, Lara, VIC 3212

Features of Interest

164-200 McManus Road, Lara, VIC 3212

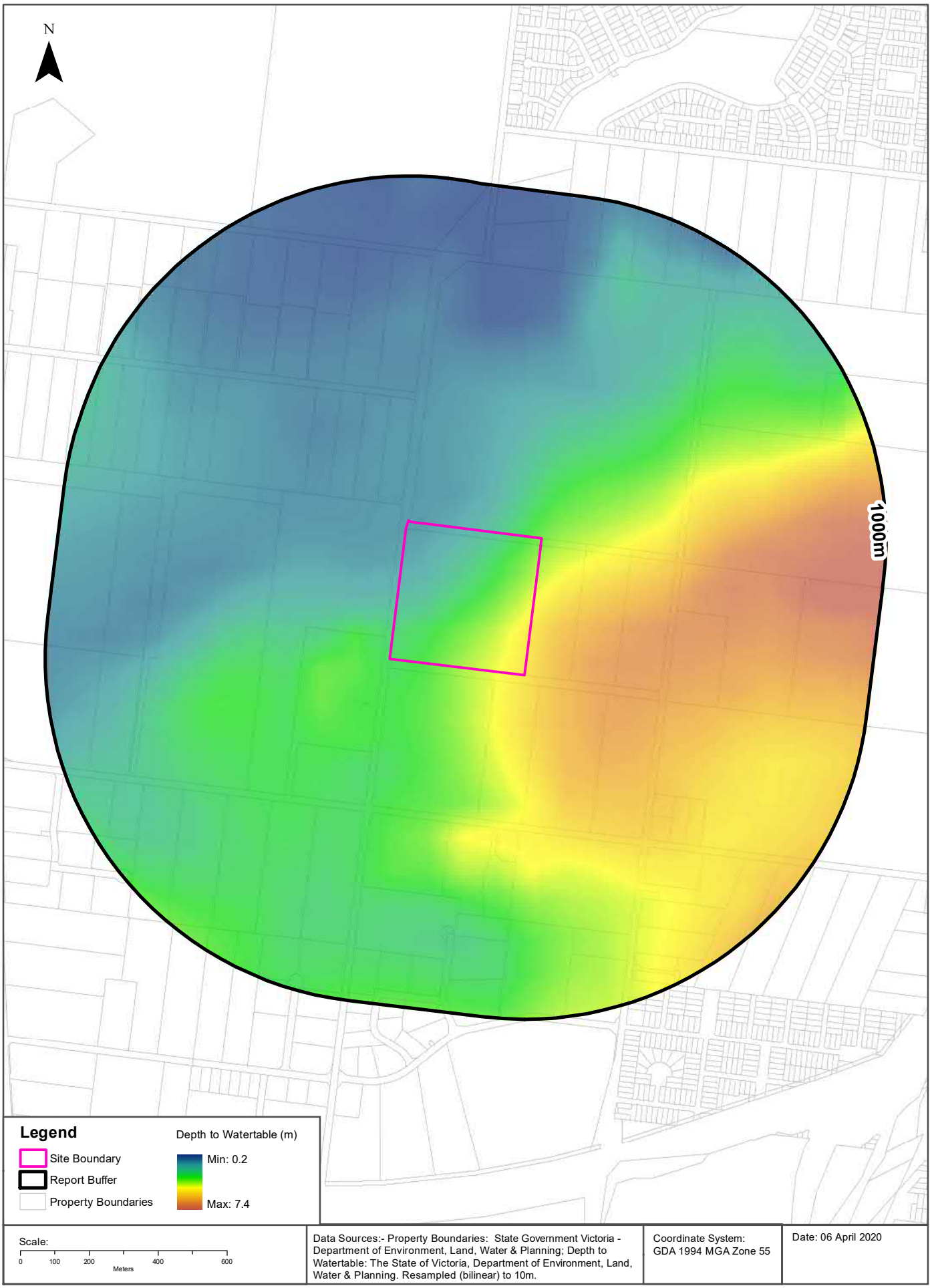
Features of Interest

Features of Interest within the dataset buffer:

Feature Id	Feature Type	Feature Sub Type	Name	Distance	Direction
1140494	reserve	park		0m	South East
1004726	storage facility	oil tank		140m	South West
1004723	storage facility	oil tank		172m	South West
1004727	storage facility	oil tank		226m	South West
1004720	storage facility	oil tank		247m	South West
1167962	pipeline	gas pipeline	Lara	269m	South
1004731	storage facility	oil tank		270m	South West
637202	pipeline	gas pipeline	Lara - Iona	515m	South West
633605	reserve	cemetery	Flinders Memorial Park Public Cemetery	567m	North East
1217391	reserve	park		709m	South
984226	sport facility	training track		896m	North East
70517	sport facility	golf course	Elcho Park Golf Course	969m	North West
639476	reserve	park		999m	North

Depth to Watertable

164-200 McManus Road, Lara, VIC 3212



Data Sources:- Property Boundaries: State Government Victoria - Department of Environment, Land, Water & Planning; Depth to Watertable: The State of Victoria, Department of Environment, Land, Water & Planning. Resampled (bilinear) to 10m.

Coordinate System: GDA 1994 MGA Zone 55

Date: 06 April 2020

Hydrogeology & Groundwater

164-200 McManus Road, Lara, VIC 3212

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Fractured or fissured, extensive aquifers of low to moderate productivity	0m	Onsite

Hydrogeology Map of Australia: Commonwealth of Australia (Geoscience Australia)

Groundwater Salinity

On-site Groundwater Salinity:

Groundwater Salinity	Percent Of Site Area
1,000 - 3,500 mg/l	100

Depth to Watertable

On-site Depth to Watertable:

Depth to Watertable	Percent Of Site Area
Less than 5 metres	100

Surface Elevation

Approximate on-site Surface Elevation:

Surface Elevation
16 AHDm to 22 AHDm

Basement Elevation

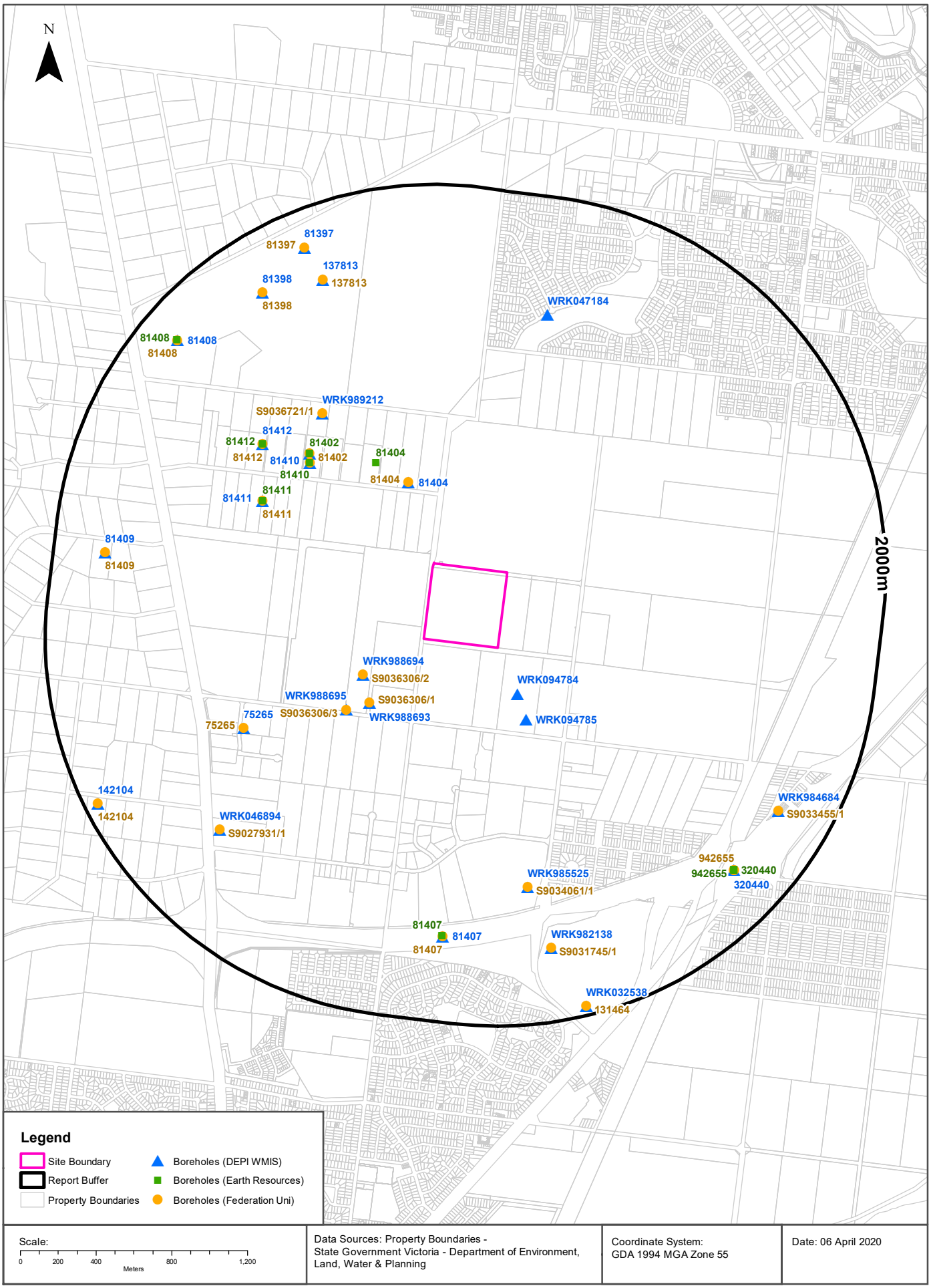
Approximate on-site Basement Elevation:

Basement Elevation - Basement Rocks comprise Lower Palaeozoic basement rocks that form the highlands and the crystalline basement; and Mesozoic rocks of the Otway and Gippsland basins both outcropping and subsurface
-195 AHDm to -188 AHDm

Groundwater Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning

Groundwater Boreholes

164-200 McManus Road, Lara, VIC 3212



Groundwater Boreholes

164-200 McManus Road, Lara, VIC 3212

Boreholes (DEPI WMIS)

Boreholes from the Department of Environment and Primary Industries' Water Measurement Information System, within the dataset buffer:

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
WRK094784	Observation	0.00m-2.40m FILL 2.40m-14.00m BASALT 14.00m-15.00m WERRIBEE FORMATION	0.00m-12.90m INNER LINING - CASING = Pvc 12.90m-15.00m INNER LINING - SCREEN = Pvc 0.50m-9.50m OUTER LINING - GRAVEL = Cement 9.50m-10.50m OUTER LINING - GRAVEL = Bentonite 10.50m-15.00m OUTER LINING - GRAVEL = Gravel			2016-06-24	263	South East
WRK988694							373	South West
WRK094785	Observation	0.00m-2.40m FILL 2.40m-12.00m BASALT 12.00m-13.90m Werribee Formation	0.00m-10.90m INNER LINING - CASING = UPVC class 18 10.90m-13.90m INNER LINING - SCREEN = UPVC class 18 0.00m-9.50m OUTER LINING - GRAVEL = Cement 9.50m-10.50m OUTER LINING - GRAVEL = Bentonite 10.50m-13.90m OUTER LINING - GRAVEL = Gravel			2016-06-24	405	South East
WRK988693							442	South West
81404	Stock	0.00m-7.32m GREY CLAY 7.32m-7.93m BASALT 7.93m-16.76m BROKEN BASALT 16.76m-22.00m FINE SAND	0.00m-7.32m INNER LINING - CASING = Pvc 7.32m-22.00m INNER LINING - SCREEN = Pvc			1983-01-31	446	North West
WRK988695							554	South West
81410	Stock		0.00m-9.30m INNER LINING - CASING = Pvc 9.30m-13.50m INNER LINING - SCREEN = Pvc			1986-03-31	840	North West
81402	Not Known	0.00m-17.00m CLAY 17.00m-22.00m SAND	0.00m-17.00m INNER LINING - CASING = Steel 17.00m-22.00m INNER LINING - SCREEN = Steel		17.00m-22.00m Sand	1983-01-12	872	North West
81411	Not Known		0.00m-10.60m INNER LINING - CASING = Pvc 10.20m-15.20m INNER LINING - SCREEN = Pvc			1986-03-31	962	North West
WRK989212	Domestic & Stock		0.00m-1.00m OUTER LINING - GRAVEL = Cement			2008-12-23	984	North West
75265	Domestic, Stock	0.00m-1.00m TOPSOIL AND CLAY 1.00m-7.00m VOLCANIC ASH 7.00m-18.00m BASALT 18.00m-21.00m BROWN CLAY 21.00m-25.00m BASALT 25.00m-28.00m BROKEN BASALT 28.00m-30.50m BLAK CLAY	-0.30m-25.00m INNER LINING - CASING = Pvc 25.00m-28.00m INNER LINING - SCREEN = Pvc 28.00m-30.50m INNER LINING - CASING = Pvc		25.00m-28.00m Basalt	1990-03-01	1062	South West
81412	Stock		0.00m-8.00m INNER LINING - CASING = Pvc 8.00m-13.00m INNER LINING - SCREEN = Pvc			1986-04-03	1100	North West
WRK985525							1275	South
WRK047184	Irrigation						1378	North
WRK046894	Domestic & Stock	0.00m-1.00m BROWN CLAY 1.00m-1.50m LIMESONE & CLAY 1.50m-3.50m BASALT 3.50m-10.00m WEATHERED BASALT 10.00m-17.00m BASALT 17.00m-19.00m FRACTURED BASALT & GREY CLAY	0.50m-17.00m INNER LINING - CASING = Pvc 17.00m-19.00m INNER LINING - SLOT = Pvc 0.00m-0.50m OUTER LINING - GRAVEL = Cement			2007-01-11	1476	South West

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
81407	Not Known	0.00m-9.00m TOPSOIL 9.00m-11.00m DECOMPOSED BASALT 11.00m-15.24m CLAY AND SAND 15.24m-32.00m SILTY CLAY				1982-12-09	1548	South
137813	Irrigation	0.00m-0.50m OVERBURDEN 0.50m-1.50m GREY CLAY 1.50m-4.50m BASALT BOULDERS 4.50m-7.20m WEATHERED BASALT 7.20m-13.00m FRACTURED BASALT 13.00m-15.00m HARD BASALT 15.00m-18.00m FRACTURED BASALT 18.00m-19.00m GREY CLAY 19.00m-28.00m FINE WHITE SAND 28.00m-29.20m YELLOW CLAY	-0.50m-7.20m INNER LINING - CASING = Pvc 7.20m-29.20m INNER LINING - SCREEN = Pvc 0.00m-0.50m OUTER LINING - GRAVEL = Cement		7.20m-29.20m Basalt	1999-05-28	1605	North West
WRK982138	Domestic & Stock					2007-07-05	1611	South
81398	Not Known	0.00m-1.00m TOPSOIL CLAY 1.00m-2.00m LIMESTONE/CLAY 2.00m-12.19m BASSALT SOFT 12.19m-14.30m BROKEN BASSALT	0.00m-12.19m INNER LINING - CASING = Not Known 12.19m-14.30m INNER LINING - SCREEN = Not Known			1975-09-08	1688	North West
320440	Non Groundwater					1981-10-14	1713	South East
WRK984684							1713	South East
81409	Domestic, Stock	0.00m-1.00m TOP SOIL 1.00m-9.10m CLAY 9.10m-11.00m CLAY BASALT 11.00m-24.30m BASALT	0.00m-17.00m INNER LINING - CASING = Mild Steel 17.00m-24.30m INNER LINING - SCREEN = Mild Steel		17.00m-24.30m Basalt	1986-12-08	1725	West
81408	Domestic, Miscellaneous, Stock	0.00m-1.00m TOP SOIL 1.00m-16.00m BASALT 16.00m-18.00m CLAY (WHITE) 18.00m-36.00m GREY SANDS (.03)"	0.00m-24.00m INNER LINING - CASING = Pvc 24.00m-28.00m INNER LINING - SCREEN = Pvc		24.00m-28.00m Basalt	1985-03-30	1794	North West
81397	Not Known	0.00m-1.50m TOP SOIL CLAY 1.50m-3.00m LIME STONE/CLAY 3.00m-12.19m BASSALT SOFT 12.19m-14.24m BROKEN BASSALT	0.00m-12.19m INNER LINING - CASING = Not Known 12.19m-15.24m INNER LINING - SCREEN = Not Known			1975-09-15	1800	North West
142104	Domestic, Stock	0.00m-1.00m TOPSOIL & GREY CLAY 1.00m-6.00m HARD BLUE BASALT 6.00m-8.00m SOFT BROWN BASALT 8.00m-12.00m MEDIUM BROWN BASALT 12.00m-12.50m ORANGE CLAY 12.50m-15.00m FINE YELLOW SAND 15.00m-28.00m FINE ORANGE SAND 28.00m-45.00m FINE YELLOW SAND 45.00m-48.00m ORANGE CLAY 48.00m-54.00m COARSE GRAVEL	-0.30m-54.00m INNER LINING - CASING = Pvc 48.00m-54.00m INNER LINING - SCREEN = Pvc 0.00m-0.50m OUTER LINING - GRAVEL = Cement 47.00m-0.00m OUTER LINING - GRAVEL = Seal			2000-01-11	1930	South West
WRK032538	Industrial, Irrigation, Miscellaneous	0.00m-2.00m CLAY 2.00m-7.50m SOFT BASALT 7.50m-10.50m BROWN CLAY 10.50m-22.00m FINE YELLOW SABD 22.00m-29.00m FINE GREY SANND 29.00m-30.00m GREY CLAY	1.00m-10.50m INNER LINING - CASING = Pvc 10.50m-22.00m INNER LINING - SCREEN = Pvc 22.00m-30.00m INNER LINING - SCREEN = Not Known			1997-08-29	1949	South

Groundwater Boreholes

164-200 McManus Road, Lara, VIC 3212

Boreholes (Earth Resources Database)

Boreholes from the Earth Resources dataset, within the dataset buffer:

Bore Id	Bore Type	Company	Usage	Method	Status	Drill Date	Depth	Elevation	Accuracy (m)	Dist (m)	Direct
81404		Private Individual/Corporation	Industrial/commercial water	Rotary (diamond/drag bit)		31/01/1983	22.00		100	608	North West
81410		Private Individual/Corporation	Stock/Poultry water supply	Air Percussion/Air Rotary		31/03/1986	16.70		100	841	North West
81402		Private Individual/Corporation	Irrigation	Percussion (cable)		12/01/1983	22.00		100	873	North West
81411		Private Individual/Corporation		Percussion (cable)	Abandoned	31/03/1986	21.34		100	964	North West
81412		Private Individual/Corporation	Stock/Poultry water supply	Percussion (cable)		03/04/1986	16.25		100	1102	North West
81407		Private Individual/Corporation		Air Percussion/Air Rotary	Abandoned	09/12/1982	32.00		100	1547	South
320440		Private Individual/Corporation		Rotary (diamond/drag bit)		14/10/1981	140.00	20.00	300	1712	South East
942655		CRA Exploration Pty Ltd		Rotary mud drilling	Completed	14/10/1981	140.00		25	1713	South East
81408		Local Government Authority	Fire fighting/Sports/general	Air Percussion/Air Rotary		30/03/1985	36.00		100	1796	North West

Boreholes (Federation University)

Boreholes from the Federation University Australia dataset, within the dataset buffer:

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Direct
S9036306/2		Groundwater				373	South West
S9036306/1		Groundwater				442	South West
81404	Private Landholders Bore	Groundwater	Stock		D: 0.000m-7.320m Grey Clay D: 7.320m-7.930m Basalt D: 7.930m-16.760m Broken Basalt D: 16.760m-22.000m Fine Sand	446	North West
S9036306/3		Groundwater				554	South West
81410	Private Landholders Bore	Groundwater	Stock		D: 0.000m-1.520m Overburden D: 1.520m-3.500m Clay (Wet) D: 3.500m-7.000m Clay (Dry) D: 7.000m-9.100m Sandstone D: 9.100m-16.700m Basalt	840	North West
81402	Private Landholders Bore	Groundwater		9187.70	D: 0.000m-17.000m Clay D: 17.000m-22.000m Sand	872	North West

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Direct
81411	Private Landholders Bore	Groundwater			D: 0.000m-1.520m Overburden D: 1.520m-9.100m Clay D: 9.100m-9.500m Sandstone D: 9.500m-15.200m Basalt (Soft) D: 15.200m-21.340m Basalt Hard-Bore Abandoned	962	North West
S9036721/1		Groundwater	Domestic and Stock			984	North West
75265		Groundwater	Stock (ST) Domestic (DM)		D: 0.000m-1.000m Topsoil And Clay D: 1.000m-7.000m Volcanic Ash D: 7.000m-18.000m Basalt D: 18.000m-21.000m Brown Clay D: 21.000m-25.000m Basalt D: 25.000m-28.000m Broken Basalt D: 28.000m-30.500m Blak Clay	1062	South West
81412	Private Landholders Bore	Groundwater	Stock		D: 0.000m-1.500m Overburden D: 1.500m-7.500m Clay D: 7.500m-13.000m Basalt (Hard) D: 13.000m-16.250m Basalt (Porous)	1100	North West
S9034061/1		Groundwater				1275	South
S9027931/1		Groundwater	Domestic and Stock		D: 0.000m-1.000m Brown Clay D: 1.000m-1.500m Limesone & Clay D: 1.500m-3.500m Basalt D: 3.500m-10.000m Weathered Basalt D: 10.000m-17.000m Basalt D: 17.000m-19.000m Fractured Basalt & Grey Clay	1476	South West
81407	Private Landholders Bore	Groundwater			D: 0.000m-9.000m Topsoil D: 9.000m-11.000m Decomposed Basalt D: 11.000m-15.240m Clay And Sand D: 15.240m-32.000m Silty Clay	1548	South
137813		Groundwater	Irrigation		D: 0.000m-0.500m Overburden D: 0.500m-1.500m Grey Clay D: 1.500m-4.500m Basalt Boulders D: 4.500m-7.200m Weathered Basalt D: 7.200m-13.000m Fractured Basalt D: 13.000m-15.000m Hard Basalt D: 15.000m-18.000m Fractured Basalt D: 18.000m-19.000m Grey Clay D: 19.000m-28.000m Fine White Sand D: 28.000m-29.200m Yellow Clay	1605	North West
S9031745/1	Private Landholders Bore	Groundwater				1611	South
81398	Private Landholders Bore	Groundwater			D: 0.000m-1.000m Topsoil Clay D: 1.000m-2.000m Limestone/Clay D: 2.000m-12.190m Bassalt Soft D: 12.190m-14.300m Broken Bassalt	1688	North West
320440	Department of Mines (1860 - 1895)		Non Groundwater			1713	South East
S9033455/1		Groundwater				1713	South East
942655	Exploration Company - Minerals and Petroleum	Coal	Non Groundwater		g: 0.000m-9.000m Basalt g: 9.000m-12.000m Fine Qtz Sand g: 12.000m-24.000m Clay And Sand g: 24.000m-80.000m Brown/Grey Clay With Shelly Fragments g: 80.000m-86.000m Sand Clay With Shelly Fragments g: 86.000m-118.000m Grey Brown Silty Clay g: 118.000m-138.000m Grey Clay With Shell Fragments, Abundant Lst Chips	1713	South East
81409	Private Landholders Bore	Groundwater	Domestic Stock	9612.30	D: 0.000m-1.000m Top Soil D: 1.000m-9.100m Clay D: 9.100m-11.000m Clay Basalt D: 11.000m-24.300m Basalt	1725	West
81408	Private Landholders Bore	Groundwater	Domestic Stock Miscellaneous		D: 0.000m-1.000m Top Soil D: 1.000m-16.000m Basalt D: 16.000m-18.000m Clay (White) D: 18.000m-36.000m Grey Sands (.03\)"	1794	North West
81397	Private Landholders Bore	Groundwater			D: 0.000m-1.500m Top Soil Clay D: 1.500m-3.000m Lime Stone/Clay D: 3.000m-12.190m Bassalt Soft D: 12.190m-14.240m Broken Bassalt	1800	North West

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Direct
142104		Groundwater	Domestic Stock		D: 0.000m-1.000m Topsoil & Grey Clay D: 1.000m-6.000m Hard Blue Basalt D: 6.000m-8.000m Soft Brown Basalt D: 8.000m-12.000m Medium Brown Basalt D: 12.000m-12.500m Orange Clay D: 12.500m-15.000m Fine Yellow Sand D: 15.000m-28.000m Fine Orange Sand D: 28.000m-45.000m Fine Yellow Sand D: 45.000m-48.000m Orange Clay D: 48.000m-54.000m Coarse Gravel	1930	South West
131464		Groundwater	Industrial (IN) Miscellaneous (MI) Irrigation (IR)		D: 0.000m-2.000m Clay D: 2.000m-7.500m Soft Basalt D: 7.500m-10.500m Brown Clay D: 10.500m-22.000m Fine Yellow Sabd D: 22.000m-29.000m Fine Grey Sannd D: 29.000m-30.000m Grey Clay	1949	South

Historical Mining Activity - Shafts

164-200 McManus Road, Lara, VIC 3212

Historical Mining Activity - Shafts

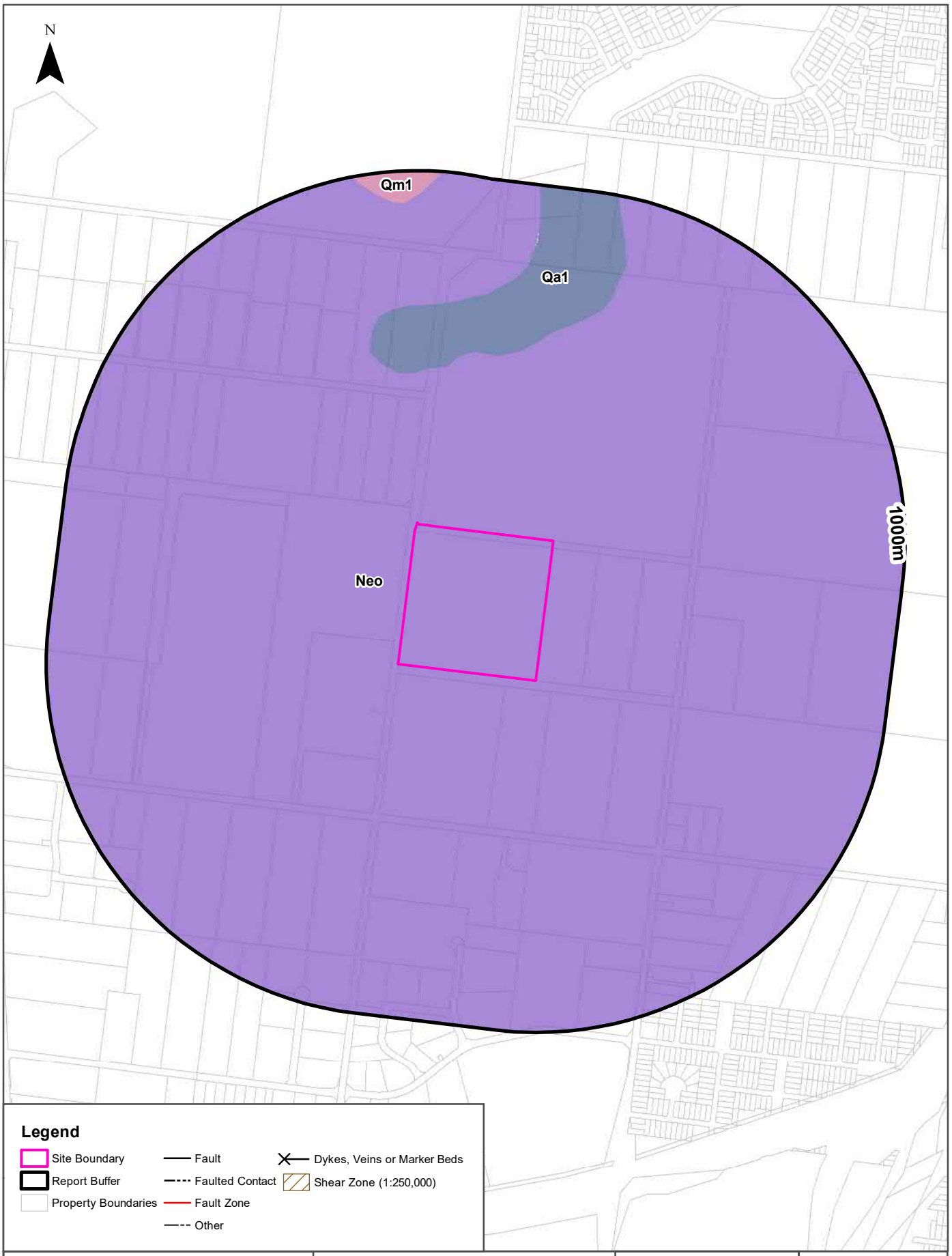
Mine Shaft Locations were collected by a variety of methods from 1869 in some areas of the state, mainly concentrating in Ballarat and Bendigo. In places a shaft may be recorded multiple times with a different source. In cases where several shaft locations are shown close together (generally with separations less than stated position errors) and they have different sources, it is possible that one shaft has been mapped several times. In cases where several shaft locations are shown close together but they have the same information source, it is possible that each shaft location represents a different shaft on the ground.

