

Site Investigation Report

Insert project name

50522014



Prepared for
Sacco Building Group

14 April 2022



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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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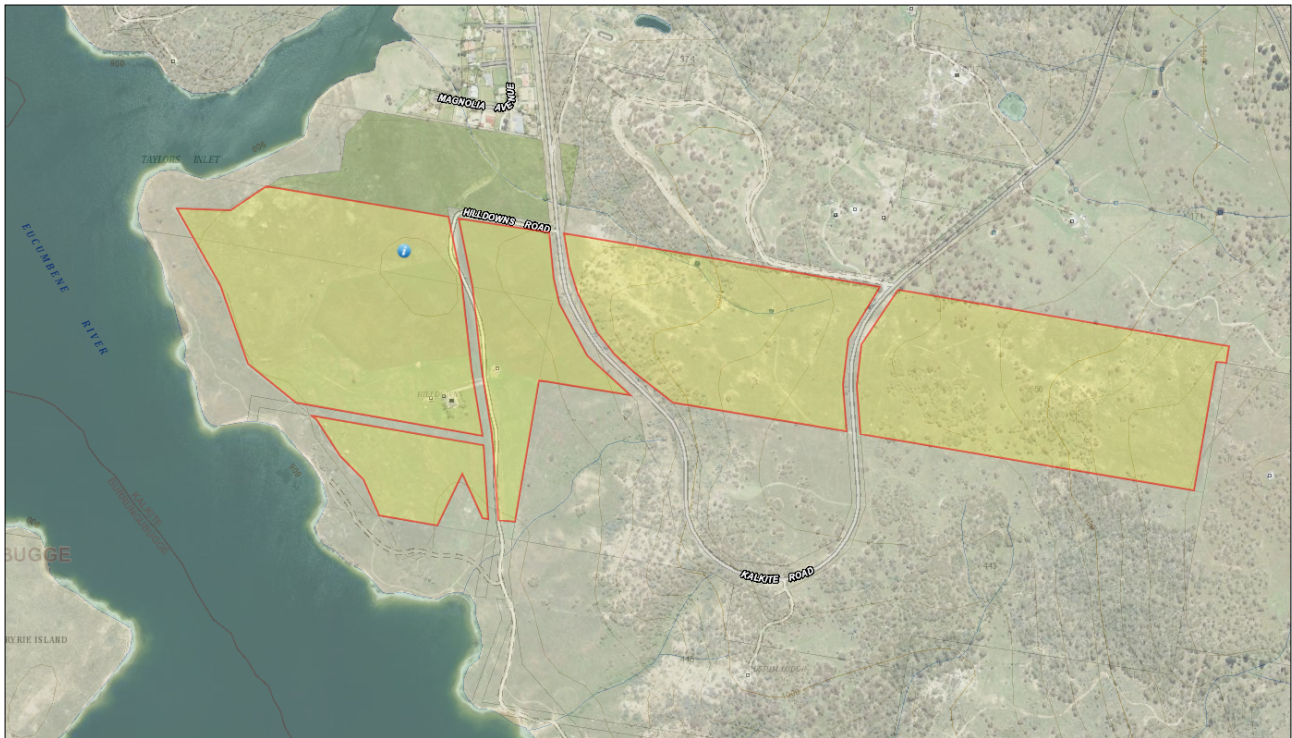
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1 Introduction

Cardno have been engaged by the Sacco Building Group to undertake a due diligence investigation for the development of Lot 5 DP529579 and Lot 190 DP756727, Kalkite NSW (herein referred to as the 'subject site'). The subject site lies to the south of the existing Kalkite Township which is situated approximately 20km north of Jindabyne and 55km west of Cooma. The subject site is approximately 798,500m². Refer to **Figure 1-1** for a locality plan.

Figure 1-1 Locality Plan (Source: NSW Spatial Information Exchange, Six Maps)



The subject site is located within the Snowy Monaro local government area (LGA) and is governed by the Snowy River Local Environmental Plan 2013 (LEP) and Development Control Plan 2013 (DCP). The current LEP zoning for the subject site is RU1 and has a minimum lot size of 40ha and maximum building height of 9m.

The subject site is currently utilised for primary production and contains multiple buildings including one single residential dwelling, and two detached work sheds.

From preliminary consultation, Cardno understands that the site is to be subdivided into approximately 118 residential lots and 5 commercial lots. These yields are subject to the outcomes of reporting prior to lodgement of the planning proposal.

The purpose of this due diligence investigation is to assess the suitability of the site and feasibility of the proposed development. This report identifies the opportunities, constraints, and required works on site to facilitate the proposed development.

A detailed scope of works undertaken as part of this report is listed in **Section 2**.

2 Investigation Scope

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

This report presents risk assessment and feasibility advice in terms of the developability of the site, focusing on the risks and scope of further investigations. These investigations include specialist studies and qualitative advice on opinions of cost to unencumber the subject site.

The scope of works for this engagement is to consolidate all existing information to inform the best and highest value future use of the site. The following investigations are proposed to develop a better understanding of the opportunities and constraints impacting development.

- > Introduction
 - Background of project;
 - Aerial photograph figure;
 - Site zoning and locality figure;
 - Proposed development figure and description;
- > Best use analysis;
- > Existing services and constraints (based on Dial Before You Dig plans, Metromap and engineering experience);
 - Traffic and access review
 - Site flooding review;
 - Bushfire review;
 - Water;
 - Sewer;
 - Stormwater;
 - Other potential constraints identified;
 - Electrical;
 - Telecommunications;
 - Gas;
- > Specialist Investigations
 - Traffic and Transport Study;
 - Floodplain Risk Management Strategy;
 - LIDAR Survey Data;
 - Contamination Investigation;
 - Geotechnical Investigation;
- > Consultation with council and associated site visits, meetings and expenses;
- > Risk analysis for site development;
- > Gap analysis and recommendations for additional investigations.

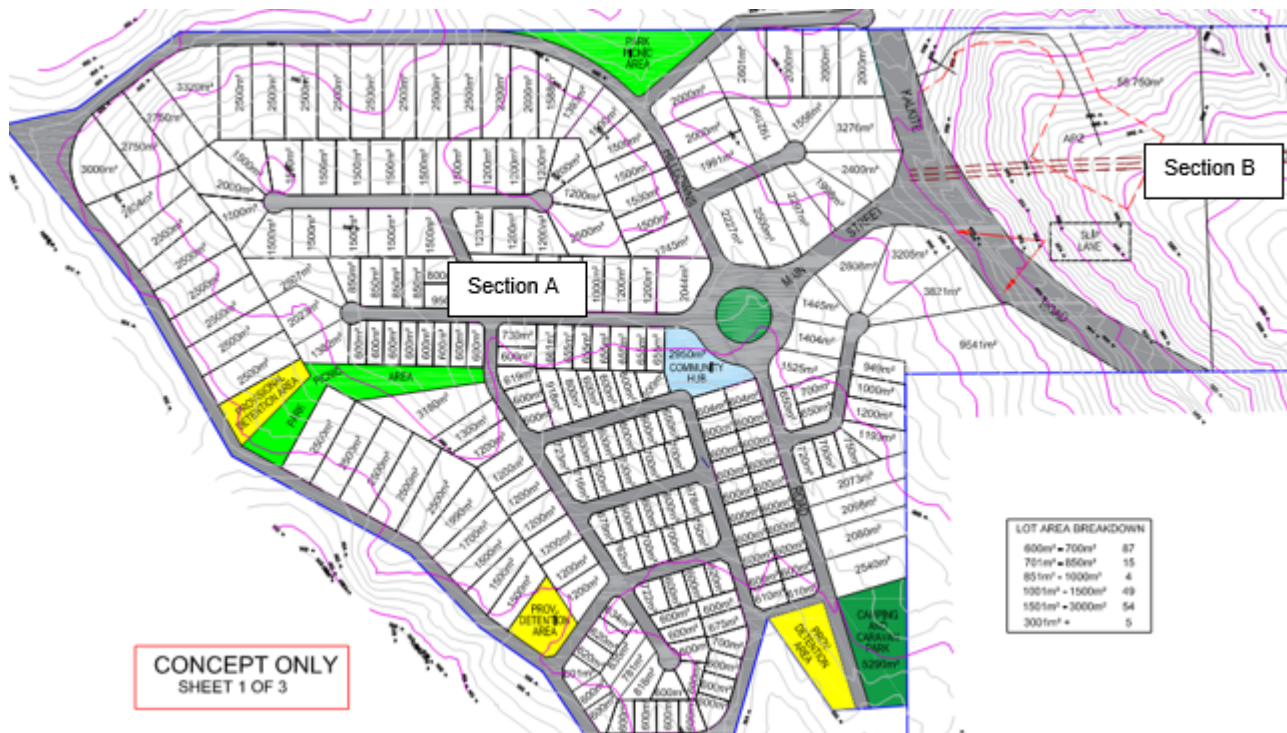
3 Proposed Development

The a breakdown of the proposed Kalkite residential development located upon lots DP 529579 and DP 756727, Kalkite is listed below:

1. Lot DP529579 is located directly south of the existing Kalkite Township and is bound by Lake Jindabyne to the west and Kalkite Road to the east. It is proposed that this portion of the subject site will contain approximately 214 Single Residential Lots, 1 Commercial Lot, and 1 Camping and Caravan Lot.
2. Lot DP756727 directly east of Lot DP529579 is proposed house to approximately 8 large lot dwellings with multiple access points from both sides of Kalkite Road.

Refer to **Figure 3-1** and **Appendix F** for further details.

Figure 3-1 Concept Layout (Source: Masterplan – Massed option REV C, Design Workshop Australia)



4 Existing Services and Constraints

4.1 General

In order to gain an understanding of the opportunities for the use of existing services for the proposed development and to identify constraints and opportunities within the site, a detailed preliminary examination has been completed for the subject site. This detailed analysis includes 'Dial Before You Dig' (DBYD) information, Work as Executed (WAE) records, Snowy Monaro Regional Council Data, and consultation and coordination with local service authorities.

The existing services information has been compiled from available documentation obtained from site investigations, service providers, and previous surveys completed. The details, dimensions, and alignments of existing services included in this report should be treated as indicative only and the accuracy of the information cannot be warranted. All services must be accurately located on site prior to any development proceeding.

All relevant correspondence with service authorities, including DYBD information is included within **Appendix B**.

4.2 Traffic conditions

The local traffic network surrounding Kalkite is limited to three main roads: Lotus Street, Gardenia Court and Kalkite Road. Both Lotus Street and Gardenia Court connect residential dwellings to Kalkite Road, which provides the singular connection from the township through Eucumbene Road and Kosciusko Road to Jindabyne and Cooma.

Kalkite Road is classified as a local road and is single carriage with a posted speed limit of 60km/h within the township and 80km/h from the southern entrance of Kalkite through to the Eucumbene Road intersection.

The average daily traffic volume across Kalkite Road (both directions) is approximately 1080 vehicles per day as determined from existing dwelling trip generation rates outlined in the '*RMS Technical Direction TDT 2013/04a – Guide to Traffic Generating Developments (2013)*'.

Based on its location and characteristics, it is expected Kalkite road will maintain a slightly higher heavy vehicle percentage than typical local roads in NSW.

4.3 Access Requirements

The subject site borders Kalkite Road across four frontages, which will allow potential for multiple safe access locations. The site is currently accessed by Hilldowns Road, which provides single carriage access under give way conditions. It is assumed that Hilldowns Road shall provide primary access to the proposed development. As this road is unsealed, the intersection will require at a minimum, pavement replacement, streetlighting and widening across both Kalkite Road and Hilldowns Road in line with current Austroads turning and sight distance treatments.

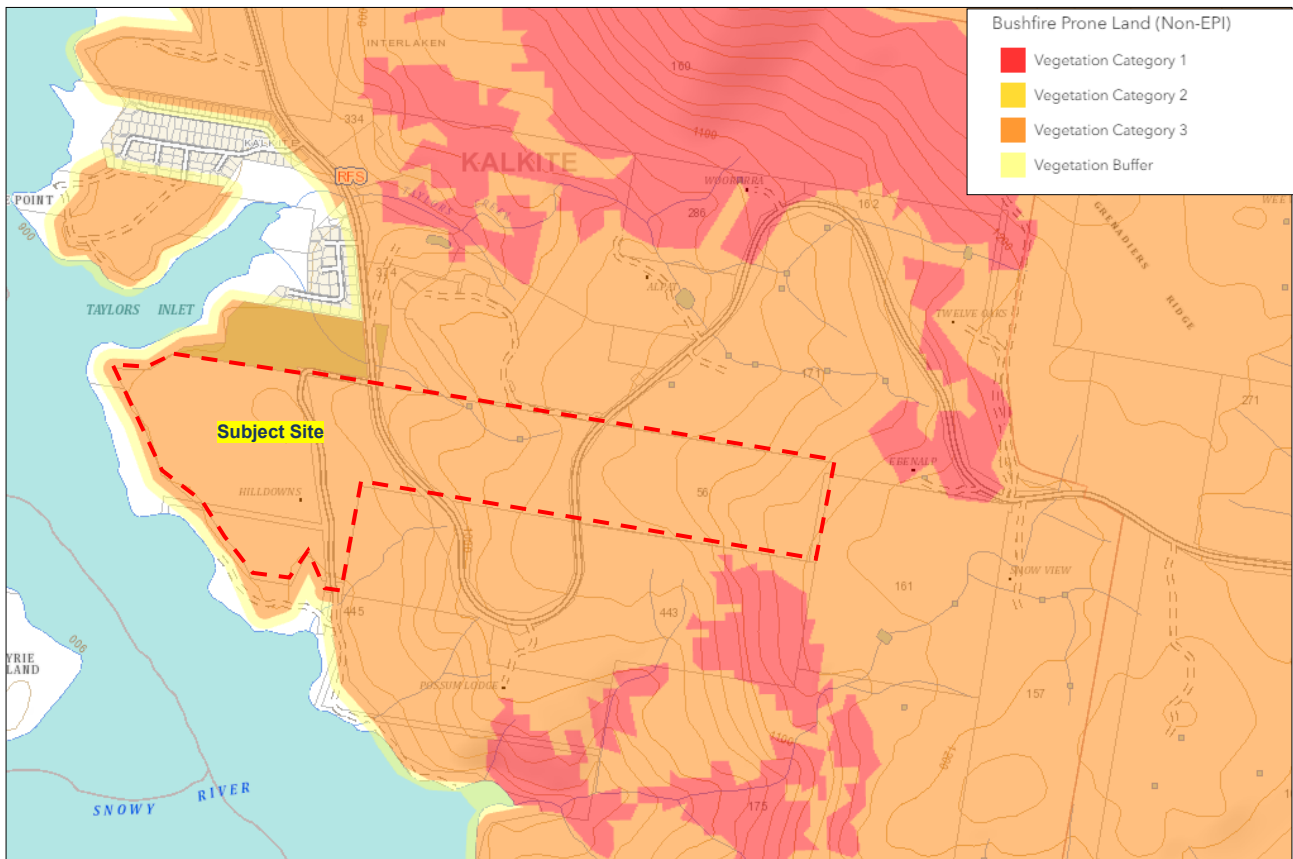
Based upon local daily traffic volumes across Kalkite Road and the proportion of trips generated by the proposed development, preliminary analysis suggests that a shortened Auxiliary Left (AUL(S)) lane from the southern approach of the Kalkite Road / Hilldowns Road intersection is required to provide safe deceleration for approaching motorists. These intersection treatments will need to be reviewed in the context of the ultimate yield once it has been finalised. All intersection upgrades will be required to meet local guidelines as well as Austroads design standards.

4.4 Bushfire Risk

From the NSW Government Planning Portal Spatial Viewer, the subject site is classed as bushfire prone land under Vegetation Category 3, medium bushfire risk classification. Surrounding areas to the north, east and south contain high sections of Vegetation Category 1, high bushfire risk, where there is a high concentration of tree vegetation. It is recommended that a bushfire management plan be completed for the subject site by an FPA Australian accredited bushfire consultant. At a minimum, it is expected that perimeter roads will be required to provide sufficient firefighting access in the event of an emergency. Early and ongoing engagement with the Rural Fire Service is recommended to understand the site specific bushfire constraints.

Refer to **Figure 4-1** below for an overview of the bushfire prone land surrounding the Kalkite Township.

Figure 4-1 Bushfire Prone Land Map (NSW ePlanning Spatial Viewer)



4.5 Flood Risk

Information supplied by Snowy Monaro Regional Council identified area affected by the Probable Maximum Flood (PMF) level which is estimated from probably maximum precipitation, snow melt coupled with the worst flood producing catchment conditions.

Cardno do not have access to any existing 1% Annual Exceedance Probability (AEP) so the flood planning area and associated development controls cannot be determined without further information being provided.

Based on analysis of the PMF levels provided, the risk of flooding within the subject site is low. A flood planning level will need to be adopted to ensure that all dwellings constructed near the lake meet the minimum flood free requirements. However, the sites on the lake only show minimal impact from the PMF and so the 1% AEP event is not likely to represent a significant constrain to future development.

Further information on the PMF level is provided in **Section 5.2.2**.

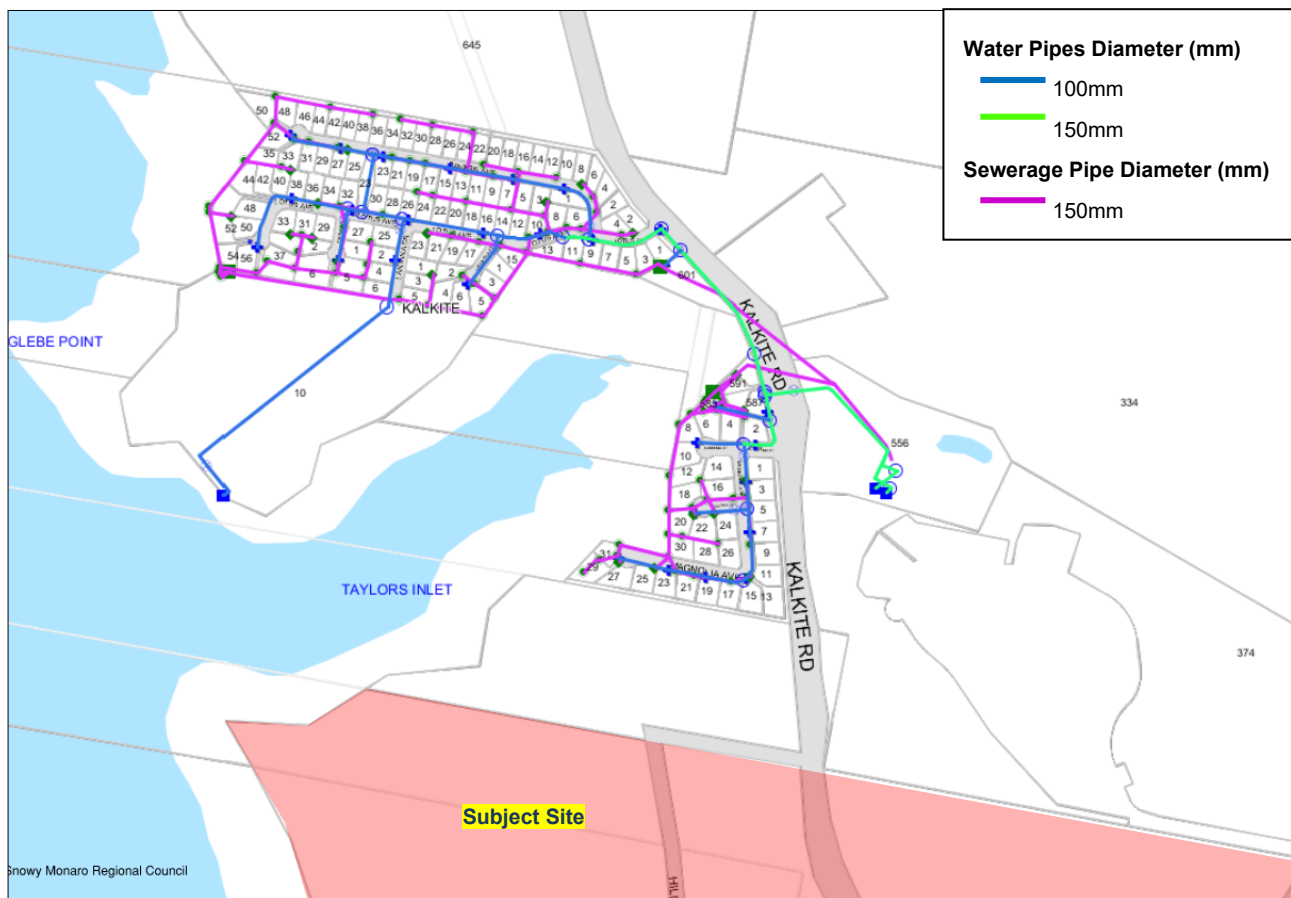
4.6 Potable Water

Based upon information provided by the Snowy Monaro Regional Council, the subject site is not currently serviced by a potable water tie. Potable water is available in the Kalkite township with the nearest practical connection point being at the Lotus Street / Kalkite Road Intersection approximately 500m to the north of Hilldowns Road. This connection is 150mm, which would likely provide sufficient water capacity, however, further analysis regarding water capacity and pressure is required to ensure compliance with planning standards.

It is also noted that the existing potable water network will likely need to be augmented to meet the demand requirements of the proposed development. Preliminary consultation with SMRC suggests that the scope and scale of these works will be developed during 2022. Ongoing consultation with SMRC is recommended to ensure that appropriate assets are planned and implemented in a timely manner.

Refer to **Figure 4-2** below for existing nearby water infrastructure.

Figure 4-2 Nearby Water and Sewer infrastructure



4.7 Sewerage

From information supplied by Snowy Monaro Regional Council, the subject site is not currently serviced by a sewer connection. The township contains both gravity and pressure sewer throughout, with the closest potential connection point at the Lotus Street / Kalkite Road Intersection approximately 500m to the north of Hilldowns Road.

The township contains a Sewer Pump Station (SPS) and Wastewater Treatment Plant (WWTP) which is located on the hill directly adjacent to the Lotus Street / Kalkite Road Intersection (See Figure 4-2 above)

Based on the local topography and the location of the existing WWTP, it is expected that the proposed development will require an SPS onsite to divert waste water to the WWTP.

Snowy Monaro Regional Council have indicated that they are considering the procurement of investigations into the upgrade this WWTP, with the timing still unconfirmed. Further consultation will be needed with Council during this process to ensure the proposed development is included within these investigations.

4.8 Stormwater Infrastructure

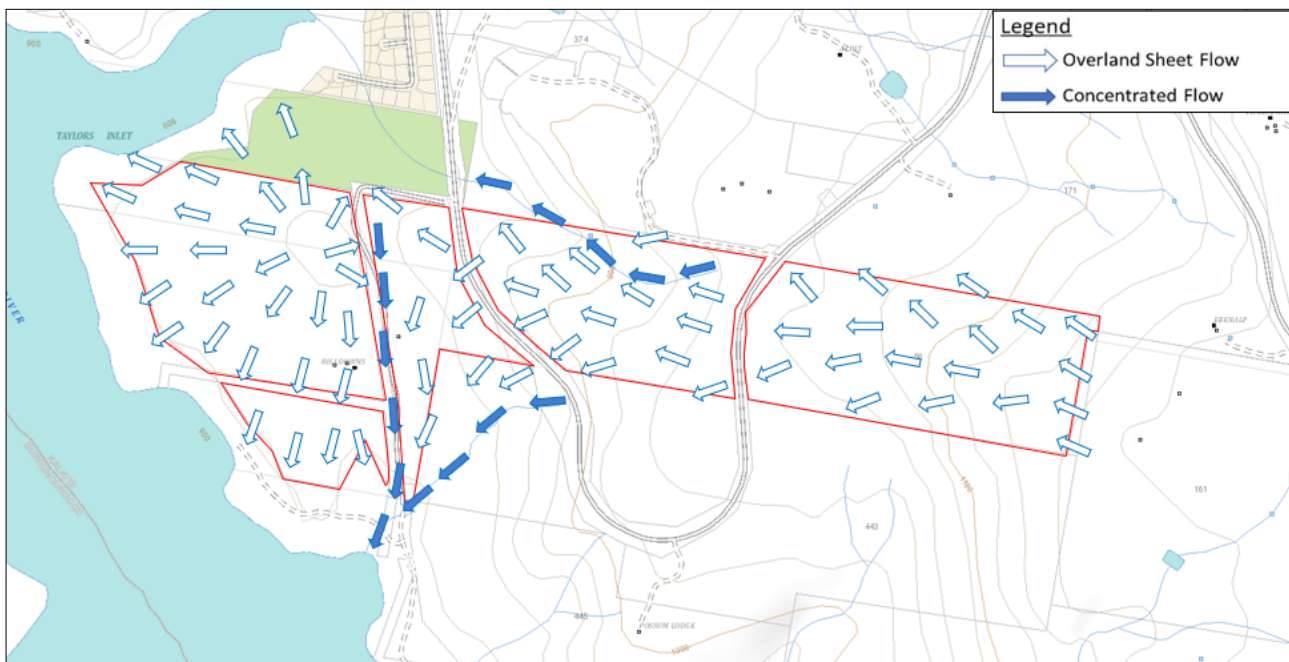
A review of aerial images and correspondence with representative from SMRC confirm that there is no formal stormwater infrastructure within or surrounding the subject site. The ultimate masterplan for the development will need to provide these assets to manage flow generated by the development. The exact legal point of discharge for stormwater generated by the development is to be determined, however the lake will ultimately receive these flow.

4.9 Stormwater Catchment and Overland Flow

Based on available contours from SIX Maps, the subject site generally slopes from east to west, towards Lake Jindabyne. There is a small hill within Lot 5 DP529579 and Lot 190 DP756727 that forms a localised highpoint within the subject site. Overland flow will radiate outwards from this highpoint, with flows on the western side heading towards Lake Jindabyne and flows on the eastern and southern side heading towards Hilldowns Rd. Due to this highpoint, a natural valley is formed, approximately along Hilldowns Rd, which will concentrate the sheet flows from the east, south towards Lake Jindabyne. Some sheet flows along the northern boundary of the site will concentrate to the north-west, along the existing creek path, towards the Kalkite Town Centre and into Lake Jindabyne.

Refer to **Figure 4-3** for anticipated overland flow paths.

Figure 4-3 Overland Flow Paths



4.10 Electrical

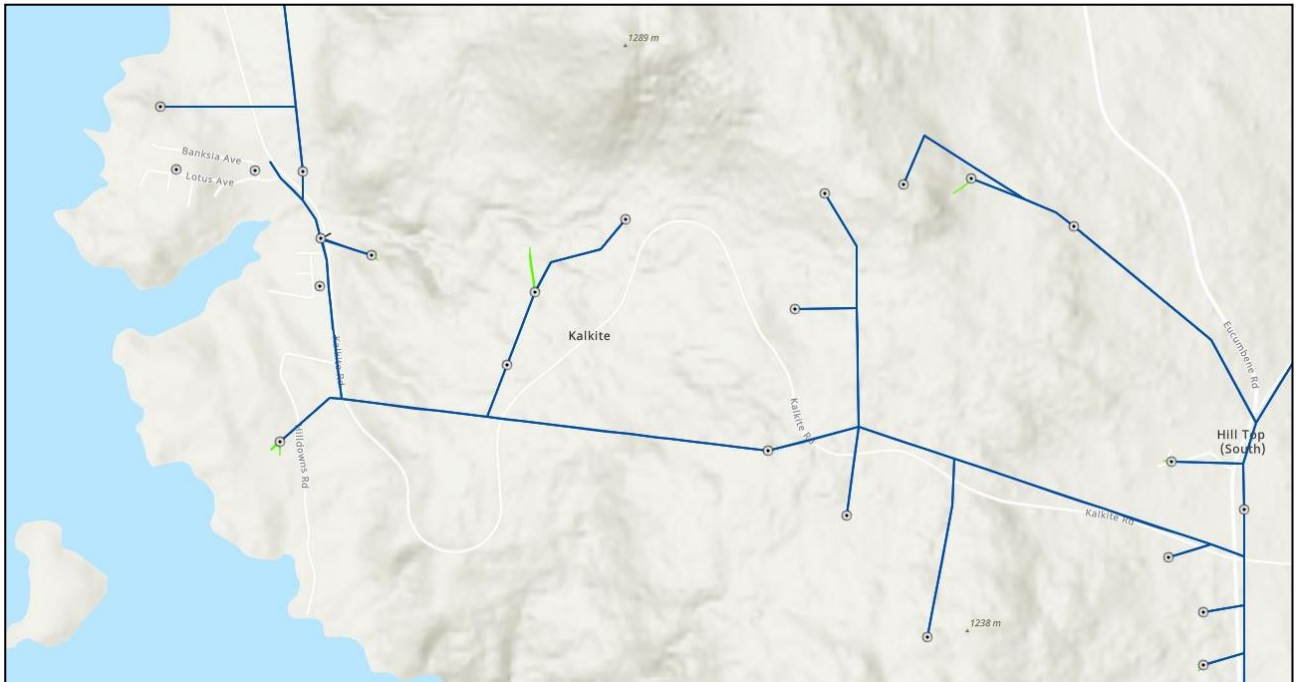
There is an existing overhead electrical network within the subject site. The network extends from Eucumbene Rd, to the east, through the centre of the subject site to the western part of Kalkite Rd where it then turns north and follows Kalkite Rd into the Kalkite township. Where the overhead line turns to head north, there is also a small branch off to the southwest, which services the existing property on Hilldowns Rd.

Consultation with Essential Energy will be required to determine whether the existing network has sufficient capacity for the proposed development as well as what, if any, additional infrastructure will be required to service the proposed subdivision.

During consultation with SMRC, it was noted that preliminary feedback from Essential Energy suggested a mains upgrade may be required to service the upgraded water and wastewater facilities. It is recommended that early planning works are commenced in consultation with Essential Energy to determine the scale and scope of necessary upgrades.

See **Figure 4-4** for a map of Electrical infrastructure within the subject site.

Figure 4-4 Overhead electrical infrastructure within and around the subject site

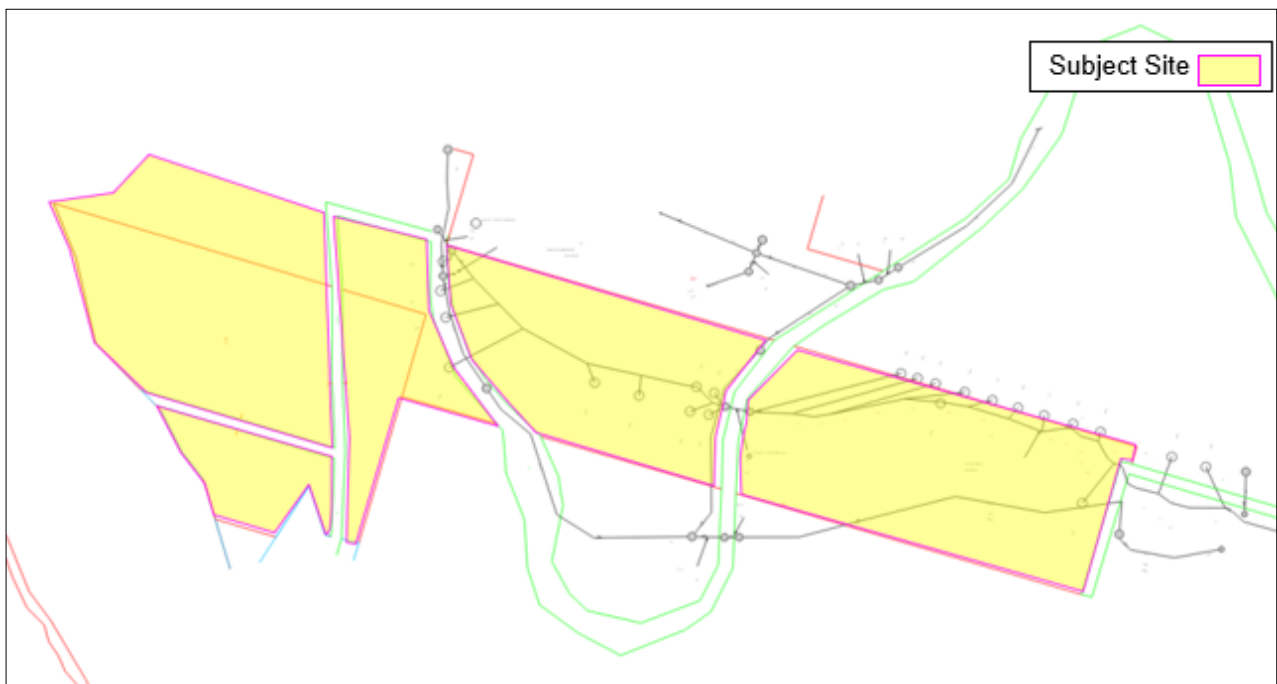


4.11 Telecommunications

There is existing Telstra infrastructure through the centre of Lot 190 DP756727 which connects to Kalkite via the eastern verge of Kalkite Rd. Therefore, it should be possible to connect the proposed larger lot residential developments to the Telstra network without extensive works being required. In order to connect the area of the subject site west of Kalkite Rd, it is likely that new Telstra infrastructure will need to be installed and connected to the existing conduits in Kalkite Rd. Consultation with Telstra should be undertaken to determine feasibility of service connections for the proposed development from the existing infrastructure and determine their requirements.

Refer to **Figure 4-5** for a plan showing the location of Telstra assets within and around the subject site.

Figure 4-5 Telstra infrastructure



4.12 Gas

From preliminary investigations and DBYD searches, there does not appear to be any existing gas infrastructure within or around the Kalkite Township or the subject site.

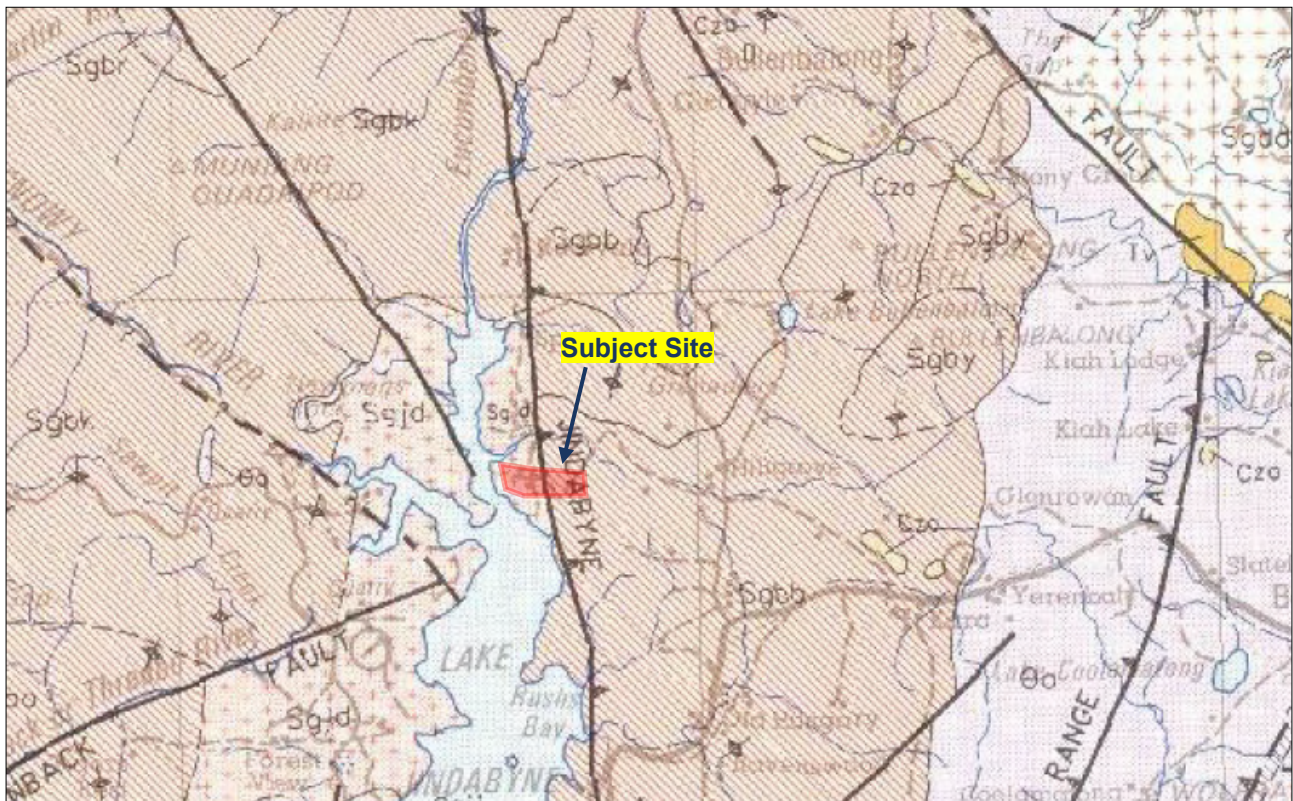
4.13 Easements and Setbacks

- From preliminary investigations it is presumed that there will be 10m wide easements around the overhead electricity infrastructure.
- Consultation with Telstra is recommended to discuss any easements or restrictions surrounding their high integrity cables.

4.14 Geological Review

Reference to the Bega-Mallacoota 1:100,000 Geological Series map produced by the Geological Survey of NSW provides indicative geological strata for subject site. This data indicates that the subject site is underlain mainly by Silurian biotite-rich granodiorite in the higher elevations and hornblende and biotite rich tonalite in the areas closer to Lake Jindabyne. Refer to **Figure 4-6** below for further information of the geological mapping of Kalkite and its surrounding areas.

Figure 4-6 Geological Map (Source: Lewis P.C. & Glen R.A, 1995, Bega-Mallacoota 1:250,000 Geological Sheet SJ/55-4, SJ/55-8. Second Edition. Geological Survey of New South Wales, Sydney)



It is recommended that detailed intrusive geotechnical analysis is undertaken to confirm the geological strata of the site and to enable adequate design provisions for future development.

4.15 Trees

From a review of aerial imagery of the subject site, the only part that contains existing trees is Lot 190 DP756727. Within the part of this Lot east of Kalkite Rd, there are two large clusters of trees in the southern half of the lot, one in approximately the centre of the lot, and the other a short way to the west of that. There is also some sparse covering of trees across the rest of this part of the Lot.

It is currently unknown whether any of the trees within the subject site have a significance or are of high value and a tree assessment should be conducted in order to determine this.

4.16 Ecology

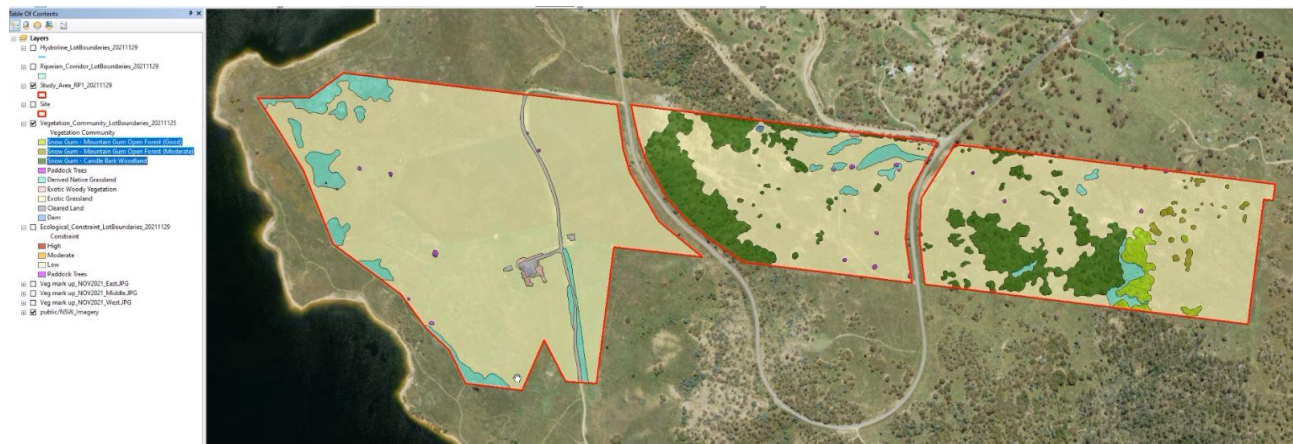
A review of vegetation mapping of the subject site revealed three main types of ecological significant vegetation communities within the subject site. These communities are Snow Gum – Mountain Gum Open Forest (Good), Snow Gum – Candle Bark Woodland, and Derived Native Grassland.

The major clusters of trees identified in the previous section are Snow Gum – Candle Bark Woodland, with parts of the eastern most cluster of trees being identified as Snow Gum – Mountain Gum Open Forest. There are multiple clusters of Derived Native Grassland throughout the subject site; namely along the western border of the site, along Hilldowns Rd, amongst the two clusters of trees in the eastern section of Lot 190 DP756727, and in the north-eastern corner of the western section of Lot 190.

Based upon this review, it is recommended that an ecological assessment be undertaken by a qualified team of ecologists to further identify any constraints associated with native flora and fauna within the subject site.

See **Figure 4-7** below for the vegetation mapping of the site.

Figure 4-7 Vegetation Map



5 Specialist Investigations

5.1 Traffic and Transport Study

Cardno undertook a detailed Transport Impact Assessment for the proposed development upon the subject site. This assessment considered the existing local traffic conditions and provided an assessment of the future traffic network with the increased traffic movements as a result of the proposed development.

Analysis of the local traffic network was undertaken utilising SIDRA 9.0, with key performance indicators i.e. degree of saturation, queue length and average delay generated for the 2031 “with proposed development” scenario for both AM and PM peak hours.

The assessment scope incorporated both existing intersections and three new access intersections along Kalkite Road and included preliminary trip generation yields for 118 single dwelling lots and 5 commercial lots.

The nominated intersections are listed in **Table 5-1** below along with the total proposed development generated trips in **Table 5-2**.

Table 5-1 Nominated Intersections

No.	Intersection
1.	Lotus Street / Kalkite Road
2.	Gardenia Court / Kalkite Road
3.	Section A Proposed Access / Kalkite Road
4.	Section B Proposed Access / Kalkite Road
5.	Section C Proposed Access / Kalkite Road

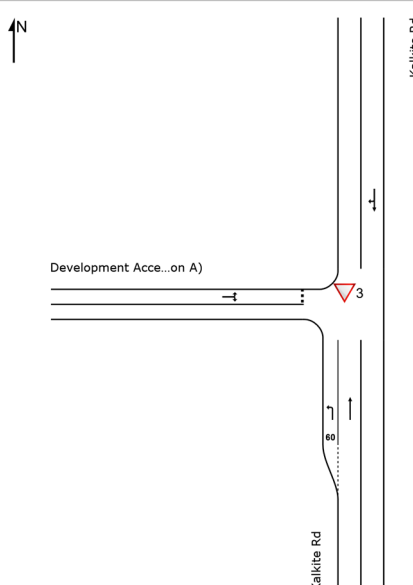
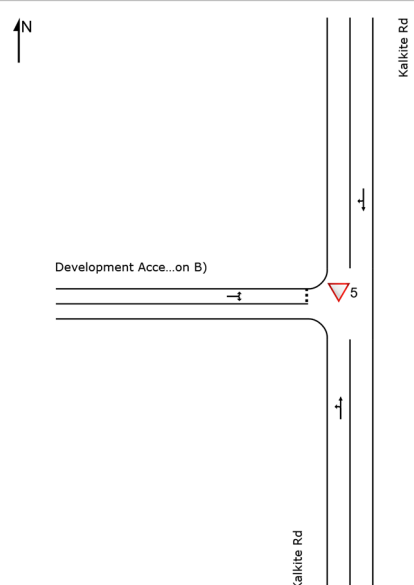
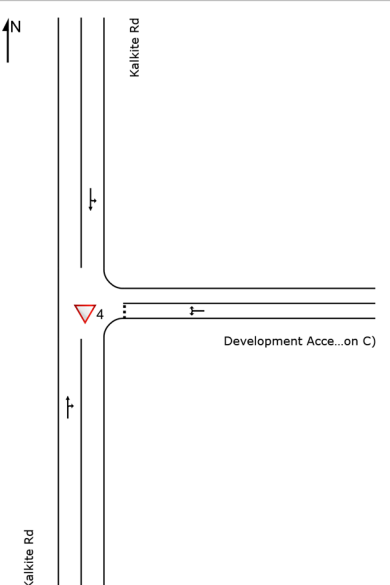
Table 5-2 Proposed Kalkite Development Trip Generation

Land Use	Yield	Peak Period	Trip Rate	Peak Direction	Peak Split	Total Trips Generated
Single Residential	214 dwellings	AM	0.71	In	0.26	42
				Out	0.74	116
		PM	0.78	In	0.64	111
				Out	0.36	62
Commercial	500m ² GFA	AM	0.125	In	0.50	31
				Out	0.50	31
		PM	0.125	In	0.50	31
				Out	0.50	31
Caravan Park	20 Sites	AM	1	In	0.00	0
				Out	1.00	20
		PM	1	In	1.00	20
				Out	0.00	0
Total		AM		In		72
				Out		168
		PM		In		162
				Out		94

5.1.2 Proposed Access

The proposed access road geometries were determined in accordance with Part 4a - Austroads Guide to Road Design (2021) and are detailed in **Table 5-3** below.

Table 5-3 Proposed Access Geometry

Section A Access / Kalkite Road Intersection	Section B Access / Kalkite Road Intersection	Section C Access / Kalkite Road Intersection
Widened T-intersection with short left turning auxiliary lane AUL(S) with give way signage for east approach	Widened T-intersection, with give way signage for west approach	Widened T-intersection, with give way signage for west approach
		

5.1.3 Transport Assessment Findings

A summary of findings from the assessment are listed below. Further details including SIDRA movement summaries are listed in the full report within **Appendix E – Transport Impact Assessment**

5.1.3.1 Lotus Street / Kalkite Road and Gardenia Court / Kalkite Road Intersections

The performance of the upstream intersections across the Kalkite Road traffic network does not see any significant impact to the key performance indicators with the increase in traffic volumes as a result of the proposed development access and additional traffic generation.

The intersection displays good levels of Degree of Saturation and Average Delay across the 2031 'with development' design year. The level of service remains at LOS A – Good operation across all approaches during both AM and PM peak hour periods.

The 95th percentile queuing is minimal for both AM and PM scenarios across both sites.

5.1.3.2 Section's A, B and C Access points / Kalkite Road Intersections

The three proposed access points experience moderate increases in traffic volumes associated with the proposed development. However, the performance of these intersection experience negligible impact to all key performance indicators.

All intersections display good levels of Degree of Saturation and Average Delay across the 2031 'with development' design year. The level of service remains at LOS A – Good operation across all approaches during both AM and PM peak hour periods.

The 95th percentile queuing is minimal for both AM and PM scenarios across all sites.

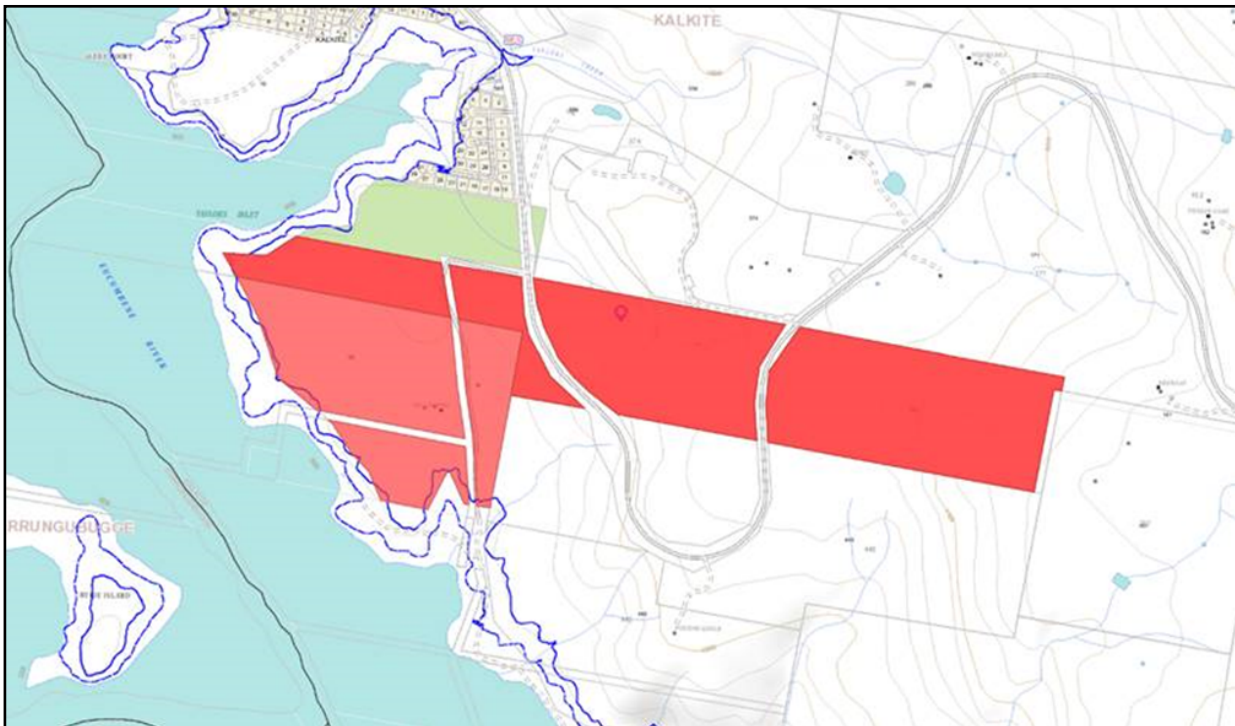
It is expected that the proposed development will have negligible impact to the overall Kalkite Road network performance in future "2031 with development" design year.

5.2 Floodplain Risk Management Strategy

5.2.1 Site Flood Information

The Site is located at the entrance of Taylors Creek into the Eucumbene River, directly upstream of the Snowy River entrance which feeds into Lake Jindabyne. Lake Jindabyne forms part of the upstream catchment of the Jindabyne Dam. Jindabyne Dam, constructed in 1967, has a gross capacity of 689,900 ML and is one of 16 major dams constructed as part of The Snowy Hydroelectric Scheme. The Jindabyne Dam levels are controlled to generate electricity in the scheme's power stations and also to maintain environmental flows in the downstream Snowy River system. The normal maximum operating water level of Lake Jindabyne not affected by floods, corresponding to its 100% capacity, is represented by the lower blue level in **Figure 5-1**. The Probable Maximum Flood level, is represented in the upper blue level in **Figure 5-1**. The proposed Site is highlighted red in **Figure 5-1** for reference.

Figure 5-3 Locality Map (Snowy Monaro Regional Council, 2021)



5.2.2 Flood Planning Level

The flood planning area determines flood development controls of land and is typically defined as the 1% Annual Exceedance Probability (AEP) + 0.5 m freeboard. The flood liable land or flood prone land corresponds to the area impacted by the Probable Maximum Flood (PMF). The PMF event is estimated from probably maximum precipitation, snow melt coupled with the worst flood producing catchment conditions. This flood event is used to define the floodplain and flood emergency response plans.

Cardno do not have access to any existing 1% AEP information for this catchment, so the flood planning area and associated development controls cannot be determined without further flood assessments. However, the PMF has been identified by Council and as seen in **Figure 5-1** only impacts a small area along the western boundary of the Site. The development Masterplan for the Site identifies large lot dwellings to be located along this river facing extent, these will be the only lots located within the floodplain. Given the gradual uphill sloped Site from the river, these river facing properties will likely be the only lots subject to flood development controls (if at all depending on confirmation of the 1% AEP level).

5.2.3 Emergency Management

There are several methods to determine the appropriate flood emergency management response for an area, one being the Flood Emergency Response Classifications as defined in the Australian Disaster Resilience Handbook 7 2017 (AIDR, 2017). The classification indicates the relative vulnerability of different areas in any catchment and considers the feasibility to evacuate certain parts of it.

A high-level assessment of the information provided by Council in **Figure 5-1** and the Site Masterplan, indicates the properties along the western river extent adjacent to New Link Road would be classified as FEO – Flooded area, with an Exit Route via Overland Escape. This overland escape corresponds to the proposed ‘Green Links’ connecting the public space along the river front to the new road located outside the floodplain area. This new road rises out of the floodplain and is completely above the PMF flood levels and extent. Local evacuation, whereby residents located along these river front lots observe flooding and respond by moving to higher ground via the proposed ‘Green Links’ may be feasible. There are limitations to this response, as follows:

- > Requires vigilance of residents to respond to the flooding event in a timely manner.
- > Depending on the time of day/ year of the flood, residents may not be awake to observe the flooding or the weather be too dangerous to respond to the flooding.
- > Residents not able to walk using the ‘Green Links’ must be evacuated by boats, aircraft or if people cannot get out before inundation, rescue will most likely be from rooftops.
- > Residents will be limited to what they can carry i.e. without a car valuables and objects of significance may potentially need to be left on the properties.

Noting only a small portion of the FEO classified properties are impacted by the PMF event and therefore shelter in place may be more suitable depending on the location of the dwellings and if they have sufficient habitable areas above the flood planning level to allow for it.

Furthermore, depending on the PMF level (to be confirmed), it may be feasible to design New Link Road above the PMF level therefore increasing the classification of those western river facing properties to be FER – Flooded area, with an Exist Route via a Rising Road. There are four lots on the southern river extent which have direct access to one of the New Road’s including two proposed battle-axe properties. These our properties would be classified as FER as well. FER classifications reduce some of the risk and limitations described above.

The remaining residential dwellings would be un-impacted by the PMF, classified as N – Not Flooded and therefore not require any flood emergency management plan.

There are four commercial/ retail lots proposed along the river extent in the Site Masterplan which appear to be located at least partially within the PMF extent. The southernmost lot can utilise the proposed New Road as an evacuation route, classifying it as FER. The two northern most lots can utilise the proposed ‘Green Link’ to evacuate if required, classifying it as FEO. However, the middle lot appears to be closer to the river’s edge and may become inundated with little warning. Once the flood planning level and PMF level are confirmed, consideration should be given to these proposed developments to ensure they are suitable for their location.

5.3 Contamination Investigation

Cardno engaged Lanterra to undertake a preliminary site investigation (PSI) of the subject site to investigate and assess the potential risk of contamination across the site which may impact the suitability of developing the site. To complete the PSI, Lanterra undertook a site visit in December 2021 as well as a review of relevant images, documents and data pertaining to the current and historical use of the site and known sources of contamination in the area.

Based on this, one area of environmental concern (AEC) was identified within the vicinity of the historical shearing shed and soil samples were collected and tested. Notable results from the testing include zinc in concentrations of up to 1,300 mg/kg around the base of the shearing shed, which exceeds the ecological investigation level criterion, but is below the health-based investigation levels for standard residential use (HIL A) the source of the zinc was attributed to the galvanised metal sheeting used in the construction of the shed, and due to the similar construction of the existing hay shed, it is possible that the soil around the shed may also contain elevated concentrations of the shed.

Based on the results of the PSI, it is recommended the following be completed to ensure suitability of the development of the site:

- After the shearing and hay sheds have been demolished, validation sampling of the soil beneath the sheds should be completed to assess whether the soil is suitable for the proposed land uses. If the concentration of zinc is found to be too high, remedial works to remove the zinc impacted soil will be required.
- The tyres located in the central portion of the site are to be removed and disposed to a suitably licensed landfill.
- An unexpected finds protocol (UFP) to manage the occurrences of contamination, should be encountered during the development of the site, should be prepared prior to any earthworks commencing.

5.4 Geotechnical Investigation

Cardno engaged ACT Geotechnical Engineers to conduct a desk-top preliminary geotechnical investigation of the site. This assessment was based off ACT Geotechnical Engineers' past experience and investigations in the area, past and present topographical maps, local soil and geology maps, and a site walk over on the 5th November 2021. This site walkover also included drilling three push tube boreholes across the site to collect and analyse soils samples.

The results of the investigation found that around the hill tops on the site, there is approximately 0.5m of soil and weak rock and below 0.5m is medium strong rock which will require significant machinery to remove. Elsewhere on the site, the soil and weak rock was found to extend to below 1.5m deep.

From the investigation it appears that the site is geotechnically suitable for the proposed development. Apart from the tops of the hills and close to the gullies, the site appears to have a suitable topography for the proposed development. Some cut-to-fill earthworks, with engineered retaining walls, would be required on the slightly sloping areas, however, this would not prevent development.

It is recommended that a comprehensive site-specific, detailed geotechnical investigation by test pits and/or boreholes be undertaken for any proposed development, to properly assess the depth of the bedrock, groundwater conditions, and material properties.

6 Gap analysis

The following table outlines the investigations and reports that Cardno recommends be completed to inform subsequent stages of development investigations.

Table 6-1 List of required investigations and reports

Section	Discipline	Required Investigations/Reports
4.3	Access	Safety investigation into the location of the existing access road to Section A is recommended to determine the practicability of upgrading the existing access to serve as access for the proposed development. This can be undertaken in the masterplanning phase of the development
4.4	Bushfire	Bushfire management plan is required to be undertaken by an FPA Australian accredited bushfire consultant.
4.5	Flood	Flood investigation and emergency management plan requires an update once relevant data (1%AEP event) is made available by SMRC.
4.11	Telecommunications	Confirmation from Telstra on the capacity of the existing network is required to determine any additional costs associated with infrastructure upgrades.
4.15	Trees	A tree assessment within the site is recommended to determine the quality of trees and inform any constraints to the proposed development.
4.16	Ecology	An ecological assessment is required to be undertaken by a qualified team of ecologists to further identify any constraints associated with native flora and fauna within the subject site.
-	Survey	Site survey is required to inform concept design, in particular access and siting.

7 Risk Assessment and Recommendations

A table of constraints was prepared for the proposed development based on the site services and constraints identified in **Section 4** of this report. A Risk Assessment of key constraints for the development of the subject site is included in **Table 7-5**.

Table 7-1 Risk Matrix

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

Table 7-2 Qualitative Measures of Likelihood or Frequency

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

Table 7-3 Qualitative Measures of Impact

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

Table 7-4 Degree of Risk

Risk Rating	Definition of Risk Rating
Insignificant	Certain development prospect, no foreseeable challenges.
Low	Site is developable with only minor works or investigations required. It is advised to progress to Gateway 2 Site Investigation to continue development process.
Medium	Site is developable with significant works or investigations required. It is advised to progress to Gateway 2 Site Investigation to continue development process.
High	Site is developable with major works or investigations required. No further investigation recommended without comprehensive cost benefit analysis being undertaken.

Table 7-5 Risk Assessment

Probable Constraints	Description	Risk Rating
Bushfire	Due to the proximity to high bushfire risk areas and existing access limitations, a Bushfire Management Plan is required to be undertaken by an FPA Australian accredited bushfire consultant, incurring extra costs. This represents a HIGH Risk to the proposed development will incur extra costs for additional investigations.	High
Ecology	The site contains major clusters of Snow Gum – Candle Bark Woodland and Derived Native Grassland across the site, which presents a significant constraint to the development yields. Further detailed ecological assessments are required, which will incur additional costs. This represents a HIGH Risk to the proposed development ultimate yield. Extra costs will be required for additional investigations.	High
Potable Water	The subject site is not currently serviced by potable water infrastructure. The closest connection point is approximately 500 north of the site at the Gardenia Court / Kalkite Road intersection. Connection to this location may be possible within the Kalkite Road reserve. However, information from SMRC relating to existing capacity availability and proposed infrastructure upgrade works is required prior to concept design. This represents a HIGH risk to the proposed development as infrastructure upgrades are not yet defined by SMRC, which may affect timing.	High
Sewerage	The subject site is not currently serviced by sewer infrastructure. The closest connection point is approximately 500 north of the site at the Gardenia Court / Kalkite Road intersection. Connection may be possible within the Kalkite Road reserve. However, information from SMRC relating to existing capacity availability and proposed infrastructure upgrade works is required prior to concept design. Furthermore, due to the topography of the land within the site and between Waste Treatment Plant, it is anticipated that at least one pumping station will need to be installed to pump the sewer from the site to the existing network, incurring extra costs. This represents a HIGH risk to the proposed development as infrastructure upgrades are not yet defined by SMRC, which may affect timing.	High

Electricity	The proposed development has access to existing high voltage overhead power. However, confirmation on capacity availability is required to determine the extent of infrastructure upgrades. This represents a HIGH Risk to the proposed development as additional costs may be present if sufficient capacity is not available within the existing network.	High
Access Requirements	Current access to the subject site is via Hilldowns Road. Proposed access points will require, at a minimum, intersection shoulder widening, pavement sealing and resealing and streetlighting. An additional short left auxiliary lane will be required for the southern approach of Hilldowns Road / Kalkite Road intersection (or other access) as per relevant standards. This will incur additional costs.	Medium
Contamination	Based on the findings from the preliminary site investigation. Contamination at the site does not appear to present a significant constraint. However, it is recommended that the shearing and work sheds be demolished and validation sampling be undertaken to ensure zinc levels are not in excess of minimum requirements.	Medium
Trees	It is currently unknown whether any of the trees within the subject site have a significance or are of high value. As such, a tree assessment is required to determine this. Incurring additional costs.	Medium
Stormwater Infrastructure	As there is no public stormwater infrastructure within the vicinity the subject site, it is anticipated that detention basins or other On Site Detention (OSD) devices will need to be constructed as part of the proposed developments. Further drainage assessments will be required during concept design.	Low
Stormwater Catchments and Overland Flows	Based on an analysis of available contours, the subject site has two distinctive catchments within sheet flows naturally draining west towards Lake Jindabyne and concentrated overland flows diverting flows from the east of Hilldowns Road south along the road towards Lake Jindabyne. These catchments will inform OSD locations.	Low
Flood	Information provided by SMRC suggests that the subject site has little risk of flooding, with the exception of small areas in the south western portion of the site. However, this information is based upon available PMF data, which is expected to be more conservative than the 1% AEP level. Appropriate treatments and siting will address these concerns. As such, does not present a significant constraint to the proposed development.	Low
Telecommunications	Due to the proximity to existing Telstra infrastructure, telecommunication connection does not present a significant constraint. Consultation with Telstra is required to confirm capacity and new infrastructure requirements.	Low

Geotechnical	An initial desktop investigation of the geotechnical condition of the site found it to be comprised mainly of Biotite-rich granodiorite and Tonalite. A detailed Geotechnical Site Investigation is recommended to be undertaken to confirm this and provide more accurate geotechnical data.	Low
Easements and Setbacks	From an initial review, there are two easements present within the site. Electrical and Telstra. Electrical overhead lines require a minimum 10m clearance, which should not pose a significant constraint to the proposed development. As easement requirements for the Telstra assets are currently undefined, it is recommended that consultation be undertaken to clarify any constraints prior to concept design.	Low
Traffic	Concept layout and ultimate yield may change during the planning proposal process. This may require update of traffic modelling and subsequent report.	Low
Gas	There are no existing gas services available within Kalkite and the surrounding area. It is not anticipated that the proposed development will require a gas network based upon current market trends and sustainability benchmarks.	Insignificant

7.2 Recommendations

Table 7-6 Table of Recommendations

Consideration	Recommendation
Bushfire	It is recommended that a bushfire management plan be completed for the subject site by an FPA Australian accredited bushfire consultant
Ecology	It is recommended that the subject site be assessed by a qualified team of ecologists to further identify any constraints associated with native flora and fauna within the subject site. This will inform the ultimate yield of the proposed development.
Potable Water	Consultation with SMRC is recommended to discuss the potable water requirements for the subject including connection strategies and any potential network upgrade requirements.
Sewerage	Consultation with SMRC is recommended to determine existing capacity and appropriate connection strategies. It is recommended that, once the siting and yields are finalised, sewer load calculations be conducted to determine the required size and type of on-site sewer treatment systems required. Further consultation with SMRC will be required to discuss any constraints surrounding on-site sewer treatment.

Electricity	Consultation with Essential Energy is required to determine the existing network capacity and availability. This will determine if any additional infrastructure will be required to service the proposed subdivision.
Access requirements	Consultation with relevant authorities (SMRC, TfNSW, etc.) regarding proposed intersection treatments is required prior to concept design to confirm requirements ensuring integration best practice design.
Contamination	<p>Recommendations provided within the PSI include:</p> <ul style="list-style-type: none"> • Demolish existing sheds, and undertake validation sampling to determine zinc level within soil. Soil removal or remediation may be required if Zinc concentrations are in excess of minimum levels; • Safe removal and disposal of rubber tyres on site; <p>Preparation of an Unexpected Finds Protocol (UFP).</p>
Trees	A tree assessment is recommended to determine the quality of trees within the subject site and inform any constraints to the proposed development.
Stormwater Infrastructure	It is recommended that investigations into the On Site Detention (OSD) requirements of each of the proposed developments be undertaken during concept design to inform the type, size and location of any required OSD systems.
Stormwater Catchments and Overland Flows	It is recommended that a detailed analysis of the overland flow paths within the subject site be undertaken during concept design to confirm the initial desktop study.
Flood	<p>It is recommended that the 1% AEP level be obtained to confirm the flood constraints within the south western portion of the site.</p> <p>The flood investigation and emergency management plan undertaken by Cardno will require update once this relevant data is made available.</p>
Telecommunications	It is recommended that consultation with Telstra be undertaken prior to concept design to determine if sufficient capacity is available to service the proposed development.
Geotechnical	The desktop investigation recommended that a comprehensive site-specific, detailed geotechnical investigation by test pits and/or boreholes be undertaken prior to detailed design to properly assess the depth of the bedrock, groundwater conditions, and material properties
Easements and Setbacks	Consultation with Telstra is recommended to discuss any easements or restrictions surrounding their high integrity cables.
Traffic	Traffic Assessment will require updating once final concept layout and yields are confirmed for the in line with the lodgement of the planning proposal.

APPENDIX

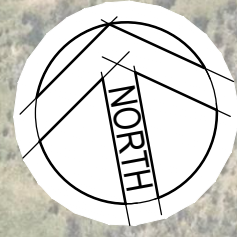
A

CONSTRAINTS MAP



now





EXISTING SERVICES

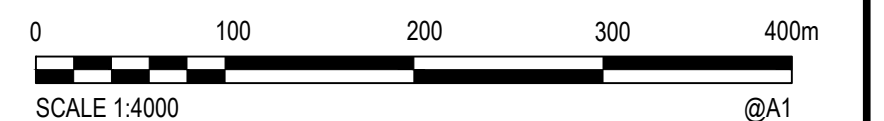
- Electrical Line (Red line)
- Elect. Pole/Underground Earth Wire (Red circle with a cross)
- Telstra (Blue line)

FLOOD LEVEL

- Lake Maximum Probable Flood Level (Red dashed line)
- Lake Full Supply Flood Level (Blue dashed line)

VEGETATION MAPPING

- Snow Gum (Candle Bark Woodland) (Green)
- Snow Gum (Good) (Yellow)
- Snowgum (Moderate) (Light Green)
- Derived Native Grassland (Cyan)
- Paddock Trees (Purple)
- Exotic Grassland (Orange)
- Dam (Blue)
- Cleared Land (Grey)



A	15/12/2021	CONCEPT APPROVAL	AS/GZ	JS	GZ
Rev.	Date	Description	Des.	Verif.	Appd.



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Drawn MPQ	Date 08/12/2021
Checked AS/TM	Date 08/12/2021
Designed AS/GZ	Date 08/12/2021
Verified JS	Date 08/12/2021
Approved	
GZ	08/12/2021

Project	KALKITE PLANNING PROPOSAL LOT 5 - DP529579 AND LOT 190 - DP756727 56 HILLDOWNS ROAD, KALKITE, NSW
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CONSTRAINTS PLAN

Status	FOR CONCEPT APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
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Date	Datum	Scale	Size
08/12/2021	AHD	1:4000	A1
Drawing Number			Revision
50522014-C1000			A

APPENDIX

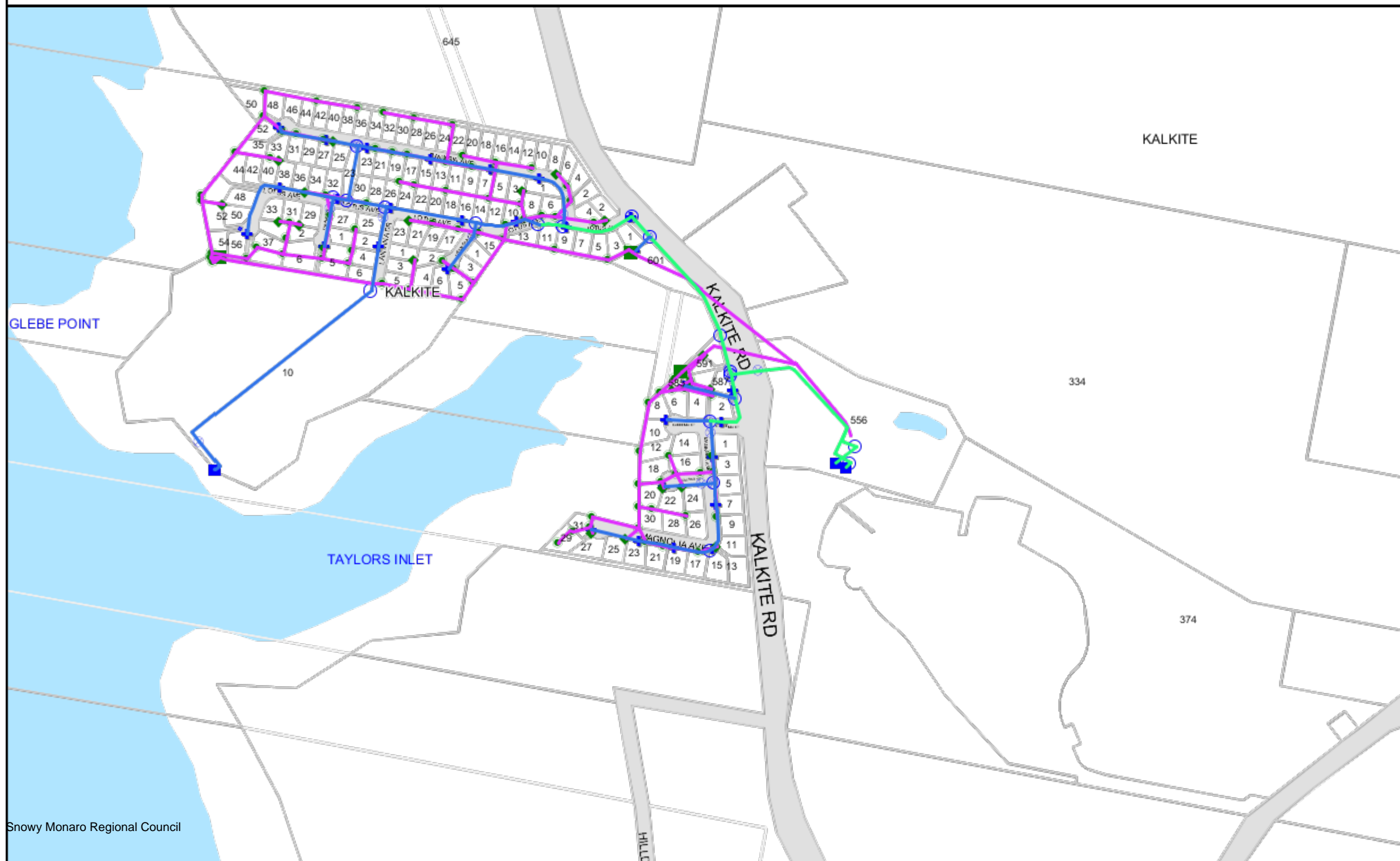
B

DBYD AND CORRESPONDENCE



now





WaterPipes Diameter (mm)

- 25mm
- 100mm
- 150mm
- 80mm
- 200mm
- 250mm
- 50mm
- 300mm
- 450mm
- 375mm
- 180mm
- 125mm
- 63mm

WWPipes Diameter (mm)

- 150mm
- 300mm
- 225mm
- 200mm
- 32mm
- 375mm
- 80mm
- 50mm
- 450mm
- 500mm
- 600mm
- 100mm
- 250mm
- 505mm

Wastewater

- ◆ WWDrainEnd
- WWPlant
- Manhole
- Point
- Point
- WWPipes
- Line
- Line

Water

- + WaterHydrants
- WPlant
- ⊗ WaterValves

Snowy Monaro Regional Council

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Cadastral and Topographic Data:



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200 m



14-Dec-2021



CABLE/PIPE LOCATION

Assets were found in the search area

COMPANY NAME:	Cardno
ATTENTION:	Terry Maher
SEARCH LOCATION:	56 Hilldowns Road Kalkite NSW 2627
SEQUENCE NO:	205067064
DATE:	Wednesday, 10 November 2021

Provision of Plans:

Please find enclosed plans depicting approximate locations of **Essential Energy** assets in the search location. **The excavator must not assume that there may not be assets owned by other network operators in the search location.**

Underground assets searched for	Underground assets found
Essential Energy Electrical	<input checked="" type="checkbox"/>
Essential Energy Water & Sewerage	<input type="checkbox"/>

Plans are updated from time to time to record changes to underground assets and may be updated by Essential Energy without notice. In the event that excavation does not commence within 28 days of receipt of a plan, a new plan should be obtained.

The excavator must retain the plans on site for the duration of the works.

The excavator shall report all damage made to Essential Energy assets immediately. Note that damage includes gouges, dents, holes and gas escapes.

**IN CASE OF EMERGENCY OR TO REPORT DAMAGE:
PHONE 13 20 80**

DISCLAIMER

Please be aware that plans may **not** reflect alterations to surface levels or the position of roads, buildings, fences etc. **Cable and pipe locations are approximate** and the plans are **not** suitable for scaling purposes. *Essential Energy does not retain plans for privately-owned underground electrical or water & sewerage assets located on private property. Privately-owned underground electrical assets located on private property are the responsibility of the owner.*

The plans have been prepared for Essential Energy's sole use and benefit. **Essential Energy cannot and does not warrant the accuracy or completeness of the plans.** Essential Energy supplies them at no cost with the object of reducing the serious risk of unintentional damage being caused to its cables and pipes. **Essential Energy does not accept any responsibility for any omissions, inaccuracies or errors in the plans, or any reliance place on the material. Any reliance placed on any plan provided in response to your request is at your own risk.**



Essential Energy retains all intellectual and industrial property rights which exists or may exist in or with respect to the plan(s). The material provided is not to be copied or distributed beyond you.

You release Essential Energy from and against all claims, demands, actions and proceedings arising out of or in any way related to the use of the provided material.

Location of Assets on Site:

The plans indicate only that cables and pipes may exist in the general vicinity – they do not pinpoint the exact location of the cables and pipes.

If it is found that the location of cables or pipes on the plans can be improved, please notify Essential Energy on 13 23 91 (or fax 1800 354 636).

All individuals have a duty of care they must observe when working in the vicinity of underground cables and pipes. It is the **excavator's responsibility to visually expose the underground cables and pipes manually, ie. by using hand-held tools and non-destructive pot-holing techniques prior to any mechanical excavation**. The excavator will be held responsible for all damage caused to the Essential Energy network or cables and pipes, and for the costs associated with the repair of any such damage. The excavator will also be held responsible for all damage caused to any persons.

When digging in the vicinity of underground assets, persons should observe the requirements of the applicable Codes of Practice published by the NSW Work Cover Authority or Safe Work Australia, and any amendments from time to time by the Authorities, including although not limited to:

- Excavation Work
- Managing Electrical Risks in the workplace
- How to manage and control asbestos in the workplace

(Please refer to <https://www.workcover.nsw.gov.au/law-and-policy/legislation-and-codes/codes-of-practice>).

When digging in the vicinity of **electrical assets** persons should observe the requirements of the **Electricity Supply Act 1995**.

Persons excavating near live underground electrical reticulation and/or earthing cables **must exercise extreme caution at all times and adhere to the requirements of Essential Energy's Electrical Safety Rules**. (These are available on our website: <http://www.essentialenergy.com.au/content/safety-community> and include

- **Work near Essential Energy's Underground Assets:**
<http://www.essentialenergy.com.au/asset/cms/pdf/contestableWorks/CEOP8041.pdf> , and
- **Asbestos Fact Sheet:**
<http://www.essentialenergy.com.au/asset/cms/pdf/safety/AsbestosFactSheet.pdf>

In some situations these procedures call for work to be performed by authorised staff.

Should there be any doubt as to the exact location of any underground electrical assets, and the potential for conflict with live underground cables caused by excavation at your work site, you should contact

13 23 91 to arrange for an on-site visit by an Essential Energy representative. No construction or mechanical excavation work is to commence prior to this on-site visit and approval being obtained.

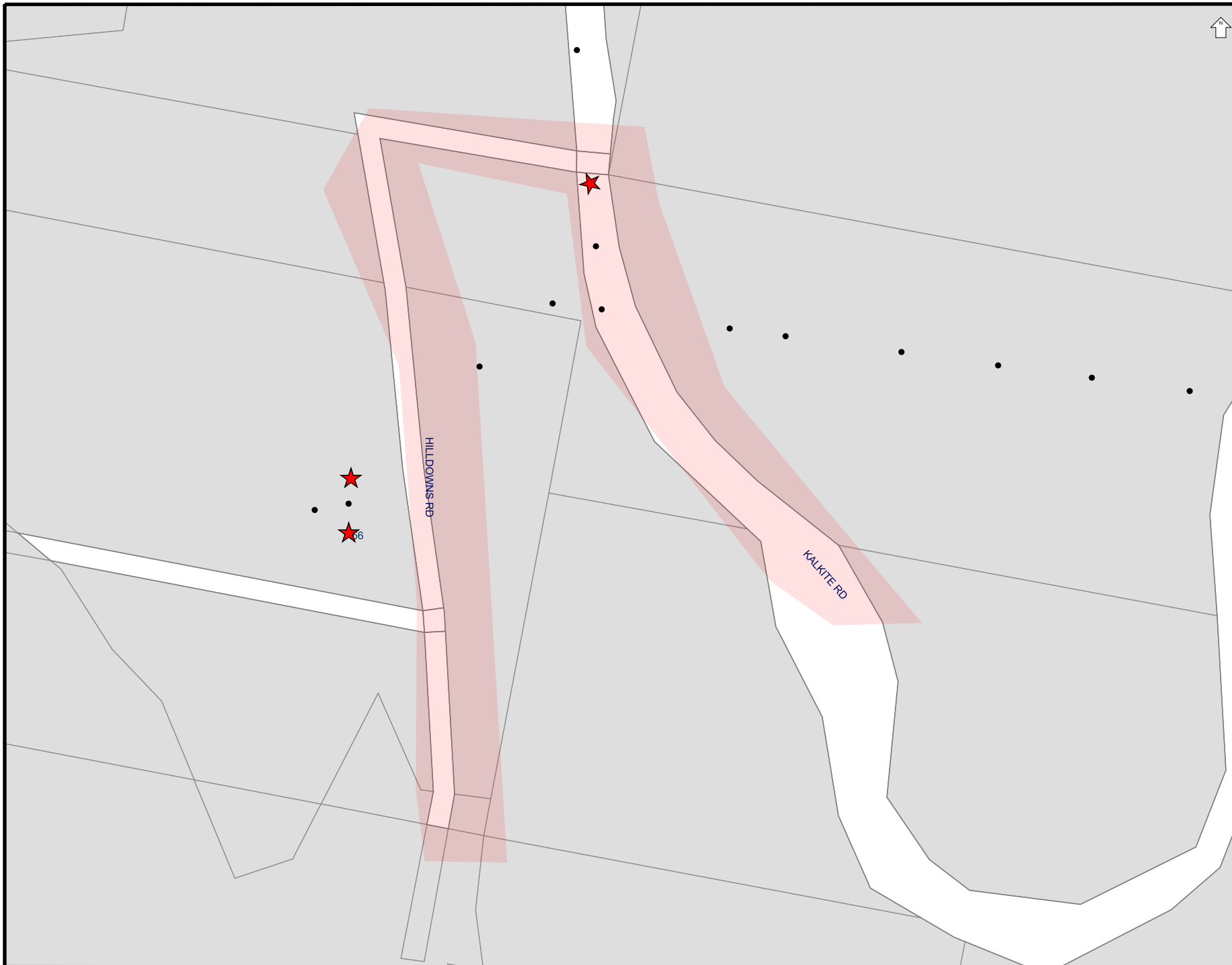
When digging in the vicinity of **water or sewer assets** persons should observe the requirements of the **Water Management Act 2000**.

Should there be any doubt as to the exact location of any underground water and sewer assets, and the potential for conflict with underground water and sewer pipes caused by excavation at your work site, you should contact **13 23 91** to arrange for an on-site visit. No construction or excavation work is to commence prior to this on-site visit and approval being obtained.

Prior Notification:

Please note that for excavation depths greater than 250mm near power poles and stays you should allow for **advance notice** in your construction program to permit Essential Energy time to allocate the necessary field resources to carry out the inspection at the site a **minimum of fourteen (14) working days prior to work commencing**. This service may incur a fee and this can be negotiated with the local Area Coordinator at the time of making the appointment. Failure to give reasonable notice to the local Area Coordinator may result in disruption to Essential Energy's planned works program in the district and could incur an extra charge over and above the normal rate for this service.

For further information please call 13 23 91.



Overhead wires not shown
LOOK UP & LIVE!

LEGEND

- LV Underground Cable
- HV Underground Cable
- Underground Pipe
- ★ Underground Earth or Wires
- ▲ Ground Substation
- Pole
- ⊠ Cubicle
- Pit
- Area of Interest

Critical Assets

Contact Essential Energy
on 13 23 91

- Zone Substation
- Underground Cable
- Underground Fibre

Proposed Works

- Area of proposed works

Proposed assets are shown as
orange symbols

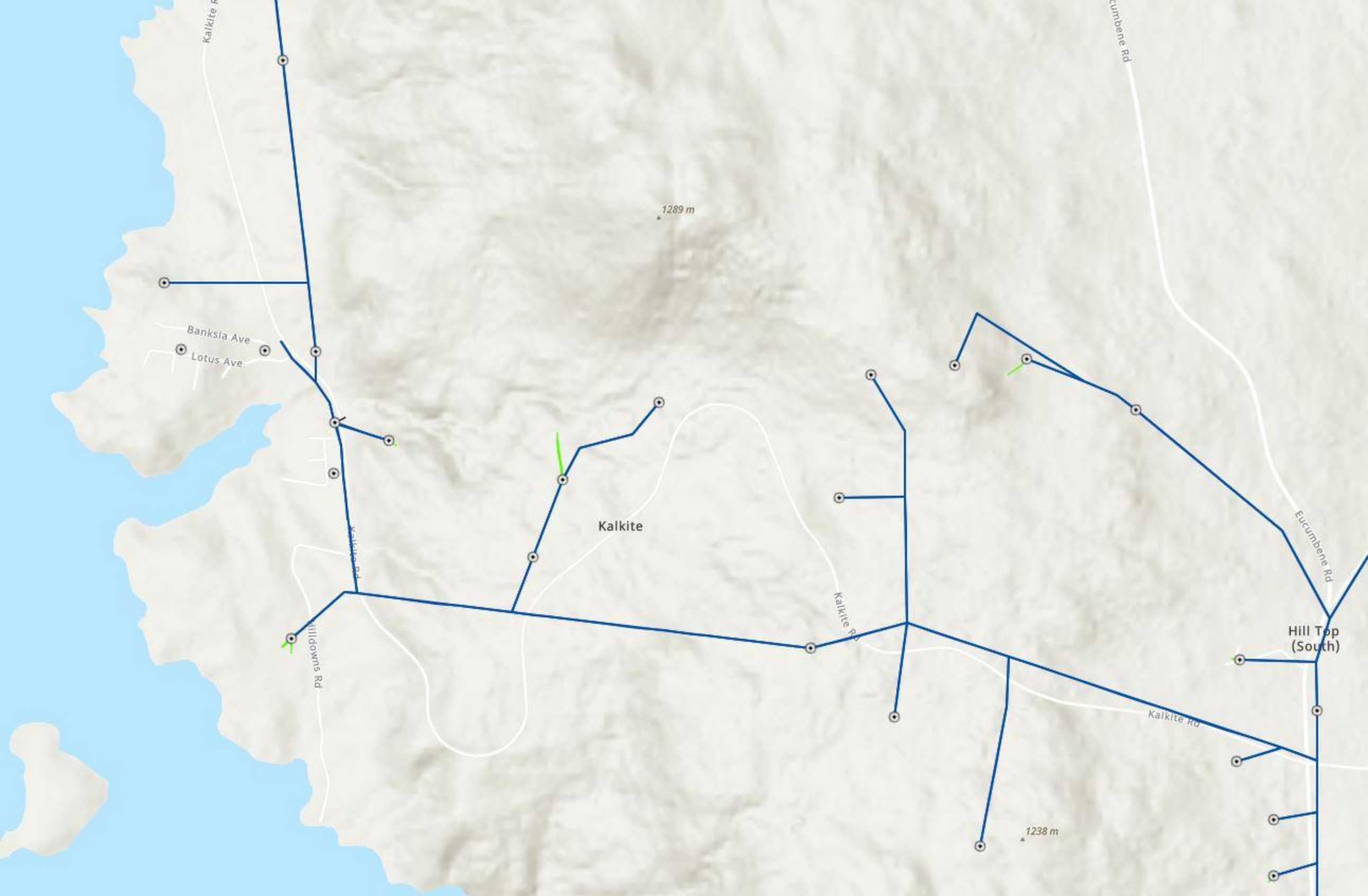
THE INFORMATION ON THIS
MAP MAY NOT BE
ACCURATE.
If details are
incorrect, please
notify
Essential Energy on
13 23 91
(or fax 1800 354 636)

ISSUE DATE: 10/11/2021

You must resubmit your
request if you have not
started work within 4 weeks
of the 'Issue Date' above

A4 SCALE: 1:4855





Terry Maher

From: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Sent: Monday, 13 December 2021 10:49 AM
To: John Sutcliffe; Terry Maher
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi John

The tender to undertake the scoping study is being developed. It will be advertised on VendorPanel when it is put out to tender.

Thanks
Jessica

Jessica Dunstan
Manager Water Wastewater Operations



PO Box 714
COOMA NSW 2630
Direct (02) 6451 1587
Phone 1300 345 345
Fax (02) 6456 3337
snowymonaro.nsw.gov.au

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From: John Sutcliffe <john.sutcliffe@cardno.com.au>
Sent: Monday, 13 December 2021 10:47 AM
To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>; Terry Maher <terry.maher@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Great, thanks Jess.

We will continue with our planning into the early new year and loop back to you when we have some firmer details on yield and layout. Just wanted to make sure we hadn't missed a trick in early planning works at this stage.

Is the scoping study a public document or for councils internal use only?

Cheers,

John Sutcliffe
SENIOR PROJECT MANAGER
CARDNO



Phone +61 2 6112 4507 Direct +61 2 6112 4507 Mobile 0403 221 730
Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

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

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From: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Sent: Monday, 13 December 2021 10:36 AM
To: John Sutcliffe <john.sutcliffe@cardno.com.au>; Terry Maher <terry.maher@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi John

Thank you for your email. At this stage all we are undertaking is the reconstruction of the evaporation dam and then a scoping study to determine a pathway forward with the STP. Due to lack of funds the findings of the scoping study are unlikely to be undertaken any time soon.