Historical Mine Shafts within the dataset buffer:

Map Id	Name	Source	Depth (m)	Collar (ft)	Fill/Cap Method	Location Desc	Location Accuracy	Distance	Direction
N/A	No records in buffer								

Geology 1:50,000

164-200 McManus Road, Lara, VIC 3212



Geology

164-200 McManus Road, Lara, VIC 3212

Geological Units

What are the Geological Units onsite?

Symbol	Name	Description	Geological Age	Lithology	Dataset
Neo	Newer Volcanic Group - basalt flows (Neo): generic	Olivine tholeiite, quartz tholeiite, basanite, basaltic icelandite, hawaiite, mugearite, minor scoria and ash, fluvial sediments: tholeiitic to alkaline; includes sheet flows and valley flows and intercalated gravel, sand, clay	Miocene to Holocene	alkali basalt (major proportion); tholeiitic basalt (major proportion); alluvium (minor proportion); tuff (minor proportion)	1:50,000

What are the Geological Units within the dataset buffer?

Symbol	Name	Description	Geological Age	Lithology	Dataset
Neo	Newer Volcanic Group - basalt flows (Neo): generic	Olivine tholeiite, quartz tholeiite, basanite, basaltic icelandite, hawaiite, mugearite, minor scoria and ash, fluvial sediments: tholeiitic to alkaline; includes sheet flows and valley flows and intercalated gravel, sand, clay	Miocene to Holocene	alkali basalt (major proportion); tholeiitic basalt (major proportion); alluvium (minor proportion); tuff (minor proportion)	1:50,000
Qa1	alluvium(Qa1): generic	Gravel, sand, silt: variably sorted and rounded; generally unconsolidated; includes deposits of low terraces; alluvial floodplain deposits	Pleistocene to Holocene	gravel material (significant); sand (significant); silt material (significant)	1:50,000
Qm1	swamp and lake deposits (Qm1): generic	Grey to black carbonaceous mud, silt, clay, minor peat: generally unconsolidated; rare dolomite	Pleistocene to Holocene	mud (major proportion); silt material (significant); clay lithology (significant); peat (minor proportion)	1:50,000

Geology

164-200 McManus Road, Lara, VIC 3212

Geological Structures

What are the Geological Faults or Faulted Contacts onsite?

Map Id	Type	Name	Contact	Positional Accuracy	Dataset
No features					1:50,000

What are the Dykes, Marker Beds and Veins onsite?

Map Id	Type	Name	Description	Positional Accuracy	Dataset
No features					1:50,000

What are the Shear Zones onsite (1:250,000 scale)?

Map Id	Type	Name	Description	Positional Accuracy	Dataset
No features					1:250,000

What are the Geological Faults or Faulted Contacts within the dataset buffer?

Map Id	Type	Name	Contact	Positional Accuracy	Dataset
No features					1:50,000

What are the Dykes, Marker Beds and Veins within the dataset buffer?

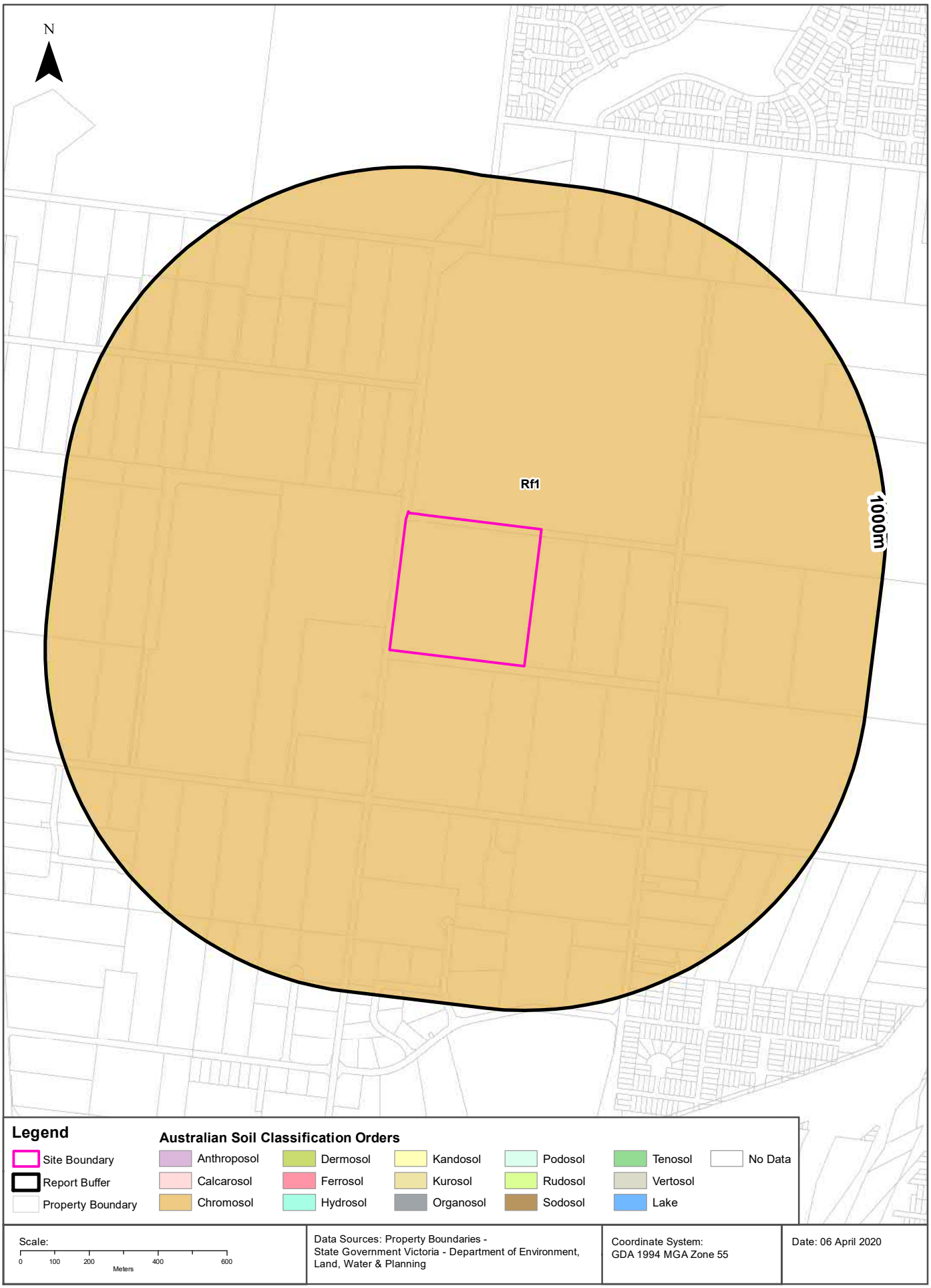
Map Id	Type	Name	Description	Positional Accuracy	Dataset
No features					1:50,000

What are the Shear Zones within the dataset buffer (1:250,000 scale)?

Map Id	Type	Name	Description	Positional Accuracy	Dataset
No features					1:250,000

Atlas of Australian Soils

164-200 McManus Road, Lara, VIC 3212



Soil Landscapes

164-200 McManus Road, Lara, VIC 3212

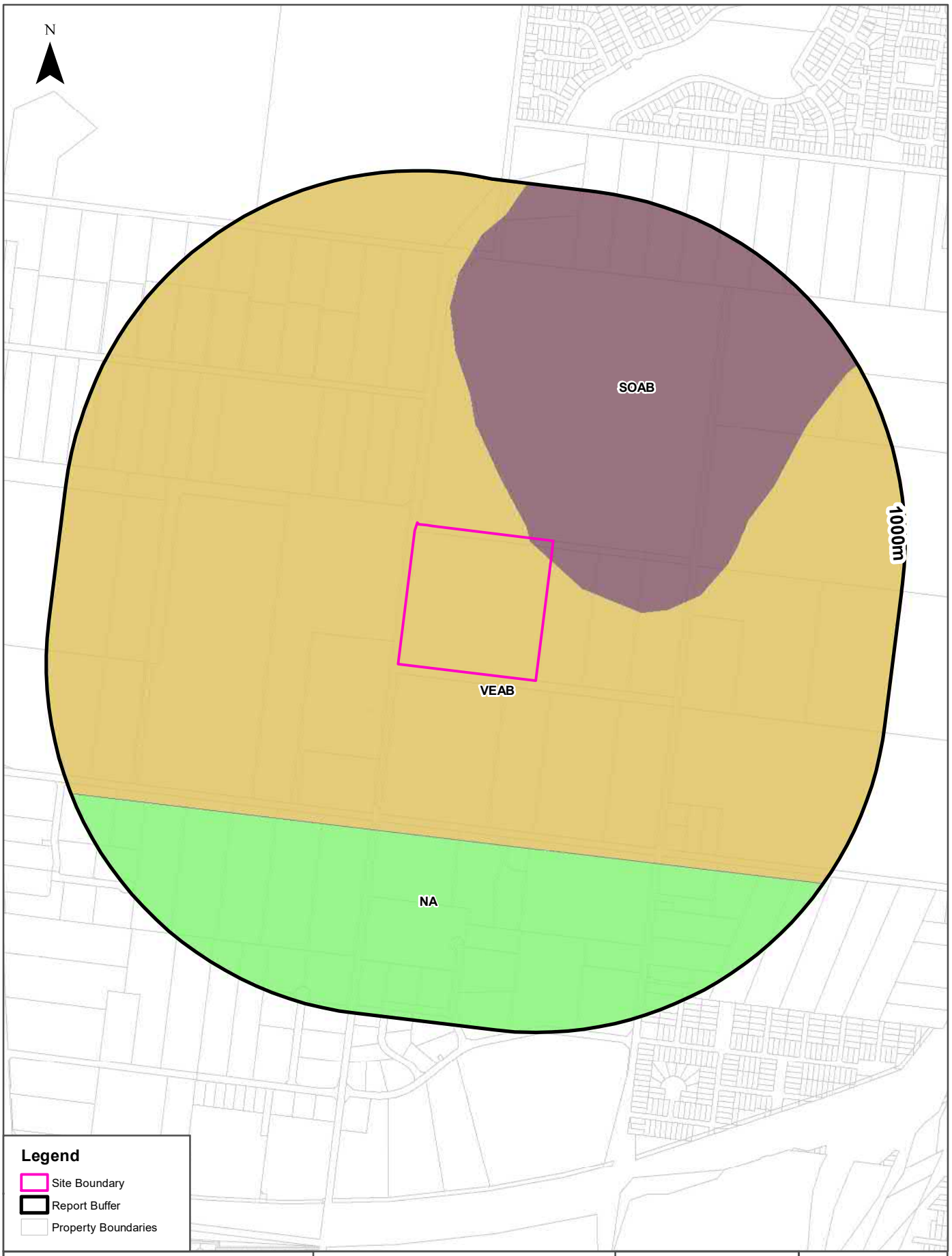
Atlas of Australian Soils

Australian soil types within the dataset buffer:

Symbol	Soil Order	Map Unit Description	Distance
Rf1	Chromosol	Undulating plateaux with major steps in them: plains of hard alkaline brown soils (Db1.13) with hard alkaline dark soils (Dd1.13), and also hard alkaline yellow mottled soils (Dy3.13) with cracking clays (Ug5.2) in gilgai microassociation; hard alkaline red soils (Dr2.13) on the slopes (steps) between the different plateau levels.	0m

Victorian Soil Type Mapping

164-200 McManus Road, Lara, VIC 3212



Soils Landscapes

164-200 McManus Road, Lara, VIC 3212

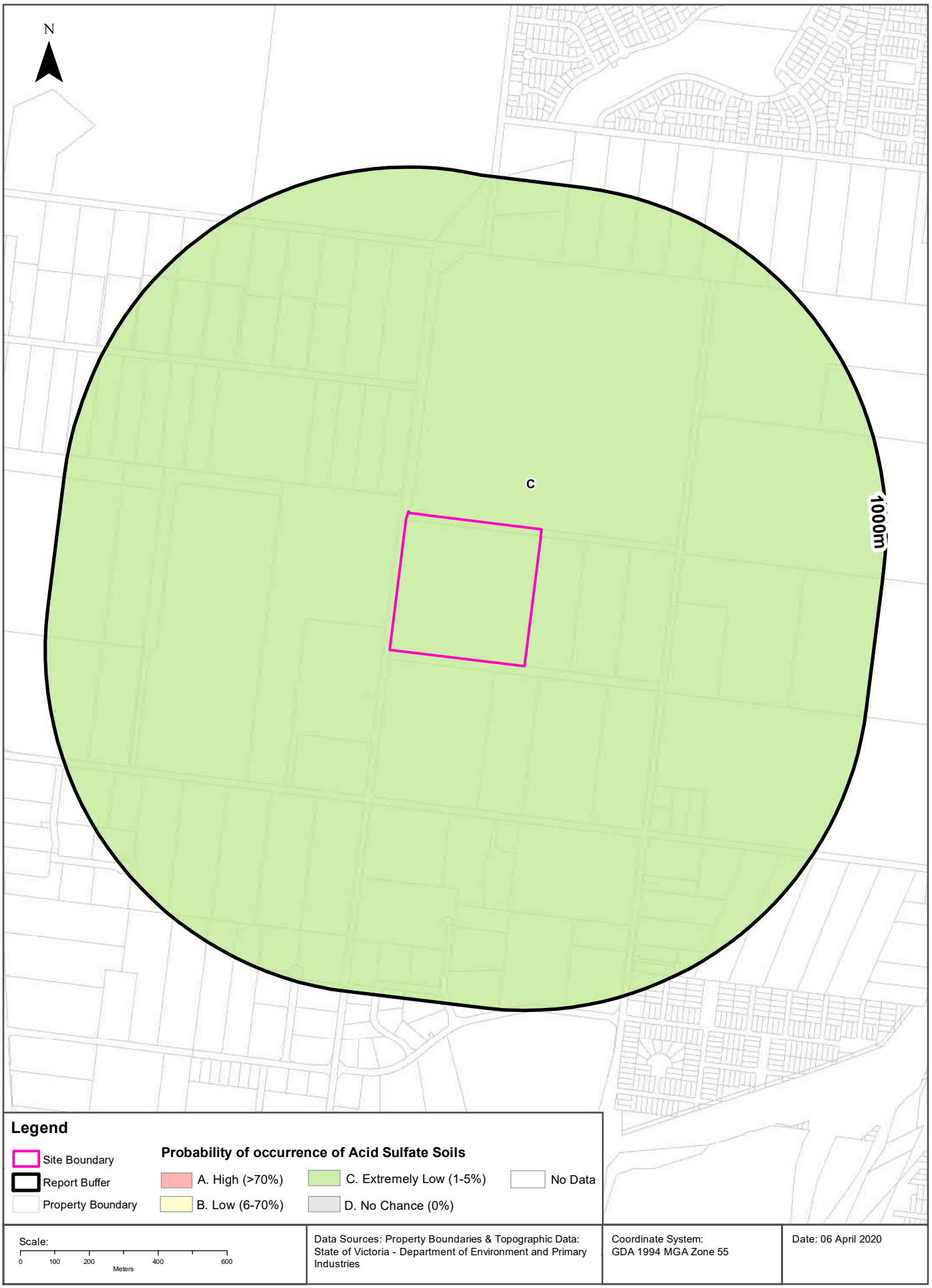
Victorian Soil Type Mapping

Victorian Soil Types within the dataset buffer:

Symbol	Description	Distance
SOAB	Brown Sodosols	0m
VEAB	Brown Vertosols	0m
NA	Unassigned	474m

Atlas of Australian Acid Sulfate Soils

164-200 McManus Road, Lara, VIC 3212



Acid Sulfate Soils

164-200 McManus Road, Lara, VIC 3212

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

PROBCLASS	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Acid Sulfate Soils

164-200 McManus Road, Lara, VIC 3212

Coastal Acid Sulfate Soils

What are the on-site Coastal Acid Sulfate Soil types?

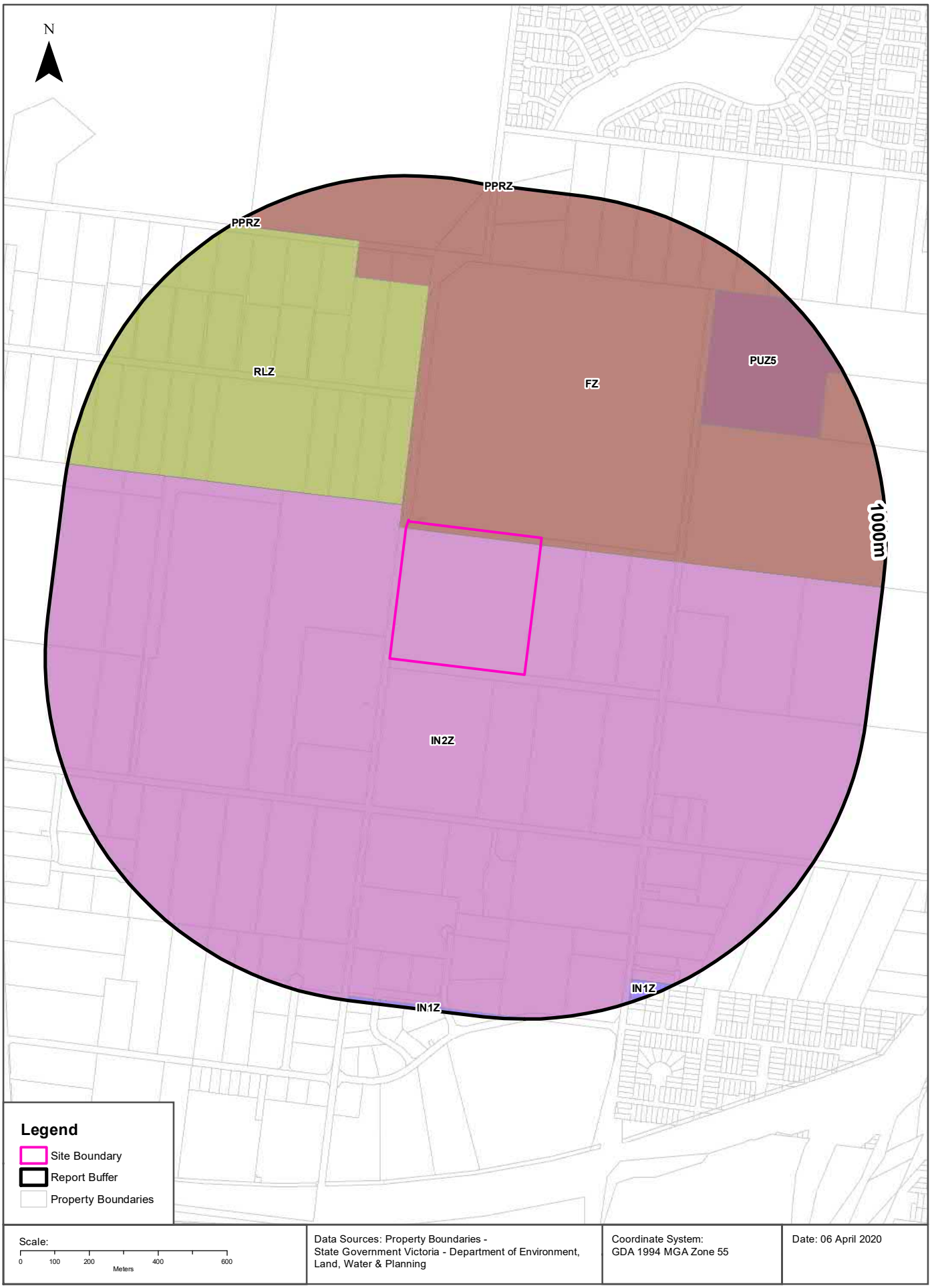
Coastal Acid Sulfate Soil Types
There are no Acid Sulfate areas onsite

What are the Coastal Acid Sulfate Soil types within the dataset buffer?