Thanks
Jessica

Jessica Dunstan
Manager Water Wastewater Operations



PO Box 714
COOMA NSW 2630

Direct (02) 6451 1587
Phone 1300 345 345
Fax (02) 6456 3337
snowymonaro.nsw.gov.au

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From: John Sutcliffe <john.sutcliffe@cardno.com.au>

Sent: Monday, 13 December 2021 10:30 AM

To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>; Terry Maher <terry.maher@cardno.com.au>

Subject: RE: Kalkite WTP/STP infrastructure & projects

Morning Jessica,

I was having a chat with Brad Elliot late last week and he mentioned that there are plans currently underway for an augmentation of the existing sewer treatment plant in Kalkite and necessary associated upgrades for the water infrastructure. Is this to service a single proposed development or a larger strategic area in Kalkite as part of the SAP?

Our client is currently undertaking works to lodge a planning proposal for their site and we would like to understand the scale and scope of any planned upgrades.

Regards,

John Sutcliffe

SENIOR PROJECT MANAGER
CARDNO



Phone +61 2 6112 4507 Direct +61 2 6112 4507 Mobile 0403 221 730

Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

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From: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Sent: Friday, 10 December 2021 11:33 AM
To: Terry Maher <terry.maher@cardno.com.au>
Cc: John Sutcliffe <john.sutcliffe@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi Terry

Thanks for your email. I will find the information for the sewer and water and get that through to you. I do not manage stormwater so can't provide that to you. Please contact Gary Shakespeare at council who looks after that infrastructure.

Regards

Jessica Dunstan
Manager Water Wastewater Operations



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From: Terry Maher <terry.maher@cardno.com.au>
Sent: Friday, 10 December 2021 10:28 AM
To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Cc: John Sutcliffe <john.sutcliffe@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Good Morning Jess,

From: Mark Adams <Mark.Adams@snowymonaro.nsw.gov.au>
Sent: Thursday, 2 December 2021 4:27 PM
To: John Sutcliffe <john.sutcliffe@cardno.com.au>
Cc: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Subject: Kalkite WTP/STP infrastructure & projects

Hi John,

As discussed linking you up with Jess who is our Manager of Water and Wastewater operations at Council.

Mark Adams
Coordinator Economic Development



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COOMA NSW 2630
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Terry Maher

From: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Sent: Monday, 13 December 2021 10:49 AM
To: John Sutcliffe; Terry Maher
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi John

The tender to undertake the scoping study is being developed. It will be advertised on VendorPanel when it is put out to tender.

Thanks
Jessica

Jessica Dunstan
Manager Water Wastewater Operations



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From: John Sutcliffe <john.sutcliffe@cardno.com.au>
Sent: Monday, 13 December 2021 10:47 AM
To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>; Terry Maher <terry.maher@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Great, thanks Jess.

We will continue with our planning into the early new year and loop back to you when we have some firmer details on yield and layout. Just wanted to make sure we hadn't missed a trick in early planning works at this stage.

Is the scoping study a public document or for councils internal use only?

Cheers,

John Sutcliffe
SENIOR PROJECT MANAGER
CARDNO



Phone +61 2 6112 4507 Direct +61 2 6112 4507 Mobile 0403 221 730
Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

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From: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Sent: Monday, 13 December 2021 10:36 AM
To: John Sutcliffe <john.sutcliffe@cardno.com.au>; Terry Maher <terry.maher@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi John

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Thanks
Jessica

Jessica Dunstan
Manager Water Wastewater Operations



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To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>; Terry Maher <terry.maher@cardno.com.au>

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Our client is currently undertaking works to lodge a planning proposal for their site and we would like to understand the scale and scope of any planned upgrades.

Regards,

John Sutcliffe

SENIOR PROJECT MANAGER
CARDNO



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Sent: Friday, 10 December 2021 11:33 AM
To: Terry Maher <terry.maher@cardno.com.au>
Cc: John Sutcliffe <john.sutcliffe@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Hi Terry

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Regards

Jessica Dunstan
Manager Water Wastewater Operations



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From: Terry Maher <terry.maher@cardno.com.au>
Sent: Friday, 10 December 2021 10:28 AM
To: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Cc: John Sutcliffe <john.sutcliffe@cardno.com.au>
Subject: RE: Kalkite WTP/STP infrastructure & projects

Good Morning Jess,

Mark has passed on your details as we are looking to obtain existing service infrastructure information for a proposed sub division within Kalkite NSW.

Details of the lots are listed below:

- Lot 5 Section DP529579; and
- Lot 190 Section DP756727.



We would like to request any available nearby existing infrastructure information (water, sewer and stormwater) to assist with our investigations.

We would greatly appreciate your assistance with providing this data.

If you have any questions or concerns, please don't hesitate to contact me on 02 6112 4576

Kind regards,

Terry Maher *He/Him*

CIVIL ENGINEER
CARDNO



Phone Direct +61 2 6112 4576

Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

Email terry.maher@cardno.com.au Web www.cardno.com

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From: Mark Adams <Mark.Adams@snowymonaro.nsw.gov.au>
Sent: Thursday, 2 December 2021 4:27 PM
To: John Sutcliffe <john.sutcliffe@cardno.com.au>
Cc: Jessica Dunstan <Jessica.Dunstan@snowymonaro.nsw.gov.au>
Subject: Kalkite WTP/STP infrastructure & projects

Hi John,

As discussed linking you up with Jess who is our Manager of Water and Wastewater operations at Council.

Mark Adams
Coordinator Economic Development



PO Box 714
COOMA NSW 2630
Direct (02) 6451 1579
Phone 1300 345 345
Fax (02) 6456 3337
snowymonaro.nsw.gov.au

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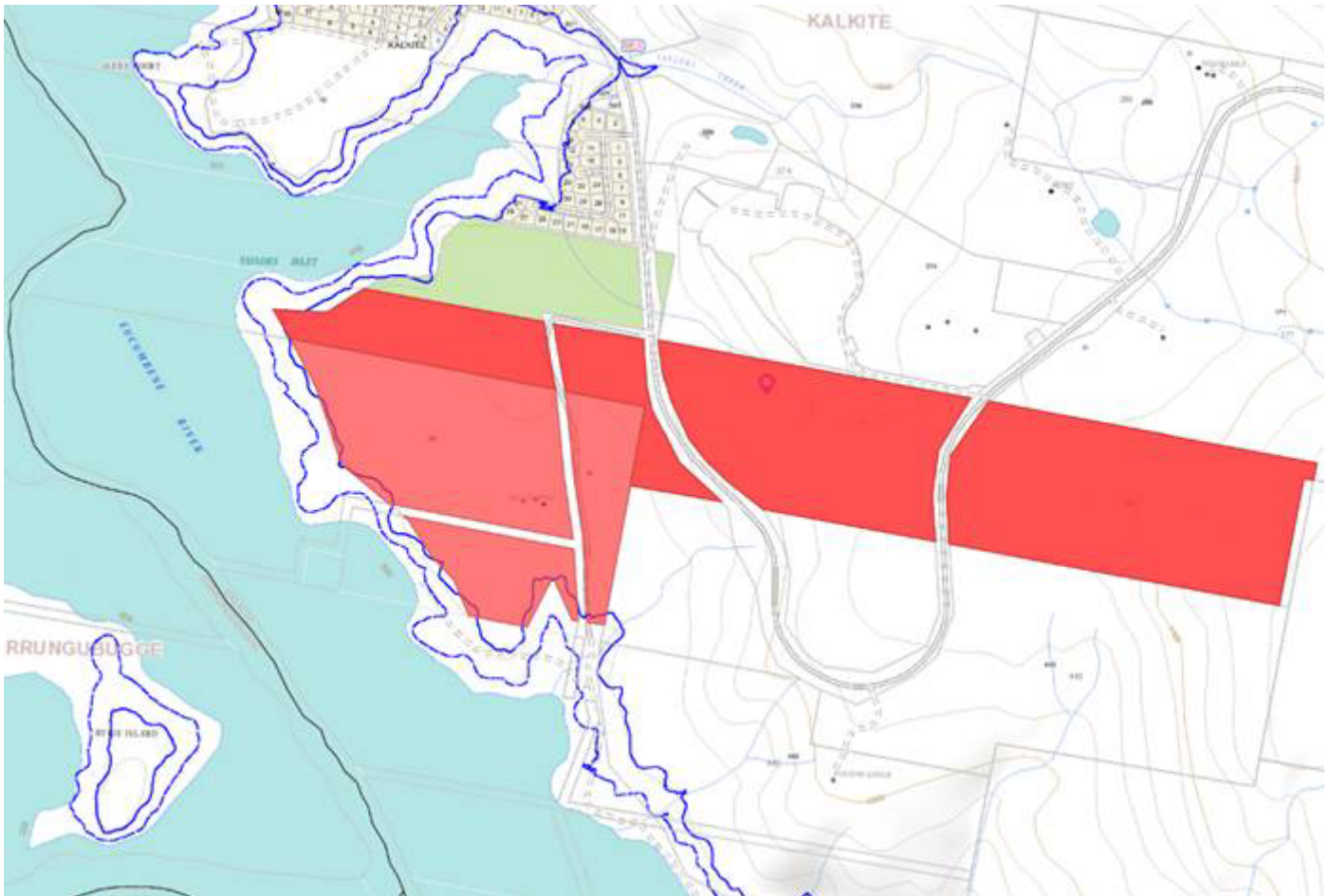
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Terry Maher

From: Snowy Monaro Regional Council Planning <Planning@snowymonaro.nsw.gov.au>
Sent: Friday, 26 November 2021 2:03 PM
To: Terry Maher
Subject: RE: Kalkite Development - Request for Servicing Information

Hi Terry,,

The information I have regarding flood is data is limited to the below. I don't have any access to the data on which the mapping is based.



The inner flood level (inner blue line) represents the full supply level of Lake Jindabyne. The outer flood level (blue line further inland) represents the maximum probable flood level. It look like the land under investigation is only minimally impacted at the eastern/south-eastern boundaries.

Regards,

Planning Snowy Monaro Regional Council
Planning

PO Box 714
COOMA NSW 2630

Phone
Fax (02) 6456 3337
snowymonaro.nsw.gov.au

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From: Terry Maher <terry.maher@cardno.com.au>
Sent: Thursday, 25 November 2021 10:37 AM
To: Mark Adams <Mark.Adams@snowymonaro.nsw.gov.au>
Cc: Snowy Monaro Regional Council Planning <Planning@snowymonaro.nsw.gov.au>; John Sutcliffe <john.sutcliffe@cardno.com.au>; Tarni Penn <tarni.penn@cardno.com.au>
Subject: FW: Kalkite Development - Request for Servicing Information

Good morning Mark,

I hope you are well.

We are currently undertaking a feasibility study for a proposed subdivision in Kalkite and are under bit of delivery pressure from our client.

Are you able to assist us by following up with the council planning team regarding our below request for servicing information and the attached flood data request.

We would really appreciate your help with this one. If you have any troubles, please feel free to give me a call on 02 6112 4576.

Kind regards,

Terry Maher *He/Him*
CIVIL ENGINEER
CARDNO



Phone Direct +61 2 6112 4576
Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

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From: Terry Maher <terry.maher@cardno.com.au>
Sent: Thursday, 11 November 2021 5:15 PM
To: council@snowymonaro.nsw.gov.au
Subject: Kalkite Development - Request for Servicing Information

Good afternoon,

Cardno have been engaged to undertake a due diligence investigation for a proposed subdivision upon Lot 5 Section DP529579 and Lot 190 Section DP756727 within Kalkite NSW.

We would like to request nearby existing service infrastructure information (water, sewer and stormwater) to assist with our investigations.

As part of our request, we would appreciate if you could provide each assets location, size and material type.



We would greatly appreciate your assistance with providing this data.

If you have any questions or concerns, please don't hesitate to contact me on 02 6112 4576

Kind regards,

Terry Maher *He/Him*
CIVIL ENGINEER
CARDNO



Phone Direct +61 2 6112 4576

Address Eastern Core, Level 4, 2 Constitution Ave, Canberra, Australian Capital Territory 2601 Australia

Email terry.maher@cardno.com.au Web www.cardno.com

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APPENDIX

C

GEOTECHNICAL INVESTIGATION
REPORT



now



29 September 2017
Our ref: MD/C12404

Cardno
Via email: john.sutcliffe@cardno.com.au

Attention: John Sutcliffe

**PROPOSED HILLDOWNS SUBDIVISION
KALKITE ROAD, KALKITE, NSW
PRELIMINARY 'DESK TOP' GEOTECHNICAL ASSESSMENT**

At the request of the client, ACT Geotechnical Engineers Pty Ltd carried out a desk-top preliminary geotechnical assessment as part of a proposed subdivision, in Kalkite, NSW.

The subdivision will comprise two sections of large lot housing, a crown land/town centre, and a Neighbourhood Centre/Community Space.

It is understood the study is required to provide preliminary geotechnical information and identify possible constraints for development of the site.

This report summarises expected site geotechnical and geological conditions based on research of available geological and topographical maps, past and recent aerial photographs, available geotechnical investigations conducted in the area, and a site walk-over conducted by a senior geotechnical engineer.

1 SITE DESCRIPTION & GEOLOGY

The proposed development site is located on the NE side of Lake Jindabyne, at 56 Hilldowns Road, in Kalkite, NSW. The site is bounded by Lake Jindabyne to the west and crosses over Kalkite Road towards the west. Figure 1 shows the site locality.

The site is presently undeveloped grazing land, fenced into paddocks with a single storey residence off Hilldowns Road. The topography of the site is dominated by several hills sloping west towards Lake Jindabyne/ Eucumbene River, with broad drainage gullies between. The highest point on site, east of Kalkite Road, is at about RL1075, with surface slopes within the large lot areas, between the two lengths of Kalkite Road that intersect the site, of up to 10°. The ground surface flattens out within the community space before sloping gently towards Lake Jindabyne. There are also some steeper slopes close to the drainage gullies. Road cuttings have been formed for Kalkite Road.

The ground surface is covered in pasture grasses, and small rounded granite outcrops are present on the surface over most of the site, however, are more prevalent on the higher slopes. There are essentially no trees on the site, however, there is a farm house located off Hilldowns Road.

Figure 2 is a recent aerial photograph showing the present site layout, while Figure 3 is a topographical map showing the surface contours and topographic features of the site. Site Photos 2 to 4 taken during the site walk over are provided in Figure 6.

The 1:250,000 Bega-Mallacoota geology map indicates the site to be underlain by Silurian age Bullenbalong bedrock, which includes granodiorite and biotite-rich granodiorite. The granodiorite crops out as very numerous, small rounded boulders easily distinguishable from the larger outcrops in the Silurian age bedrock and within the road cutting.

3 EXPECTED SUBSURFACE CONDITIONS

ACT Geotechnical Engineers have conducted many investigations and been involved in various projects in and around Jindabyne. Our assessment was based on these past involvements, as well as reference to past and present topographical maps and local soil and geology maps. In addition, three push tube boreholes, designated 1A to 3A, were drilled at the site during the site walk over on 5 November 2021. The borehole logs are attached at the end of the report, and the location of the boreholes are shown on Figure 3. The Photo's in Figure 5 are of the push tube sample from the boreholes.

The subsurface profile at the site is expected to comprise the following:

Depth	Geological Profile
0m to ~0.1m/0.2m	TOPSOIL: Silty Sand; fine to coarse sand, low plasticity silt, black, grass roots, dry to moist, loose.
~0.1m/0.2m - ~0.5m/0.8m	RESIDUAL SOILS: Clayey Sand; low to medium plasticity clay, fine to coarse sand, brown, dry to moist, medium dense to dense.
below ~0.5m/0.8m	GRANODIORITE BEDROCK: coarse grained, extremely weathered (EW) and extremely weak rock.

The road cuttings were also logged, which exposed a subsurface profile of silty topsoil to 0.1m depth underlain by weathered granodiorite bedrock. The depth to bedrock is expected to vary depending on the topography. Near the tops of the hill tops, the depth to bedrock is expected to be shallower (maybe as shallow as 0.1m), and will be stronger and less weathered. Along the flanks of the drainage gullies, and in the flatter areas of the site, bedrock is expected to be deeper (maybe >1m).

4 EXPECTED GROUNDWATER CONDITIONS

The permanent groundwater table is expected to correspond to the water level of Lake Jindabyne. However, perched groundwater may be present at shallower depth within the more pervious residual soils, but seepage flows rates are expected to be relatively low.

5 PRELIMINARY ENGINEERING ASSESSMENT

5.1 Anticipated Excavation Conditions & Use of Excavated Material

The depth of proposed excavations is not known, however, it is expected that subdivision development may require excavations of up to 1m/2m (for roadways, footing excavations, forming level cut-to-fill platforms, or for trenching for installing underground services). Such excavations would be through topsoil, residual soils, and into granodiorite bedrock. The overburden soils and weak rock expected within the upper ~1.5m can be dug by backhoe and small to medium-sized excavator, however, medium strong and less weathered bedrock would require ripping or rock hammering. Table 1 summarises the expected bedrock strength and excavation condition at the site.

TABLE 1
Expected Bedrock Strength & Excavation Conditions

Location	Depth Interval	Expected Rock Strength & Defect Spacing	Required Excavation Equipment
Around the Hill Tops	0m to ~0.5m	Soil & weak rock - defect spacing <60mm	Excavator
	below ~0.5m	Medium strong rock - defect spacing of 30mm to 300mm	Mostly heavy (dozer) ripping, some rock hammering
Elsewhere on the site	0m to >1.5m	Soil & weak rock - defect spacing <60mm	Excavator

Any low and medium-plasticity colluvial and residual soils are expected to be suitable for use in controlled fill construction for new building platforms and pavement subgrades. The weak granodiorite bedrock is expected to be a source of good-quality select fill (CBR12%) material. The stronger rock could also be used as select fill, provided it is broken down to less than 75mm particle size.

Any topsoil and medium to high and high-plasticity clays are not generally suitable for controlled fill, but could be used in non-structural applications such as landscaping.

5.2 Structure Footings

Pad and/or strip footings founding in the medium dense residual soils, or on a properly constructed engineered fill platform, would be suitable for the proposed residential structures. Alternatively, bored piers founding deeper in the weak bedrock could be used. Footings should not be founded in the topsoil.

A detailed borehole investigation would be required to more accurately determine the foundation material. Indicative allowable end-bearing pressures for pad, strip, and pier footings in these foundation categories are summarised in Table 2.

TABLE 2
Indicative Allowable End-Bearing Pressures for Footings

Foundation Material Type	Depth Below Existing Surface Level	Allowable End-Bearing Pressure		
		Strips	Pads	Bulk or Bored Piers
Newly Placed Controlled Fill & Medium Dense Natural Residual Soil	~0.2m	100kPa	125kPa	N.A.
EW & less weathered Granodiorite Bedrock	0.5m/0.8m (neighbourhood community area) Surface/0.5m (upper slopes of the site)	500kPa	750kPa	1000kPa

All footing excavations should be inspected and approved by an experienced geotechnical engineer to confirm the foundation material and design values, and to ensure the excavations are clean and stable.

Groundslabs can be constructed directly on natural soil or bedrock. Cut subgrades should be proof-rolled by a vibratory pad-foot roller, and any wet or deforming subgrades replaced to their full depth. Suitable replacement fill can be placed in not thicker than 150mm layers to not less than 95%ModMDD.

5.3 Stable Batter Slopes

Temporary site excavations to 1.5m depth can be formed near-vertical, although any loose uncontrolled fill should be cut at 1(H):1(V). If required, deeper temporary cuts can be benched or formed at 1(H):1(V) in soils and at 0.5(H):1(V) in HW and less weathered bedrock. Exposed temporary batters in soil may require protection from the weather.

Permanent cut and fill batters should be formed at no steeper than 2(H):1(V), although permanent cuts in HW and less weathered bedrock could be formed at 1(H):1(V). All soil cut and fill surfaces should be protected against erosion by topsoiling and grassing, or other suitable means. Steeper permanent cuts should be supported by structural retaining walls.

5.4 Road Pavements

New road and carpark subgrades should be stripped of all topsoil, and soils subgrades then proof-rolled by a pad-foot roller to check for any wet or otherwise weak spots which may require additional removal. Suitable replacement fill can be compacted in not thicker than 150mm layers, to not less than 98%StdMDD.

Pavement subgrades could comprise residual soil, newly placed controlled fill, or cut weathered bedrock. An indicative design CBR value of 5% can be assumed for low plasticity soils and EW & EW/HW bedrock, and 12% for HW bedrock. CBR testing of the site soils should be carried out during a site-specific geotechnical investigation.

The pervious, fine grained, sandy/silty topsoil in the upper ~0.2m of the profile is readily susceptible to saturation and weakening, so the site may be difficult to traffic by wheeled earthmoving plant following rain, and anecdotal evidence suggests that boggy conditions are regularly encountered following rainfall. It is recommended that building platforms, access tracks, and traffickable areas are covered in a gravel hardstand to maintain a working platform and vehicle access.

5.6 Drainage & Groundwater Control

Surface drainage measures should ensure that rainwater or seepage water does not pond against structure footings or pavements.

The permanent groundwater table is expected to correlate to the water level of Lake Jindabyne. Potential excavations are expected to be above the permanent groundwater level, however, perched seepages could be encountered at shallower depth following rainfall. Groundwater levels would need to be better established during a site-specific geotechnical investigation.

5.7 Earthquake Site Factor

Table 2.3 of AS1170.4 "Minimum Design Loads on Structures - Part 4: Earthquake Loads" lists the earthquake acceleration coefficients for major centres to be considered in structural design. The Jindabyne area has an acceleration coefficient of 0.08.

Section 4 of AS1170.4 summarises the Site Subsoil Class which depends on the subsurface conditions at the site in question. A Site Subsoil Class C_e is expected for the site.

5.8 Expected Slope Stability

As the groundsurface slopes of the site are generally less than 10°, and as there are no scarps, humps, boulder trains or erosion gullies to indicate past instability, the hills are geotechnically stable. No special provisions are envisaged to be necessary for subdivision development on these slopes, beyond normal compliance with AS2870 "Residential Slabs & Footings", and the implementation of suitable engineering practice for sloping sites, such as minimisation of cut and/or fill, use of structural retaining walls, and surface stabilisation of disturbed or filled ground.

6 DISCUSSION & GEOTECHNICAL CONSTRAINTS

The site appears to be geotechnically suitable for the proposed subdivision development. The large lot dwelling areas and community area (apart from the tops of the hills, and close to the gullies) appears to be reasonably flat or slightly sloping and suitable topography for a subdivision development.

Some cut-to-fill earthworks would be required, with engineered retaining walls, would be required on the sloping site, but this would not preclude development.

7 FURTHER INVESTIGATION

This report is of a preliminary nature, based on limited information from past investigations, and on our knowledge of the various geological formations.

A comprehensive site-specific, detailed geotechnical investigation by test pits and/or boreholes will be required for any proposed development, to properly assess the depth of the bedrock, groundwater conditions, and material properties.

Should you require any further information, please contact our office.

Yours faithfully

ACT Geotechnical Engineers Pty Ltd



Jeremy Murray
Director
Senior Geotechnical Engineer

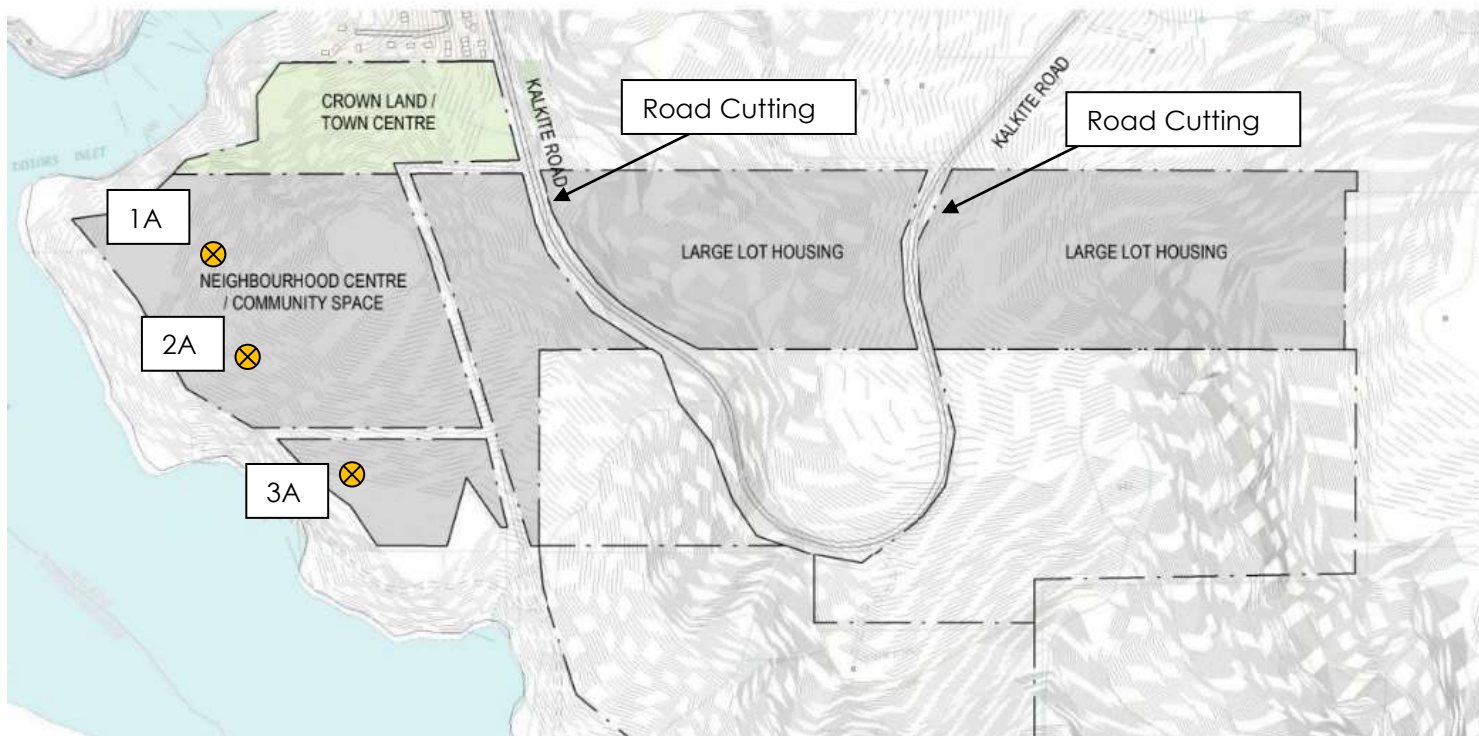


HILDDOWNS SUBDIVISION
KALKITE ROAD KALKITE
SITE LOCALITY

ACT Geotechnical Engineers

C12404

FIGURE 1



HILLDOWNS SUBDIVISION
KALKITE ROAD KALKITE
SITE LAYOUT & BOREHOLE LOCATIONS



HILLDOWNS SUBDIVISION
KALKITE ROAD KALKITE
SITE PHOTOGRAPHS



HILLDOWNS SUBDIVISION
KALKITE ROAD KALKITE
SITE PHOTOGRAPHS

ACT Geotechnical Engineers

C12404

FIGURE 4



HILDDOWNS SUBDIVISION
KALKITE ROAD KALKITE
SITE PHOTOGRAPHS

ACT Geotechnical Engineers

C12404

FIGURE 4

Excavation Log

Excavation No.	1A
Sheet	1 of 1
Job No.	C12404
Location : See Report	
Surface Level : Not Known	

CLIENT: Cardno
PROJECT Proposed Subdivision Kalkite Rd Kalkite NSW
Equipment Type : Push Tube Sampler Excavation Dimensions : 50mm diameter

Samples	Casing	Depth Metres	Graphic Log	U.S.C.S.	Material Description, Structure <small>Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure</small>	Consistency or Relative Density	Field Test Results	Geological Profile
		0.1		SM	Silty SAND; fine to medium sand, low plasticity silt, dark brown, some grass roots at the surface, dry to moist.	LOOSE		TOPSOIL
		0.5		SC	CLAYEY SAND; fine to coarse sand, low plasticity fines, brown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0			EW GRANODIORITE; coarse grained, brown.	EXTREMELY WEAK ROCK		BEDROCK
		1.2			EXCAVATION TERMINATED AT 1.2m			
		2.0						



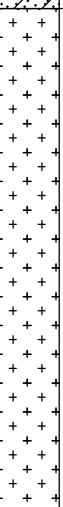
BOREHOLE/EXCAVATION LOG C12404 - LOGS.GPJ ACT GEO.GDT 12/11/21

Logged By : MD	Date : 5/11/21	Checked By :	Date :
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Excavation Log

Excavation No.	2A
Sheet	1 of 1
Job No.	C12404
Location :	See Report
Surface Level :	Not Known

CLIENT:	Cardno
PROJECT	Proposed Subdivision Kalkite Rd Kalkite NSW
Equipment Type :	Push Tube Sampler
Excavation Dimensions :	50mm diameter

Samples	Casing	Depth Metres	Graphic Log	U.S.C.S.	Material Description, Structure <small>Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure</small>	Consistency or Relative Density	Field Test Results	Geological Profile
		0.15		SM	Silty SAND; fine to medium sand, low plasticity silt, dark brown, some grass roots at the surface, dry to moist.	LOOSE		TOPSOIL
		0.8		SC	CLAYEY SAND; fine to coarse sand, low plasticity fines, brown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0			EW GRANODIORITE; coarse grained, brown.	EXTREMELY WEAK ROCK		BEDROCK
		1.5			EXCAVATION TERMINATED AT 1.5m			
		2.0						

BOREHOLE/EXCAVATION LOG C12404 - LOGS.GPJ ACT GEO.GDT 12/11/21

Logged By :	MD	Date :	5/11/21	Checked By :		Date :	
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Excavation Log

Excavation No.	3A
Sheet	1 of 1
Job No.	C12404
Location : See Report	
Surface Level : Not Known	

CLIENT: Cardno
PROJECT Proposed Subdivision Kalkite Rd Kalkite NSW
Equipment Type : Push Tube Sampler Excavation Dimensions : 50mm diameter

Samples	Casing	Depth Metres	Graphic Log	U.S.C.S.	Material Description, Structure <small>Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure</small>	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium sand, low plasticity silt, dark brown, some grass roots at the surface, dry to moist.	LOOSE		TOPSOIL
		0.6		SC	CLAYEY SAND; fine to coarse sand, low plasticity fines, brown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0			EW GRANODIORITE; coarse grained, brown.	EXTREMELY WEAK ROCK		BEDROCK
		1.5			EXCAVATION TERMINATED AT 1.5m			
		2.0						

BOREHOLE/EXCAVATION LOG C12404 - LOGS.GPJ ACT GEO.GDT 12/11/21

Logged By : MD

Date : 5/11/21

Checked By :

Date :

APPENDIX

D

CONTAMINATION REPORT (PSI)



now



Preliminary Site Investigation

56 Hilldowns Road, Kalkite, NSW

Prepared for Cardno (ACT/NSW) Pty Ltd

8 December 2021

Author Chris Gunton



Reviewer Kelly Lee



Approver Chris Gunton



Report Reference P21113_PSI_20211208

Date 8/12/2021

Revision Text R01

This report has been prepared for Cardno (ACT/NSW) Pty Ltd. Lanterra Consulting Pty Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared	Approved
R00	7/12/2021	Draft for Review	LB	KL
R01	8/12/2021	Final	LB	CG

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Executive Summary

Lanterra Consulting Pty Ltd (Lanterra) was engaged by Cardno (ACT/NSW) Pty Ltd to complete a phase 1 preliminary site investigation (PSI) Lot 190 DP756727 and Lot 5 DP529579, Kalkite, NSW (herein referred to as the Site) located at 56 Hilldowns Road, Kalkite NSW.

The site is zoned RU1 – Primary Production under the Snowy River Local Environment Management Plan 2013 and has an estimated area of 798,500 square metres (m²). The site is currently a rural property with a homestead and hay shed and historical shearing shed.

A masterplan for the site has been prepared which proposes a possible mixed residential and community space development. The objective of the PSI was to assess the potential risk of contamination across the site that may affect its suitability for development of the site in accordance with the masterplan.

One (AEC) was identified in the vicinity of the shearing shed based on the storage of chemicals. The COPCs assessed were as follows:

- Total recoverable hydrocarbons (TRH)
- Benzene, toluene, ethylbenzene, xylene (BTEX)
- Polycyclic aromatic hydrocarbons (PAH)
- Polychlorinated biphenyls (PCBs)
- Phenols
- Organochlorine pesticides/organophosphorus pesticides (OCP/OPPs)
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
- Asbestos

Results of samples collected from around the shearing shed identified traces of dieldrin and DDT below the adopted National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013) health-based investigation levels for standard residential use (HIL A) criteria.

The concentration of zinc was recorded at a maximum concentration of 1,300 mg/kg from around the base of the shearing shed, which exceeds the ecological investigation level (EIL) criterion, but was below the HIL A value. The source of the zinc was attributed to the galvanised metal sheeting used in the shed construction. Based on the similar construction of the hay shed, it is possible that the soil around the perimeter of the hay shed may also contain elevated concentrations of zinc and sampling of the soil beneath the hay shed will be required after the shed is demolished.

Overall, the majority of the site is suitable for the proposed large lot residential with a neighbourhood centre and community space. Remedial works to remove zinc impacted soil from around the shearing shed and possibly around the hay shed will be required should the site be redeveloped. After the demolition of these structures, validation of the underlying soil will be required.

Based on the results of this investigation, Lanterra recommends the following:

- After the shearing and hay sheds have been demolished, validation sampling of the soil beneath the sheds should be completed to assess whether the soil is suitable for the proposed land uses.

- The tyres located in the central portion of the site are to be removed and disposed to a suitably licensed landfill.
- An unexpected finds protocol (UFP) to manage any unexpected occurrences of contamination should they be encountered during development of the site (including building demolition) should be prepared prior to any earthworks commencing.

1. Introduction

Lanterra Consulting Pty Ltd (Lanterra) has been engaged by Cardno (ACT/NSW) Pty Ltd (Cardno) to complete a phase 1 preliminary site investigation (PSI) Lot 190 DP756727 and Lot 5 DP529579, Kalkite, NSW (herein referred to as the Site) located at 56 Hilldowns Road, Kalkite NSW. **Figure 1, Appendix A** shows the location of the site.

The site is zoned RU1 – Primary Production under the Snowy River Local Environment Management Plan 2013 and has an estimated area of 798,500 square metres (m²). The site is currently a rural property with a homestead and hay shed and historical shearing shed. A detailed site plan is shown on **Figure 2, Appendix A**.

A masterplan for the site has been prepared which proposes a possible mixed residential and community space development. Based on the plans provided, the western section of the site, which is adjacent to the shoreline of Lake Jindabyne may be the location of a neighbourhood centre / community space, while large lot housing may be located in the eastern sections of the site. **Figure 3, Appendix A** shows the proposed land uses outlined in the Master Plan.

This PSI has been completed to assess the site for activities that may introduce contaminants in the environment and assess whether the site may be suitable for the proposed uses.

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

1.1 Objectives

The objective of the PSI was to assess the potential risk of contamination across the site that may affect its suitability for development of the site in accordance with the masterplan.

1.2 Scope of Work

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

- Perform a site visit to characterise the property setting, including inspection of the site surface for obvious and visible signs of potential contamination and / or contaminant sources.
- A visual evaluation of surrounding land uses to identify any neighbouring activities which may have affected or present a potential risk to the environmental quality of the site.
- An evaluation of aerial photographs to assist in assessing historical land uses and conditions on and adjacent to the site.
- Review the results of an NSW EPA contaminated sites register to assess whether there are any known contaminating activities either on the site or on neighbouring properties.
- Review of Council's Section 10.7 planning certificate.
- A review of a historical title search.
- A review of the environmental setting with regards to geology, topography, hydrology, and hydrogeology.
- Undertake the collection of near surface samples from around the historical shearing shed.
- Undertake soil analysis at a National Association of Testing Authorities (NATA) accredited laboratory for the analyses of contaminants of potential concern (COPCs) identified by Lanterra.

- Assess laboratory results obtained from the investigation against the applicable land use criteria.
- Prepare an investigation report presenting:
 - The results of the investigation.
 - Recommendation if further investigation and/or remediation is required.

1.3 Regulatory Guidelines / Legislations

The investigation and preparation of this report was undertaken with reference to (but not limited to) the following regulatory guidance documents and standards:

- *Department of Urban Affairs and Planning (1998) Managing Land Contamination Planning Guidelines SEPP 55 – Remediation of Land*
- *National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013)*
- *NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (3rd Ed.) (2017)*
- *NSW EPA (1995) Sampling Design Guidelines (1995)*
- *NSW EPA (2020) Contaminated Land Guidelines - Consultants Reporting on Contaminated Land*
- *Standards Australia (2005). Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds AS4482.1 (2005) and Part 2: Volatile substances, AS4482.2 (2005).*

1.4 Limitations

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

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

The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the site. Lanterra will not investigate any waste materials from the property that may have been disposed of off the site, nor related waste management practices.

The results of this assessment will be based upon the site inspection and the sampling specified above conducted by Lanterra personnel and information from the Client or regulatory agencies. All conclusions and recommendations regarding the property area will be the professional opinions of the Lanterra personnel involved with the project, subject to the qualifications made above.

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

2. Site Characteristics

2.1 Site Location

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

Table 1: *Summary of Site Details*

Site Characteristics	Detail
Street Address	56 Hilldowns Road, Kalkite, NSW
Approximate Easting and Northing (centre of the site) (GDA94 / MGA zone 55)	Easting: 646859 Northing: 5976590
Approximate Elevation (m AHD)	920 – 1,160 m
Lot and DP	Lot 190 DP756727 Lot 5 DP529579
Land Zoning	RU1 – Primary Production
Current Land Use	Rural Residential
Proposed Land Use	Large Lot Residential and Community Use
Site Area	798,500 m ²

2.2 Site Description

The site is a rural property located approximately 200 m to the south of the township of Kalkite.

The following description is based on observations made during a site visit conducted on Monday 4 November 2021 by a suitably qualified environmental scientist from Lanterra:

- The site is a rural property with a residential dwelling and shed, a former shearing shed and hay storage shed. Lake Jindabyne was located to the west of the site and at the time of the site inspection, cattle were located in the western paddock. An old abandoned car was located on the crest of a hill located in the western section of the site.
- The shearing shed and hay shed are both constructed with timber and galvanised metal sheeting.
- The western section of the site comprised of lower hills that was predominantly grassland with some sporadic trees, while the eastern section of the site comprised of steeper slopes and more native vegetation. Overall, the topography of the site slopes from east to west becoming steeper towards the east. Surface water from the site would flow into drainage channels and then into Lake Jindabyne.
- Kalkite Road passes through the central portion of the site on two (2) occasions as the road winds down to the township of Kalkite. Access to the residential building was via Hilldowns Road which is an unsealed road from Kalkite Road leading to the driveway of residential building located on the western side of the road.
- The former shearing shed is located approximately 20 m to the west of the residential building. The shearing shed is currently used for the storage of equipment and chemicals (pesticides). A 200 L steel drum labelled with Dow epoxy resin was located beneath a ramp on the western side of the shed. No evidence of any sheep dip in the vicinity of the shed

were observed. Around the shed are some stockpiles of materials including steel drums, fencing wire and a gate.

- The residential property was in good condition, while the adjacent shed was used for the storage of equipment and was also in good condition. No evidence of leaks or spills of chemicals or fuels were noted. The surrounds of the residential building were well maintained and no visual or olfactory indicators of contamination were noted.
- The hay shed was located on the eastern side of Hilldowns Road and at the time of the site visit, had one piece of machinery and a 1,000 litre (L) container. The floor of the hayshed was unsealed, however no visual or olfactory indicators of contamination were noted.
- In the eastern section of the site, a dam had been constructed within a drainage channel where a pump was located. An old windmill was also lying on the ground adjacent to the dam.
- To the east of the dam was an excavated hole that was approximately 10m long by 10 m wide and 3 m deep. The purpose of the excavation was not known.
- A pile of discarded tyres were located in the central portion of the site.
- Indications of spot spraying with herbicides for weed control was evidence adjacent to Hilldowns Road.

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

2.3 Surrounding Land Uses

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

- **North:** Immediately adjacent to the site boundary is vacant Crown land, while the town of Kalkite is located approximately 200 m north of the site boundary.
- **South:** Rural properties are located to the south of the site, while Lake Jindabyne is approximately 300 m to the south.
- **East:** Rural residential properties are adjacent to the site.
- **West:** Lake Jindabyne is located to the west of the site.

2.4 Sensitive Environments

The following sensitive environment receptors were identified:

- Lake Jindabyne located to the west is used primarily for recreational use.
- Residential properties of Kalkite are located approximately 200 m to the north of the site boundary.

2.5 Proposed Land Use

It is understood that the masterplan for the site includes the development of large lot residential properties in the eastern sections and a neighbourhood centre and community space to the west.

As the configuration of the site is not known, it has been assumed that standard residential dwellings could be placed anywhere on the site.

3. Site History

3.1 Previous Investigations

No previous environmental investigations were made available to Lanterra for review.

3.2 Zoning

The site is currently zoned as RU1: Primary Production under the Snowy River Local Environment Plan 2013, and encompasses the following associated objectives:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To promote tourism, educational and recreational development and living opportunities that are compatible with agricultural activities and the environmental, historical and cultural values of the zone.
- To ensure that development maintains and protects the scenic values and rural landscape characteristics of the zone through compatible, small-scale development.

3.3 Land Title Search

A land title search for the lot was lodged as part of the Lotsearch report (Section 3.4).

The results of this search show that the site have changed owners several times since 1920. A summary of the land titles is presented in Table 2 below.

Table 2: Summary of Land Title Search for Lot 5 DP529579 and Lot 190 DP756727

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
01.01.1920 (1920 to 1950)	John Harvey (Deceased 13.08.1929) (And his deceased estate)	Crown Tenure Conditional Purchase 1871/70 Cooma
03.08.1950 (1950 to 1967)	Richard Harvey (Labourer) (Transmission Application not investigated)	Crown Tenure Conditional Purchase 1871/70 Cooma Now Volume 6321 Folio 97 (Crown Grant)
19.04.1967 (1967 to 1997)	John Thomas Harvey (Grazier) Richard Vivian Harvey (Grazier) (Section 94 Application not investigated)	Volume 6321 Folio 97 Then Volume 10841 Folio 79 Now 5/529579
26.05.1997 (1997 to 2003)	John Thomas Harvey (Transmission Application)	5/529579
12.11.2003 (2003 to 2004)	Laurel Lynette Roberson Coral Lee Constance (Transmission Application)	5/529579
27.05.2004 (2004 to Date)	# John Sacco Enterprises Pty Limited	5/529579

Land Title search documents are shown in **Appendix E**.

3.4 Aerial and Historical Photograph Review

A Lotsearch (Environmental Risk Report) was requested to assist with the history of the site and its surroundings which included historical aerial photographs of the site. These were reviewed to assist with assessing the history of the site. A summary of each photograph examined as a part of the investigation is provided in Table 3 below. A copy of the Lotsearch Report is presented in **Appendix G**.

Table 3: *Details of the Review of Aerial Photographs*

Date	Description of the Subject Site	Description of Surrounding Land
1968	The residential building, shearing shed and hay storage sheds, are visible in the western section of the site. Both the eastern and western portions of the site has sporadic tree coverage. Kalkite Road passess through the site and appears to be unsealed. Hilldowns Road is present and also unsealed.	The area surrounding appears to be rural properties. The township of Kalkite is not visible. The properties adjacent to the northeast and south east boundaries are heavily vegetated. The water level in Lake Jindabyne appears to be low, although it is noted that the Jindabyne Dam was completed in 1967 and the lake has not yet reached capacity.
1979	No discernible differences to the site are apparent with the exception that more trees appear to have been removed.	Development of Kalkite appears to have commenced with new roads being constructed. No residential dwellings are visible. Lake Jindabyne appears to be full.
1988	No discernible differences to the site are apparent.	Residential dwellings of Kalkite are visible to the north. The Kalkite sewage treatment plant is also visible to the north of the site. The adjacent property to the north appears to have a new vehicular track that loops around the property. Kalkite Road appears to have been sealed.
1992	There is no discernible difference across the majority of the site. In the western section, some small building are visible to the north of the shearing shed.	There are no discernible differences to the surrounding properties.
1998	There is no discernible difference across the majority of the site.	There are no discernible differences to the surrounding properties.
2011	The small buildings/structure that were observed in the previous photographs are no longer present. The new shed adjacent to the residential building is present.	More residential dwellings are visible in Kalkite.
2015	No discernible differences to the site are apparent with the exception of new trees located around the residential building.	There are no discernible differences to the surrounding properties.

Date	Description of the Subject Site	Description of Surrounding Land
2018	No discernible differences to the site are apparent.	There are no discernible differences to the surrounding properties.
2020	No discernible differences to the site are apparent.	There are no discernible differences to the surrounding properties.

The site and its surroundings had been established in the earliest photograph reviewed taken 1968. The township of Kalkite appears to have been first established circa 1979.

The site has not changed significantly from 1968 to 2020.

3.5 Historical Business Directories

A historical business directories search of the site is provided as part of the Lotsearch Environmental Risk report (**Appendix G**).

This search showed no records of potentially hazardous activities have been performed within the site or within a 500 m radius of the site.

3.6 EPA Contaminated Land Search

Contaminated site search was completed for the site with NSW EPA as part of the Lotsearch Report with findings below:

- The site is not listed under the NSW EPA contaminated site notification list.
- No records of sites on the NSW EPA contaminated land list were located within a 500 m radius of the site.

3.7 Council Planning Certificates

A Section 10.7 (2) and (5) planning certificate for the site was obtained from Queanbeyan-Palerang Regional Council to review the planning instruments and development control plan that apply to the site (see **Appendix F**). A summary of the review of the planning certificate associated are as follows:

- As of the date of the Section 10.7 certificate, Council has no records to indicate that the site is potentially contaminated.
- In addition, Council has not been made aware of the land being subject to the following:
 - land declared to be significantly contaminated land;
 - land subject to a management order;
 - land subject of an approved voluntary management proposal;
 - land subject to an ongoing maintenance order; or
 - subject of a site audit statement.
- Council is not aware of any residential dwelling erected on this land which has been identified in the Loose-Fill Asbestos Insulation Register as containing loose fill asbestos ceiling insulation. Contact NSW Fair Trading if further information is required.

3.8 Heritage Items

No heritage listed items are located within the site, however, several items are observed in its surroundings.

The closest is Lake Jindabyne to the west of the site.

A copy of these records is presented in the Lotsearch report in **Appendix G**.

3.9 SafeWork Dangerous Goods Search

A search of the SafeWork NSW dangerous good storage and hazardous chemicals was not undertaken for the site.

3.10 Storage Tanks

No evidence of fuel storage tanks was observed.

3.11 Waste Management & Liquid Fuel Facilities

There are no records within the site for National Liquid Fuel Facilities or records in the National Waste Management Site Database.

3.12 Chemical Storage

Other than small quantities of pesticides stored in the shearing shed, there was no evidence of chemical storage on the site, based on the site visit on 1 November 2021.

3.13 Manufacturing Processes

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

3.14 Discharges to Land, Water and Air

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

4. Site Condition and Environmental Setting

4.1 Topography

The digital topographic map presented in **Appendix G** indicates that the site has an elevation of approximately 920-1060 m above Australian Height Datum (m AHD).

The site is undulating, although the regional topography slopes from east to west. The site is steepest to the east with gentle undulations in the western section of the site to the shore of Lake Jindabyne.

4.2 Visible Signs of Contamination

No obvious indicators of chemical contamination were noted during the site visit on 4 November 2021. A pile of tyres was observed in the central portion of the site (see **Figure 2**). These should be disposed to a facility licensed to accept tyre waste.

4.3 Fill Material

No evidence of filling on the site was observed during the site visit on 4 November 2021

4.4 Odours

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

4.5 Staining

There was no evidence of hydrocarbon staining on the site during the site visit on 4 November 2021

4.6 Vegetation

No vegetation stress was observed across the site. Several trees were observed in healthy conditions within the site and its surroundings.

4.7 Hazardous Materials

No evidence of hazardous materials were noted during the site visit. It is noted that this investigation did not include a hazardous materials assessment of the buildings on the site.

5. Geology and Hydrogeology

5.1 Geology

Based on information provided by the NSW Department of Industry, Resources and Energy 1:250,000 Geology Map, the site is underlain by the following Silurian aged geological units:

- Gaden Tonalite in the western section of the site which comprises of hornblende and biotite tonalite.
- Bullenbalong Granodiorite in the eastern section of the site which comprises of biotite rich granite.

The two geological units are separated by a north-south fault.

5.2 Hydrogeology

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

This search indicated that there are twelve (12) groundwater boreholes registered with the Bureau of Meteorology within 2,000 m of the site. The nearest of these boreholes is located approximately 261 m to the east of the site. (See **Appendix G**).

Based on information provided in the Lotsearch report (**Appendix G**) sourced from the Commonwealth of Australia (Geoscience Australia) Hydrogeology Map of Australia, groundwater beneath the site is hosted by fractured or fissured, extensive aquifers of low to moderate productivity.

Based on the standing water levels of boreholes located at a similar altitude, groundwater is expected to be found between 10 – 20 m below ground level (bgl). Based on the general topography of the site groundwater flow direction is inferred to be in an overall westerly direction towards Lake Jindabyne.

5.3 Hydrology

Surface water on the site is expected to follow the topographic contours of the site and flow from east to west and into Lake Jindabyne.

5.4 Acid Sulfate Soil Risk

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

6. Preliminary Conceptual Site Model

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

The following conceptual site model has been prepared based on the information presented in the Lotsearch Report, document searches and observations made during the site visit on 4 November 2021.

6.1 Areas of Environmental Concern

The areas of environmental concern (AECs) for the site identified by Lanterra are summarised below.

AEC 1 – Former Shearing Shed

The storage of chemicals in the shearing shed has the potential to impact the soil beneath and around the shed, including in the area around the drum labelled epoxy resin.

There was no evidence of a sheep dip in the vicinity of the shearing shed and therefore any impact to the soil would be confined to the vicinity of the shed and near the surface.

6.2 Contaminants of Potential Concern

To comprehensively characterise the site and based on some of the activities associated with the site and its surroundings and respective AEC the following contaminants of potential concern (COPC) were identified.

Table 4: Identified COPC and the associated AECs

AECs	COPC
<i>Shearing Shed</i>	<ul style="list-style-type: none">• Total recoverable hydrocarbons (TRH)• Benzene, toluene, ethylbenzene, xylene (BTEX)• Polycyclic aromatic hydrocarbons (PAH)• Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)• Organochlorine and organophosphate pesticides (OCP/OPP)• Asbestos

6.3 Exposure Pathways and Receptors

For a contaminant to pose a risk to either human health and/or the environment, there must be a potentially complete or complete pathway between the contaminant and the receptor. Identified receptors at the site are as follows:

- On-site workers associated with the future use of the site.
- Current users of the site.
- Future construction workers engaged as part as the development.
- Future users of the development.
- Ecological receptors including Lake Jindabyne to the west.
- Groundwater.

Common pathways for which contaminants may migrate through the environment on the site and result in exposure to receptors are summarised in Table 5 below.

Table 5: Summary of Exposure Pathways

Pathway	Contaminants of Concern	Exposure Pathway Complete or Potentially Complete (Yes/No)	Comments
Direct Contact with Soil including dermal contact and ingestion	TRH, BTEX, PAH, Heavy Metals, OCP, OPP	Potentially Complete	Should the soil beneath and around the shearing shed be impacted, then there is potential that current and future users of the site, construction workers and fauna may have direct contact to the impacted soil.
Direct Contact with Groundwater including dermal contact and ingestion	TRH, BTEX, PAH, Heavy metals, OCP, OPP	Incomplete	No abstraction bores are located on or near the site and therefore exposure to groundwater is unlikely. Therefore, the pathway is incomplete. Furthermore, based on the volume of contaminants stored in the shearing shed, the risk to groundwater is considered negligible.
Inhalation of Asbestos Fibres	Asbestos	Potentially Complete	No evidence of asbestos containing materials were present in the vicinity of the shearing shed. However, due to the history of the shearing shed, it is possible that asbestos containing materials have been stored and/or used in the shed.
Inhalation of gasses and vapour	TRH, BTEX, PAH	Incomplete	The storage of volatile compounds at volumes that may pose a vapour risk

In its current condition, there are potentially complete contaminant exposure pathways which are dependent on whether COPCs are present.

6.4 Frequency of Potential Exposure to Contaminants

The site is unoccupied and the frequency of potential exposure to contaminants is limited. Any occupants that visit the shearing would only do so for short periods of time, that is prolonged time on the site such as regular business hours (e.g., 8 hours per day, 5 days per week) is highly unlikely and therefore, based on this the potential exposure risk is low.

7. Assessment Criteria

The assessment criteria that would be adopted for the investigation is based on the current zoning of the site and the proposed residential development which is considered a sensitive land use. Therefore, the criteria adopted from the 'National Environment Protection (Assessment of Site Contamination) Measure 1999' as amended in 2013 (ASC NEPM 2013) is HIL A residential land use.

7.1 Land Use Soil Assessment Criteria

The following soil assessment criteria have been adopted from the ASC NEPM 2013:

- Health Investigation Levels for Residential Sites (HIL A) - residential with garden accessible soil.
- Health Screening Levels for Residential Sites (HSL A) for vapour intrusion screening – low to high density residential based on sand lithology at 0-1m depth (most conservative soil and depth criteria).
- Ecological Investigation Levels (EIL) for aged contaminants Urban Residential and Public Open Space.
- Ecological Screening Levels (ESL) for Urban Residential and Public Open Space based on fine texture.
- EIL criteria was derived based on conservative physicochemical properties for pH, cation exchange capacity (CEC) and clay content. The values used for determining the EILs are summarised in **Table 6** below (**Table 1, Appendix B**).
- Health Based Investigation Levels for Residential Sites for asbestos where:
 - 0.01 %w/wt asbestos for ACM
 - 0.001 %w/wt asbestos for asbestos fines (AF) and fibrous asbestos (FA).

It is noted that the laboratory limit of reporting for the NATA accredited analytical method is 0.01 %w/wt which is greater than the adopted criteria of 0.001 %w/wt for AF and FA. Therefore, where asbestos is detected at trace concentrations in the soil, it will be assumed that asbestos exceeds the criterion value.

Table 6: Physicochemical values used in this investigation

Physicochemical Property	Unit	Sample LC32 0.5-0.6
pH	pH Unit	5.5
CEC	meq / 100g	5.5
Clay content	% w / w	10

The EIL criteria was calculated using the ASC NEPM 2013 EIL Interactive (Excel) Calculation Spreadsheet using values for aged contaminants. The results of the EIL calculations are presented in **Appendix H**.

The criteria are presented in **Table 7** below.

Table 7: Soil Assessment Criteria

Contaminant Group	HIL/HSL – A (mg/kg)	EIL – Urban Residential and Public Open Space (mg/kg)	ESL-Urban Residential and Public Open Space (mg/kg)
Heavy Metals			
Arsenic	100	100	-
Cadmium	20	-	-
Chromium (III)	100	410	-
Copper	6,000	120	-
Lead	300	1,100	-
Nickel	400	45	-
Zinc	7,400	270	-
Mercury	40	-	-
TRH and BTEX			
TRH C ₆ -C ₁₀ – BTEX (F1)	45	-	180
TRH >C ₁₀ -C ₁₆ – Naphthalene (F2)	110	-	120
TRH >C ₁₆ -C ₃₄ (F3)	-	-	300
TRH >C ₃₄ -C ₄₀ (F4)	-	-	2800
Benzene	0.5	-	50
Toluene	160	-	85
Ethylbenzene	55	-	70
Xylenes	40	-	105
OCP/OPP			
Heptachlor		-	-
Aldrin			
Endosulfan			
Chlordane			
Dieldrin			
Endrin			

Contaminant Group	HIL/HSL – A (mg/kg)	EIL – Urban Residential and Public Open Space (mg/kg)	ESL-Urban Residential and Public Open Space (mg/kg)
DDT+DDE+DDD	180		
Methoxychlor	300		
Mirex	10		
Chlorpyrifos	160		
Phenols			
Phenol	3000	-	-
Total Cresol	400		
Pentachlorophenol	100		
PAHs			
Total PAH	300	-	-
Benzo(a)pyrene	-	-	0.7
Carcinogenic PAHs as B(a)P TEQ	3	-	-
Naphthalene	3	170	-
PCBs			
Total PCBs	1	-	-
Asbestos			
Bonded ACM	0.01%	-	-
FA and AF (friable asbestos)	0.001%	-	-
All forms of asbestos	Not visible at surface	-	-

8. Sampling, Analysis and Quality Plan

Details of the sampling and analytical plan adopted to meet the project objectives are presented in the following sections.

9.1 Chronology of Events

The chronology of key project events is summarised in **Table 8** below:

Table 8: *Summary of the Chronology of Works*

Date	Event
04 November 2021	Site visit and sample collection
16 November 2021	Receipt of Sample Results
8 December 2021	Issue of PSI report to the client.

9.2 Sampling Plan

Two (2) soil sample locations were selected from around the shearing shed. The first sample was collected adjacent to the 200 L drum located beneath the ramp on the western side of the shearing shed, while the second sample was located adjacent to the southwestern corner of the shed. It was inferred that any contaminants from beneath the shed would migrate to the south-western corner of the building.

The soil sampling locations are presented in **Figure 4, Appendix A**.

9.3 Analytical Plan

From the samples collected across the site, the analytical plan presented in **Table 9** was executed to assess the identified COPCs.

Table 9: *Analytical plan for the investigation*

Sample Type	TRH	BTEX	PAH	OCP/OPP	Phenols	PCBs	Heavy Metals	Asbestos
Primary	2	2	2	2	2	2	2	2
Duplicate (QA/QC)	1	1	1	1	1	1	1	0
Triplicate (QA/QC)	0	0	0	0	0	0	0	0

9. Methods

A suitably qualified environmental scientist was mobilised to the site with appropriate equipment to undertake the soil investigation required. Methodology as below:

- Samples were collected close to the surface from 0.0 m to 0.3 m bgl with the aid of a shovel.
- Single-use disposable nitrile gloves were used to extract the samples from each sampling location to prevent cross-contamination.
- Samples were collected directly from the shovel.
- Samples were placed in a laboratory prepared 250 millilitre (mL) glass jar with a Teflon lined screw top lid and zip lock bags for asbestos analysis. Details of the sample, including project number, sample number, sample depth and date of the sample were written on each sample container.
- Each soil sample was described in general accordance with the Unified Soil Classification System (USCS) and details of any discolouration, staining, odours or other indicators of contamination noted.
- Each sample was field screened with a PID for volatile organic compounds (VOCs).
- Samples were immediately placed and stored in an ice-filled esky to keep them chilled. Samples were transported to a NATA accredited laboratory with the signed chain of custody (COC) form with the required analysis (**Appendix C**).

10. Quality Assurance / Quality Control (QA / QC)

11.1 Field Quality Assurance / Quality Control

Field duplicate and field triplicate samples were collected for calculating the relative percent difference (RPD) and assess the precision and accuracy of the laboratory. An RPD of less than 50% is considered acceptable where the analyte concentration is greater than five (5) times the laboratory LOR. Should the RPD be greater than 50%, then further investigation as to the reason for high RPD would occur.

The duplicate sample (QC1) was collected with primary sample LC1.

The calculated RPDs of the duplicate sample for detectable concentrations of COPCs was less than 50% for all analytes excepting copper with an RPD of 51%. This exceedance is attributed to sample heterogeneity and does not compromise the outcome of this investigation.

11.2 Laboratory Quality Assurance / Quality Control

A review of the laboratory QA/QC data is summarised below.

Holding Times

The extraction and analysis dates of samples were noted to be outside of holding times. A review of the COC indicated that an incorrect date of 1 October 2021 was on the listed, however the samples were collected on 4 November 2021 while the samples were extracted on 12 November and analysed on 15 November 2021. Therefore all holding times were within their tolerable ranges.

Laboratory Accreditation

All analysis was performed in NATA accredited laboratory as follow:

- **Primary Laboratory:** SGS Australia Pty Ltd (NATA accreditation No. 2562)

Surrogate and Spike Recoveries

All surrogate recoveries were within the tolerable limits.

All matrix spike recoveries were within the tolerable limits.

Laboratory Control Sample Results

All laboratory control sample results were within the tolerable limits.

Laboratory Duplicate Results

The duplicate sample RPDs were within the tolerable range for all samples except for the ones listed below.

Table 10: Duplicate Results that Exceed the Laboratory QA/QC criteria.

Primary	Duplicate	Analyte	Recovery (%)	Laboratory Comment
SE225619.003	LB236904.024	Lead	53	Failed due to sample heterogeneity

Based on the information provided by the laboratory, the RPD exceedances for the above analytes were due to sample heterogeneity. However, based on the nature of the site and the overall low concentrations of lead found within the site, the RPD failed acceptance criteria do not alter the outcome of this investigation.

Laboratory Blank Results

All method laboratory blanks were below the laboratory LOR and therefore within tolerable limits.

11. Results

The findings from site inspection and laboratory analytical results of the investigation are presented in the following sections.

12.1 Visual Observations / Field Measurements

The shearing shed is constructed with timber and galvanised metal sheeting. To the west of the shed, a stockpile of metal products including 200 L drums, wire fencing and gates were present. No evidence of chemical contamination were noted.

A description of the samples collected across the site are given in **Table 11**.

Table 11: Summary of soil materials sampled across the site

Borehole	Depth (m)	Type	Soil Description	Observations
SS1	0.0-0.1	Natural	Sandy clayey silt, brown, dry, soft.	Sample collected from adjacent to the 200 L drum labelled Epoxy Resin. Sample location was exposed soil.
SS2	0.0-0.1	Natural	Sandy clayey silt, brown, dry, soft.	Sample collected from the base of the shed wall in the southwestern corner of the building. Sample location was exposed soil.

12.2 Analytical Results

Two (2) primary soil samples were collected for analysis. A summary of the analytical results is presented in **Table 1**, **Appendix B**, while copies of the laboratory reports, sample receipt and COCs are presented in **Appendix C**.

BTEX and PAH

Concentrations of BTEX and PAH compounds were below the laboratory limit of reporting (LOR) and therefore below the adopted assessment criteria.

TRH

Concentrations of TRH were above the laboratory LOR for sample SS1 where TRH >C₁₆-C₃₄ (F3) was 170 mg/kg which is below the ESL criteria for F3 (300 mg/kg).

Heavy Metals

Heavy metals were detected above the laboratory LOR in each sample, although with the exception of zinc, the metals concentrations were below the adopted criteria.

The concentration of zinc was 1,300 mg/kg in sample SS1 and 730 mg/kg in sample SS2. Both of these concentrations were below the adopted HIL A criteria (7,400 mg/kg), however the both exceeded the EIL criteria.

The source of the zinc is attributed to the galvanised metal sheeting (whereby the galvanising is zinc a zinc coating) which has deteriorated over time and resulted in the zinc in soil.

Asbestos

No pieces of cement sheet that may contain asbestos were observed while sampling and no traces of asbestos fibres were detected in any of the samples.

12. Discussion

Based on the results of the investigation, no significant sources of contamination that may compromise the suitability of the site were detected. While no major sources of contamination were noted, the following areas will require further action:

- The soil around the shearing shed that has been impacted with zinc will require further assessment and remediation after the shed has been demolished. The source of the zinc was attributed to the deterioration of the zinc galvanised coating of the metal sheets used in the shed construction and it is anticipated that the zinc is restricted to the immediate vicinity of the shed.
- While no sampling was conducted around the former hay shed, its construction was noted to be similar to the shearing shed and therefore it is possible that elevated concentrations of zinc may also be around the perimeter of the hay shed.
- The tyres located in the central section of the site should be removed and disposed to a suitably licensed landfill.
- The abandoned car and other metal objects should be removed from the site.

In addition to the above, it is possible that other activities that are associated with agricultural land uses may have been conducted on the site (e.g. use of carcass pits for disposal of dead stock). While there are no records or evidence of these activities, the size of the site makes it difficult to eliminate the possibility of other activities that may introduce contaminants within the site. Therefore an unexpected finds protocol (UFP) should be prepared and implemented during any future constructions.

13. Conclusions and Recommendations

Lanterra was engaged by Cardno to complete a phase 1 preliminary site investigation (PSI) Lot 190 DP756727 and Lot 5 DP529579, Kalkite, NSW (herein referred to as the Site) located at 56 Hilddowns Road, Kalkite NSW.

The site is zoned RU1 – Primary Production under the Snowy River Local Environment Management Plan 2013 and has an estimated area of 798,500 square metres (m²). The site is currently a rural property with a homestead and hay shed and historical shearing shed.

A masterplan for the site has been prepared which proposes a possible mixed residential and community space development. The objective of the PSI was to assess the potential risk of contamination across the site that may affect its suitability for development of the site in accordance with the masterplan.

One (AEC) was identified in the vicinity of the shearing shed based on the storage of chemicals. The COPCs assessed were as follows:

- Total recoverable hydrocarbons (TRH)
- Benzene, toluene, ethylbenzene, xylene (BTEX)
- Polycyclic aromatic hydrocarbons (PAH)
- Polychlorinated biphenyls (PCBs)
- Phenols
- Organochlorine pesticides/organophosphorus pesticides (OCP/OPPs)
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
- Asbestos

Results of samples collected from around the shearing shed identified traces of dieldrin and DDT below the adopted HIL A criteria.

The concentration of zinc was recorded at a maximum concentration of 1,300 mg/kg from around the base of the shearing shed, which exceeds the EIL criterion. The source of the zinc was attributed to the galvanised metal sheeting used in the shed construction. Based on the similar construction of the hay shed, it is possible that the soil around the perimeter of the hay shed may also contain elevated concentrations of zinc.

Overall, the majority of the site is suitable for the proposed large lot residential with a neighbourhood centre and community space. Remedial works to remove zinc impacted soil from around the shearing shed and possibly around the hay shed will be required should the site be redeveloped. After the demolition of these structures, validation of the underlying soil will be required.

Lanterra recommends the following:

- After the shearing and hay sheds have been demolished, validation sampling of the soil beneath the sheds should be completed to assess whether the soil is suitable for the proposed land uses.
- The tyres located in the central portion of the site are to be removed and disposed to a suitably licensed landfill.

- An unexpected finds protocol (UFP) to manage any unexpected occurrences of contamination should they be encountered during development of the site (including building demolition) should be prepared prior to any earthworks commencing.

14. References

Department of Urban Affairs and Planning (1998) Managing Land Contamination Planning Guidelines SEPP 55 – Remediation of Land

National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013)

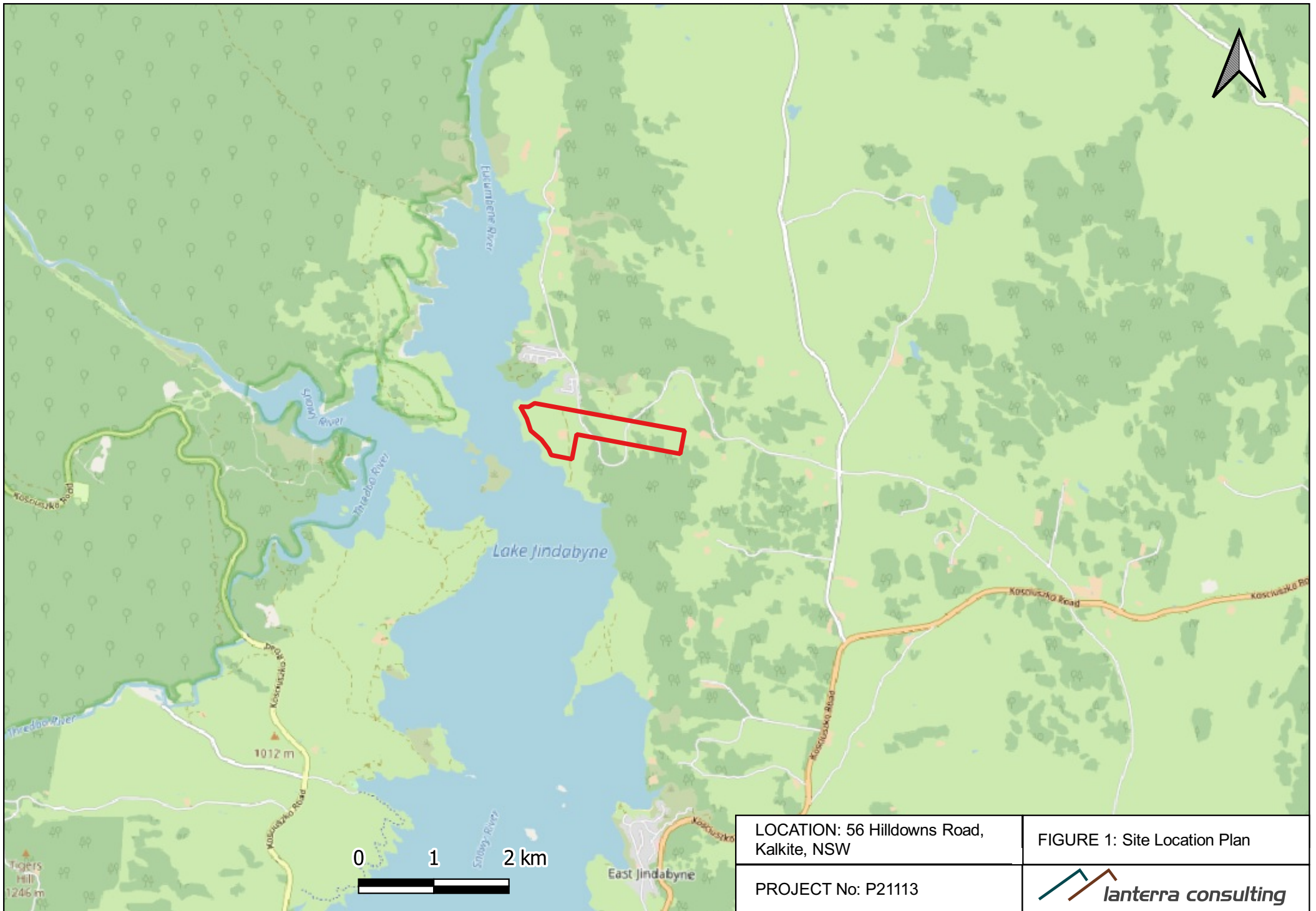
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NSW EPA (1995) Sampling Design Guidelines (1995)

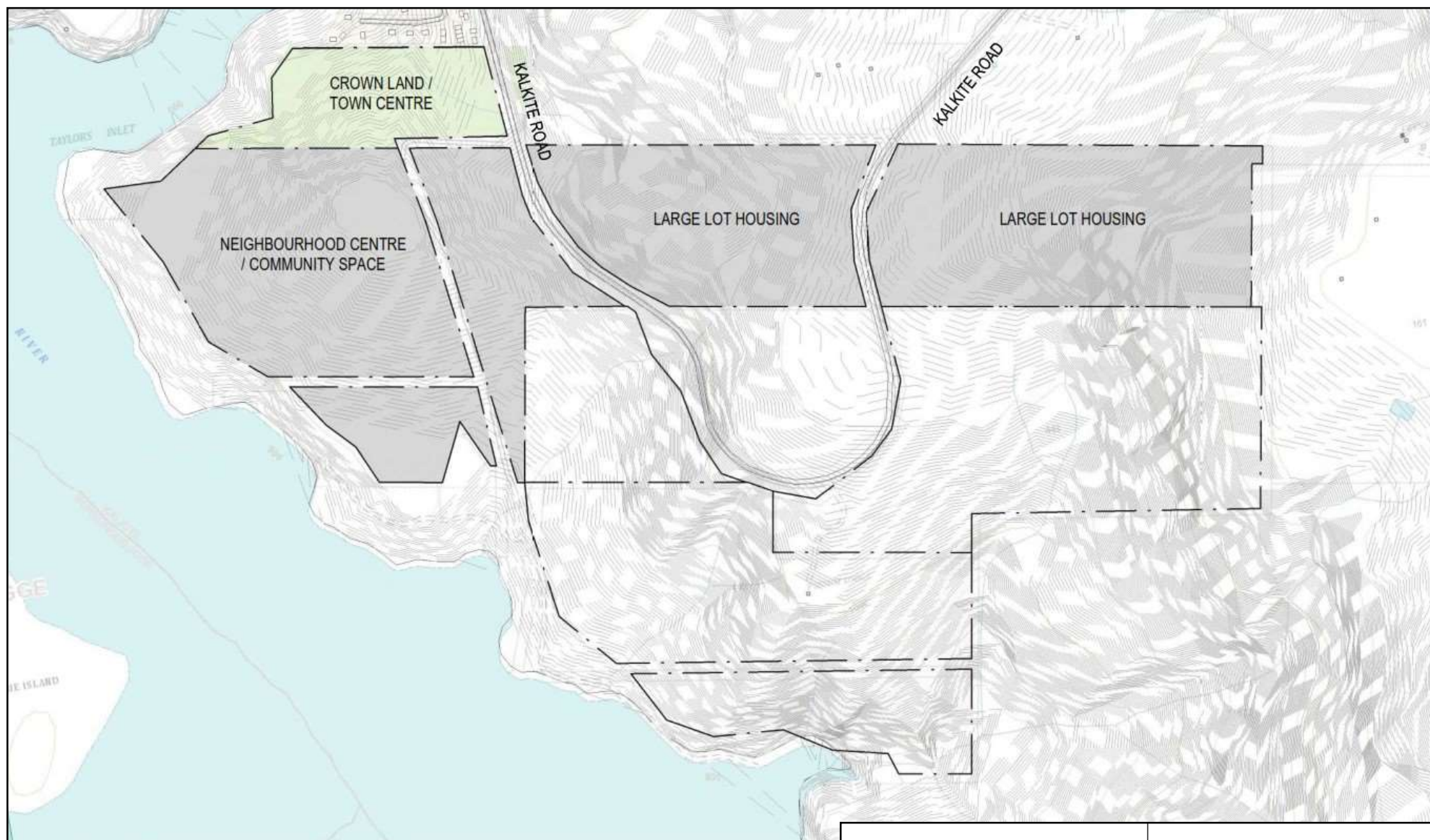
NSW EPA (2020) Contaminated Land Guidelines - Consultants Reporting on Contaminated Land

Standards Australia (2005). Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds AS4482.1 (2005) and Part 2: Volatile substances, AS4482.2 (2005).

Figures







Location: 65 Hilddowns Road,
Kalkite

Figure 3: Proposed Land Uses

Project No: P21113





Analytical Summary Table

P21113 - Preliminary Site Investigation, 56 Hilldowns Road, Kalkite, ACT

Table 1: Analytical Results

Method_Type	ChemName	Units	EQL	ASC NEPM (2013) EI/ESL Urban Residential and Public Open Space	ASC NEPM (2013) HSL A (mg/kg) 0.0- 1.0m/1.0-2.0m/2.0- 4.0m	Field_ID	SS1	QC1	RPD	SS2
						Depth m	0.2			0.2
						Sampled-date	4/11/2021	4/11/2021		4/11/2021
						Fill/Natural				
						HIL A				
Metals in soil	Arsenic, As	mg/kg	1	100		100	2	2	0%	2
	Cadmium, Cd	mg/kg	0.3			20	0.5	0.4	0%	1.1
	Chromium, Cr	mg/kg	0.3	490		100	5	5.3	6%	5
	Copper, Cu	mg/kg	0.5	180		6000	16	27	51%	6
	Lead, Pb	mg/kg	1	1100		300	62	59	5%	14
	Nickel, Ni	mg/kg	0.5	120		400	3.1	3.2	3%	2.6
	Zinc, Zn	mg/kg	2	430		7400	1300	1300	0%	730
	Mercury	mg/kg	0.05			40	<0.05	<0.05	0%	<0.05
Organochlorine Pesticides	Hexachlorobenzene (HCB)	mg/kg	0.1			10	<0.1	<0.1	0%	<0.1
	Alpha BHC	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Lindane	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Heptachlor	mg/kg	0.1			6	<0.1	<0.1	0%	<0.1
	Aldrin	mg/kg	0.1			6	<0.1	<0.1	0%	<0.1
	Beta BHC	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Delta BHC	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Heptachlor epoxide	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	o,p'-DDE	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Alpha Endosulfan	mg/kg	0.2			270	<0.2	<0.2	0%	<0.2
	Gamma Chlordane	mg/kg	0.1			50	<0.1	<0.1	0%	<0.1
	Alpha Chlordane	mg/kg	0.1			50	<0.1	<0.1	0%	<0.1
	trans-Nonachlor	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	p,p'-DDE	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Dieldrin	mg/kg	0.2			6	0.2	0.2	0%	<0.2
	Endrin	mg/kg	0.2			10	<0.2	<0.2	0%	<0.2
	o,p'-DDD	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	o,p'-DDT	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Beta Endosulfan	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	p,p'-DDD	mg/kg	0.1			240	<0.1	<0.1	0%	<0.1
	p,p'-DDT	mg/kg	0.1	180		240	0.1	<0.1	0%	<0.1
	Endosulfan sulphate	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Endrin Alderhyde	mg/kg	0.1			10	<0.1	<0.1	0%	<0.1
	Methoxychlor	mg/kg	0.1			300	<0.1	<0.1	0%	<0.1
	Endrin Ketone	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Isodrin	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Mirex	mg/kg	0.1			10	<0.1	<0.1	0%	<0.1
Organophosphorus Pesticides	Dichlorvos	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	Dimethoate	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	Fenitrothion	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Malathion	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2			160	<0.2	<0.2	0%	<0.2
	Parathion-ethyl (Parathion)	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Bromophos Ethyl	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Methidathion	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	Ethion	mg/kg	0.2				<0.2	<0.2	0%	<0.2
PAHs in Soil	Azinhos-methyl (Guthion)	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Naphthalene	mg/kg	0.1	170	5/NL/NL		<0.1	<0.1	0%	<0.1
	2-methylnaphthalene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	1-methylnaphthalene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Acenaphthylene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Acenaphthene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Fluorene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Phenanthrene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Anthracene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Fluoranthene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Pyrene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Benzo(a)anthracene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Chrysene	mg/kg	0.1				<0.1	<0.1	0%	<0.1

P21113 - Preliminary Site Investigation, 56 Hilldowns Road, Kalkite, ACT

Table 1: Analytical Results

Method_Type	ChemName	Units	EQL	ASC NEPM (2013) EIL/ESL Urban Residential and Public Open Space	ASC NEPM (2013) HSL A (mg/kg) 0.0- 1.0m/1.0-2.0m/2.0- 4.0m	Field_ID	SS1	QC1	RPD	SS2
						Depth m	0.2			0.2
						Sampled-date	4/11/2021	4/11/2021		4/11/2021
						Fill/Natural				
						HIL A				
	Benzo(b&j)fluoranthene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1	0.7			<0.1	<0.1	0%	<0.1
	Benzo(a)pyrene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Dibenzo(ah)anthracene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Benzo(ghi)perylene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Carcinogenic PAHs, BaP TEQ <LORe=0	TEQ (mg/kg)	0.2			3	<0.2	<0.2	0%	<0.2
	Carcinogenic PAHs, BaP TEQ <LORe=LORe	TEQ (mg/kg)	0.3			3	<0.3	<0.3	0%	<0.3
	Carcinogenic PAHs, BaP TEQ <LORe=LORe/2	TEQ (mg/kg)	0.2			3	<0.2	<0.2	0%	<0.2
	Total PAH (18)	mg/kg	0.8			300	<0.8	<0.8	0%	<0.8
PCBs in Soil	Arochlor 1016	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1221	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1232	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1242	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1248	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1254	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1260	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1262	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Arochlor 1268	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	Total PCBs (Arochlors)	mg/kg	1			1	<1	<1	0%	<1
TRH Soil C10-C40 NEPM	TRH C10-C14	mg/kg	20				<20	<20	0%	<20
	TRH C15-C28	mg/kg	45			53	53	53	12%	<45
	TRH C29-C36	mg/kg	45			150	110	110	31%	<45
	TRH C37-C40	mg/kg	100				<100	<100	0%	<100
	TRH >C10-C16	mg/kg	25				<25	<25	0%	<25
	TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	120	280/NL/NL		<25	<25	0%	<25
	TRH >C16-C34 (F3)	mg/kg	90	1300		170	140	140	19%	<90
	TRH >C34-C40 (F4)	mg/kg	120	5600			<120	<120	0%	<120
	TRH C10-C36 Total	mg/kg	110			210	160	160	27%	<110
	TRH >C10-C40 Total (F bands)	mg/kg	210				<210	<210	0%	<210
BTEX + VOC	Benzene	mg/kg	0.1	65	0.7/1/2		<0.1	<0.1	0%	<0.1
	Toluene	mg/kg	0.1	105	480/NL/NL/NL		<0.1	<0.1	0%	<0.1
	Ethylbenzene	mg/kg	0.1	125	NL/NL/NL		<0.1	<0.1	0%	<0.1
	m/p-xylene	mg/kg	0.2				<0.2	<0.2	0%	<0.2
	o-xylene	mg/kg	0.1				<0.1	<0.1	0%	<0.1
	Total Xylenes	mg/kg	0.3	45	110/310/NL		<0.3	<0.3	0%	<0.3
	Total BTEX	mg/kg	0.6				<0.6	<0.6	0%	<0.6
	Benzene (F0)	mg/kg	20		0.7/1/2		<0.1	<0.1	0%	<0.1
	TRH C6-C9	mg/kg	0.1				<20	<20	0%	<20
	TRH C6-C10	mg/kg	25				<25	<25	0%	<25
Speciated Phenol	TRH C6-C10 minus BTEX (F1)	mg/kg	25	180	50/90/150		<25	<25	0%	<25
	Phenol	mg/kg	0.5			3000	<0.5	<0.5	0%	<0.5
	2-methyl phenol (o-cresol)	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	3/4-methyl phenol (m/p-cresol)	mg/kg	1				<1	<1	0%	<1
	Total Cresol	mg/kg	1.5			400	<1.5	<1.5	0%	<1.5
	2-chlorophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2,4-dimethylphenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2,6-dichlorophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2,4-dichlorophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2,4,6-trichlorophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2-nitrophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	4-nitrophenol	mg/kg	1				<1	<1	0%	<1
	2,4,5-trichlorophenol	mg/kg	0.5				<0.5	<0.5	0%	<0.5
	2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1				<1	<1	0%	<1
	Pentachlorophenol	mg/kg	0.5			100	<0.5	<0.5	0%	<0.5
	2,4-dinitrophenol	mg/kg	2				<2	<2	0%	<2
Asbestos	4-chloro-3-methylphenol	mg/kg	2				<2	<2	0%	<2
	Asbestos Detected	No unit	0				No	N.A.	-	No
	Estimated Fibres	%w/w	0.01				<0.01	N.A.	-	<0.01

Laboratory Report

CLIENT DETAILS

Contact Chris Gunton
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Project **P21113 - Kalkite**
Order Number **P21113**
Samples 3

LABORATORY DETAILS

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SGS Reference **SE225619 R0**
Date Received 9/11/2021
Date Reported 16/11/2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

A portion of the sample supplied has been sub-sampled for asbestos analysis in soil according to SGS In-house procedures.

We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied.

SGS Industries and Environment recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES



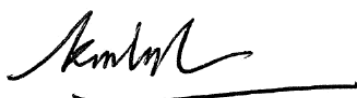
Akheeque BENIAEMEEN
Chemist



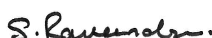
Bennet LO
Senior Chemist



Dong LIANG
Metals/Inorganics Team Leader



Ly Kim HA
Organic Section Head



Ravee SIVASUBRAMANIAM
Hygiene Team Leader



Shane MCDERMOTT
Inorganic/Metals Chemist



ANALYTICAL RESULTS

SE225619 R0

VOC's in Soil [AN433] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1
Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL	SOIL	SOIL
			-	-	-
			1/10/2021 SE225619.001	1/10/2021 SE225619.002	1/10/2021 SE225619.003
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C9	mg/kg	20	<20	<20	<20
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
TRH C10-C14	mg/kg	20	<20	<20	<20
TRH C15-C28	mg/kg	45	53	<45	47
TRH C29-C36	mg/kg	45	150	<45	110
TRH C37-C40	mg/kg	100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	170	<90	140
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	210	<110	160
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

Speciated Phenols in Soil [AN420] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Phenol	mg/kg	0.5	<0.5	<0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	<1
Total Cresol	mg/kg	1.5	<1.5	<1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5
4-nitrophenol	mg/kg	1	<1	<1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	<1
Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
2,4-dinitrophenol	mg/kg	2	<2	<2	<2
4-chloro-3-methylphenol	mg/kg	2	<2	<2	<2

OC Pesticides in Soil [AN420] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	0.2	<0.2	0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1
Total OC VIC EPA	mg/kg	1	<1	<1	<1

OP Pesticides in Soil [AN420] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7

PCBs in Soil [AN420] Tested: 9/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 12/11/2021

PARAMETER	UOM	LOR	SS1	SS2	QC1
			SOIL - 1/10/2021 SE225619.001	SOIL - 1/10/2021 SE225619.002	SOIL - 1/10/2021 SE225619.003
Arsenic, As	mg/kg	1	2	2	2
Cadmium, Cd	mg/kg	0.3	0.5	1.1	0.4
Chromium, Cr	mg/kg	0.5	5.0	5.0	5.3
Copper, Cu	mg/kg	0.5	16	6.0	27
Lead, Pb	mg/kg	1	62	14	59
Nickel, Ni	mg/kg	0.5	3.1	2.6	3.2
Zinc, Zn	mg/kg	2	1300	730	1300

Mercury in Soil [AN312] Tested: 12/11/2021

			SS1	SS2	QC1
			SOIL	SOIL	SOIL
			-	-	-
			1/10/2021	1/10/2021	1/10/2021
			SE225619.001	SE225619.002	SE225619.003
PARAMETER	UOM	LOR			
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05

Moisture Content [AN002] Tested: 11/11/2021

			SS1	SS2	QC1
			SOIL	SOIL	SOIL
			-	-	-
			1/10/2021	1/10/2021	1/10/2021
			SE225619.001	SE225619.002	SE225619.003
PARAMETER	UOM	LOR			
% Moisture	%w/w	1	10.8	12.8	11.3

Fibre Identification in soil [AN602] Tested: 15/11/2021

			SS1	SS2
			SOIL	SOIL
			-	-
			1/10/2021	1/10/2021
			SE225619.001	SE225619.002
PARAMETER	UOM	LOR		
Asbestos Detected	No unit	-	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01

METHOD

METHODOLOGY SUMMARY

AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic 'clues', which provide a reasonable degree of certainty, dispersion staining is a mandatory 'clue' for positive identification. If sufficient 'clues' are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocally identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

AN602

The sample can be reported "no asbestos found at the reporting limit (RL) of 0.1 g/kg" (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if-

- (a) no trace asbestos fibres have been detected (i.e. no 'respirable' fibres);
- (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg; and
- (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
		IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
***	Indicates that both * and ** apply.	LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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STATEMENT OF QA/QC PERFORMANCE

SE225619 R0

CLIENT DETAILS

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Project **P21113 - Kalkite**
Order Number **P21113**
Samples 3

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SGS Reference **SE225619 R0**
Date Received 09 Nov 2021
Date Reported 16 Nov 2021

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.