Coastal Acid Sulfate Soil Types	Distance	Direction
There are no Acid Sulfate areas within the report buffer		

Planning Zones

164-200 McManus Road, Lara, VIC 3212



Planning

164-200 McManus Road, Lara, VIC 3212

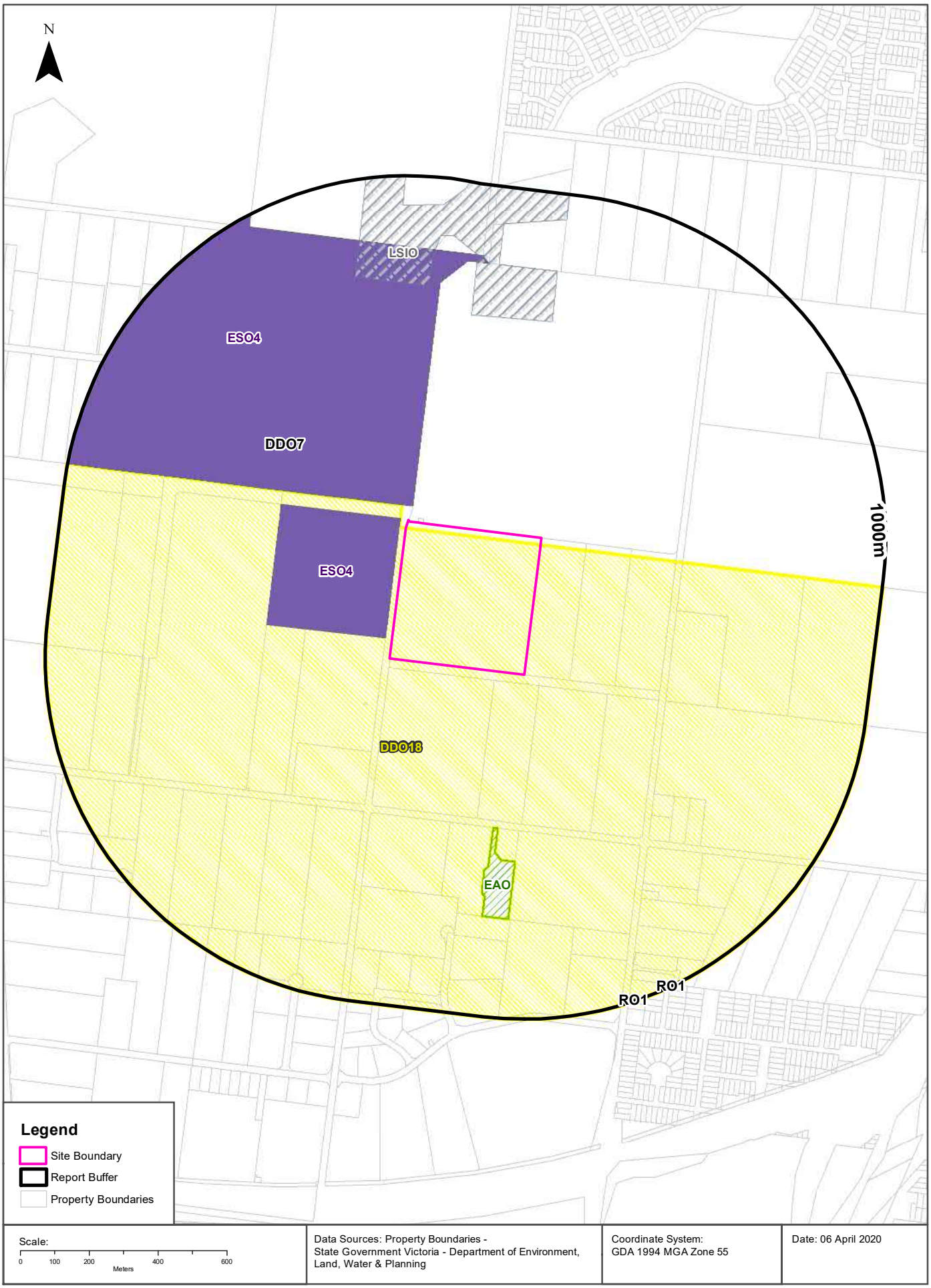
Planning Zones

Planning zones within the dataset buffer:

Zone Code	Description	Distance	Direction
IN2Z	INDUSTRIAL 2 ZONE	0m	Onsite
FZ	FARMING ZONE	0m	Onsite
RLZ	RURAL LIVING ZONE	50m	North West
PUZ5	PUBLIC USE ZONE - CEMETERY/CREMATORIUM	567m	North East
IN1Z	INDUSTRIAL 1 ZONE	937m	South
PPRZ	PUBLIC PARK AND RECREATION ZONE	969m	North West
PPRZ	PUBLIC PARK AND RECREATION ZONE	999m	North

Planning Overlays

164-200 McManus Road, Lara, VIC 3212



Planning

164-200 McManus Road, Lara, VIC 3212

Planning Overlays

Planning overlays within the dataset buffer:

Zone Code	Description	Distance	Direction
DDO18	DESIGN AND DEVELOPMENT OVERLAY - SCHEDULE 18	0m	Onsite
ESO4	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4	20m	West
ESO4	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4	44m	North
DDO7	DESIGN AND DEVELOPMENT OVERLAY - SCHEDULE 7	50m	North West
EAO	ENVIRONMENTAL AUDIT OVERLAY	450m	South
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	618m	North
RO1	RESTRUCTURE OVERLAY - SCHEDULE 1	982m	South East

Heritage

164-200 McManus Road, Lara, VIC 3212

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
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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Victorian Heritage Register

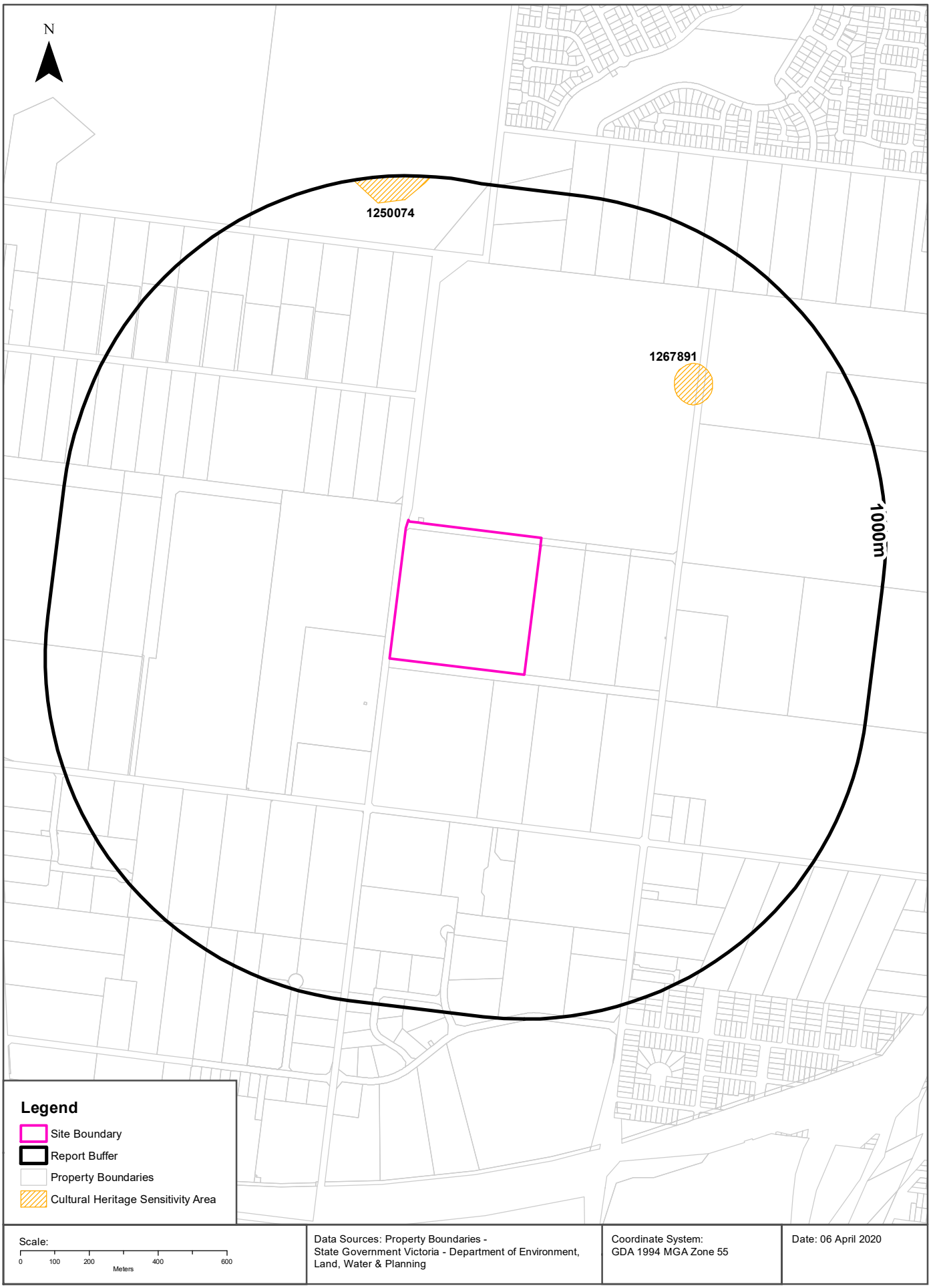
What are the Victorian Heritage Register items located within the dataset buffer?:

VHR Number	Description	Distance	Direction
N/A	No records within buffer		

Victorian Heritage Register Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning
Creative Commons Attribution 4.0 International © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/

Cultural Heritage Sensitivity

164-200 McManus Road, Lara, VIC 3212



Heritage

164-200 McManus Road, Lara, VIC 3212

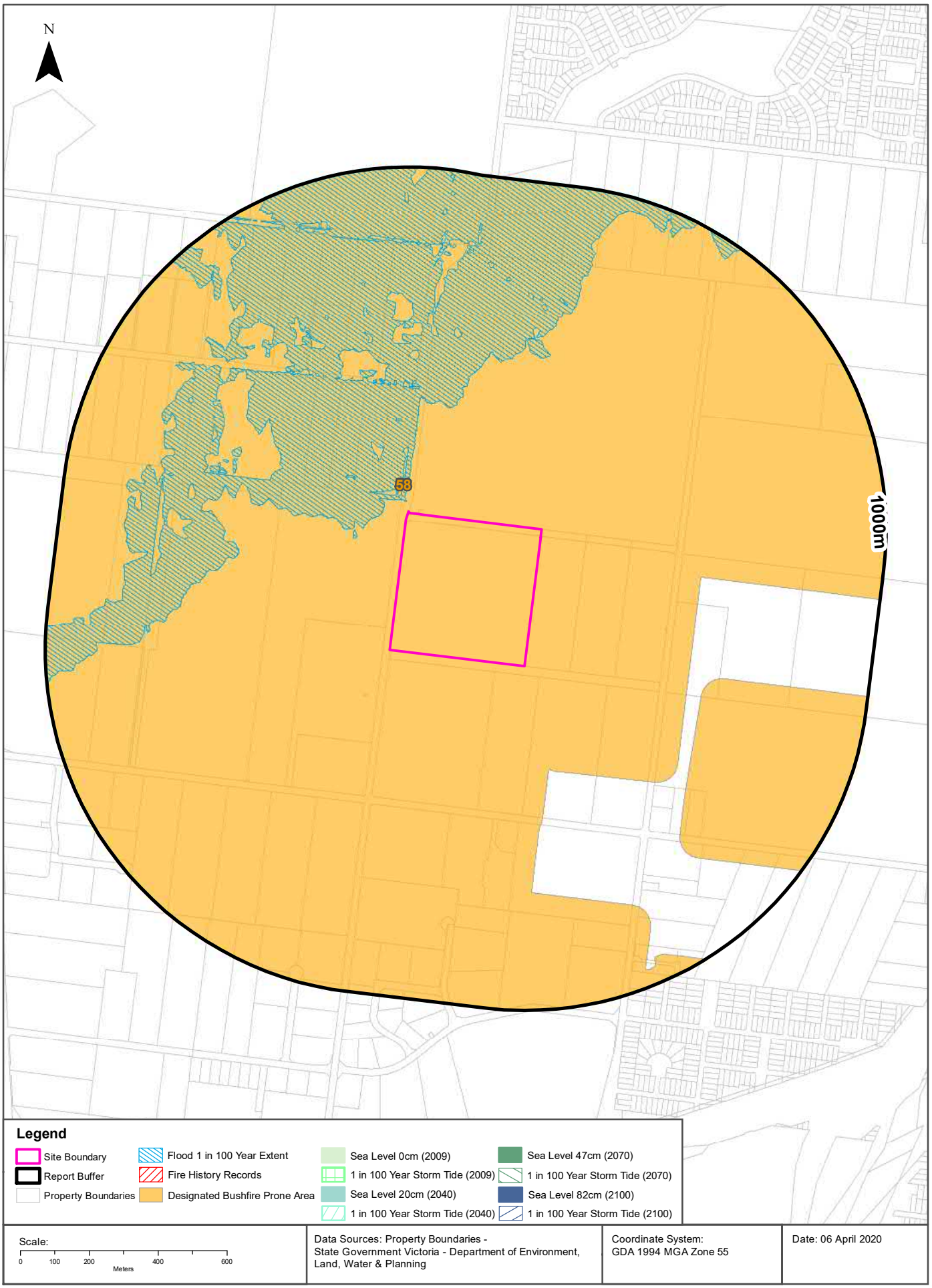
Cultural Heritage Sensitivity

Areas of Cultural Heritage Sensitivity as specified in Division 3 of Part 2 in the Victorian Aboriginal Heritage Regulations 2018, within the dataset buffer:

Map Id	Distance	Direction
1267891	571m	North East
1250074	925m	North

Natural Hazards

164-200 McManus Road, Lara, VIC 3212



Natural Hazards

164-200 McManus Road, Lara, VIC 3212

Bushfire Prone Areas

What are the designated bushfire prone areas within the dataset buffer?

Map ID	Feature	Plan No	LGA	Gazetted Date	Distance	Direction
58	Designated Bushfire Prone Area	LEGL./19-216	GREATER GEELONG	10/09/2019	0m	Onsite

Fire History

What are the fire history records of fires primarily on public land, within the dataset buffer?

Map Id	Fire Type	Fire Key	Season	Fire No	Fire Name	Treatment	Fire Cover	Start Date	Dist (m)	Direction
N/A	No records within buffer									

Flood - 1 in 100 year modelled flood extent

What 1 in 100 year flood extent features exist within the dataset buffer?

Feature	Source	Method	Scale	Modified Date	Distance	Direction
100 Year Flood Outline	City of Greater Geelong	Modelled		18/06/2012	29m	North

Natural Hazards

164-200 McManus Road, Lara, VIC 3212

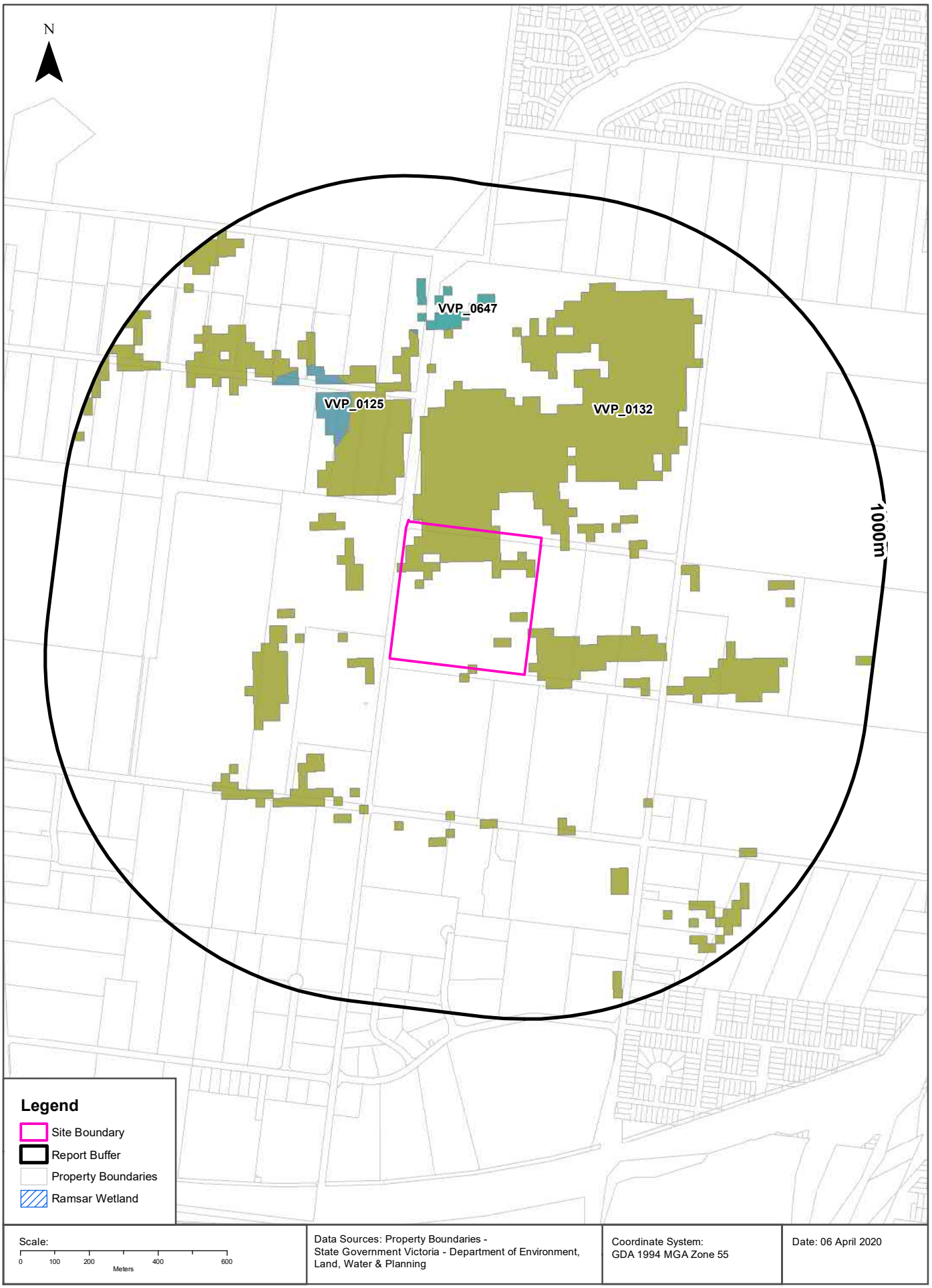
Victorian Coastal Inundation Sea Level Rise

What coastal inundation sea level rise features exist within the dataset buffer?