This QA/QC Statement must be read in conjunction with the referenced Analytical Report.

The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Mercury in Soil	3 items
	Moisture Content	3 items
	OC Pesticides in Soil	3 items
	OP Pesticides in Soil	3 items
	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	3 items
	PCBs in Soil	3 items
	Speciated Phenols in Soil	3 items
	TRH (Total Recoverable Hydrocarbons) in Soil	3 items
	VOC's in Soil	3 items
Analysis Date	Mercury in Soil	3 items
	VOC's in Soil	4 items
	Volatile Petroleum Hydrocarbons in Soil	7 items
Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	1 item

There are more than 15 quality objective exceedences. Please see report for details

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	9/11/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	18.3°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236984	01 Oct 2021	09 Nov 2021	01 Oct 2022	15 Nov 2021	01 Oct 2022	16 Nov 2021
SS2	SE225619.002	LB236984	01 Oct 2021	09 Nov 2021	01 Oct 2022	15 Nov 2021	01 Oct 2022	16 Nov 2021

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236911	01 Oct 2021	09 Nov 2021	29 Oct 2021	12 Nov 2021†	29 Oct 2021	15 Nov 2021†
SS2	SE225619.002	LB236911	01 Oct 2021	09 Nov 2021	29 Oct 2021	12 Nov 2021†	29 Oct 2021	15 Nov 2021†
QC1	SE225619.003	LB236911	01 Oct 2021	09 Nov 2021	29 Oct 2021	12 Nov 2021†	29 Oct 2021	15 Nov 2021†

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236843	01 Oct 2021	09 Nov 2021	15 Oct 2021	11 Nov 2021†	16 Nov 2021	15 Nov 2021
SS2	SE225619.002	LB236843	01 Oct 2021	09 Nov 2021	15 Oct 2021	11 Nov 2021†	16 Nov 2021	15 Nov 2021
QC1	SE225619.003	LB236843	01 Oct 2021	09 Nov 2021	15 Oct 2021	11 Nov 2021†	16 Nov 2021	15 Nov 2021

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236904	01 Oct 2021	09 Nov 2021	30 Mar 2022	12 Nov 2021	30 Mar 2022	15 Nov 2021
SS2	SE225619.002	LB236904	01 Oct 2021	09 Nov 2021	30 Mar 2022	12 Nov 2021	30 Mar 2022	15 Nov 2021
QC1	SE225619.003	LB236904	01 Oct 2021	09 Nov 2021	30 Mar 2022	12 Nov 2021	30 Mar 2022	15 Nov 2021

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
SS2	SE225619.002	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021
QC1	SE225619.003	LB236663	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	19 Dec 2021	15 Nov 2021

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†
SS2	SE225619.002	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†
QC1	SE225619.003	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref
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SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-ENVJAN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE225619.001	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†
SS2	SE225619.002	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†
QC1	SE225619.003	LB236671	01 Oct 2021	09 Nov 2021	15 Oct 2021	09 Nov 2021†	15 Oct 2021	15 Nov 2021†

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	SS1	SE225619.001	%	60 - 130%	91
	SS2	SE225619.002	%	60 - 130%	87
	QC1	SE225619.003	%	60 - 130%	97

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS1	SE225619.001	%	60 - 130%	92
	SS2	SE225619.002	%	60 - 130%	89
	QC1	SE225619.003	%	60 - 130%	85
d14-p-terphenyl (Surrogate)	SS1	SE225619.001	%	60 - 130%	95
	SS2	SE225619.002	%	60 - 130%	97
	QC1	SE225619.003	%	60 - 130%	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS1	SE225619.001	%	70 - 130%	92
	SS2	SE225619.002	%	70 - 130%	89
	QC1	SE225619.003	%	70 - 130%	85
d14-p-terphenyl (Surrogate)	SS1	SE225619.001	%	70 - 130%	95
	SS2	SE225619.002	%	70 - 130%	97
	QC1	SE225619.003	%	70 - 130%	92
d5-nitrobenzene (Surrogate)	SS1	SE225619.001	%	70 - 130%	75
	SS2	SE225619.002	%	70 - 130%	80
	QC1	SE225619.003	%	70 - 130%	77

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	SS1	SE225619.001	%	60 - 130%	91
	SS2	SE225619.002	%	60 - 130%	87
	QC1	SE225619.003	%	60 - 130%	97

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2,4,6-Tribromophenol (Surrogate)	SS1	SE225619.001	%	70 - 130%	73
	SS2	SE225619.002	%	70 - 130%	78
	QC1	SE225619.003	%	70 - 130%	73
d5-phenol (Surrogate)	SS1	SE225619.001	%	50 - 130%	83
	SS2	SE225619.002	%	50 - 130%	87
	QC1	SE225619.003	%	50 - 130%	72

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	SS1	SE225619.001	%	60 - 130%	79
	SS2	SE225619.002	%	60 - 130%	79
	QC1	SE225619.003	%	60 - 130%	81
d4-1,2-dichloroethane (Surrogate)	SS1	SE225619.001	%	60 - 130%	100
	SS2	SE225619.002	%	60 - 130%	101
	QC1	SE225619.003	%	60 - 130%	104
d8-toluene (Surrogate)	SS1	SE225619.001	%	60 - 130%	101
	SS2	SE225619.002	%	60 - 130%	101
	QC1	SE225619.003	%	60 - 130%	105

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	SS1	SE225619.001	%	60 - 130%	79
	SS2	SE225619.002	%	60 - 130%	79
	QC1	SE225619.003	%	60 - 130%	81
d4-1,2-dichloroethane (Surrogate)	SS1	SE225619.001	%	60 - 130%	100
	SS2	SE225619.002	%	60 - 130%	101
	QC1	SE225619.003	%	60 - 130%	104
d8-toluene (Surrogate)	SS1	SE225619.001	%	60 - 130%	101
	SS2	SE225619.002	%	60 - 130%	101
	QC1	SE225619.003	%	60 - 130%	105

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-ENVJAN312

Sample Number	Parameter	Units	LOR	Result
LB236911.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-ENVJAN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
	Alpha BHC	mg/kg	0.1	<0.1
	Lindane	mg/kg	0.1	<0.1
	Heptachlor	mg/kg	0.1	<0.1
	Aldrin	mg/kg	0.1	<0.1
	Beta BHC	mg/kg	0.1	<0.1
	Delta BHC	mg/kg	0.1	<0.1
	Heptachlor epoxide	mg/kg	0.1	<0.1
	Alpha Endosulfan	mg/kg	0.2	<0.2
	Gamma Chlordane	mg/kg	0.1	<0.1
	Alpha Chlordane	mg/kg	0.1	<0.1
	p,p'-DDE	mg/kg	0.1	<0.1
	Dieldrin	mg/kg	0.2	<0.2
	Endrin	mg/kg	0.2	<0.2
	Beta Endosulfan	mg/kg	0.2	<0.2
	p,p'-DDD	mg/kg	0.1	<0.1
	p,p'-DDT	mg/kg	0.1	<0.1
	Endosulfan sulphate	mg/kg	0.1	<0.1
	Endrin Aldehyde	mg/kg	0.1	<0.1
	Methoxychlor	mg/kg	0.1	<0.1
	Endrin Ketone	mg/kg	0.1	<0.1
	Isodrin	mg/kg	0.1	<0.1
	Mirex	mg/kg	0.1	<0.1
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	82

OP Pesticides in Soil

Method: ME-(AU)-ENVJAN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Dichlorvos	mg/kg	0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5	<0.5
	Fenitrothion	mg/kg	0.2	<0.2
	Malathion	mg/kg	0.2	<0.2
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
	Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
	Bromophos Ethyl	mg/kg	0.2	<0.2
	Methidathion	mg/kg	0.5	<0.5
	Ethion	mg/kg	0.2	<0.2
	Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	2-fluorobiphenyl (Surrogate)	%	-	92
Surrogates	d14-p-terphenyl (Surrogate)	%	-	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-ENVJAN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1
	Fluoranthene	mg/kg	0.1	<0.1
	Pyrene	mg/kg	0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1	<0.1
	Chrysene	mg/kg	0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
	Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
	Benzo(ghi)perylene	mg/kg	0.1	<0.1
	Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates			
	d5-nitrobenzene (Surrogate)	%	-	79
	2-fluorobiphenyl (Surrogate)	%	-	92
	d14-p-terphenyl (Surrogate)	%	-	105

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Arochlor 1016	mg/kg	0.2	<0.2
	Arochlor 1221	mg/kg	0.2	<0.2
	Arochlor 1232	mg/kg	0.2	<0.2
	Arochlor 1242	mg/kg	0.2	<0.2
	Arochlor 1248	mg/kg	0.2	<0.2
	Arochlor 1254	mg/kg	0.2	<0.2
	Arochlor 1260	mg/kg	0.2	<0.2
	Arochlor 1262	mg/kg	0.2	<0.2
	Arochlor 1268	mg/kg	0.2	<0.2
	Total PCBs (Arochlors)	mg/kg	1	<1
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	82

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB236663.001	Phenol	mg/kg	0.5	<0.5
	2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5
	3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1
	2-chlorophenol	mg/kg	0.5	<0.5
	2,4-dimethylphenol	mg/kg	0.5	<0.5
	2,6-dichlorophenol	mg/kg	0.5	<0.5
	2,4-dichlorophenol	mg/kg	0.5	<0.5
	2,4,6-trichlorophenol	mg/kg	0.5	<0.5
	2-nitrophenol	mg/kg	0.5	<0.5
	4-nitrophenol	mg/kg	1	<1
	2,4,5-trichlorophenol	mg/kg	0.5	<0.5
	2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1
	Pentachlorophenol	mg/kg	0.5	<0.5
	2,4-dinitrophenol	mg/kg	2	<2
	4-chloro-3-methylphenol	mg/kg	2	<2
	Surrogates			
	2,4,6-Tribromophenol (Surrogate)	%	-	86
	d5-phenol (Surrogate)	%	-	103

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB236904.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB236663.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR
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Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB236671.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene (VOC)	mg/kg	0.1	<0.1
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	107
		d8-toluene (Surrogate)	%	-	106
		Bromofluorobenzene (Surrogate)	%	-	85
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB236671.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	107

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Mercury in Soil

Method: ME-(AU)-ENVJAN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225577.010	LB236911.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE225619.003	LB236911.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

Method: ME-(AU)-ENVJAN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.003	LB236843.011	% Moisture	%w/w	1	3.8	3.9	56	1
SE225622.009	LB236843.018	% Moisture	%w/w	1	17.5	16.3	36	7

OC Pesticides in Soil

Method: ME-(AU)-ENVJAN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.004	LB236663.023	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Lindane	mg/kg	0.1	<0.1	<0.1	200	0
		Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
		Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
		Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
		o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
		p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
		Endrin	mg/kg	0.2	<0.2	<0.2	200	0
		o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
		Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
		Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
		Mirex	mg/kg	0.1	<0.1	<0.1	200	0
		Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Total OC VIC EPA	mg/kg	1	<1	<1	200	0
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.13	30	2	

OP Pesticides in Soil

Method: ME-(AU)-ENVJAN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.004	LB236663.024	Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
		Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
		Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
		Malathion	mg/kg	0.2	<0.2	<0.2	200	0
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
		Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
		Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
		Ethion	mg/kg	0.2	<0.2	<0.2	200	0
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
		Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	0
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
SE225622.009	LB236663.021	Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.009	LB236663.021	Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
		Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
		Malathion	mg/kg	0.2	<0.2	<0.2	200	0
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
		Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
		Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
		Ethion	mg/kg	0.2	<0.2	<0.2	200	0
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
		Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	5
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.004	LB236663.024	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
		Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
		Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
		Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
		Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	2
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	0
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE225622.009	LB236663.021	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
		Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
		Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
		Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.009	LB236663.021	Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates						
		d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.4	30	3
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	5
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.004	LB236663.023	Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
		Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates						
		Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	2

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.004	LB236663.023	Phenol	mg/kg	0.5	<0.5	<0.5	200	0
		2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	200	0
		3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	200	0
		Total Cresol	mg/kg	1.5	<1.5	<1.5	200	0
		2-chlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,4,6-trichlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2-nitrophenol	mg/kg	0.5	<0.5	<0.5	200	0
		4-nitrophenol	mg/kg	1	<1	<1	200	0
		2,4,5-trichlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	200	0
		Pentachlorophenol	mg/kg	0.5	<0.5	<0.5	200	0
		2,4-dinitrophenol	mg/kg	2	<2	<2	200	0
		4-chloro-3-methylphenol	mg/kg	2	<2	<2	200	0
		Surrogates						
		2,4,6-Tribromophenol (Surrogate)	mg/kg	-	3.6	3.6	30	0
		d5-phenol (Surrogate)	mg/kg	-	1.5	1.4	30	10

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225577.010	LB236904.014	Arsenic, As	mg/kg	1	2	2	79	5
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.5	7.8	7.6	37	3
		Copper, Cu	mg/kg	0.5	8.4	8.7	36	3
		Nickel, Ni	mg/kg	0.5	6.6	8.1	37	20
		Lead, Pb	mg/kg	1	14	10	38	29
		Zinc, Zn	mg/kg	2	24	24	38	2
SE225619.003	LB236904.024	Arsenic, As	mg/kg	1	2	2	86	16
		Cadmium, Cd	mg/kg	0.3	0.4	0.5	96	1
		Chromium, Cr	mg/kg	0.5	5.3	4.7	40	13
		Copper, Cu	mg/kg	0.5	27	21	32	22
		Nickel, Ni	mg/kg	0.5	3.2	2.7	47	16
		Lead, Pb	mg/kg	1	59	35	32	53 @
		Zinc, Zn	mg/kg	2	1300	1200	30	3

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.009	LB236663.021	TRH C10-C14	mg/kg	20	<20	<20	200	0
		TRH C15-C28	mg/kg	45	<45	<45	200	0
		TRH C29-C36	mg/kg	45	<45	<45	200	0
		TRH C37-C40	mg/kg	100	<100	<100	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.009	LB236663.021	TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
		TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	mg/kg	25	<25	<25	200	0
		TRH >C10-C16	mg/kg	25	<25	<25	200	0
		TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
		TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
		TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE225622.003	LB236671.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.3	10.9	50	6
			d8-toluene (Surrogate)	mg/kg	-	10.1	10.8	50	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.9	8.5	50	7
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE225622.009	LB236671.021	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.4	9.5	50	1
			d8-toluene (Surrogate)	mg/kg	-	9.2	9.1	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.6	7.6	50	0
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE225622.003	LB236671.014	TRH C6-C10	mg/kg	25	<25	<25	200	0	
		TRH C6-C9	mg/kg	20	<20	<20	200	0	
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.3	10.9	30	6
			d8-toluene (Surrogate)	mg/kg	-	10.1	10.8	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.9	8.5	30	7
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE225622.009	LB236671.021	TRH C6-C10	mg/kg	25	<25	<25	200	0	
		TRH C6-C9	mg/kg	20	<20	<20	200	0	
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.4	9.5	30	1
			d8-toluene (Surrogate)	mg/kg	-	9.2	9.1	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.6	7.6	30	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236911.002	Mercury	mg/kg	0.05	0.23	0.2	70 - 130	113

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236663.002	Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	87
	Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	83
	Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	83
	Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	82
	Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	89
	p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	82
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	0.15	40 - 130	82

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236663.002	Dichlorvos	mg/kg	0.5	1.6	2	60 - 140	82
	Diazinon (Dimpylate)	mg/kg	0.5	1.9	2	60 - 140	96
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	2	60 - 140	98
	Ethion	mg/kg	0.2	1.7	2	60 - 140	83
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	85

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236663.002	Naphthalene	mg/kg	0.1	4.8	4	60 - 140	120
	Acenaphthylene	mg/kg	0.1	4.9	4	60 - 140	123
	Acenaphthene	mg/kg	0.1	4.2	4	60 - 140	106
	Phenanthrene	mg/kg	0.1	4.6	4	60 - 140	115
	Anthracene	mg/kg	0.1	4.2	4	60 - 140	106
	Fluoranthene	mg/kg	0.1	4.3	4	60 - 140	107
	Pyrene	mg/kg	0.1	4.6	4	60 - 140	114
	Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	118
Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	77
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
	d14-p-terphenyl (Surrogate)	ma/ka	-	0.4	0.5	40 - 130	85

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236663.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	77

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB236663.002	Phenol	mg/kg	0.5	1.0	1	70 - 130	96	
	2,4-dichlorophenol	mg/kg	0.5	1.1	1	70 - 130	109	
	2,4,6-trichlorophenol	mg/kg	0.5	0.8	1	70 - 130	84	
	Pentachlorophenol	mg/kg	0.5	0.8	1	70 - 130	77	
	Surrogates	2,4,6-Tribromophenol (Surrogate)	mg/kg	-	4.1	5	40 - 130	82
		d5-phenol (Surrogate)	mg/ka	-	2.0	2	40 - 130	100

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236904.002	Arsenic, As	mg/kg	1	350	318.22	80 - 120	110
	Cadmium, Cd	mg/kg	0.3	5.2	4.81	70 - 130	107
	Chromium, Cr	mg/kg	0.5	38	38.31	80 - 120	100
	Copper, Cu	mg/kg	0.5	320	290	80 - 120	111
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	102
	Lead, Pb	mg/kg	1	97	89.9	80 - 120	108
	Zinc, Zn	mg/kg	2	290	273	80 - 120	105

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR
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Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)
Method: ME-(AU)-[ENV]JAN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236663.002	TRH C10-C14	mg/kg	20	50	40	60 - 140	125
	TRH C15-C28	mg/kg	45	46	40	60 - 140	115
	TRH C29-C36	mg/kg	45	<45	40	60 - 140	83
	TRH F Bands						
	TRH >C10-C16	mg/kg	25	46	40	60 - 140	115
	TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	100
	TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80

VOC's in Soil
Method: ME-(AU)-[ENV]JAN433

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236671.002	Monocyclic						
	Benzene	mg/kg	0.1	4.5	5	60 - 140	90
	Aromatic						
	Toluene	mg/kg	0.1	4.7	5	60 - 140	94
	Ethylbenzene	mg/kg	0.1	5.2	5	60 - 140	104
	m/p-xylene	mg/kg	0.2	11	10	60 - 140	114
	o-xylene	mg/kg	0.1	5.6	5	60 - 140	113
	Surrogates						
	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	11.7	10	70 - 130	117
	d8-toluene (Surrogate)	mg/kg	-	11.5	10	70 - 130	115
	Bromofluorobenzene (Surrogate)	mg/kg	-	8.9	10	70 - 130	89

Volatile Petroleum Hydrocarbons in Soil
Method: ME-(AU)-[ENV]JAN433

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB236671.002	TRH C6-C10	mg/kg	25	72	92.5	60 - 140	78
	TRH C6-C9	mg/kg	20	57	80	60 - 140	71
	Surrogates						
	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	11.7	10	70 - 130	117
	Bromofluorobenzene (Surrogate)	mg/kg	-	8.9	10	70 - 130	89
	VPH F Bands						
	TRH C6-C10 minus BTEX (F1)	mg/kg	25	41	62.5	60 - 140	65

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225577.001	LB236911.004	Mercury	mg/kg	0.05	0.22	<0.05	0.2	103

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
		Lindane	mg/kg	0.1	<0.1	<0.1	-	-
		Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	95
		Aldrin	mg/kg	0.1	0.2	<0.1	0.2	90
		Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
		Delta BHC	mg/kg	0.1	0.2	<0.1	0.2	92
		Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
		o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
		Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
		trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
		p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
		Dieldrin	mg/kg	0.2	0.4	0.2	0.2	89
		Endrin	mg/kg	0.2	0.2	<0.2	0.2	94
		o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
		o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
		Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
		p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
		p,p'-DDT	mg/kg	0.1	0.3	0.1	0.2	96
		Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
		Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
		Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
		Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
		Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
		Mirex	mg/kg	0.1	<0.1	<0.1	-	-
		Total CLP OC Pesticides	mg/kg	1	1	<1	-	-
		Total OC VIC EPA	mg/kg	1	1	<1	-	-
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.14	-	93

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Dichlorvos	mg/kg	0.5	1.7	<0.5	2	83
		Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
		Diazinon (Dimpylate)	mg/kg	0.5	2.0	<0.5	2	98
		Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
		Malathion	mg/kg	0.2	<0.2	<0.2	-	-
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.0	<0.2	2	100
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
		Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
		Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
		Ethion	mg/kg	0.2	1.8	<0.2	2	90
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
		Total OP Pesticides*	mg/kg	1.7	7.4	<1.7	-	-
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	88
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	90

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Naphthalene	mg/kg	0.1	4.6	<0.1	4	115
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	4.7	<0.1	4	118
		Acenaphthene	mg/kg	0.1	4.1	<0.1	4	102
		Fluorene	mg/kg	0.1	<0.1	<0.1	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Phenanthrene	mg/kg	0.1	4.4	<0.1	4	111
		Anthracene	mg/kg	0.1	4.0	<0.1	4	100
		Fluoranthene	mg/kg	0.1	4.2	<0.1	4	104
		Pyrene	mg/kg	0.1	4.4	<0.1	4	110
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
		Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(a)pyrene	mg/kg	0.1	4.3	<0.1	4	108
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
		Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
		Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.5	<0.3	-	-
		Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.4	<0.2	-	-
		Total PAH (18)	mg/kg	0.8	35	<0.8	-	-
		d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	-	78
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	88
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	90

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1260	mg/kg	0.2	0.3	<0.2	0.4	83
		Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
		Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
		Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	93

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	Phenol	mg/kg	0.5	0.8	<0.5	1	78
		2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5	<0.5	-	-
		3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1	<1	-	-
		Total Cresol	mg/kg	1.5	<1.5	<1.5	-	-
		2-chlorophenol	mg/kg	0.5	<0.5	<0.5	-	-
		2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	-	-
		2,6-dichlorophenol	mg/kg	0.5	<0.5	<0.5	-	-
		2,4-dichlorophenol	mg/kg	0.5	1.1	<0.5	1	98
		2,4,6-trichlorophenol	mg/kg	0.5	0.8	<0.5	1	78
		2-nitrophenol	mg/kg	0.5	<0.5	<0.5	-	-
		4-nitrophenol	mg/kg	1	<1	<1	-	-
		2,4,5-trichlorophenol	mg/kg	0.5	0.6	<0.5	-	-
		2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1	<1	-	-
		Pentachlorophenol	mg/kg	0.5	1.0	<0.5	1	101
		2,4-dinitrophenol	mg/kg	2	<2	<2	-	-
		4-chloro-3-methylphenol	mg/kg	2	<2	<2	-	-
		2,4,6-Tribromophenol (Surrogate)	mg/kg	-	3.7	3.6	-	73
		d5-phenol (Surrogate)	mg/kg	-	1.6	1.7	-	81

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225577.001	LB236904.004	Arsenic, As	mg/kg	1	55	2	50	104
		Cadmium, Cd	mg/kg	0.3	44	<0.3	50	89
		Chromium, Cr	mg/kg	0.5	57	8.3	50	97
		Copper, Cu	mg/kg	0.5	65	13	50	105
		Nickel, Ni	mg/kg	0.5	52	5.2	50	94

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225577.001	LB236904.004	Lead, Pb	mg/kg	1	56	7	50	99
		Zinc, Zn	mg/kg	2	74	23	50	103

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236663.004	TRH C10-C14	mg/kg	20	51	<20	40	105
		TRH C15-C28	mg/kg	45	100	53	40	118
		TRH C29-C36	mg/kg	45	150	150	40	5 ☹
		TRH C37-C40	mg/kg	100	<100	<100	-	-
		TRH C10-C36 Total	mg/kg	110	310	210	-	-
		TRH >C10-C40 Total (F bands)	mg/kg	210	240	<210	-	-
	TRH F Bands	TRH >C10-C16	mg/kg	25	45	<25	40	113
		TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	45	<25	-	-
		TRH >C16-C34 (F3)	mg/kg	90	190	170	40	48 ☹
		TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE225619.001	LB236671.004	Monocyclic	Benzene	mg/kg	0.1	4.1	<0.1	5	81
		Aromatic	Toluene	mg/kg	0.1	4.3	<0.1	5	86
			Ethylbenzene	mg/kg	0.1	4.8	<0.1	5	95
			m/p-xylene	mg/kg	0.2	11	<0.2	10	105
			o-xylene	mg/kg	0.1	5.2	<0.1	5	103
			Polycyclic	Naphthalene (VOC)	mg/kg	0.1	<0.1	<0.1	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.6	10.0	10	106
			d8-toluene (Surrogate)	mg/kg	-	10.3	10.1	10	103
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.7	7.9	10	77
		Totals	Total Xylenes	mg/kg	0.3	16	<0.3	-	-
Total BTEX	mg/kg		0.6	29	<0.6	-	-		

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%	
SE225619.001	LB236671.004	TRH C6-C10	mg/kg	25	70	<25	92.5	76	
		TRH C6-C9	mg/kg	20	61	<20	80	76	
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.6	10.0	10	106
			d8-toluene (Surrogate)	mg/kg	-	10.3	10.1	10	103
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.7	7.9	-	77
		VPH F	Benzene (F0)	mg/kg	0.1	4.1	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	41	<25	62.5	66

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here : https://www.sgs.com.au/~media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022_QA_QC_Plan.pdf

- * NATA accreditation does not cover the performance of this service .
- ** Indicative data, theoretical holding time exceeded.
- *** Indicates that both * and ** apply.
- Sample not analysed for this analyte.
- IS Insufficient sample for analysis.
- LNR Sample listed, but not received.
- LOR Limit of reporting.
- QFH QC result is above the upper tolerance.
- QFL QC result is below the lower tolerance.
- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- ⑩ LOR was raised due to high conductivity of the sample (required dilution).
- † Refer to relevant report comments for further information.

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Email: au.samplerreceipt.sydney@sgs.com

CHAIN OF CUSTODY & ANALYSIS REQUEST

Page 1 of 3

Contact Name: Chris Gunton

Facsimile:

Email Results: chris@lanterra.com.au

[illegible]

SGS EHS Sydney COC
SE225619



Received By:

Date/Time	Location	Activity	Notes
10/10/2023 10:00	Room 101	Meeting with Mr. Smith	Discussed project progress
10/10/2023 14:30	Room 202	Training session	Completed module 3
10/11/2023 09:15	Room 101	Meeting with Mr. Jones	Reviewed contract terms
10/11/2023 16:00	Room 303	Workshop	Brainstorming ideas for Q4
10/12/2023 11:45	Room 101	Meeting with Mr. Brown	Finalized action items
10/12/2023 15:30	Room 202	Training session	Completed module 4
10/13/2023 10:30	Room 101	Meeting with Mr. Green	Discussed budget review
10/13/2023 14:00	Room 303	Workshop	Developed new strategy
10/14/2023 09:00	Room 101	Meeting with Mr. White	Reviewed client feedback
10/14/2023 13:15	Room 202	Training session	Completed module 5
10/15/2023 10:45	Room 101	Meeting with Mr. Black	Discussed partnership opportunities
10/15/2023 15:00	Room 303	Workshop	Finalized project plan
10/16/2023 11:00	Room 101	Meeting with Mr. Grey	Reviewed project timeline
10/16/2023 14:45	Room 202	Training session	Completed module 6
10/17/2023 09:30	Room 101	Meeting with Mr. Gold	Discussed future goals
10/17/2023 13:00	Room 303	Workshop	Developed marketing plan
10/18/2023 10:15	Room 101	Meeting with Mr. Silver	Reviewed project status
10/18/2023 14:30	Room 202	Training session	Completed module 7
10/19/2023 11:30	Room 101	Meeting with Mr. Copper	Discussed team performance
10/19/2023 15:45	Room 303	Workshop	Finalized report
10/20/2023 09:45	Room 101	Meeting with Mr. Zinc	Reviewed project outcomes
10/20/2023 13:30	Room 202	Training session	Completed module 8
10/21/2023 10:00	Room 101	Meeting with Mr. Iron	Discussed next steps
10/21/2023 14:15	Room 303	Workshop	Developed action plan
10/22/2023 11:15	Room 101	Meeting with Mr. Steel	Reviewed project results
10/22/2023 15:00	Room 202	Training session	Completed module 9
10/23/2023 09:00	Room 101	Meeting with Mr. Aluminum	Discussed project closure
10/23/2023 13:00	Room 303	Workshop	Finalized all tasks
10/24/2023 10:30	Room 101	Meeting with Mr. Magnesium	Reviewed project success
10/24/2023 14:45	Room 202	Training session	Completed module 10
10/25/2023 11:00	Room 101	Meeting with Mr. Nickel	Discussed future projects
10/25/2023 15:15	Room 303	Workshop	Developed new initiatives
10/26/2023 09:30	Room 101	Meeting with Mr. Cobalt	Reviewed project impact
10/26/2023 13:45	Room 202	Training session	Completed module 11
10/27/2023 10:15	Room 101	Meeting with Mr. Manganese	Discussed project legacy
10/27/2023 14:30	Room 303	Workshop	Finalized all documentation
10/28/2023 11:45	Room 101	Meeting with Mr. Silicon	Reviewed project achievements
10/28/2023 15:30	Room 202	Training session	Completed module 12
10/29/2023 09:00	Room 101	Meeting with Mr. Phosphorus	Discussed project future
10/29/2023 13:15	Room 303	Workshop	Developed long-term vision
10/30/2023 10:45	Room 101	Meeting with Mr. Sulfur	Reviewed project impact
10/30/2023 14:00	Room 202	Training session	Completed module 13
10/31/2023 11:30	Room 101	Meeting with Mr. Chlorine	Discussed project closure
10/31/2023 15:45	Room 303	Workshop	Finalized all tasks
11/01/2023 09:15	Room 101	Meeting with Mr. Fluorine	Reviewed project success
11/01/2023 13:30	Room 202	Training session	Completed module 14
11/02/2023 10:00	Room 101	Meeting with Mr. Neon	Discussed project future
11/02/2023 14:15	Room 303	Workshop	Developed new strategy
11/03/2023 11:45	Room 101	Meeting with Mr. Argon	Reviewed project status
11/03/2023 15:00	Room 202	Training session	Completed module 15
11/04/2023 09:30	Room 101	Meeting with Mr. Krypton	Discussed project outcomes
11/04/2023 13:45	Room 303	Workshop	Finalized all tasks
11/05/2023 10:15	Room 101	Meeting with Mr. Xenon	Reviewed project results
11/05/2023 14:30	Room 202	Training session	Completed module 16
11/06/2023 11:00	Room 101	Meeting with Mr. Radon	Discussed project legacy
11/06/2023 15:15	Room 303	Workshop	Developed long-term vision
11/07/2023 09:00	Room 101	Meeting with Mr. Helium	Reviewed project impact
11/07/2023 13:15	Room 202	Training session	Completed module 17
11/08/2023 10:45	Room 101	Meeting with Mr. Hydrogen	Discussed project future
11/08/2023 14:00	Room 303	Workshop	Finalized all tasks
11/09/2023 11:30	Room 101	Meeting with Mr. Oxygen	Reviewed project success
11/09/2023 15:45	Room 202	Training session	Completed module 18
11/10/2023 09:15	Room 101	Meeting with Mr. Nitrogen	Discussed project future
11/10/2023 13:30	Room 303	Workshop	Developed new strategy
11/11/2023 10:00	Room 101	Meeting with Mr. Carbon	Reviewed project status
11/11/2023 14:15	Room 202	Training session	Completed module 19
11/12/2023 11:45	Room 101	Meeting with Mr. Silicon	Discussed project outcomes
11/12/2023 15:00	Room 303	Workshop</	

Received By:

Date/Time	
-----------	--

Sample Cooler Sealed: Yes/ No

Laboratory Quotation No:

Comments:

CLIENT DETAILS

Contact Chris Gunton
 Client LANTERRA CONSULTING PTY LTD
 Address Unit 13, 71 Leichhardt Street
 Kingston
 ACT 2604

Telephone 0432 324 348
 Facsimile (Not specified)
 Email Chris.Gunton@lanterra.com.au

Project **P21113 - Kalkite**
 Order Number **P21113**
 Samples 2

LABORATORY DETAILS

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 Laboratory SGS Alexandria Environmental
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 Alexandria NSW 2015

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SGS Reference **SE225619 R0**
 Date Received 09 Nov 2021
 Date Reported 16 Nov 2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

A portion of the sample supplied has been sub-sampled for asbestos analysis in soil according to SGS In-house procedures. We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied. SGS Industries and Environment recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES



Akheeque BENIAMEEN
 Chemist



Bennet LO
 Senior Chemist



Ly Kim HA
 Organic Section Head



Ravee SIVASUBRAMANIAM
 Hygiene Team Leader

RESULTS

Fibre Identification in soil

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE225619.001	SS1	Soil	67g Clay,Sand,Soil, Rocks	01 Oct 2021	No Asbestos Found at RL of 0.1g/kg	<0.01
SE225619.002	SS2	Soil	69g Clay,Sand,Soil, Rocks	01 Oct 2021	No Asbestos Found at RL of 0.1g/kg	<0.01

METHOD

METHODOLOGY SUMMARY

AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic 'clues', which provide a reasonable degree of certainty, dispersion staining is a mandatory 'clue' for positive identification. If sufficient 'clues' are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocally identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states: "Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	<p>The sample can be reported "no asbestos found at the reporting limit (RL) of 0.1 g/kg" (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if-</p> <ul style="list-style-type: none"> (a) no trace asbestos fibres have been detected (i.e. no 'respirable' fibres); (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg; and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service.
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.
			***	-	Indicates that both * and ** apply.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.

Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.

Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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SAMPLE RECEIPT ADVICE

SE225619

CLIENT DETAILS

Contact Chris Gunton
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Project **P21113 - Kalkite**
Order Number **P21113**
Samples 3

LABORATORY DETAILS

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Alexandria NSW 2015

Telephone +61 2 8594 0400
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Samples Received Tue 9/11/2021
Report Due Tue 16/11/2021
SGS Reference **SE225619**

SUBMISSION DETAILS

This is to confirm that 3 samples were received on Tuesday 9/11/2021. Results are expected to be ready by COB Tuesday 16/11/2021. Please quote SGS reference SE225619 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Soil
Date documentation received	9/11/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	18.3°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

A separate portion was not supplied for Asbestos analysis. A sub-sample will be used from the jar provided.

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SAMPLE RECEIPT ADVICE

SE225619

CLIENT DETAILS

Client **LANTERRA CONSULTING PTY LTD**

Project **P21113 - Kalkite**

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Speciated Phenols in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	SS1	30	14	26	11	18	10	11	7
002	SS2	30	14	26	11	18	10	11	7
003	QC1	30	14	26	11	18	10	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .



SAMPLE RECEIPT ADVICE

SE225619

CLIENT DETAILS

Client **LANTERRA CONSULTING PTY LTD**

Project **P21113 - Kalkite**

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
001	SS1	2	1	1	7
002	SS2	2	1	1	7
003	QC1	-	1	1	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Site Photographs

Client Name

Cardno

Site Location

56 Hilldowns Road, Kalkite

Project No.

P21113

Photo No.

1.

Date

4/11/2021

Description

View of the Shearing Shed from the west.



Photo No.

2.

Date

4/11/2021

Description



View of the Shearing Shed from the north.



Client Name
Cardno

Site Location
56 Hilldowns Road, Kalkite



Project No.
P21113

Photo No.	Date	
3.	4/11/2021	
Description 200L drum located beneath the ramp of the Shearing Shed where sample SS1 was collected		
4.	4/11/2021	
Description Chemicals (pesticides) stored inside the Shearing Shed.		

Client Name
Cardno

Site Location
56 Hilldowns Road, Kalkite

Project No.
P21113

Photo No.	Date	
5.	4/11/2021	
Description View of the Hay Shed from the southwest		
6.	4/11/2021	
Description View of the Hay Shed from the east.		

Client Name
Cardno

Site Location
56 Hilldowns Road, Kalkite

Project No.
P21113

Photo No.	Date	
7.	4/11/2021	
Description View inside the Hay Shed		
8.	4/11/2021	
Description Abandoned car located in the western section of the site.		

Client Name



Cardno

Site Location

56 Hilldowns Road, Kalkite

Project No.



P21113

Photo No.	Date	
9.	4/11/2021	
Description View of the north western section of the site with the township of Kalkite in the background.		
Photo No.	Date	
10.	4/11/2021	
Description Tyres located in the central portion of the site.		

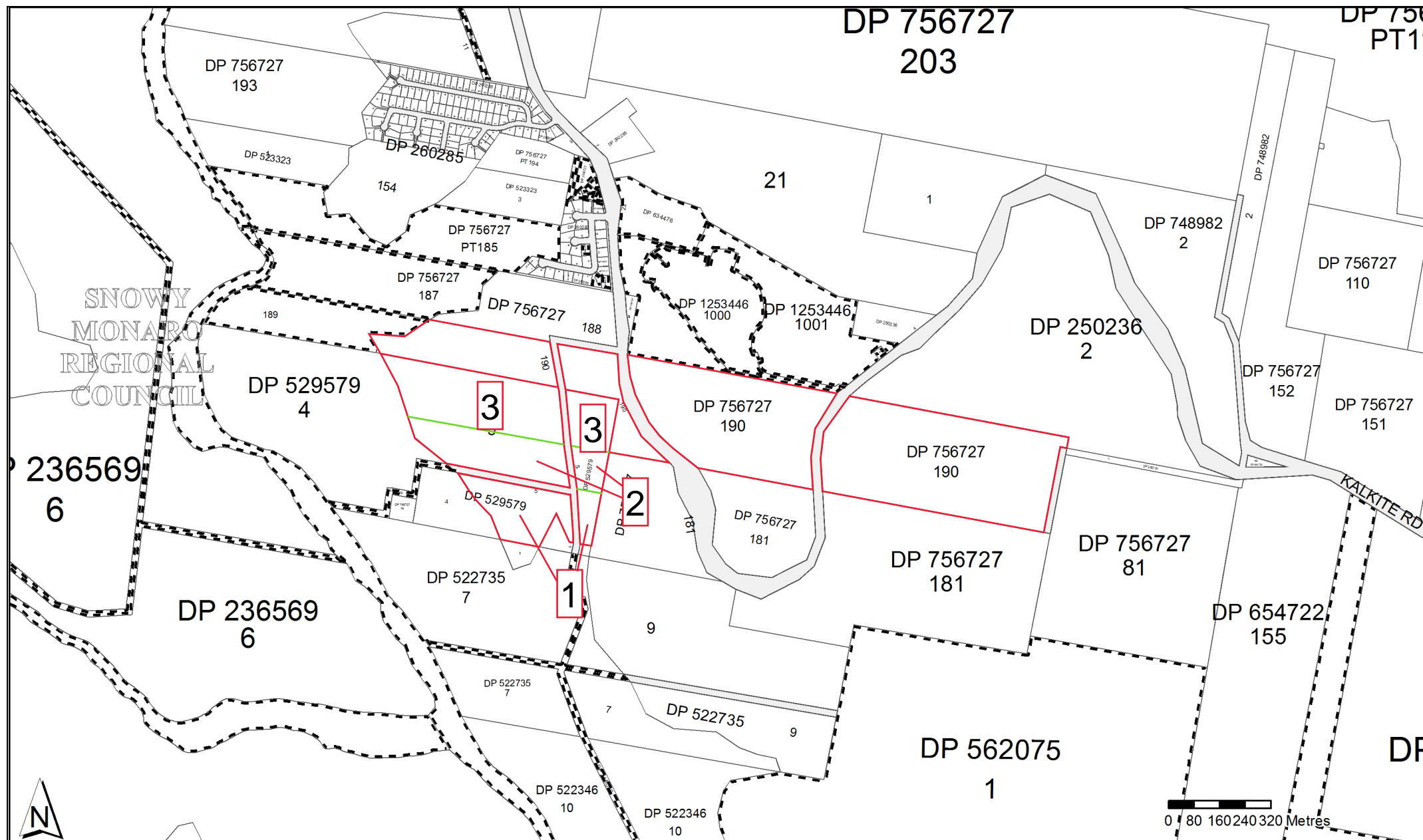
Client Name
Cardno

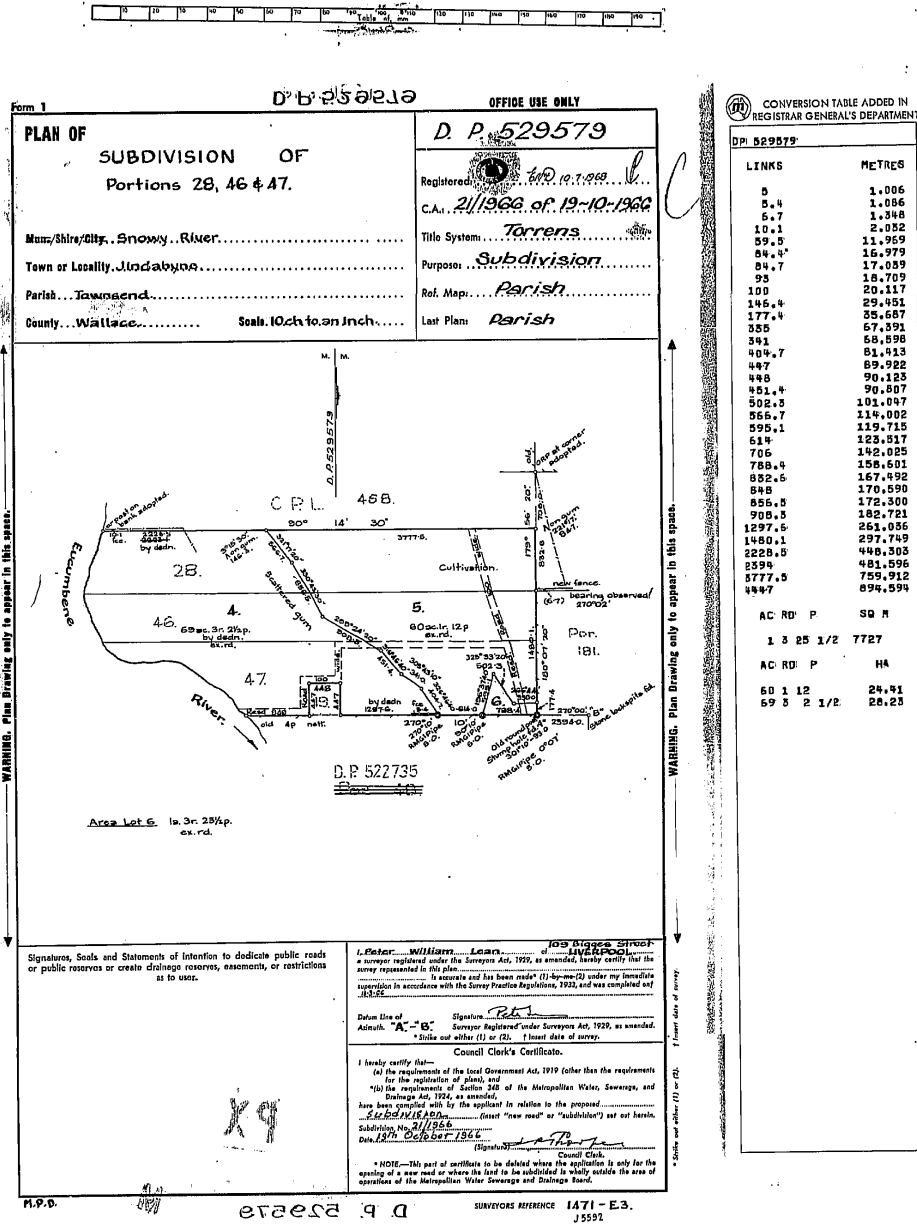
Site Location
56 Hilldowns Road, Kalkite

Project No.
P21113

Photo No.	Date	
11.	20/01/2021	
Description Dam and pump housing with the fallen windmill located in the central section of the site.		
12.	20/01/2021	
Description Excavation located in the central section of the site.		

Land Title Search





I, Jack Hayward Watson, Registrar General for New South Wales, certify that this negative is a photograph made as a permanent record of a document in my custody this 31st day of May, 1976.

Plan of 50 ac^s

Cooma

11.9181

N^o 28 Parish of Townsend
County of Wallace

Applied for under the 13th Section of the Crown Lands Alienation Act of 1861.
by [redacted]

Scale 20 Chains to 1 Inch

NOTE.—In the event of the Conditional Purchase becoming either LAPSED or FORFEITED the plan should be forwarded to the RESERVE BRANCH with a view of including the area in *Kiandra G.F. Extⁿ Procl^d 7th April 64.*



Traverse					
1	301°	500	4	298°	900
2	302°	300	5	297°	800
3	302°16	500	6	298°	320
1300			2220		

PLAN MICROFILMED

NO ADDITIONS OR AMENDMENTS TO BE MADE

Original plan indicates
bank is the portion boundary
(ADDED FOR MICROFILM PURPOSES)

TRADED FOR D.S.O.
10.2.86

645-1604

Marked in accordance with the Regulations

Instrument used *Circumferenter*

Transmitted to the Surveyor General with
my letter N^o 40 of July 31st 1871

James Haylocke
Secy. Survey
645-1604

Reference to Corners.				
Corner	Bearing	From	Links	N ^o on tree
a	267°	Gum	125	28
b	345°15	Gum	79	28
d	330°15	d°	61	28
e	225°	d°	29	28

Date of Survey *July 3rd 71*
Name of Run *Sunderstone*
Value of Improvements *£15.0.0.*

Charter
8th Sep 71
JH

12 Sept 1871

11-9

14
1344

Amended

PLAN OF 82 acres in two blocks

No. 46 and 47 PARISH OF Townsend

COUNTY OF WALLACE.

Applied for under the Clause of the Crown Lands Alienation Act of 1861 by

John Harvey

47. 42 acres measured for sale under the 23rd section of the C.L.A. Act of 1861.

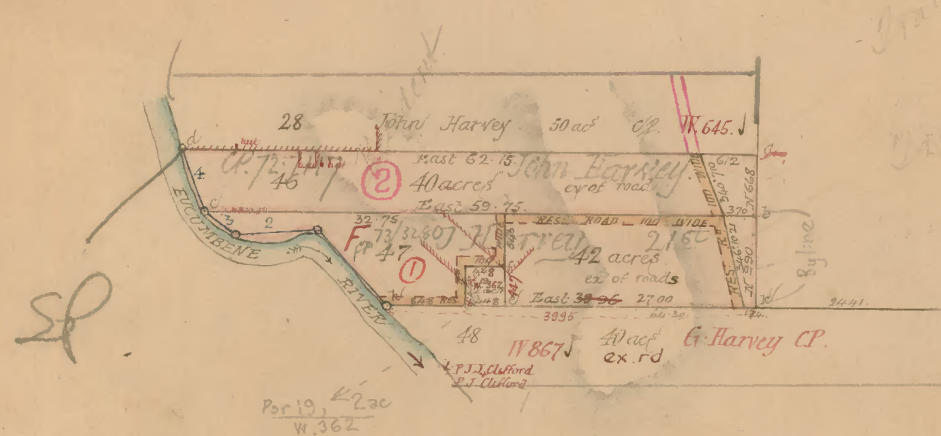
Cancels plan by 73 5447 A.

Sale at Cooma 26th April 1875

Country lot F. Portion 47

Vide Ord 73 23160 above lot withdrawn from sale

NOTE.—In the event of the Conditional Purchase becoming either LAPSED or FORFEITED the plan should be forwarded to the RESERVE BRANCH with a view of including the area in Kiandra G.F. Extn. Procl. 7th April '84.



PLAN MICROFILMED

NO ADDITIONS OR AMENDMENTS TO BE MADE

Original plan indicates
bank is the portion boundary
(ADDED FOR MICROFILM PURPOSES)

Reference to Corners.

Corner	Bearing	From	Links	No. on Tree
a	S 30° E	145741 100	61	28 46
b	E 44° N	145741 100	17	46 47
c	N 15° W	145741 100	31	46 47
d	N 15° W	145741 100	29	28 46
e	N 31° W	145741 100	42	47 48
f	N 59° E	145741 100	33	47 48

Reference to Traverse.

Line	Bearing	Distance
1	317° 15'	11 00
2	266° 15'	09 00
3	305° 45'	04 13
4	340° 15'	07 10

Scale 20 Chains to an Inch.

Marked in accordance with regulations.

Instrument used in Survey. Theodolite.

Date of Survey 26 March 1873

Value of Improvements £ 5

Situated in the Kalkite Run.

929 - 1604

Original Plan Transmitted to the Surveyor-General with my letter of the 10th April 1873 No. 73/15. 50

Jan. 15. 1874. 73/15. 50

P. A. Campbell

MAILED 24 DEC 1873
11-2-86

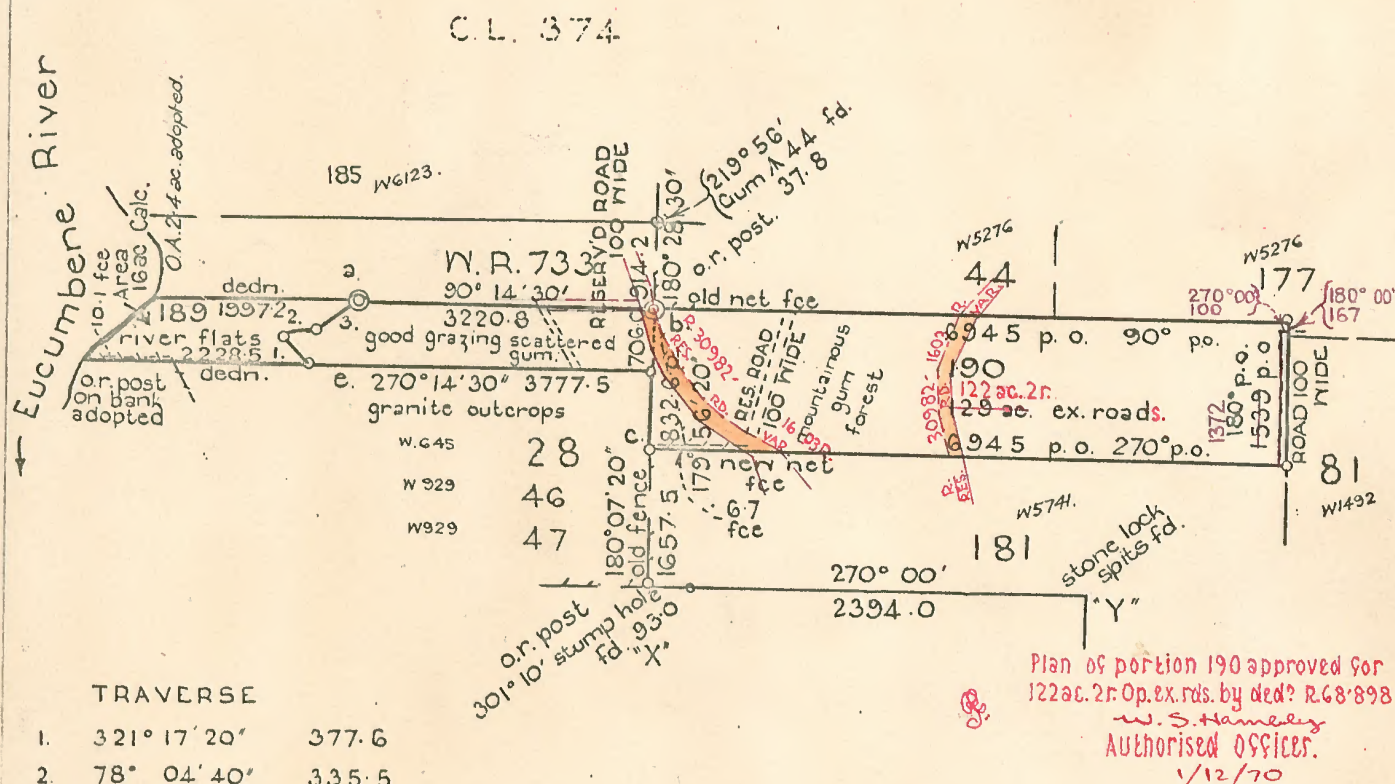
PLAN OF Por. 189 & 190 PARISH TOWNSEND COUNTY WALLACE
LAND DISTRICT COOMA SHIRE SNOWY RIVER

NOTATION PLAN

I, the Officer-in-Charge, General Drafting Branch, CERTIFY that this notation plan is a PHOTOGRAPHIC COPY OF THE ORIGINAL AT DATE OF ITS APPROVAL.

Por. 190: 622.2r. (in 3 pbs.) resumed for road R. 30982-1603 R. Gaz. 10.1.1969. R. 68-898.

DATE 4 Nov '68



I, Peter William Loan of 105 Bigges St., LIVERPOOL a Surveyor registered under the Surveyors Act, 1929-1946, hereby certify that the survey represented in this plan is accurate and has been made under my immediate supervision in accordance with the Survey Practice Regulations, 1933, and the special requirements of the Department of Lands and was completed on 24.3.66

Signature Peter William Loan
Surveyor registered under the Surveyors Act, 1929-1946.

Cancels plan C.P.L. 179 Ca.
Within: Kiandra Gold Field Extension, Proclaimed 7th April, 1884.
Snowy River & tributaries erosion hazard Area, under Sec. 16 S.C. Act, 1938.
Snowy Mountains Area, Proclaimed Commonwealth Gazette 6th May, 1954.
Snowy River Shire Council's Town & Country Planning Scheme Gaz. 7th Sept. 1951.
Portion 189: Pt. C.L. 468, 10th Jan'y 1885, of 150 acres, now C.L. 68-5 of 10th Jan'y 1885, John Thomas Harvey & Richard Vivian Harvey.
Portion 190: Pt. C.L. 468, 10th Jan'y 1885 of 150 acres, John Thomas Harvey & Richard Vivian Harvey, now 129 acres by subdivision.

PAPER NO. LB 68/495 TEN 68/3689

CAT. NO. W6151-1604

NOTATION PLAN

ref: 1471: E2 J5591



Amended Survey
Land District of Cooma

CANCELLED PLAN
To be used for record
purposes only

County of Wallace Parish of Townsend

PLAN OF CONVERTED PRE-LEASE Containing ¹⁵⁰~~150~~ Acres

Measured on the Application of [redacted] *88/179/6a*

Approved Vide Government Gazette dated 11th Aug '85 No. 468.

Within the
Extension of the Kiandra
Gold Field claimed on 1st April
1884. Open to P. under the 45th
Clause of the Act of 1884.

Eucumbene River
W.645
28 J. Harvey
46 J. Harvey
1000 3000 4000
25 Oct 82
6000
5155 1000
90° 00'
stone
SPUR

R.733

Notified

RA. 472

W.6151-1604
886
Robert Williams
240ac
1374
Robert Williams
11 120ac
W.868
10ac
2000
1237 PO
1330

CPL 468

rocky and water

ridge

150ac

81
Robt Harvey
CPL 7510
80ac

BY
first adabync

Value not more than 20% per ac
21803-5419
571 f

Checked and charted
J. E. Bailey
14th Jan '87

PLAN MICROFILMED

NO ADDITIONS OR AMENDMENTS TO BE MADE

Examined
Hayes
12/2/87

plan approved
J. C. Bell
Dist. Sur.
8th June 1887

Azimuth taken from

Reference to Corners

Corner	Bearing	From	Links	N° on Tree
a	267° 0'	Gum	125	28. CPL
b	229° 0'	Gum	29	28
c	330° 15'	Gum	61	28. CPL
d	142° 0'	Gum	15	CPL
e	95° 52'	Gum	55 1/2	CPL
f	159° 11'	Gum	54	CPL

Reference to Traverse

Line	Bearing	Distance
1	227° 16'	262
2	228° 43'	801

I hereby certify that I in person made and on the 9th Dec '86 completed the survey represented on this plan, on which are written the bearings and lengths of the lines measured by me, and I declare that the survey has been executed in accordance with the regulations published for the guidance of Licensed Surveyors, and the practice of the Surveyor General's Department.

179-3021

Value of Improvements Nil
Situating in the

Certified true and correct
Head Office 3rd Aug 1887

(Edmund J. Bailey)
Licensed Surveyor

179-3021

Scale 20 Chains to an Inch

Transmitted to the District Surveyor with my letter of the 31st Dec 86 No 84/96

Cal Book 1882 page 19

CONDITIONAL LEASES.

NOTICE is hereby given that the Conditional Leases particularised in the following Schedule have been brought under the provisions of section 6 of the Crown Lands Act Amendment Act of 1903 (now section 310 of the Crown Lands Consolidation Act, 1913), and the term of the Conditional Leases has been extended to forty years from the date of their commencement.

The rents of the leases have been reappraised in accordance with the provisions of the above section, and determined at the rates per acre stated.

The rents as determined will apply to the leases from the dates mentioned in the Schedule.

Any difference of rent found to be due to the Crown in consequence of such reappraisal must be paid within one month from this date to the Crown Land Agent of the district, or to the State Treasurer.

Any rent paid after the due date will bear interest from the due date, in accordance with the provisions of section 11 of the Crown Lands (Amendment) Act of 1893 (now section 278 of the Crown Lands Consolidation Act, 1913).

J. L. TREFLÉ.

SCHEDULE.

No. of Conditional Lease.	Papers.	Lessee.	Address.	County.	Parish.	Area.	Rate per Acre.	Annual Rent.	Date of commencement of Rent, as reappraised.	Rent now owing.		Shire.
										Amount.	For period ending—	
EASTERN DIVISION.												
LAND DISTRICT OF CARCOAR.												
4405	C.S. 1918-24620	Emmeline Ann Cobb, Amie Eleanor Cobb, Frank Darvall Cobb, and William King Howell, executrices and executors of late B. Stimpson, of Blenheim, Carcoar.	Blayney	Bathurst ...	Bracebridge ...	1,802 0 0	0 3½	26 5 7	4 Mar., 1912	10 3 0	31 Dec., 1913	Waugoola.
15084	24619	Do do ...	do	do ...	Purfleet ...	564 0 0	0 3½	8 4 6	30 " "	3 8 3	5 Mar., 1914	do
LAND DISTRICT OF COOMA.												
59	1913-23423	Edmond John Bede O'Brien	Berridale	Wallace ...	Bulgundara ...	420 0 0	0 2	3 10 0	20 Dec., 1912	Nil.	.....	Dalgety.
156	23410	Fanny Rebecca Williams	Jindabyne	do ...	Townsend ...	300 0 0	0 2½	2 16 3	30 Nov., "	5 6 8	31 Dec., 1913	do
241	23422	The Australian Joint Stock Bank (Limited). (per Thomas Wroe)	Sydney	do ...	Tongaroo ...	510 0 0	0 3½	7 6 3	12 Oct., "	0 13 9	31 " "	do
374	23433	James Taylor	Jimenbuan, Cooma.	do ...	Townsend ...	120 0 0	0 3½	1 15 0	9 Nov., "	0 17 2	31 " "	do
375	23409	Adeline Williamson	Lake Plain, Cooma ...	do ...	do ...	106 0 0	0 2½	0 19 11	30 " "	0 2 5	31 " "	do
452	23425	George Constance	Jindabyne	do ...	Gygederick ...	113 0 0	0 3½	1 13 0	22 " "	0 5 3	31 " "	do
468	23426	John Harvey	Cootralantra, Cooma...	do ...	Townsend ...	150 0 0	0 3½	2 0 8	9 Dec., "	0 6 6	31 " 1914	do
600	23414	John Langhorn and Thomas Langhorn	Jindabyne	do ...	Tongaroo ...	1,880 0 0	0 2½	19 11 8	6 Aug., "	9 8 5	31 " "	do
886	23407	Susan Williamson	Jimenbuan	do ...	Townsend ...	240 0 0	0 2½	2 5 0	21 Nov., "	0 5 7	31 " 1913	do
952	23421	The Commissioners Government Savings Bank of New South Wales. (per Alfred Roberson)	Jindabyne	do ...	do ...	136 0 0	0 4	2 5 4	10 July, "	1 5 2	31 " "	do
958	23411	Adeline Williamson	Sydney	do ...	do ...	65 0 0	0 2½	0 12 3	30 Nov., "	0 1 6	31 " "	do
1176	23412	William Wallace	Berridale.	do ...	do ...	240 0 0	0 3	3 0 0	5 Dec., "	1 1 6	31 " "	do
4788	23127	The Commissioners Government Savings Bank of New South Wales. (per James Deegan)	Jindabyne	do ...	Gygederick ...	618 0 0	0 2	5 3 0	18 " "	15 9 0	31 " "	do
6602	23424	John Sorrell	Sydney	do ...	Chippendale...	240 0 0	0 4	4 0 0	20 " "	1 9 4	8 June, 1914	do
29473	23430	The Commissioners Government Savings Bank of New South Wales. (per Alfred Roberson)	Care of Crown Land Agent, Cooma.	do ...	Jinderboine ...	192 1 0	0 3	2 8 1	10 July, "	3 8 6	18 Oct., "	do
			Sydney	do ...								
			Kara, Berridale.									

CONDITIONAL LEASES—continued.

No. of Conditional Lease.	Papers.	Lessee.	Address.	County.	Parish.	Area.	Rate per Acre.	Annual Rent.	Date of commencement of Rent, as reappraised.	Rent now owing.		Shire.	
										Amount.	For period ending—		
CENTRAL DIVISION.													
LAND DISTRICT OF NARRABRI.													
	C.S.					a. r. p.	s. d.	£ s. d.		£ s. d.			
2935	1913-24911	The Commercial Banking Company of Sydney (Limited). (per Thomas Knight)	Sydney	Jamison ...	Weeta Waa ...	600 0 0	0 3	7 10 0	12 Dec., 1912	Nil.	.....	Namoi.
2945*	24373	The Bank of Australasia ... (per Lillias Thompson)	Wee Waa. Sydney	do ...	Tulla Dunna...	1,079 0 0	0 4	17 19 8	7 " "	1 16 7	31 Dec., 1913	do	
4814	24910	The Commercial Banking Company of Sydney (Limited). (per Thomas Knight)	Wee Waa. Sydney	do ...	Weeta Waa ...	57 1 0	0 3	0 14 4	12 " "	0 1 3	31 " "	do	
LAND DISTRICT OF WARREN.													
5725	1913-25079	The Commercial Banking Company of Sydney (Limited). (per James McCalman)	Sydney	Ewenmar ...	Bullagreen ...	1,920 0 0	0 3½	28 0 0	24 April, 1913	Nil.	.....	Marthaguy.
6755	25082	George Alexander Munro and Donald McCalman Munro (executors and trustees of late David Munro).	Bullagreen. Care of H. W. Lovett, Warren.	Gregory ...	Mellerstain ...	652 1 0	0 4	10 17 5	12 Mar., "	2 5 6	15 Nov., 1914	do	
8840	25033	The Commercial Banking Company of Sydney (Limited). (per Charles Ernest Campbell)	Sydney	Oxley...	Garule ...	1,920 0 0	0 4	32 0 0	15 April, "	1 15 0	28 Feb., "	do	
9491	25086	The Commercial Banking Company of Sydney (Limited). (per James McCalman)	Keswick, near Nevertire. Sydney	Ewenmar ...	Bullagreen ...	1,731 2 0	0 4	28 17 2	24 " "	3 13 10	2 May, "	do	
9492	25005	Do do ...	Bullagreen, Warren. do do ...	do ...	do ...	800 0 0	0 3½	11 13 4	24 " "	1 14 2	2 " "	do	
10132	25009	George Alexander Munro and Donald McCalman Munro (executors late David Munro.)	Care of H. W. Lovett, Warren.	Gregory ...	Mellerstain ...	1,915 0 0	0 4	31 18 4	12 Mar., "	5 19 4	5 Dec., "	do	
10170	25008	The Commercial Banking Company of Sydney (Limited). (per Thomas William Tyers)	Sydney	Oxley...	Narromine ...	1,404 0 0	0 3½	21 18 9	11 " "	2 7 5	23 Oct., "	do	
10912	25087	The Commercial Banking Company of Sydney (Limited). (per Charles Ernest Campbell)	Warren. Sydney	do ...	Gobabla ...	1,224 0 0	0 4	20 8 0	15 April, "	7 19 8	30 April, "	do	
15382	25085	Do do ...	Nevertire. do	do ...	do ...	491 2 0	0 4½	9 4 4	15 " "	Nil.	.....	do
15453	25006	The Commercial Banking Company of Sydney (Limited). (per James McCalman)	Sydney	Ewenmar ...	Merrigal ...	140 0 0	0 3	1 15 0	24 April, "	0 3 2	21 May, 1914	do	
19090	25014	George Alexander Munro and Donald McCalman Munro (Executors of late David Munro).	Bullagreen. Care of H. W. Lovett, Warren.	Gregory ...	Mellerstain ...	267 3 0	0 4	4 9 3	12 Mar., "	0 13 2	20 " "	do	
27652	25084	The Commercial Banking Company of Sydney (Limited). (per Charles Ernest Campbell)	Sydney	Oxley...	Gobabla ...	1,428 2 0	0 4½	26 15 9	15 April, "	Nil.	.....	do

* Area reduced by 691 acres, viz.:—Conditional purchase 1912-86, applied for 20th December, 1912; confirmed, 14th May, 1913.

F277515

AUG 3 11 05 AM 1950

R.P.3.

This form should be marked by the Commissioner of Stamp Duties before lodgment at the Land Titles Office.

No. _____

APPLICATION TO BE REGISTERED UNDER THE REAL PROPERTY ACT, 1900
(SECTION 94), AS PROPRIETOR BY TRANSMISSION.I/We (a) [redacted] of Hilldowns, Baskite near
Jindabyne, N. S. W. [redacted].

FEES: £ s. d.

Certificate ... : : :

Lodgment ... 1 10: -

Endorsements ... : 5: -

Total ... 1-15 -



do solemnly and sincerely declare that I/we believe myself/ourselves to be entitled for an estate (in fee simple) (b) to the land described in the following Certificates of Title and Crown Grants held by

(c)	Vol.	Fol.	Vol.	Fol.	Vol.	Fol.	Vol.	Fol.	Vol.	Fol.	Vol.	Fol.
5	[redacted]											
	[redacted]											

lodged herewith I/we having become so entitled as (d) devisee under the will

REGISTRATION
NOT OPPOSED

6.1000/115

Commissioner of Stamp Duties

726-570

who died on the 13th day of August 1929 and (e) Probate (No. 163324) of whose will dated 27.11.19 of the said deceased

(e) was/were g [redacted] 19th day of November 1929. In further verification whereof I/we have deposited the abovementioned deeds and also the documents mentioned in the schedule hereunder.

I/We also declare that no other person is within my/our knowledge entitled to any estate or interest in the said land:—(f)

SCHEDULE OF DOCUMENTS DEPOSITED.

1. (a) Probate of the will of the said deceased.
2. (g) Office copy of the said will.
3. (e) { Federal Commissioner's Receipt for payment of estate duty; or - } (see note A)
4. (h) { Evidence that the Estate is not liable therefor. }
5. (i) { Declaration negating any application under the Testator's Family Maintenance and Guardianship of Infants Act, 1916-1938. & Annexures A and B }

Received Documents
Nos.

and Grants/C's. T.

Receiving Clerk

AND I/WE MAKE THIS SOLEMN DECLARATION conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act, 1900 (j)

(k) I/We also certify that this application is correct for the purposes of the Real Property Act, 1900.

(l) MADE and subscribed by the abovenamed

RICHARD HARVEY

at

Cooma

the 25th day of May 1950
in the presence of

ONE POUND

Stamp Duty

I, [redacted] hereby consent to this application.

Dated at Cooma this 25th day of May 1950.

SIGNED in my presence by the said
RICHARD HARVEY who is personally
known to me:—

Richard Harvey

ALL BLANKS SHOULD BE RULED BEFORE SIGNING.

The Justice of the Peace or other person who attests the application should initial all alterations.

CAUTION.—This application is in form a statutory declaration, and applicants are reminded that, by virtue of the provisions of the Crimes Act, 1900, the penalties of perjury are attached to a false declaration concerning any matter or procedure under the Act. The utmost care is therefore necessary in framing (or reading over if the form be filled up by an Attorney) every particular statement therein. It is further provided by Section 126 of the Real Property Act, 1900, that any applicant procuring a Certificate through any fraud, error, omission, misrepresentation or misdescription will, notwithstanding the issue of such Certificate, remain liable for damages to any person thereby prejudiced. And any person who fraudulently procures, assists in fraudulently procuring, or is privy to the fraudulent procurement of any Certificate of Title is declared guilty of a misdemeanour and liable to a penalty not exceeding £500, or imprisonment not exceeding three years, and any Certificate thereby procured is rendered void as between all parties or privies to the fraud.

(See back for "Hints.")

No alterations should be made by erasure. The words rejected should be scored through with the pen, and those substituted written over them, the alteration being verified by signature or initials in the margin, or noticed in the attestation.

ATTENTION IS DIRECTED TO THE HINTS ON THE BACK HEREOF.

I will see 1, 4 & 2 (2) 6/5/50

6390

5125
110
5615
197

No.

APPLICATION BY TRANSMISSION.

Lodged by

USE
DEPARTMENTAL
FOR
SPACES
THESE
LEAVE

(Applicant.)

PARTICULARS ENTERED IN REGISTER BOOK

Vol. 5128 Fol. 110
" 5615 " 197

the 24th day of August 1950, at 12 o'clock noon.

J. Wells

Registrar-General



HINTS FOR APPLICANTS.

(A) APPLICATION BY EXECUTORS OR ADMINISTRATORS.

- There should be lodged with the application:—
 - The Probate or Letters of Administration.
 - The Certificate of Title or Grants.
 - An office copy of the Will for permanent lodgment. (See under "General.")
- Evidence should be lodged with the application:—
 - Of the payment of Federal Estate Duty, or—
 - That the Estate is not liable to duty, or—
 - (From the Federal Commissioner of Taxation) that sufficient security is held for the payment of the duty.

If this cannot be furnished, the application will be allowed to proceed subject to a Caveat as in 3 (b) being entered. (See Note A.)
- (In appropriate cases) that Double Probate has not been applied for.
- A Caveat will be entered to prevent dealings:—
 - Not in accordance with the powers and duties of such executor or administrator, and
 - In contravention of the Estate Duty Assessment Act (Federal) (unless evidence of payment or non-liability has been furnished).

The fee (15/- and 5/- for every extra folium) for such Caveat should be paid at the time of lodging the application.

(B) APPLICATION BY DEVISEE.

- There should be lodged with the application:—
 - The Probate or Letters of Administration, etc.
 - The Certificates of Title or Grants.
 - The duly stamped consent of the executor or administrator, where the applicant is not such executor or administrator.
- Evidence should be lodged with the application:—
 - Of the payment of Federal Estate Duty, or—
 - That the Estate is not liable to duty, or—
 - (From the Federal Commissioner of Taxation) that sufficient security is held for the payment of the duty.
- (In appropriate cases) that Double Probate has not been applied for.
- Of the payment or release of any legacy charged on subject land or the determination of any rights under the will in any person other than the applicant. (See "General" under "Receipts, Consents, &c.")
- Of the identity, where not evident, of the land devised with that applied for. (See Note D.)
- Of the identity, where not evident, of the devisee with the applicant.

- That the title is not affected or liable to be affected by any Order under the Testator's Family Maintenance and Guardianship of Infants Act, 1916-1938. (See Note C.)
- That the applicant is not a bankrupt, and has not assigned or encumbered his interest.

(C) APPLICATION BY PERSONS CLAIMING UNDER AN INTESTACY

- There should be lodged with the application:—
 - The Letters of Administration.
 - The Certificates of Title or Grants.
 - The duly stamped consent of the administrator.
 - A certificate of death of the deceased.
- Evidence should be lodged:—
 - Of the payment of Federal Estate Duty, or—
 - That the Estate is not liable to duty, or—
 - (From the Federal Commissioner of Taxation) that sufficient security is held for the payment of the duty.
 - That the applicant is not a bankrupt, and has not assigned or encumbered his interest.
 - Of facts showing that the applicants are the only persons entitled in distribution to the estate of the intestate. (See Notes C and E.)

GENERAL.

- Such other evidence which any case may require should also be lodged.

Caveats and Office Copies of Wills.

- When a transfer of the whole of the land in the application is lodged therewith a caveat, as in A 3 (a), will not be entered, and an office copy of the will need not be lodged. If the Probate is allowed to remain in the case until the whole of the land has been transferred, such office copy will not be required.

Statutory Declarations.

- Declarants should fully state their means of knowledge of the facts declared to, and where the facts are not within their own knowledge they should fully state the sources of their information and belief. Facts, and not inferences, should be declared to. Declarations made outside the State of New South Wales should be made under the law of the State in which they are made and before a person authorised by that law to take declarations. Declarations should be signed on each page by the declarant and the person before whom made, and should be suitably endorsed.

Receipts, Consents, &c.

- Receipts for legacies and consents and similar documents lodged in support of applications should be accompanied by evidence as to the identity of the person signing, and that he had attained the age of twenty-one years at the date of such signing.

Applications by Persons not Resident in New South Wales.

- See Section 94 (7) of the Real Property Act, 1900.

They will also be received, if declared at the place where the applicant resides in accordance with the law relating to statutory declarations of the State where made before a person authorised by that law to take declarations.

Alterations.

- In no case can any alteration, however trifling, be allowed to be made after the application has been declared unless all parties re-sign and re-declare the same. If it is discovered that any alterations are necessary the applicant may make a statutory declaration setting out in what manner he desires the application to be altered, which declaration will then (unless the Registrar-General considers that a fresh application ought to be made) be read as one with the application.

Fees.

- Application by (a) any persons other than executors, administrators or trustees, £1/10/0, and an additional 15/- for each such applicant after the first; (b) executors, administrators or trustees, £1/10/0. For every extra memorial 5/- and for every new Certificate of Title required, £1/10/0.

These are in addition to the fees mentioned above.

NOTES.

NOTE A.

Federal Estate Duty.

In applications in respect of estates of persons dying on or after the 21st December, 1914, the Caveat referred to in A 3 (b) will not be entered—

- when the Probate or Letters of Administration shows that the gross value of the estate in New South Wales did not exceed £1,000, or where the deceased person died on or after 20th May, 1940, and the whole estate passes to his widow, children, or grandchildren, £2,000, and evidence is furnished that the deceased did not leave any assets outside the State; or
- when a receipt for payment of duty is furnished, or the Probate or Letters of Administration bears a Certificate by the Federal Commissioner of Taxation that duty has been paid or that the estate is exempt from duty; or
- when the Federal Commissioner of Taxation certifies that he holds sufficient security for the payment of the duty.

NOTE B.

Evidence of Payment of Debts, Funeral and Testamentary or Administrative Expenses is not usually required with an application by an executor or administrator or with an application by a beneficiary on which is endorsed the consent of the executor or administrator.

NOTE C.

Testator's Family Maintenance and Guardianship of Infants' Act, 1916-1938.

An application by a devisee under the will of a testator who died since 7th October, 1915, should be accompanied by a statutory declaration by the executor that he has not received notice of an application under the said Act, or a statutory declaration showing that search in the Equity Office discloses that no proceedings under the said Act have been taken in respect of the will of the deceased. In the latter case the declaration should show the date of search.

A similar declaration showing the result of search in the Equity Office will be required in the case of a distribution of the estate of an intestate husband who died on or after 1st January, 1939—see Section 3 (1A) of the above Act.

NOTE D.

Evidence as to Identity of Land.

All facts which are necessary to establish this identity should be fully set out, and might advantageously be illustrated by a sketch in appropriate cases.

Where the testator had not, at the date of his will or codicil, as the case may be, any land in the locality or street mentioned in the devise other than that included in the application, proof of this will usually be sufficient.

Any surveyor's plans or certificates in the applicant's possession which would assist in identification might be lodged with the application.

NOTE E.

Suggestions showing the nature of Evidence necessary to prove who are entitled in certain cases in Distribution to the Estate of an Intestate.

- When the applicant claims as the widow or widower of an intestate who died on or after 13th June, 1893, it will be necessary to prove—
 - the marriage of the applicant to the intestate;
 - that the intestate was never previously married, or if he or she were, the determination of such marriage;
 - that there were not any children of the said marriage or marriages, or if there were that they all predeceased the intestate without leaving children or remoter issue surviving him or her;
 - that the net value of the estate in New South Wales did not exceed (1) £500 as to persons dying before 1st January, 1939 and (2) £1,000 as to persons dying on or after 1st January, 1939.
- When the applicant claims as the children of the intestate it will be necessary to prove—
 - the marriage of the intestate with applicants' mother or father, as the case may be;
 - that the father or mother of the applicants predeceased the intestate;
 - that the intestate was only once married, or if more than once, the determination of all marriages and that the applicants are the only children of such marriage or marriages.

(All the children should be accounted for, and if any predeceased the intestate, it should be shown that he or she did not leave any child or more remote issue who survived the intestate.)
- When the applicant claims as the father of the intestate it will be necessary to prove—
 - the marriage of the applicant to the intestate's mother;
 - that the intestate was a child of such marriage;
 - that the intestate did not leave any widow or widower or issue.
- When the applicant claims as the mother of the intestate, it will be necessary to prove—
 - the marriage of the applicant to the intestate's father;
 - that the intestate was a child of such marriage;
 - that the intestate's father predeceased him;
 - that the intestate did not leave any brothers or sisters or children of brothers or sisters;
 - that the intestate did not leave any widow or widower or issue.
- When the applicants claim as the brothers or sisters of the intestate, it will be necessary to prove—
 - the marriage or marriages of the intestate's parents;
 - that the intestate was a child of one of such marriages;
 - that the intestate's father and mother predeceased him;
 - that the applicants are all the children of such marriages who survived the intestate;
 - that the intestate did not leave any widow or widower or issue;
 - that no brother or sister predeceased the intestate leaving children who survived him.

The evidence to prove who are the persons entitled in distribution to the estate of an intestate or other matters of pedigree should extend to all facts necessary for the purpose, and in each of the above cases evidence should also be furnished that no person is entitled under the Legitimisation Act, 1902, or the Child Welfare Act, 1939, to share in the estate of the deceased.

Bald statements that persons named are the next of kin of the intestate and the like are useless.

As far as possible the evidence should be established by certificates of birth, marriage, or death, verified by statutory declaration.

In those cases in which certificates cannot be obtained, copies, verified by statutory declaration, of entries in family bibles should, if possible, be supplied, and evidence should be furnished by statutory declarations of persons who can speak of the facts of their own knowledge or who can depose to statements made by deceased relatives of the persons whose estate is the subject of claim.



10841079

NEW SOUTH WALES

CERTIFICATE OF TITLE

PROPERTY ACT, 1900, as amended.

Prior Titles (Crown Grants)



ID

Edition issued 18-7-1968.

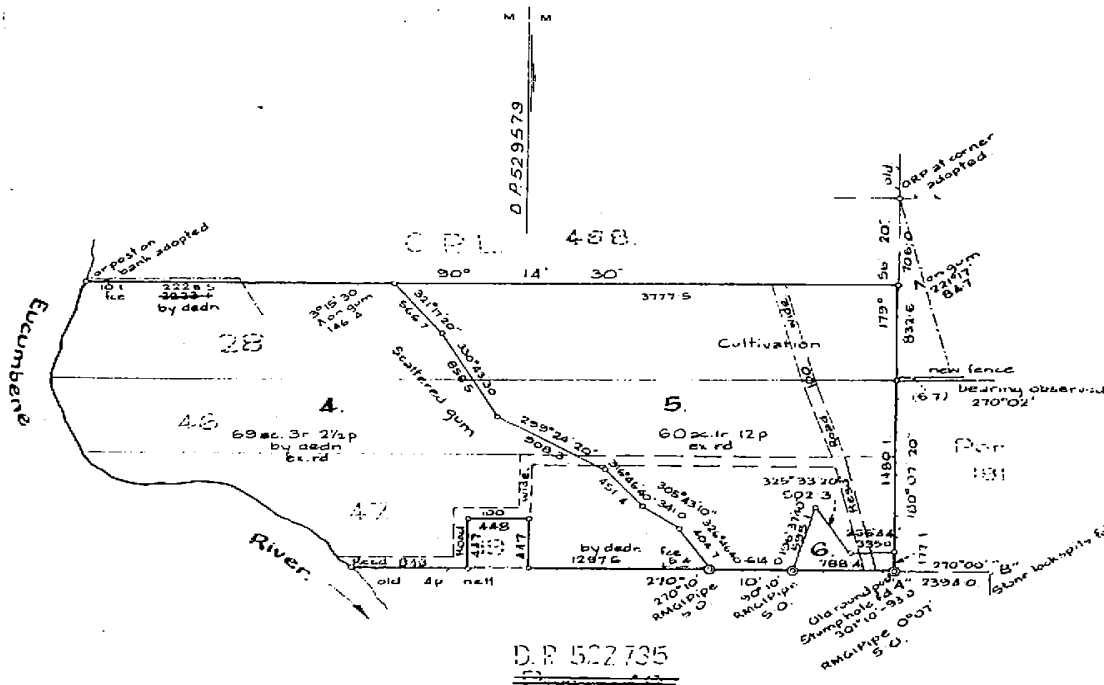
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness *M. Flint*

CANCELLED
J. Watson
Registrar General.
SEE AUTO FOLIO



PLAN SHOWING LOCATION OF LAND



Area Lot 6 1a. 3r 25/4p.
ex rd.

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in [redacted] at Jindabyne in the Shire of Snowy River Parish of Townsend and County of Wallace EXCEPTING THEREOUT the road shown in the plan hereon and the minerals reserved by the Crown Grants.

FIRST SCHEDULE (continued overleaf)

SECOND SCHEDULE (continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grants above referred to.
2. Caveat No. K641363 by the Registrar General Entered 1944-1967. Withdrawn C775980

J. Watson
Registrar General

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TILES OFFICE.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON



NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

25/11/2021 3:38PM

FOLIO: 5/529579

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 10841 FOL 79

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
1/7/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
26/5/1997	3091718	TRANSMISSION APPLICATION	EDITION 1
12/11/2003	AA151389	TRANSMISSION APPLICATION	EDITION 2
27/5/2004	AA672559	TRANSFER	EDITION 3
24/8/2012	AH195694	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

97-03TA



TRANSMISSION APPLICATION

Section 93 Real Property Act 1900



3091718 J

Blaxland

00*010

Office of State Revenue use only

STAMP DUTY

107/756727
fine 12-50

- (A) **I** [REDACTED]
Show no more than 20 References to Title.

<i>4</i>	<i>107/756727</i> NOW BEING <i>107/756727</i> Volume 10122 Folio 142 + Volume 4837 Folio 84 a <i>107/756727</i> + NOW BEING <i>107/756727</i>
----------	---

- (B) **REGISTERED DEALING**
If applicable.

--

- (C) **LODGED BY**

L.T.O. Box 39u	Name, Address or DX and Telephone REED HANIGAN & TURNER LAW STATIONERS SYDNEY DX. 452 SYDNEY PH.: 232 1486 REFERENCE (max. 15 characters): <i>Blaxland Harvey</i>
------------------------------	--

- (D) [REDACTED]
[REDACTED]

[REDACTED]

- (E) [REDACTED]

TA	[REDACTED]
-----------	---

- (F) I, the Applicant, being entitled as devisee of the will/estate of the Deceased Registered Proprietor (who died on between 13 & 14 September 1996) pursuant to Probate/Letters of Administration No. 100253/97 granted on 14th January 1997 to JOHN THOMAS HARVEY, apply to be registered as proprietor of the estate or interest of the Deceased Registered Proprietor in the Land/Registered Dealing specified above.

- (G) Certified correct for the purposes of the Real property Act.1900.
Signed in my presence by the Applicant who is personally known to me.

DATE *11th February 1997*

[Signature]
Signature of Witness

JUNE MCPHIE
Name of Witness (BLOCK LETTERS)

Dawson St
Address of Witness *(Cooma)*

[Signature]
Signature of Applicant

EVIDENCE SIGHTED & RETURNED (office use only)

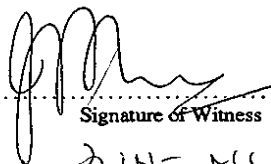
CHECKED BY (office use only)

4 **GT SIGHTED
CANC. & RET.**

26/5/97

CONSENT OF EXECUTOR OR ADMINISTRATOR

(H) I, JOHN THOMAS HARVEY **Executor of the will /Administrator of the estate**
of the Deceased Registered Proprietor, hereby consent to this application.


.....
Signature of Witness

JUNE McPHIE
.....
Name of Witness (BLOCK LETTERS)

Dawson St Coon
.....
Address of Witness


.....
Signature of Executor/Administrator

INSTRUCTIONS FOR COMPLETION

STAMP DUTY: if the Applicant is a devisee, beneficiary, next-of-kin or otherwise beneficially entitled or if the Deceased Registered Proprietor died prior to 31 December 1981 the application must be presented to the Office of State Revenue prior to lodgment at the Land Titles Office.

1. The Application must be completed clearly and legibly in permanent, dense, black or dark blue non-copying ink. If using a dot-matrix printer the print must be letter-quality.
2. Do not use an eraser or correction fluid to make alterations: rule through rejected material. Initial each alteration in the lefthand margin.
3. If the space provided at any point is insufficient, you may annex additional pages. These must be the same size as the form; paper quality, colour, etc, must conform to the requirements set out in Land Titles Office Information Bulletin No. 19. All pages of any annexure must be signed by the person executing the Application and any attesting witness.
4. The following instructions relate to the marginal letters on the application.

(A) LAND

Show the relevant Reference to Title. If there are more than 20 show none in this panel. Place ALL of them on an annexure (see 3 above) with 20 per sheet.

(B) REGISTERED DEALING

Show the registration number of any lease, mortgage or charge in regard to which the Applicant is applying to be registered as a proprietor.

(C) LODGED BY

This section relates to the person or firm lodging the Application at the Land Titles Office.

Reference (max. 15 characters) This is optional. Any slashes, dots, blank spaces, etc, will be counted as characters.

(D) DECEASED REGISTERED PROPRIETOR

Show the name in full. Address and occupation need not be shown.

(E) APPLICANT

Show the name in full. Address and occupation need not be shown.

(F) WILL/ESTATE, etc

Amend "will/estate", "Probate/Letters of Administration" and "Land/Registered Dealing" as appropriate.

In the relevant spaces show the capacity (executor, devisee, etc) in which the Applicant is entitled to apply, the number and date of grant of the Probate or Letters of Administration pursuant to which the application is made, and the name of the person to whom the grant was made.

(G) EXECUTION

General The application must be executed by or on behalf of the Applicant.

By the Applicant Personally The application must be signed in the presence of an adult witness who is not an Applicant and who knows the party executing personally. The witness should complete the appropriate section of the application.

By the Applicant's Attorney The Power of Attorney must be registered in the General Register of Deeds at the Land Titles Office. The execution should take the form, "AB by her attorney XY [full name] pursuant to Power of Attorney Book 1234 Number 567".

Under Authority If the application is made pursuant to any statutory, judicial or other authority, except a Power of Attorney (see above), the nature of the authority should be disclosed.

By a Corporation under Seal The execution should include a statement that the seal has been properly affixed, for example, "... pursuant to a resolution of the board of directors ...". Alternatively, all those attesting the affixing of the seal must state their position in the corporation.

(H) CONSENT OF EXECUTOR OR ADMINISTRATOR

This is required only where the Applicant claims to be entitled other than as executor, administrator or trustee.