Description	Distance	Direction
No records within buffer		

Ecological Constraints - Native Vegetation 2005 & Ramsar Wetlands

164-200 McManus Road, Lara, VIC 3212



Ecological Constraints

164-200 McManus Road, Lara, VIC 3212

Native Vegetation (Modelled 2005 Ecological Vegetation Classes)

What native vegetation exists within the dataset buffer?

Veg Code	EVC Name	EVCCode	Group	Subgroup	Bioregion	Conservation Status	Geographic Occurance	Distance
VVP_0132	Plains Grassland	0132	Plains Grasslands and Chenopod Shrublands	Clay soils	Victorian Volcanic Plain	Endangered	Common	0m
VVP_0125	Plains Grassy Wetland	0125	Wetlands	Freshwater	Victorian Volcanic Plain	Endangered	Common	299m
VVP_0647	Plains Sedgy Wetland	0647	Wetlands	Freshwater	Victorian Volcanic Plain	Endangered	Common	539m

Ramsar Wetlands

What Ramsar wetland areas exist within the dataset buffer?

Map ID	Site Name	Lake Name	Distance	Direction
N/A	No records within buffer			

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

164-200 McManus Road, Lara, VIC 3212

Ecological Constraints

164-200 McManus Road, Lara, VIC 3212

Groundwater Dependent Ecosystems Atlas

What GDEs exist within the dataset buffer?

GDE Type	Name	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial		High potential GDE - from national assessment	Plains mainly on basalt lavas with many volcanic forms and lakes, partly on weak sedimentary rocks.	Vegetation	Fractured rock	299m

Inflow Dependent Ecosystems Likelihood

164-200 McManus Road, Lara, VIC 3212

Ecological Constraints

164-200 McManus Road, Lara, VIC 3212

Inflow Dependent Ecosystems Likelihood

What IDEs exist within the dataset buffer?

GDE Type	Name	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial		6	Plains mainly on basalt lavas with many volcanic forms and lakes, partly on weak sedimentary rocks.	Vegetation	Fractured rock	299m
Terrestrial		7	Plains mainly on basalt lavas with many volcanic forms and lakes, partly on weak sedimentary rocks.	Vegetation	Fractured rock	437m
Terrestrial		8	Plains mainly on basalt lavas with many volcanic forms and lakes, partly on weak sedimentary rocks.	Vegetation	Unconsolidated sedimentary	539m

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 code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb 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
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

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Historical Search

HISTORICAL SEARCH STATEMENT Land Use Victoria

Produced 06/04/2020 09:48 AM

Volume 11814 Folio 999
Folio Creation: Created as a computer folio
Parent title Volume 11689 Folio 582

RECORD OF HISTORICAL DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details

RECORD OF VOTS DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
24/09/2019	24/09/2019	AS558963U	N

TRANSFER CONTROL OF AN ELECTRONIC CERTIFICATE OF TITLE

02/10/2019	02/10/2019	AS581153B (E)	N

APPLICATION TO NOMINATE AN ECT TO AN ELECTRONIC INSTRUMENT
ELF Id: 203523108
Removed by Dealing AS628491X

18/10/2019	18/10/2019	AS628491X (E)	N

TRANSFER OF LAND BY ENDORSEMENT
FROM:
GREATER GEELONG CITY COUNCIL
TO:
PROSPECT HILL INTERNATIONAL PTY LTD 617544224
RESULTING PROPRIETORSHIP:
Estate Fee Simple
Sole Proprietor
PROSPECT HILL INTERNATIONAL PTY LTD of 107 PROSPECT HILL ROAD CAMBERWELL VIC
3124
AS628491X 18/10/2019

STATEMENT END

VOTS Snapshot

VOLUME 11814 FOLIO 999
124062081165C
Produced 25/08/2016 06:48 pm

LAND DESCRIPTION

Lot D on Plan of Subdivision 710783E.
PARENT TITLE Volume 11689 Folio 582
Created by instrument PS710783E 25/08/2016

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
GREATER GEELONG CITY COUNCIL of 30 GHERINGHAP STREET GEELONG VIC 3220
PS710783E 25/08/2016

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS710783E FOR FURTHER DETAILS AND BOUNDARIES

Historical Search

HISTORICAL SEARCH STATEMENT Land Use Victoria

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Volume 11689 Folio 582
Folio Creation: Created as a computer folio
Parent title Volume 11580 Folio 730

RECORD OF HISTORICAL DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details

RECORD OF VOTS DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
02/08/2016	02/08/2016	AM984794Q	N
RECTIFICATION AMEND eCT TO pCT			
02/08/2016	02/08/2016	AM985253W	N
NOMINATE PCT TO PAPER INSTRUMENT OR LODGEMENT CASE			
08/08/2016	25/08/2016	PS710783E (S)	Y
PLAN OF SUBDIVISION, SUBDIVISION ACT 1988 Cancelled by PS710783E			

STATEMENT END

VOTS Snapshot

VOLUME 11689 FOLIO 582
124061170909K
Produced 06/07/2016 09:03 am

LAND DESCRIPTION

Lot C on Plan of Subdivision 710782G.
PARENT TITLE Volume 11580 Folio 730
Created by instrument PS710782G 06/07/2016

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
GREATER GEELONG CITY COUNCIL of 30 GHERINGHAP STREET GEELONG VIC 3220
PS710782G 06/07/2016

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Historical Search

HISTORICAL SEARCH STATEMENT Land Use Victoria

Produced 06/04/2020 09:49 AM

Volume 11580 Folio 730
Folio Creation: Created as a computer folio

Parent titles :
Volume 10028 Folio 447 Volume 05722 Folio 397

RECORD OF HISTORICAL DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details

RECORD OF VOTS DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
30/11/2015	30/11/2015	AM364430Q	N
RECTIFICATION AMEND eCT TO pCT			
30/11/2015	30/11/2015	AM364730C	N
NOMINATE PCT TO PAPER INSTRUMENT OR LODGEMENT CASE			
15/06/2016	06/07/2016	PS710782G (S)	Y
PLAN OF SUBDIVISION, SUBDIVISION ACT 1988 Cancelled by PS710782G			

STATEMENT END

VOTS Snapshot

VOLUME 11580 FOLIO 730
124055837585C
Produced 29/06/2015 02:15 pm

LAND DESCRIPTION

Lot B on Plan of Subdivision 710776B.
PARENT TITLES :
Volume 05722 Folio 397 Volume 10028 Folio 447
Created by instrument PS710776B 29/06/2015

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
GREATER GEELONG CITY COUNCIL of 30 GHERINGHAP STREET GEELONG VIC 3220
PS710776B 29/06/2015

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS710776B FOR FURTHER DETAILS AND BOUNDARIES

Historical Search

HISTORICAL SEARCH STATEMENT Land Use Victoria

Produced 06/04/2020 09:49 AM

Volume 10028 Folio 447
Folio Creation: Created as paper folio continued as computer folio

THE IMAGE OF THE FOLIO CEASED TO BE THE DIAGRAM LOCATION ON 24/08/2002 05:01:25 AM

RECORD OF HISTORICAL DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details

RECORD OF VOTS DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
14/09/2012	14/09/2012	AJ911568N	Y
MORTGAGE OF LAND MORTGAGE AJ911568N 14/09/2012 COLES GROUP PROPERTY DEVELOPMENTS LTD			
14/04/2014	14/04/2014	AL024572B	Y
DISCHARGE OF MORTGAGE AFFECTED ENCUMBRANCE(S) AND REMOVED MORTGAGE(S) MORTGAGE AJ911568N			
04/06/2015	29/06/2015	PS710776B (S)	Y
PLAN OF SUBDIVISION, SUBDIVISION ACT 1988 Cancelled by PS710776B			

STATEMENT END

VOTS Snapshot

VOLUME 10028 FOLIO 447
124043159025U
Produced 14/09/2012 11:04 am

LAND DESCRIPTION

Portion 110 Parish of Moranghurk.
Created by Application No. 068218N 22/11/1990

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
GREATER GEELONG CITY COUNCIL
S800676L 19/11/1993

ENCUMBRANCES, CAVEATS AND NOTICES

For details of any other encumbrances see the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP064480K FOR FURTHER DETAILS AND BOUNDARIES

ORIGINAL

NOT TO BE TAKEN FROM THE OFFICE OF TITLES

REGISTER BOOK

VOL. 10028 FOL. 447

VICTORIA

Certificate of Title

UNDER THE "TRANSFER OF LAND ACT"

FOL.

VOL.

GEELONG REGIONAL COMMISSION of 5th Floor State Government Offices Corner of Little Malop and Fenwick Streets Geelong is the proprietor of an estate in fee simple subject to the encumbrances notified hereunder in all that piece of land in the Parish of Moranghurk being Crown Portion 110 which land is shown enclosed by continuous lines on the map hereon -

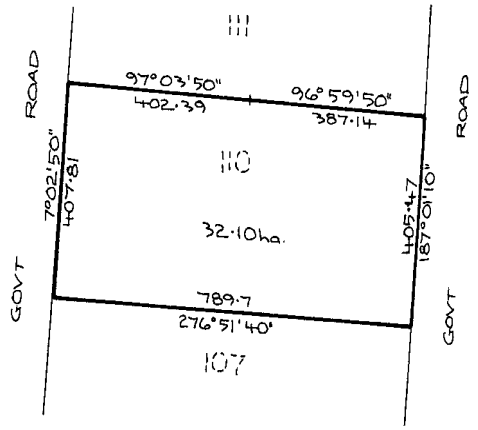
Dated 22/11/1990

DERIVED FROM APPLICATION 68218N

ENCUMBRANCES

OFFICE OF TITLES VICTORIA

Assistant Registrar of Titles



T10028-447-1-7

Area is in Hectares (ha)
MEASUREMENTS ARE IN METRES

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PROPRIETOR
GREATER GEELONG CITY COUNCIL
S800676L 19/11/93