The completed Application must be lodged by hand at the LAND TITLES OFFICE, Queen's Square, Sydney, together with the Certificate of Title, the probate or letters of administration (or a copy thereof certified by a solicitor to be a true copy) and a completed Notice of Sale.

If you have any questions about filling out the form, please call 228-6666 and ask for our Customer Services Branch.

Form: 03TA
Release: 1
www.lpi.nsw.gov.au

TRANSMISSION APPLICATION



AA151389U

New South Wales
Section 93 Real Property Act 1900

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP DUTY

Office of State Revenue use only

(A) [Redacted]

Torrens Title

F/Id. [Redacted]

(B) REGISTERED
DEALING

Number

Torrens Title

(C) LODGED BY

Delivery
Box

28A

Name, Address or DX and Telephone

28A galloways
legal services

Phone: (02) 9233 1011 Fax: (02) 9232 6491

Reference:

BMRL-HARVEY

CODE

TA

(D) [Redacted]

J

(E) [Redacted]

L

E

(F) The applicant, being entitled as executors of the will of the deceased registered proprietor (who died on 29 May 2003) pursuant to probate No. 114950/03 granted on 22 Sep 2003 to the applicants LAUREL LINETTE ROBERTSON AND CORAL LEE CONSTANCE (a certified copy of which is lodged herewith) applies to be registered as proprietor of the estate or interest of the deceased registered proprietor in the abovementioned land

DATE

7th November 2003

(G) I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Certified correct for the purposes of the Real Property Act 1900 by the Applicant.

Signature of witness:

Signature of Applicant:

Name of witness:

JUNE McPHIE
SOLICITOR
COOMA

Address of witness:

(H) CONSENT OF EXECUTOR, ADMINISTRATOR OR TRUSTEE

I, _____ of the deceased registered proprietor, hereby consent to this application.

Signature of witness:

Signature of

Name of witness:

Address of witness:

All handwriting must be in block capitals.

Office use only—

Evidence sighted/sighted and returned:

✓ Probate

Page 1 of _____

LAND AND PROPERTY INFORMATION NSW



FOLIO: 5/529579

SEARCH DATE	TIME	EDITION NO	DATE
25/11/2021	3:38 PM	3	27/5/2004

LAND

LOT 5 IN DEPOSITED PLAN 529579

AT JINDABYNE

LOCAL GOVERNMENT AREA SNOWY MONARO REGIONAL

PARISH OF TOWNSEND COUNTY OF WALLACE

TITLE DIAGRAM DP529579

FIRST SCHEDULE

JOHN SACCO ENTERPRISES PTY LIMITED

(T AA672559)

SECOND SCHEDULE (2 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND
CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
- * 2 LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

STATE OF
NEW SOUTH WALES

CROWN GRANT



14154049

No. 35882



CANCELLED

Registered 30-6-1980

Registrar General

SEC AUTO FOLIO

We, Elizabeth the Second, by the Grace of God Queen of Australia and Her other Realms and Territories, Head of the Commonwealth, do hereby grant to the person described in the First Schedule a Lease in Perpetuity in the land within described, subject nevertheless to such reservations, conditions and other provisions as are shown in the Second Schedule. In testimony whereof We have caused this Our Grant to be sealed with the seal of Our said State

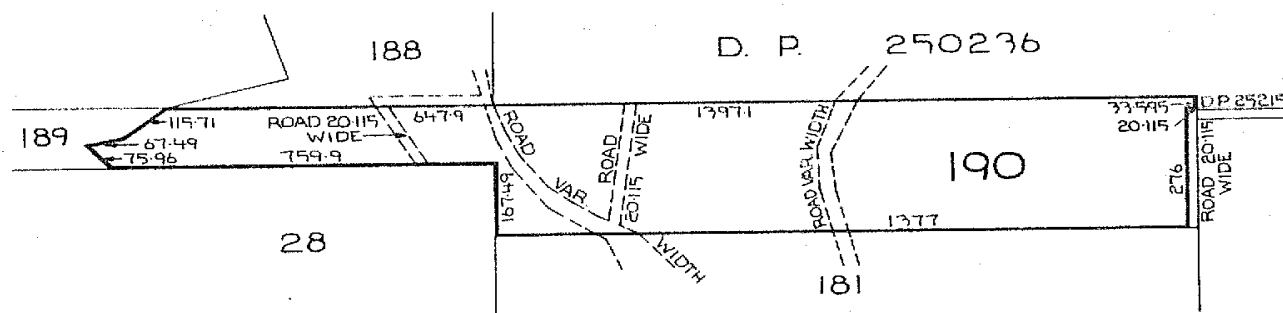
Witness Our Governor of Our State of New South Wales and its Dependencies in the Commonwealth of Australia, at Sydney in Our said State, this twentieth day of June in the twenty ninth year of Our Reign and in the year of Our Lord one thousand nine hundred and eighty.

A. R. Butler
Governor



PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



AREA: 49.57 ha

THIS AREA DOES NOT INCLUDE
THE AREA OF THE ROADS.

REDUCTION RATIO 1:12500

LAND REFERRED TO

P [redacted] in the Shire of Snowy River Parish of Townsend and County of Wallace. EXCEPTING THEREOUT the roads shown in the plan hereon.

PL
[redacted]
FIRST SCHEDULE

GSC
SECOND SCHEDULE

1. The reservation and exception unto Us Our Heirs and Successors of all minerals, land for public ways, and rights and powers in respect thereof and the provision for forfeiture as more fully set out in memorandum filed as No. Q400000.
2. The provisions of the Crown Lands Acts and Regulations thereunder in respect of Conditional Leases and in particular that the Grantee and his Assigns shall pay for the said land an annual rent of twenty dollars

as determined in due course of law or such other rent as may from time to time be so determined (provided always that such rent shall not be less than the minimum for the time being provided under the said Acts) to our Treasurer or such other officer in Our said State as may from time to time be appointed for that purpose on such day or days in each year as may from time to time be determined in due course of law.

- AB
Kx
3. Perpetual Lease Grant (C.L. 468 Cooma) - Crown dues payable, reservations, conditions and restrictions as herein set out and in the Crown Lands Consolidation Act, 1913, particularly section 257.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE REGISTRAR GENERAL'S OFFICE.

FIRST SCHEDULE (continued)

[illegible]

T 331456 Te
 (Page 2 of 2 pages)

SECOND SCHEDULE (continued)

[illegible]

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED



SEARCH DATE

25/11/2021 3:38PM

FOLIO: 190/756727

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 14154 FOL 49

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
12/12/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
30/1/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
26/4/1991		AMENDMENT: TITLE DIAGRAM	
26/5/1997	3091718	TRANSMISSION APPLICATION	EDITION 1
12/11/2003	AA151389	TRANSMISSION APPLICATION	EDITION 2
27/5/2004	AA672559	TRANSFER	EDITION 3
7/10/2004	AA999949	APPLICATION FOR RECORDING OF ACTION AFFECTING CROWN HOLDING	
7/10/2004	AB217	APPLICATION FOR RECORDING OF ACTION AFFECTING CROWN HOLDING	EDITION 4

*** END OF SEARCH ***



FOLIO: 190/756727

SEARCH DATE	TIME	EDITION NO	DATE
-----	----	-----	----
25/11/2021	3:38 PM	4	7/10/2004

LAND

LOT 190 IN DEPOSITED PLAN 756727

LOCAL GOVERNMENT AREA SNOWY MONARO REGIONAL
PARISH OF TOWNSEND COUNTY OF WALLACE
(FORMERLY KNOWN AS PORTION 190)
TITLE DIAGRAM CROWN PLAN 6151.1604

FIRST SCHEDULE

JOHN SACCO ENTERPRISES PTY LIMITED

(T AA672559)

SECOND SCHEDULE (2 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)
- 2 LAND EXCLUDES THE ROAD(S) SHOWN IN THE TITLE DIAGRAM

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Council Planning Certificates

Lanterra Consulting Pty Ltd
13/71 Leichhardt St
KINGSTON ACT 2604

Planning Certificate – Section 10.7

Environmental Planning and Assessment Act 1979

Section 10.7(2) Details

In accordance with the requirements of section 10.7(2) of the Environmental Planning and Assessment Act 1979 (as amended), the following prescribed matters relate to the land at the date of this certificate.

Certificate Information

Certificate Number	2631/21
Certificate Date	06/12/2021
Your Reference	P21104

Property Description

Address	Hilldowns 56 Hilldowns Road KALKITE NSW 2627
Land Title	Lot: 5 DP: 529579
Assessment Number	40529497

This certificate provides information on how a property (such as land and buildings) may be used and the limits on its development. The certificate contains information Council is aware of through its records and environmental plans, along with data supplied by the State Government.

Snowy Monaro Regional Council does not accept any liability for anything contained in this certificate which has been supplied by third-party sources and does not warrant the accuracy of the contents.

All users of this certificate must acknowledge that Snowy Monaro Regional Council does not owe them any duty of care and they indemnify Snowy Monaro Regional Council from all claims demands suits actions and proceedings for damages and consequential loss howsoever arising from their use of this certificate and its contents where third-party information is relied upon.

Column 1 Section 10.7(2) (Schedule 4 EP&A Regulation 2000)	Identification of the matter referred to in Column 1 and the extent to which it applies to the land
1 Names of relevant planning instruments and DCPs	
(1) The name of each environmental planning instrument that applies to the carrying out of development on the land.	<p>Snowy River Local Environmental Plan 2013 Snowy River Local Environmental Plan 2013 (Amendment No 1)</p> <p>See Note 6 for list of State Environmental Planning Policies</p>
(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Secretary has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved).	Introduction of Snowy Mountains Special Activation Precinct - Discussion Paper June 2021
(3) The name of each development control plan that applies to the carrying out of development on the land.	<p>"Snowy River Shire Council Development Control Plan 2013 (Amendment 1)</p> <p>The plan was adopted by Council on 26 November 2013 and came into effect on 20 December 2013.</p> <p>The purpose of DCP 2013 is a source of information covering the technical, legislative and administrative aspects of development within the former Local Government boundary of Snowy River Shire. It provides detailed provisions to guide development so that it achieves the aims and objectives of the Snowy River Local Environmental Plan 2013. The DCP includes detailed objectives and controls for ensuring well designed, quality land use and development within the Snowy Monaro Regional Council.</p> <p>This plan applies to all land to which the Snowy River Local Environmental Plan 2013 applies excluding the site specific Development Control Plan T2 Tyrolean Village Stage 3.</p>
In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.	
2 Zoning and land use under relevant LEPs	
For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):	
(a) the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage Area") or by reference to a number (such as "Zone No 2 (a)"),	RU1 Primary Production
(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent,	See Note 7 – Land Use Table
(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,	See Note 7 – Land Use Table

(d) the purposes for which the instrument provides that development is prohibited within the zone,	See Note 7 – Land Use Table
(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed,	Yes. Refer to the NSW Planning Portal https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address for details or contact Councils Development section.
(f) whether the land includes or comprises critical habitat,	No
(g) whether the land is in a conservation area (however described),	Not in Heritage Conservation Area
(h) whether an item of environmental heritage (however described) is situated on the land.	No Heritage Item
2A Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006	
To the extent that the land is within any zone (however described) under:	
(a) Part 3 of the State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (the 2006 SEPP), or	N/A
(b) a Precinct Plan (within the meaning of the 2006 SEPP), or	N/A
(c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,	N/A
the particulars referred to in clause 2 (a)–(h) in relation to that land (with a reference to “the instrument” in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).	
3 Complying Development	
(1) The extent to which the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.	<p>The following Codes are not applicable to this land:</p> <ul style="list-style-type: none"> Housing Code Commercial and Industrial Alterations Code Commercial and Industrial (New Buildings and Additions) Code Container Recycling Facilities Code Low Rise Medium Density House Code <p>The following Codes are applicable to the land and complying development may be carried out on the whole of the land under these Codes:</p> <p>Nil</p> <p>The following Codes are applicable to the land but due to the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 complying development may only be carried out on part of the land under these Codes:</p> <p>NIL</p>

	<p>The following Codes are applicable to the land but due to the provisions of clauses 1.17A(1)(c) to (e), (2), (3) and (4), 1.18(1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes)2008 complying development may not be carried out on the whole of the land under these Codes:</p> <ul style="list-style-type: none"> Rural Housing Code Housing Alterations Code General Development Code Subdivisions Code Demolition Code Fire Safety Code Inland Code
(2) The extent to which complying development may not be carried out on that land because of the provisions of clauses 1.17A(1)€ to €, (2), (3) and (4), 1.18 (1)(c3) and 1.19 of that Policy and the reasons why it may not be carried out under those clauses.	<p>For the Codes listed above that may only be carried out on part of the land or may not be carried out on any part of the land the reasons why complying development may not be carried out are as follows:</p> <p>The land is wholly affected by specific land exemptions being land identified as environmentally sensitive land as it is subject to considerations associated with the Scenic protection area contained in the relevant Local Environmental Plan.</p> <p>If complying development is permitted on only part of the land due to the above restrictions, the extent to which these restrictions apply to the land can be found on the NSW Planning Portal website maps at www.planningportal.nsw.gov.au. These map(s) are based on the legislated maps/s for Cooma-Monaro Local Environmental Plan 2013, Snowy Rover Local Environment Plan 2013 and Bombala Local Environment Plan 2012 and represent the best information Council has on the extent to which the above restrictions affect this land.</p>
(3) If the council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land, a statement that a restriction applies to the land, but it may not apply to all of the land, and that council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land.	Not Applicable
	See Note 3 at the end of this Certificate for further information.
4 Repealed	

4A	Repealed	
4B	Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works	
	In relation to a coastal council—whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act). Note. “Existing coastal protection works” are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.	N/A
5	Mine subsidence	
	Whether or not the land is proclaimed to be a mine subsidence district within the meaning of the Coal Mine Subsidence Compensation Act 2017.	No
6	Road widening and road realignment	
	Whether or not the land is affected by any road widening or road realignment under:	
(a)	Division 2 of Part 3 of the Roads Act 1993, or	No
(b)	any environmental planning instrument, or	No
(c)	any resolution of the council.	No
7	Council and other public authority policies on hazard risk restrictions	
	Whether or not the land is affected by a policy:	
(a)	adopted by the council, or	No (see Note below)
(b)	adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council,	Council has been advised by the NSW Department of Planning that in accordance with section 4.14 of the Environmental Planning and Assessment Act 1979 Council is required to be satisfied that a development complies with ‘Planning for Bushfire Protection 2019’ where that development is within land identified as bushfire prone.
	that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding),	
	Note: Council has recently been provided with mapping information from the Department of Industry – Resources and Energy in conjunction with the NSW Governments Heads of Asbestos Coordination Authorities (HACA) in relation to the presence of ‘Naturally Occurring Asbestos’ (NOA) within the Shire. The HACA has also published information on what can be done to avoid contact with NOA. This information can be viewed at http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/topics/NOA where there is a link to mapping and other information. The HACA has also published information on what can be done to avoid contact with NOA. Council has adopted an Asbestos Policy which includes provisions applicable to NOA. Council was not aware of the presence of NOA in the Shire when this Policy was adopted, and has no knowledge of any confirmed NOA sites. However following receipt of the mapping information Council is currently in the process of developing risk controls, guidance materials and an asbestos management plan in accordance with the adopted Asbestos Policy. The confirmed presence of naturally occurring asbestos on a site may result in restrictions being imposed upon future development of the site in accordance with the provisions of the Asbestos Policy.	
7A	Flood related development controls information	
(1)	Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing	Unknown - the land is not part of a flood planning study

or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.	
(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.	Unknown - the land is not part of a flood planning study
(3) Words and expressions in this clause have the same meanings as in the standard instrument set out in the Standard Instrument (Local Environmental Plans) Order 2006.	
8 Land reserved for acquisition	
Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 3.15 of the Act.	Council has not been advised that any environmental planning instrument or proposed environmental planning instrument applying to the land provides for the acquisition of the land by a public authority as referred to in section 3.15 of the Act
9 Contributions plans	
The name of each contributions plan applying to the land.	Snowy River Shire Council Section 7.11 Contributions Plan 2008 Snowy River Shire Council Section 7.11 Contributions Plan 2010 - Shared Trails
9A Biodiversity certified land	
If the land is biodiversity certified land under Part 8 of the Biodiversity Conservation Act 2016, a statement to that effect.	No
Note: Biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995 that is taken to be certified under Part 8 of the Biodiversity Conservation Act 2016.	
10 Biodiversity stewardship sites	
If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Chief Executive of the Office of Environment and Heritage).	No
Note: Biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995 that are taken to be biodiversity stewardship agreements under Part 5 of the Biodiversity Conservation Act 2016.	
10A Native vegetation clearing set asides	
If the land contains a set aside area under section 60ZC of the Local Land Services Act 2013, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).	No
11 Bush fire prone land	
If any of the land is bush fire prone land (as defined in the Act), a statement that all or, as the case may be, some of the land is bush fire prone land. If none of the land is bush fire prone land, a statement to that effect.	All of the land is bushfire prone. Information relied on to answer the above question has been provided to Council by the NSW Rural Fire Service, for more information regarding the above information please contact the NSW Rural Fire Service. (www.rfs.nsw.gov.au)

12 Property vegetation plans	
If the land is land to which a property vegetation plan under Part 4 of the Native Vegetation Act 2003 (and that continues in force) applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).	No PVP applicable
13 Orders under Trees (Disputes Between Neighbours) Act 2006	
Whether an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land (but only if the council has been notified of the order).	No
14 Directions under Part 3A	
If there is a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.	No
15 Site compatibility certificates and conditions for seniors housing	
If the land is land to which State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 applies:	
(a) a statement of whether there is a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:	No
(i) the period for which the certificate is current, and	N/A
(ii) that a copy may be obtained from the head office of the Department, and	N/A
(b) a statement setting out any terms of a kind referred to in clause 18(2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.	N/A
16 Site compatibility certificates for infrastructure, schools or TAFE establishments	
A statement of whether there is a valid site compatibility certificate (infrastructure), or site compatibility certificate (schools or TAFE establishments) of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:	No
(a) the period for which the certificate is valid, and	N/A
(b) that a copy may be obtained from the head office of the Department.	N/A
17 Site compatibility certificates and conditions for affordable rental housing	
(1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land	No

	and, if there is a certificate, the statement is to include:	
	(a) the period for which the certificate is current, and	N/A
	(b) that a copy may be obtained from the head office of the Department.	N/A
(2)	A statement setting out any terms of a kind referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.	N/A
18	Paper subdivision information	
(1)	The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot.	No
(2)	The date of any subdivision order that applies to the land.	No
(3)	Words and expressions used in this clause have the same meaning as they have in Part 16C of this Regulation.	No
19	Site verification certificates	
	A statement of whether there is a current site verification certificate, of which the council is aware, in respect of the land and, if there is a certificate, the statement is to include:	No
	(a) the matter certified by the certificate, and Note. A site verification certificate sets out the Secretary's opinion as to whether the land concerned is or is not biophysical strategic agricultural land or critical industry cluster land-see Division 3 of Part 4AA of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	N/A
	(b) the date on which the certificate ceases to be current (if any), and	N/A
	(c) that a copy may be obtained from the head office of the Department.	N/A
20	Loose-fill asbestos insulation	
	If the land includes any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division, a statement to that effect.	Council is not aware of any residential dwelling erected on this land which has been identified in the Loose-Fill Asbestos Insulation Register as containing loose fill asbestos ceiling insulation. Contact NSW Fair Trading if further information is required.
21	Affected building notices and building product rectification orders	
(1)	A statement of whether there is any affected building notice of which the council is aware that is in force in respect of the land.	No affected building notice.
(2)	A statement of:	
(a)	whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not	No building product rectification order.

<p>been fully complied with, and</p> <p>(b) whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding.</p>	No notice of intention to make a building rectification order.
<p>(3) In this clause:</p> <p>affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017.</p> <p>building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.</p>	

Note: The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate:

- (a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act—if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued,
- (b) that the land to which the certificate relates is subject to a management order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued,
- (c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act—if it is the subject of such an approved proposal at the date when the certificate is issued,
- (d) that the land to which the certificate relates is subject to an ongoing maintenance order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued,
- (e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act—if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

Contaminated Land

As of the date of this certificate, Council has no records to indicate that the site is potentially contaminated.

It is recommended that you ensure that the land has not in the past been used for certain purposes which could have involved the use of contaminants. A list of potentially contaminating uses is outlined in Attachment "A" to the end of this planning certificate.

Refer to Cooma Monaro Development Control Plan 2014 / Snowy River Development Control Plan 2013 / Bombala Development Control Plan 2012 – Planning Guidelines prepared by the Environment Protection Authority and the Department of Urban Affairs and Planning (1998). The guidelines are underpinned by State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55), and the Contaminated Lands Management Act 1987.

In addition, Council has not been made aware of the land being subject to the following:

- land declared to be significantly contaminated land;
- land subject to a management order;
- land subject of an approved voluntary management proposal;
- land subject to an ongoing maintenance order; or
- subject of a site audit statement

IMPORTANT NOTES – SECTION 10.7(2) CERTIFICATE

Note 1 Terms of Reference

This Certificate does not make reference to the physical conditions of the property. Consequently no inspections have been made in respect of:

- (a) The presence or otherwise of noxious weeds on the property,
- (b) The condition of any structure/s on the land and associated infrastructure.

No advice is included in this Certificate in respect of outstanding or unauthorised works.

Should applicants require such details, that may be in addition to information provided in a S10.7(2) & (5) Certificate, application should be made, accompanied by the appropriate fee for such inspections.

Note 2 Biosecurity (Weeds)

Weeds are a major environmental threat to the Snowy Monaro Region's agricultural and environmental assets. People considering purchasing land, particularly rural land, in the Council area are urged to contact Council's Biosecurity (Weeds) team for advice regarding landowners' responsibilities for the control of weeds.

Note 3 Complying Development

- Under the Housing Code complying development may not be carried out on land which has an area less than 200 square metres and has a width, measured at the building line fronting a primary road, of at least 6m.
- Under the Rural Housing Code complying development for the erection of a new single-storey or two-storey dwelling house may only be carried out on land that (a) has an area of at least 80 hectares, or (b) is subject to a restriction created under section 88B of the Conveyancing Act 1919 that specifies a building envelope for the lot and was required by the council.
- As per clause 1.18 of the Codes SEPP Complying Development is only possible on land where the development would otherwise be permissible with or without consent under the Council's Local Environmental Plan applicable to the land.
- Complying development may not be carried out on land outside the zonings identified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, or on a lot which is not entirely within the zoning in the Codes SEPP specified for that particular Complying Development code. Refer to State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 for other permissibility criteria.

Note 4 Important Notice for any maps that relate to this certificate

These maps are not a precise survey document. Accurate locations can only be determined by a survey on the ground.

While every care is taken to ensure the accuracy of this data, neither the Snowy Monaro Regional Council nor the Land and Property Management Authority makes any representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.

Note 5 Coinciding Legal and Practical Access

Purchasers of rural and non-urban land are advised to ensure that coinciding legal and practical access can be gained to the property from a public road.

Note 6 State Environmental Planning Policies

Below is a list of all State Environmental Planning Policies (including publicised draft policies) that apply to Snowy Monaro Regional Council. Depending on circumstances set down in each policy, the policy may be specifically applicable to the land that is the subject of this certificate. You are advised to check the policy for the necessary details.

State Environmental Planning Policy No 19—Bushland in Urban Areas
 State Environmental Planning Policy No 21—Caravan Parks
 State Environmental Planning Policy No 33—Hazardous and Offensive Development
 State Environmental Planning Policy No 36—Manufactured Home Estates
 State Environmental Planning Policy No 55—Remediation of Land
 State Environmental Planning Policy No 64—Advertising and Signage
 State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development
 State Environmental Planning Policy No 70—Affordable Housing (Revised Schemes)
 State Environmental Planning Policy (Aboriginal Land) 2019
 State Environmental Planning Policy (Activation Precincts) 2020
 State Environmental Planning Policy (Affordable Rental Housing) 2009
 State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
 State Environmental Planning Policy (Concurrences and Consents) 2018
 State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017
 State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
 State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
 State Environmental Planning Policy (Infrastructure) 2007
 State Environmental Planning Policy (Koala Habitat Protection) 2020
 State Environmental Planning Policy (Koala Habitat Protection) 2021
 State Environmental Planning Policy (Kosciuszko National Park—Alpine Resorts) 2007
 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
 State Environmental Planning Policy (Primary Production and Rural Development) 2019
 State Environmental Planning Policy (State and Regional Development) 2011
 State Environmental Planning Policy (State Significant Precincts) 2005
 State Environmental Planning Policy (Urban Renewal) 2010
 State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

Any enquiries regarding these State policies should be directed to the Department of Planning.

Zone RU1 Primary Production

Without Consent

Environmental protection works; Extensive agriculture; Home occupations

With Consent

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Centre-based child care facilities; Community facilities; Crematoria; Depots; Dual occupancies; Dwelling houses; Eco-tourist facilities; Educational establishments; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Funeral homes; Garden centres; Helipads; Home-based child care; Home businesses; Home industries; Industrial training facilities; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Jetties; Landscaping material supplies; Mooring pens; Moorings; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Respite day care centres; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Timber yards; Transport depots; Truck depots; Veterinary hospitals; Water recreation structures; Wharf or boating facilities

Prohibited

Any development not specified in item 2 or 3

ATTACHMENT A' – S10.7(2)

Activities which are likely to have contaminated sites because of their past or present use:

- asbestos works;
- chemical and petrochemical works;
- docks and railway land, especially large sidings and depots;
- gasworks, other local carbonisation plants and ancillary by products works;
- industries making or using wood preservatives;
- installations involving the processing or use of radioactive materials;
- landfills and other waste disposal and storage sites, and transfer sites;
- land heavily treated with chemicals for agricultural or other purposes, eg aerial spraying;
- metal mines, smelters, foundries, iron and steel works, metal finishing works;
- mine tailings dumps (including mineral sands tailings);
- munitions production and testing sites;
- oil refineries, petroleum storage and distributions sites;
- paper and printing works;
- pesticide storage areas, areas where vehicles used for the transport and storage of pesticides are washed, and areas where tanks are used to store pesticides;
- plants and heavy engineering installations, eg shipbuilding and shipbreaking;
- power stations and switching yards etc;
- scrap yards;
- stock dipping, eg sheep, cattle etc;
- tanneries

Lotsearch Report



LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 19 Nov 2021 13:58:32

Reference: LS026654 EP

Address: 56 Hilldowns Road, Kalkite, NSW 2627

Disclaimer:

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.

You should obtain independent advice before you make any decision based on the information within the report.

The detailed terms applicable to use of this report are set out at the end of this report.

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 On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	30/06/2021	30/06/2021	Quarterly	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	25/06/2019	25/06/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	13/10/2021	11/10/2021	Monthly	1000m	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	08/10/2021	08/10/2021	Monthly	1000m	0	0	0
Former Gasworks	Environment Protection Authority	11/08/2021	11/10/2017	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	12/05/2021	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	28/10/2021	14/07/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	29/10/2021	29/10/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	29/10/2021	29/10/2021	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	08/10/2021	08/10/2021	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	19/08/2021	19/08/2021	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	02/02/2021	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	10/11/2021	10/11/2021	Monthly	1000m	1	1	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	10/11/2021	10/11/2021	Monthly	1000m	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	10/11/2021	10/11/2021	Monthly	1000m	3	3	3
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	0	0	0
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	1	1	15
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	1	1	4
Major Easements	NSW Department of Finance, Services & Innovation	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	22/01/2021	11/12/2020	Annually	1000m	0	0	1
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	26/10/2020	21/02/2018	Annually	1000m	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000m	0	0	12

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Geological Units 1:250,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	2	3	3
Geological Structures 1:250,000	NSW Department of Planning, Industry and Environment	20/08/2014		Annually	1000m	2	2	3
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	1
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	500m	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	2	2
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	02/11/2021	02/11/2021	Monthly	1000m	4	4	4
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	2	2	7
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	1	1	3
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	0	0	0
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	0	1	1
Bush Fire Prone Land	NSW Rural Fire Service	12/11/2021	09/11/2021	Weekly	1000m	2	3	3
Vegetation of Southern Forests	NSW Office of Environment & Heritage	09/12/2014	10/10/2011	Unknown	1000m	2	2	2
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	24/02/2021	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	2	2	6
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	2	2	9
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	18/10/2021	18/10/2021	Weekly	10000m	-	-	-

Site Diagram

56 Hilldowns Road, Kalkite, NSW 2627



<div>Legend</div> <div><div></div> Site Boundary</div> <div><div></div> Internal Parcel Boundaries</div>	<div>Total Area: 798624m²</div> <div>Total Perimeter: 5.33km</div>		<div>Scale:</div> <div><div></div><div>050100200300400500</div><div>Meters</div></div>	
	<div>Disclaimers:</div> <div>Measurements are approximate only and may have been simplified or smaller lengths removed for readability.</div> <div>Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.</div>		<div>Data Source Aerial Imagery:</div> <div>© Aerometrex Pty Ltd</div>	
			<div><div>Coordinate System:</div><div>GDA 1994 MGA Zone 56</div></div> <div><div>Date:</div><div>19 November 2021</div></div>	

Contaminated Land

56 Hilldowns Road, Kalkite, NSW 2627

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
N/A	No records in buffer								

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Contaminated Land

56 Hilldowns Road, Kalkite, NSW 2627

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit
<http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm>

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Waste Management & Liquid Fuel Facilities

56 Hilldowns Road, Kalkite, NSW 2627

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	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia

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National Liquid Fuel Facilities

National Liquid Fuel Facilities within the dataset buffer:

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

National Liquid Fuel Facilities Data Source: Geoscience Australia

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PFAS Investigation & Management Programs

56 Hilldowns Road, Kalkite, NSW 2627

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Defence PFAS Investigation Program

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

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

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

Defence PFAS Management Program

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

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

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

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

56 Hilldowns Road, Kalkite, NSW 2627

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 Other Sites with Contamination Issues

56 Hilldowns Road, Kalkite, NSW 2627

EPA Other Sites with Contamination Issues

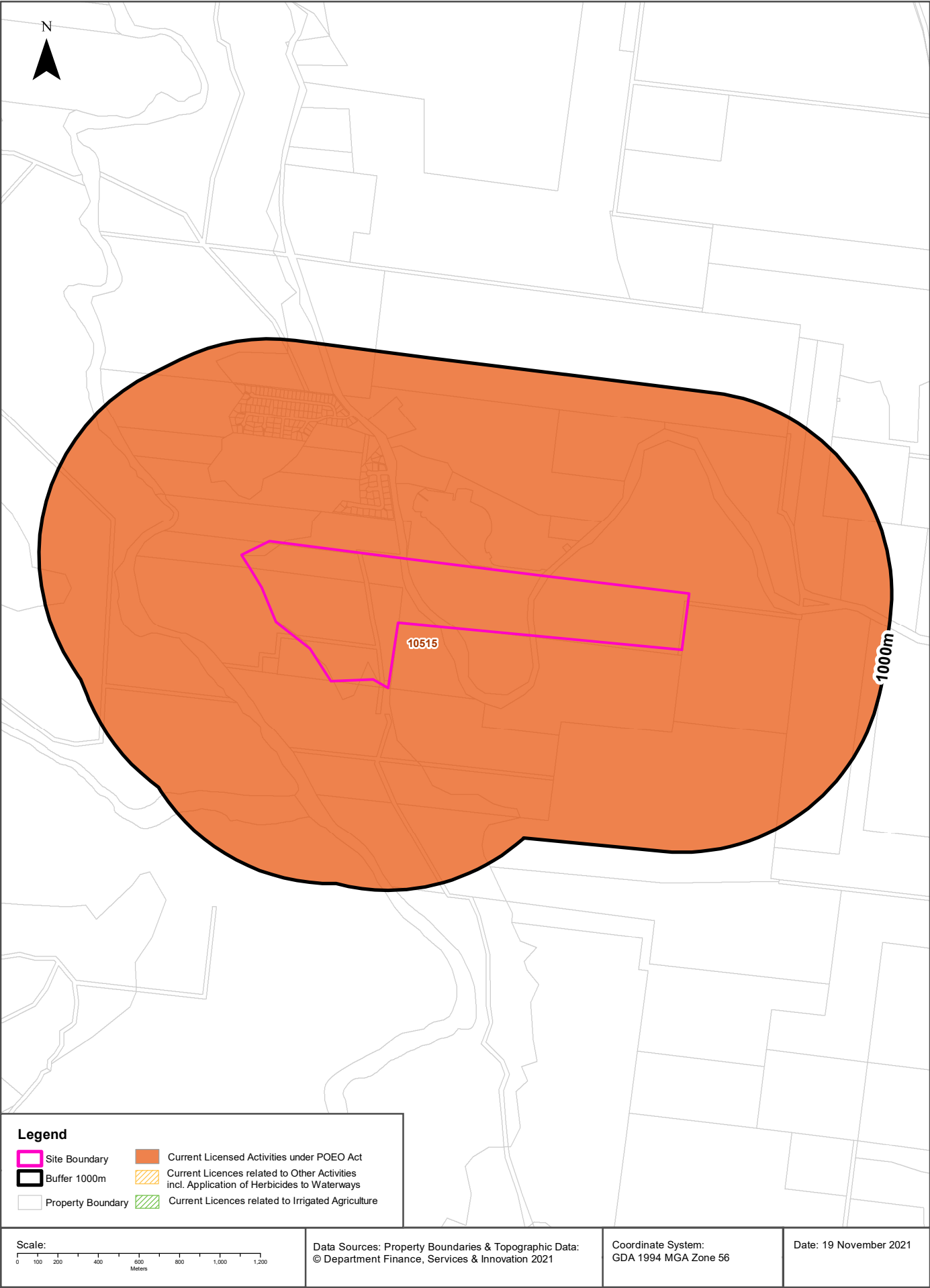
This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority



EPA Activities

56 Hilldowns Road, Kalkite, NSW 2627

Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

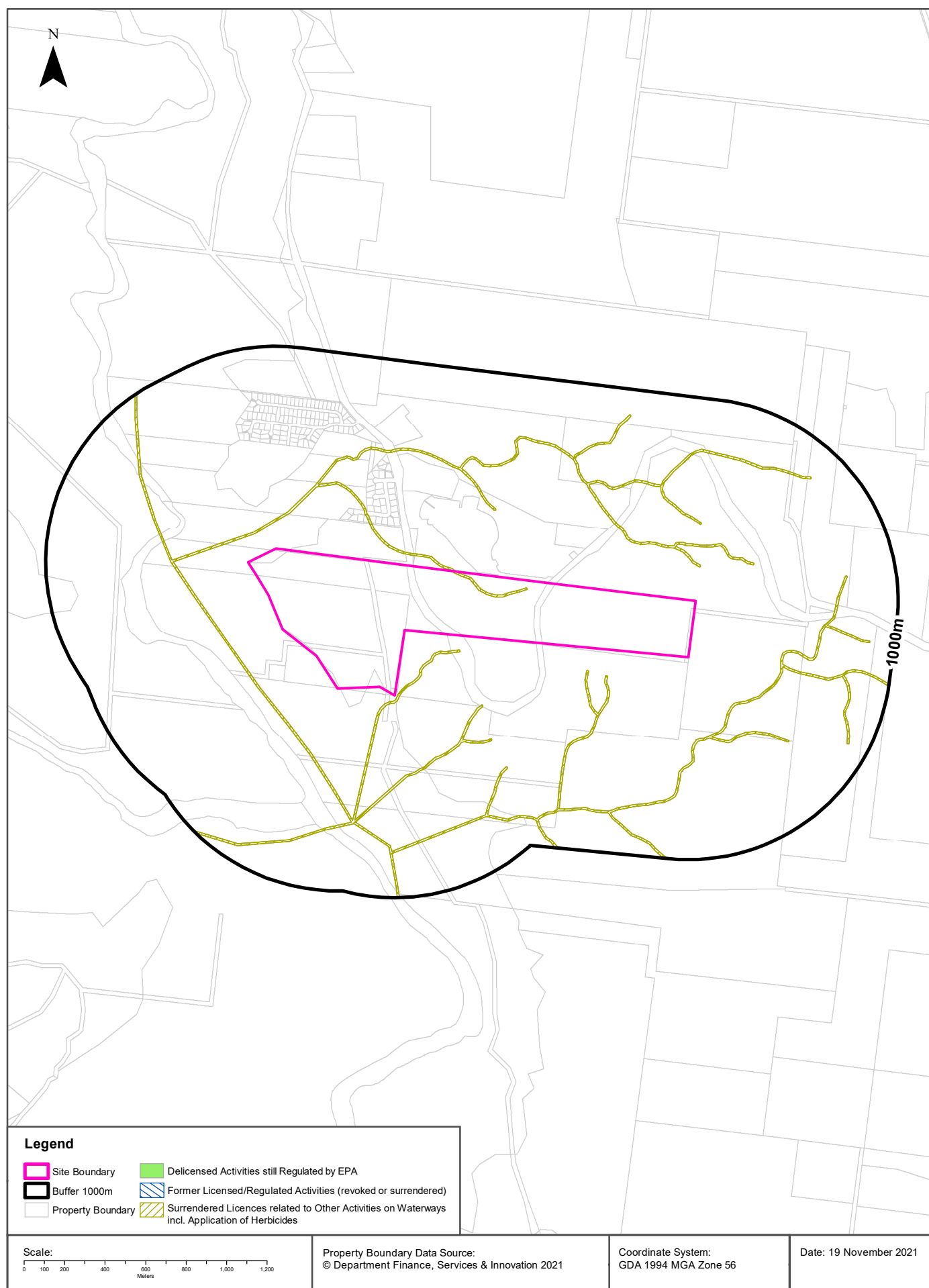
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
10515	SNOWY HYDRO LIMITED	SNOWY MOUNTAINS HYDRO-ELECTRIC SCHEME	KOSCIUSZKO NATIONAL PARK AND VICINITY	COOMA	Generation of electrical power otherwise than from coal, diesel or gas	Area Match	0m	On-site

POEO Licence Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Delicensed & Former Licensed EPA Activities

56 Hilldowns Road, Kalkite, NSW 2627



EPA Activities

56 Hilldowns Road, Kalkite, NSW 2627

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site

Former Licensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Historical Business Directories

56 Hilldowns Road, Kalkite, NSW 2627

Business Directory Records 1950-1991 Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, 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
N/A	No records in buffer						

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Business Directory Records 1950-1991

Road or Area Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, 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
N/A	No records in buffer					

Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Historical Business Directories

56 Hilldowns Road, Kalkite, NSW 2627

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

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

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

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Aerial Imagery 2020

56 Hilldowns Road, Kalkite, NSW 2627



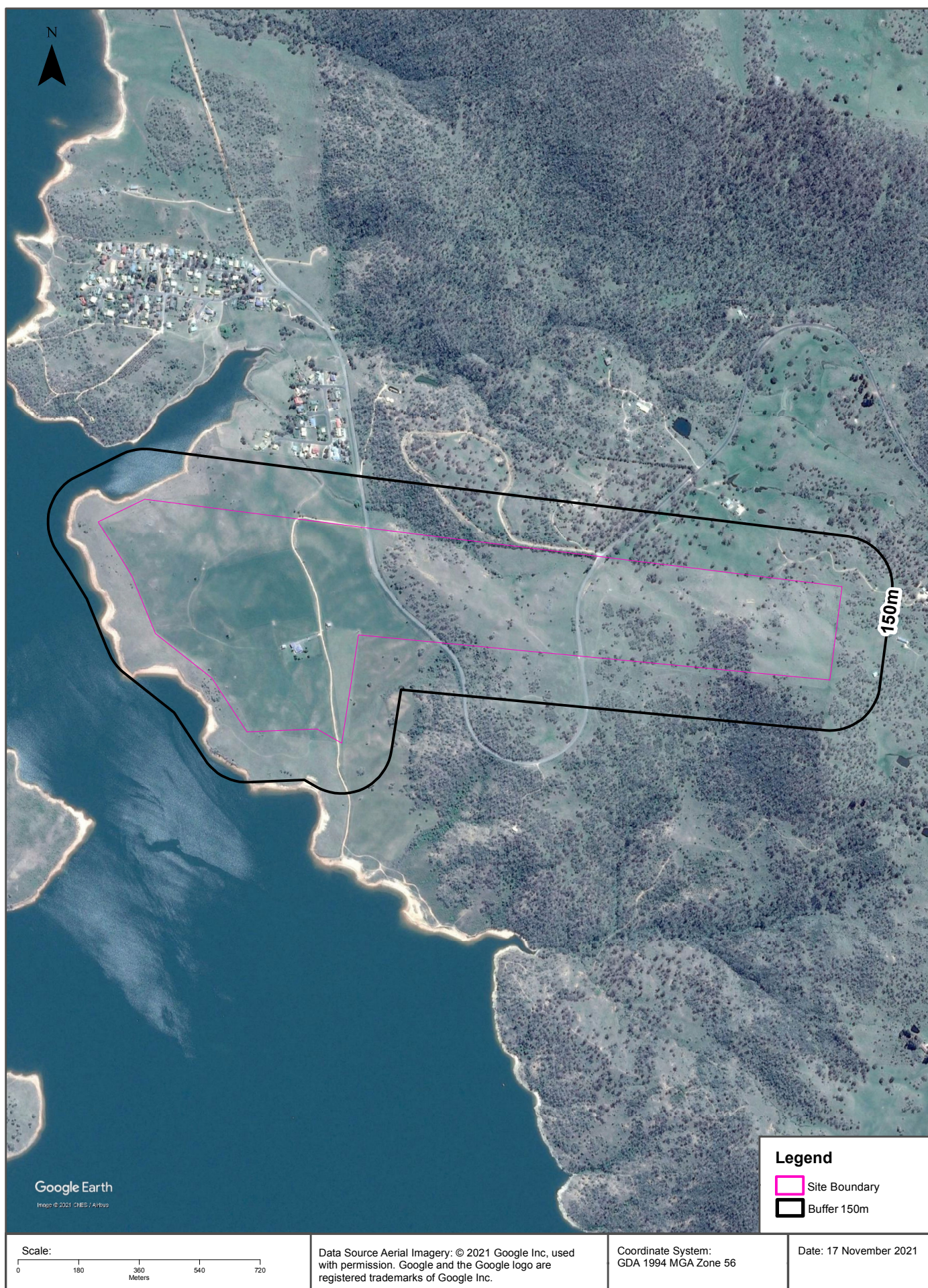
Aerial Imagery 2018

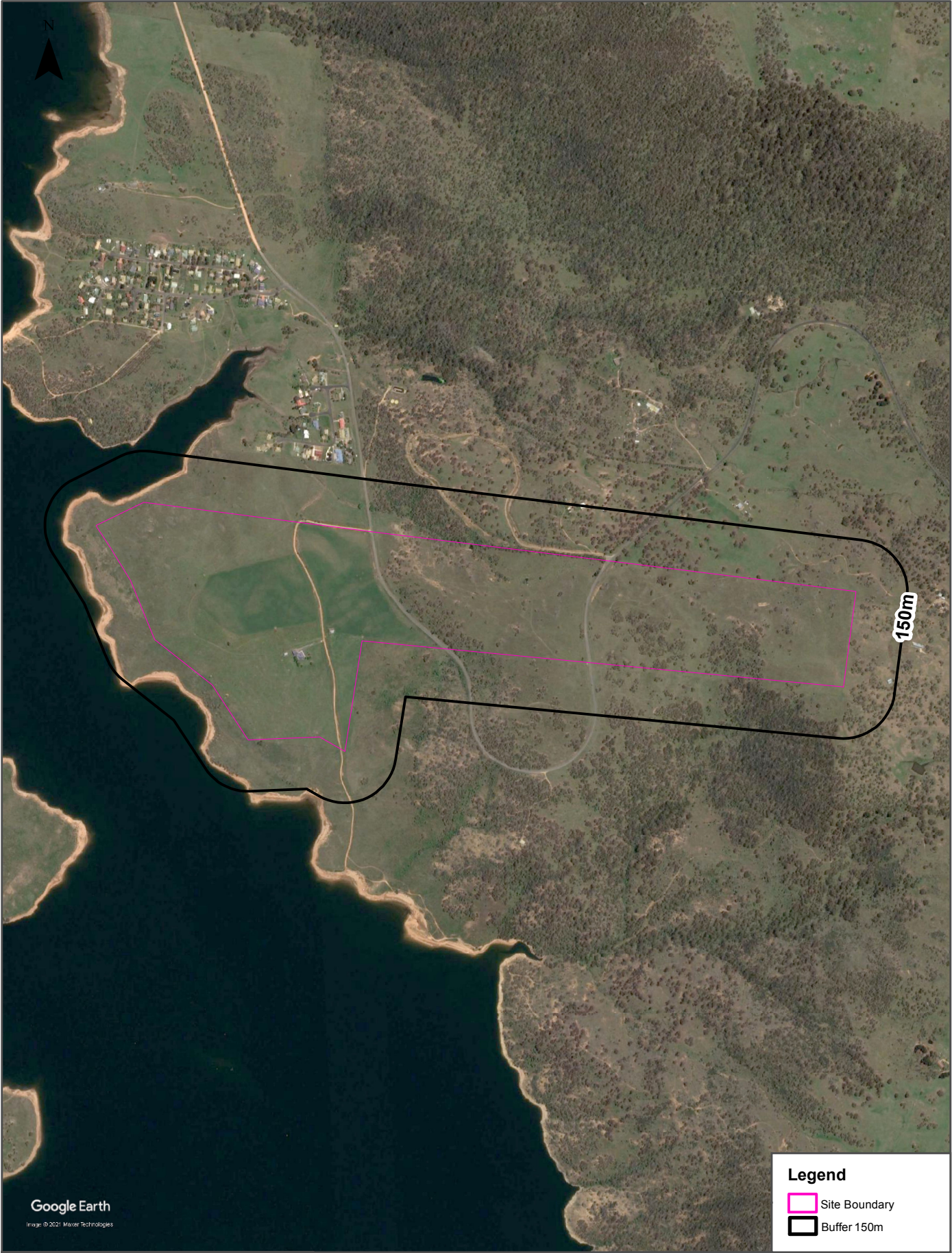
56 Hilldowns Road, Kalkite, NSW 2627



Aerial Imagery 2015

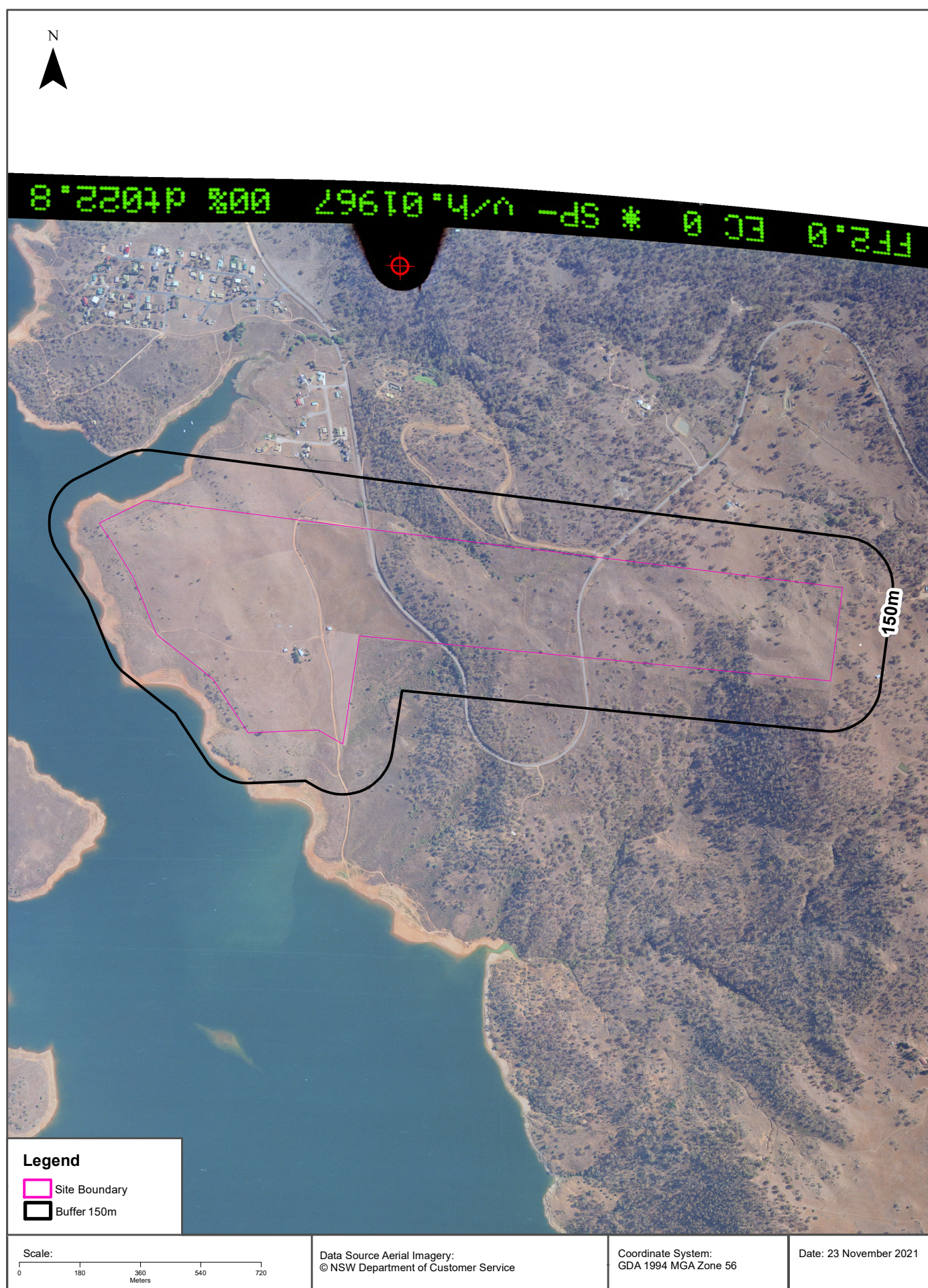
56 Hilldowns Road, Kalkite, NSW 2627





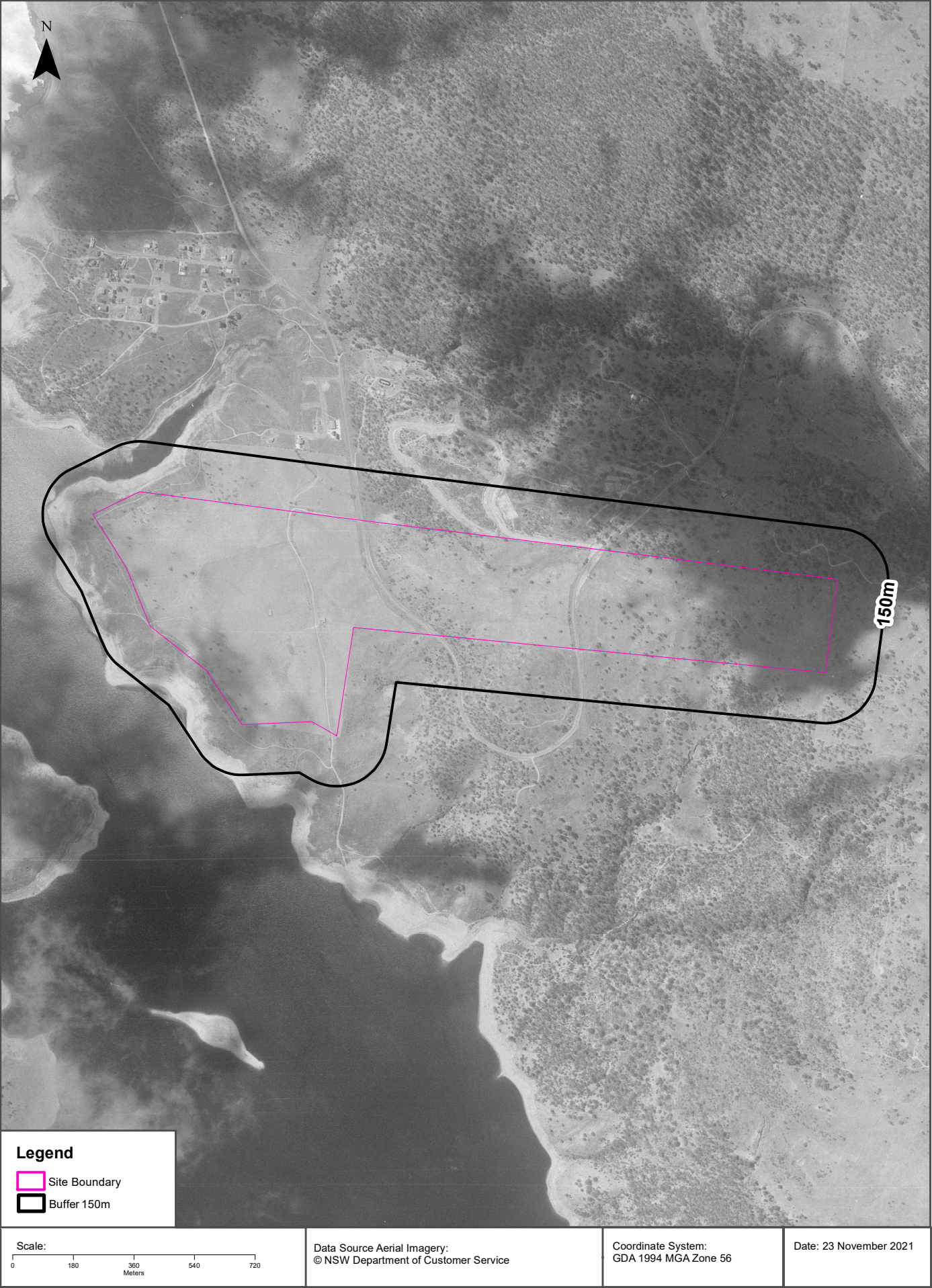
Scale: 0 180 360 540 720 Meters	Data Source Aerial Imagery: © 2021 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 17 November 2021
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56 Hilldowns Road, Kalkite, NSW 2627





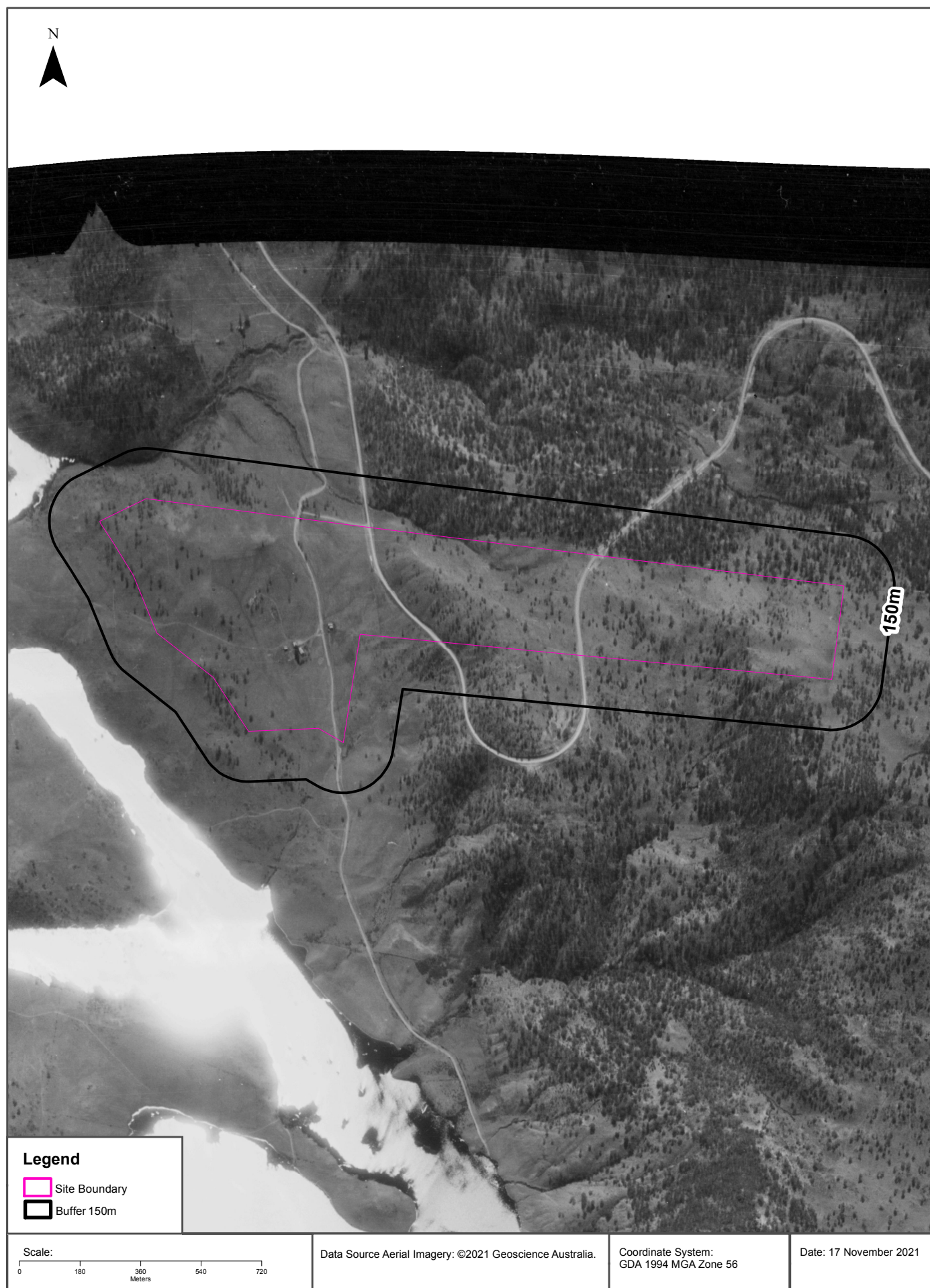
Scale: 0 180 360 540 720 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 23 November 2021
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Aerial Imagery 1979

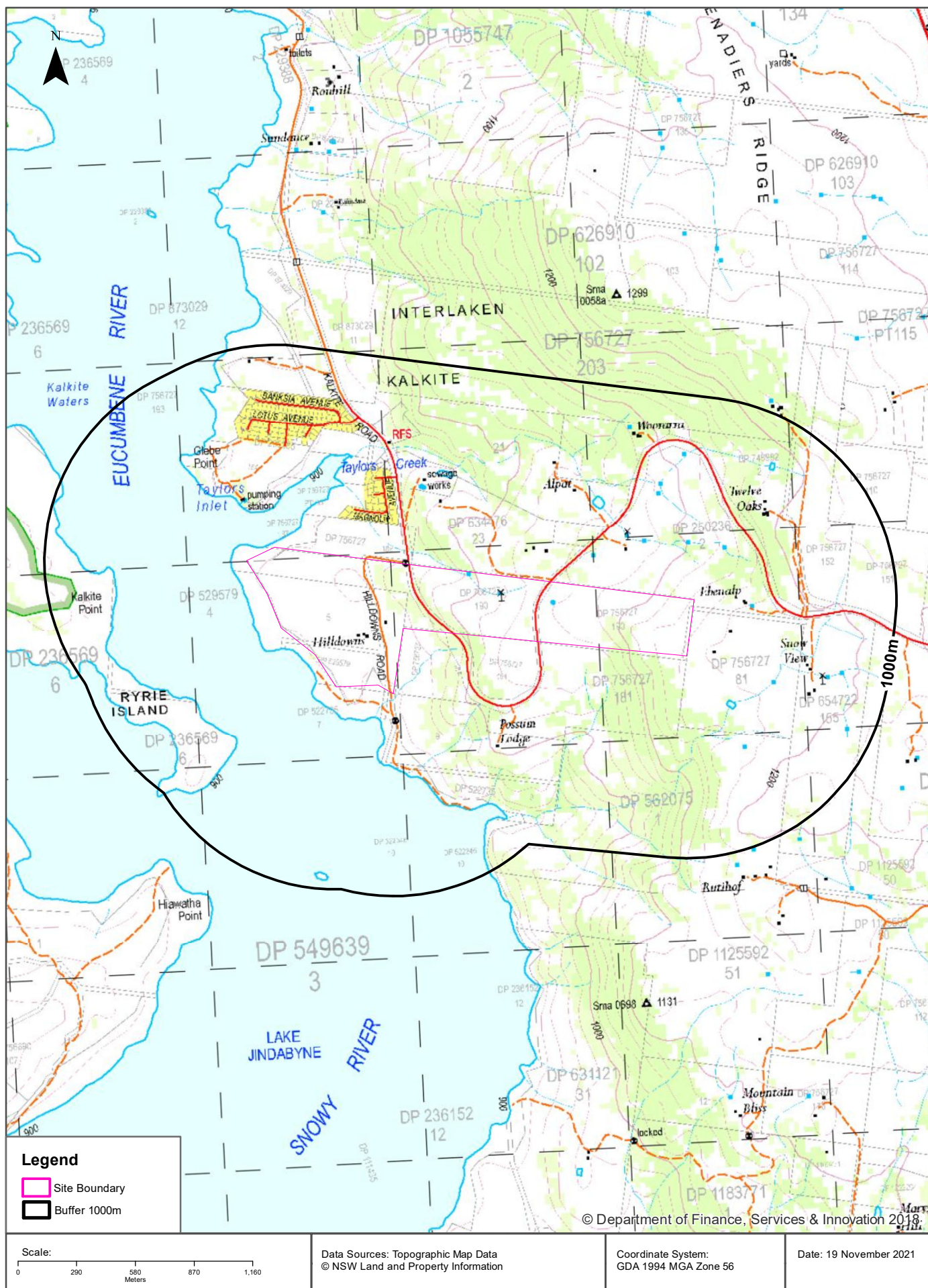
56 Hilldowns Road, Kalkite, NSW 2627





Topographic Map 2015

56 Hilldowns Road, Kalkite, NSW 2627



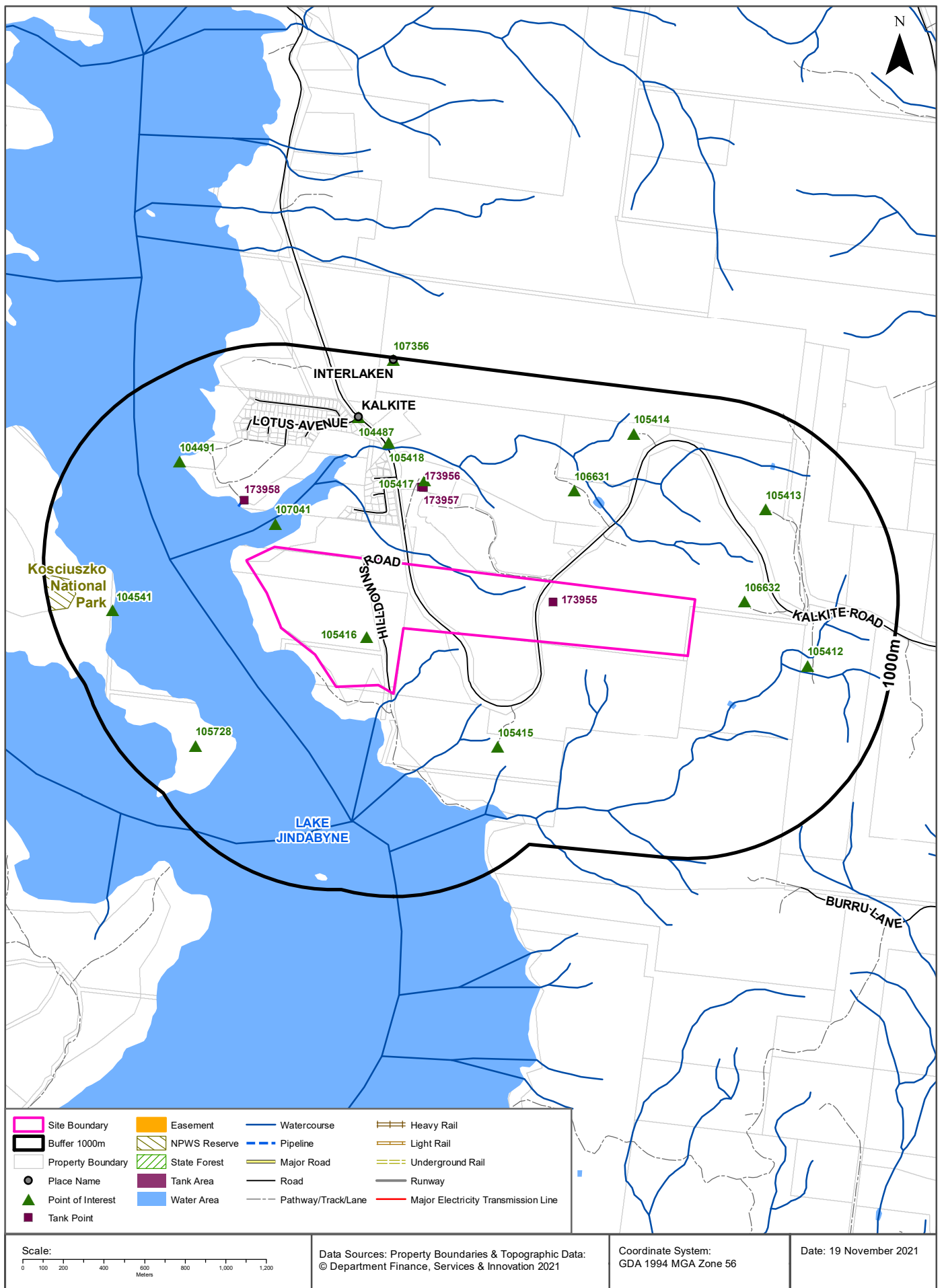
Historical Map 1983

56 Hilddowns Road, Kalkite, NSW 2627



Topographic Features

56 Hilldowns Road, Kalkite, NSW 2627



Topographic Features

56 Hilldowns Road, Kalkite, NSW 2627

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
105416	Homestead	HILLDOWNS	0m	On-site
107041	Bay / Inlet / Basin	TAYLORS INLET	115m	North West
106632	Homestead	EBENALP	245m	East
105417	Sewage Works	Sewage Works	421m	North
106631	Homestead	ALPAT	461m	North East
105415	Homestead	POSSUM LODGE	536m	South
105413	Homestead	TWELVE OAKS	563m	East
105418	Firestation - Bush	BERRIDALE-KALKITE RFB	581m	North
104491	Headland	GLEBE POINT	589m	North West
105412	Homestead	SNOW VIEW	593m	East
104487	Locality	KALKITE	687m	North West
104541	Headland	KALKITE POINT	704m	West
105728	Island	RYRIE ISLAND	718m	South West
105414	Homestead	WOORARRA	773m	North East
107356	Rural Place	INTERLAKEN	990m	North

Topographic Data Source: © Land and Property Information (2015)

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Topographic Features

56 Hilldowns Road, Kalkite, NSW 2627

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
173955	Water	Operational		10/09/2001	0m	On-site
173958	Water	Operational		10/09/2001	270m	North West
173957	Water	Operational		10/09/2001	384m	North
173956	Water	Operational		10/09/2001	386m	North

Tanks Data Source: © Land and Property Information (2015)

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Major Easements

What Major Easements exist within the dataset buffer?

Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
N/A	No records in buffer				

Easements Data Source: © Land and Property Information (2015)

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Topographic Features

56 Hilldowns Road, Kalkite, NSW 2627

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)

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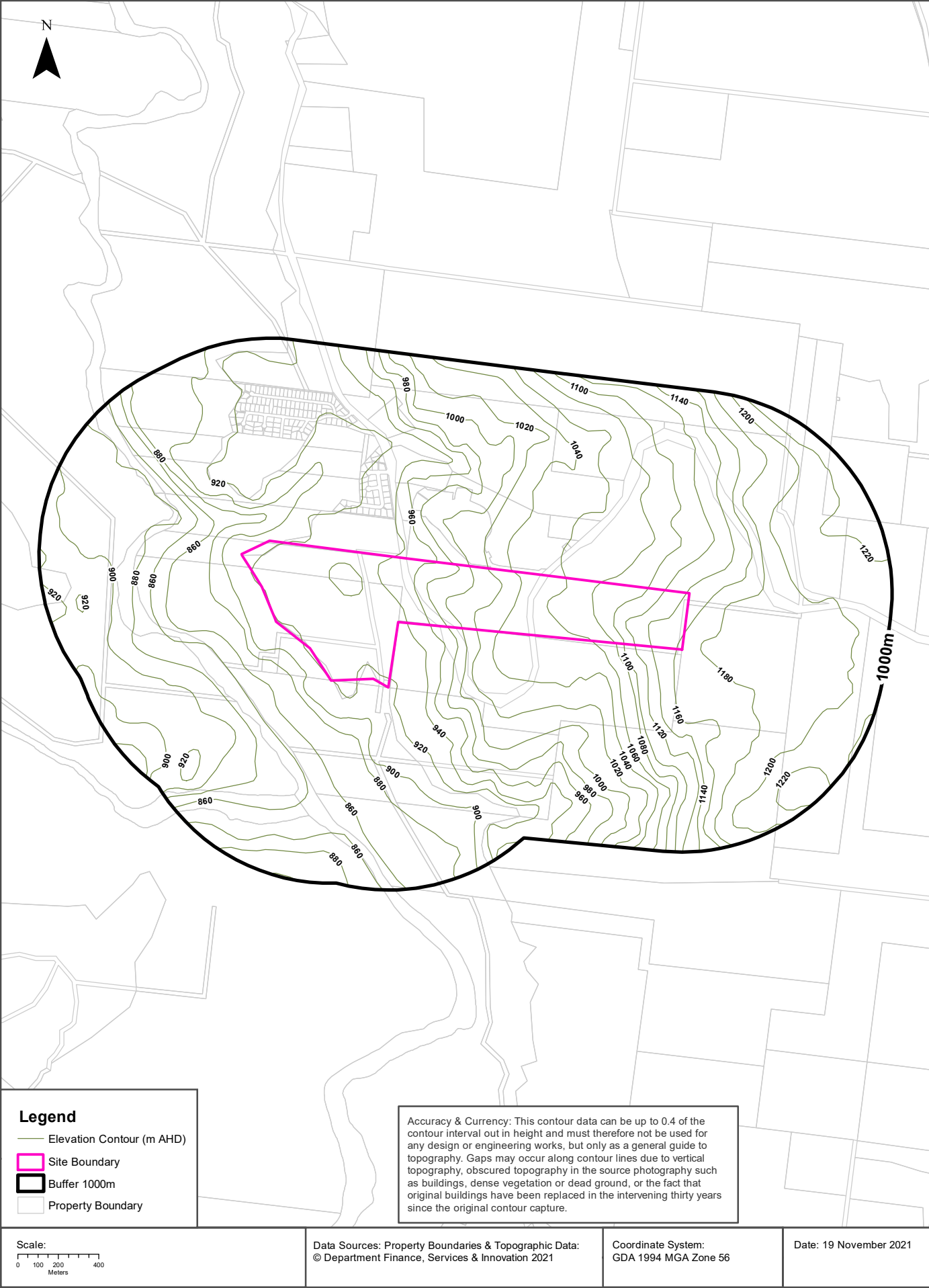
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N0018	NATIONAL PARK	Kosciuszko National Park	01/10/1967	858m	West

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)

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Hydrogeology & Groundwater

56 Hilldowns Road, Kalkite, NSW 2627

Hydrogeology

Description of aquifers within the dataset buffer:

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

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

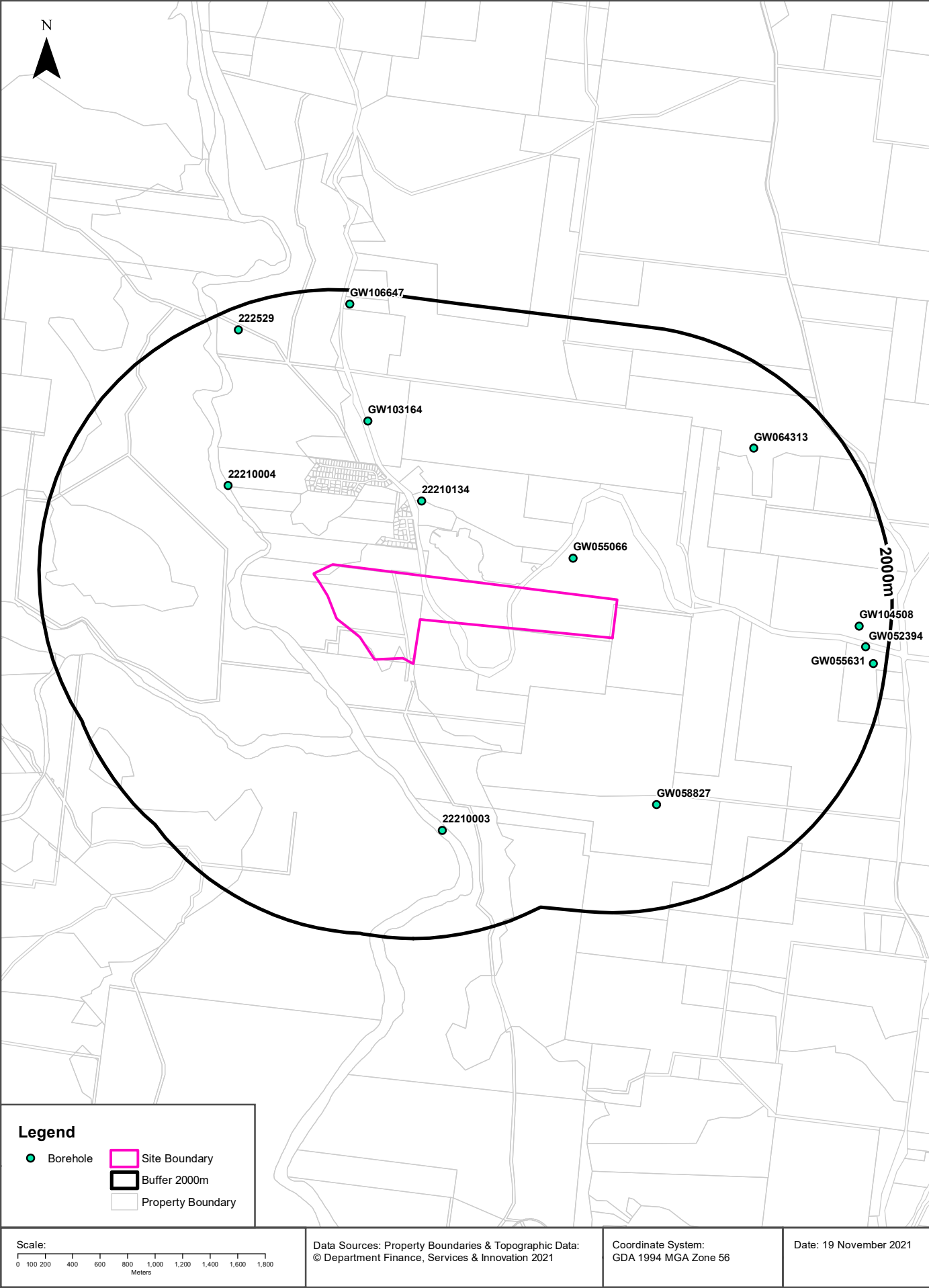
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Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries



Hydrogeology & Groundwater

56 Hilldowns Road, Kalkite, NSW 2627

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW055 066	10BL117 035	Bore	Private	Stock	Stock		01/07/1979	15.20	15.20	Good				261m	East
222101 34					UNK								930.0 8	540m	North
222100 04					UNK								902.0 0	894m	North West
GW103 164	10BL159 692	Bore		Domestic, Stock	Domestic, Stock		26/04/2000	45.00	45.00					1068m	North West
222100 03					UNK								902.0 0	1232m	South
GW058 827	10BL128 791	Bore open thru rock	Private	Domestic, Stock	Domestic, Stock			91.40	91.40	Good				1257m	South East
GW064 313	10BL136 567	Bore	Private	Domestic, Stock	Domestic, Stock		01/07/1987	33.50						1485m	North East
GW104 508	10BL160 652	Bore	Private	Domestic, Stock	Domestic, Stock		28/03/2002	23.00	23.00	Good	3.00	0.550		1773m	East
222529					UNK								902.0 0	1839m	North West
GW052 394	10BL117 340	Well	Private	Domestic, Stock	Not Known		01/10/1980	3.00						1839m	East
GW106 647	10BL160 357	Bore		Domestic, Stock	Domestic, Stock		20/05/2002	43.00	43.00	Good	18.0 0	0.075		1899m	North
GW055 631	10BL120 808	Bore open thru rock	Private	Domestic, Stock	Domestic, Stock		01/07/1981	76.20	76.20	Good				1909m	East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

Hydrogeology & Groundwater

56 Hilldowns Road, Kalkite, NSW 2627

Driller's Logs

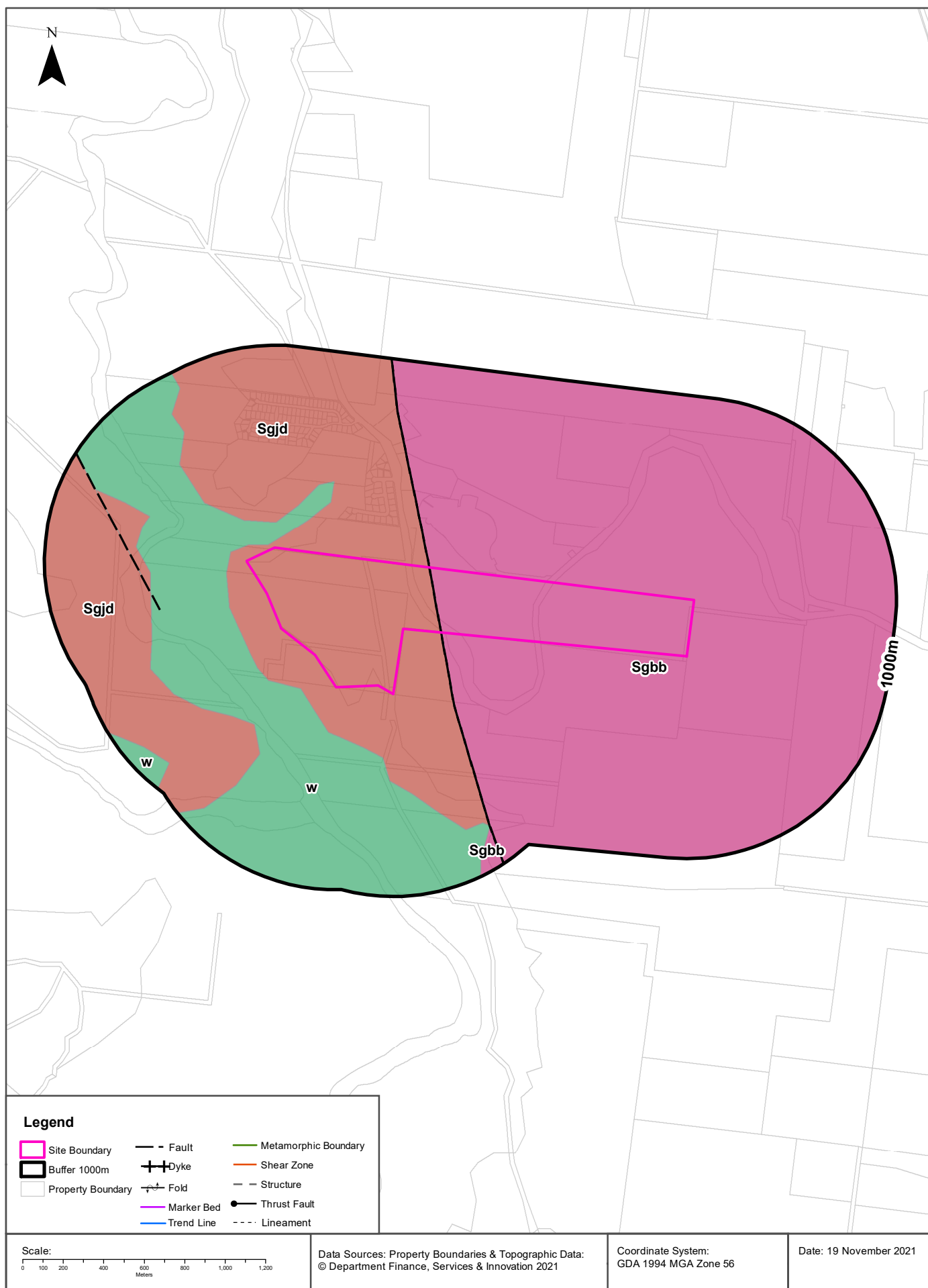
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW055066	0.00m-0.30m Topsoil 0.30m-9.80m Granite Decomposed Water Supply 9.80m-15.20m Granite	261m	East
GW103164	0.00m-0.50m TOPSOIL 0.50m-6.00m LIGHT DECOMPOSED GRANITE 6.00m-13.00m DECOMPOSED GRANITE AND COARSE 13.00m-14.00m BROKEN GRANITE AND QUARTZ 14.00m-42.00m GREY HARD GRANITE AND QUARTZ 42.00m-45.00m HARD BLUE GRANITE	1068m	North West
GW058827	0.00m-0.30m Topsoil 0.30m-0.91m Clay 0.91m-2.13m Granite Decomposed 2.13m-2.74m Clay 2.74m-3.35m Granite Decomposed 3.35m-9.75m Granite Hard Bands Soft Bands 9.75m-91.44m Granite	1257m	South East
GW104508	0.00m-0.50m TOPSOIL 0.50m-5.50m DECOMPOSED GRANITE/SOIL 5.50m-10.00m COARSE GRANITE 10.00m-23.00m HARD BLUE GRANITE ROCK	1773m	East
GW106647	0.00m-0.30m TOPSOIL 0.30m-5.00m WEATHERED GRANITE 5.00m-33.00m RED BLACK GRANITE 33.00m-43.00m HARD,BLACK,WHITE GRANITE	1899m	North
GW055631	0.00m-0.30m Topsoil 0.30m-2.40m Granite Decomposed 2.40m-76.20m Granite Water Supply	1909m	East

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp
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Geology

56 Hilldowns Road, Kalkite, NSW 2627



Geology

56 Hilldowns Road, Kalkite, NSW 2627

Geological Units 1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dist	Dir
Sgjd	Hornblende and biotite tonalite	Gaden Tonalite	Jindabyne Suite		Palaeozoic	0m	On-site
Sgbb	Biotite-rich granite	Bullenbalong Granodiorite	Bullenbalong Suite		Palaeozoic	0m	On-site
w	Water	water	water		Cainozoic	27m	South West

Geological Structures 1:250,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Distance	Direction
Fault		Thrust, Accurate	Bega_Mallacoota	0m	On-site
Fault		Thrust, Accurate	SCRA	0m	On-site
Fault		Fault, Accurate	Bega_Mallacoota	491m	West

Geological Data Source : NSW Department of Industry, Resources & Energy

© State of New South Wales through the NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

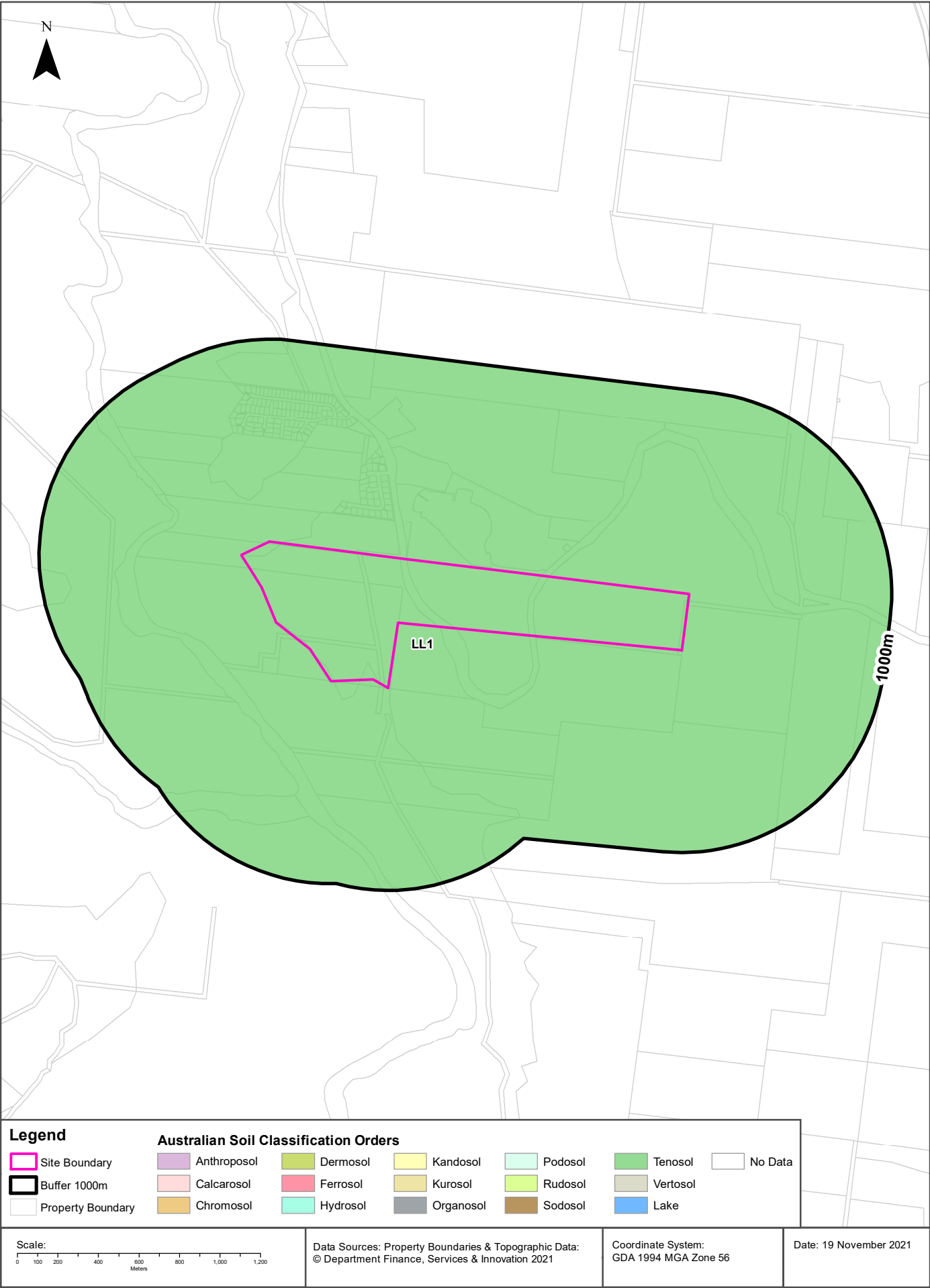
56 Hilldowns Road, Kalkite, NSW 2627

Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy



Soils

56 Hilldowns Road, Kalkite, NSW 2627

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
LL1	Tenosol	Hills and plains--multicyclic erosional landscape of hills and hillocky areas with intervening plain-like areas, the whole traversed and dissected by variously incised stream valleys--some layering of soil materials: (i) relatively higher hills and ranges of loamy soils having an A2 horizon (Um4.2) and yellow-brown earths (Gn2.44) with (Um5.41 and Um5.S1), many stones, and rock outcrops; gullies of (Dr2) and (Dy3.32 and Dy3.42) soils; (ii) relatively lower hills and hillocky areas of hard acidic red soils (Dr2.21) and (Uc6.11), (Um) soils and rock outcrops with (Dy3.4) soils on lower slopes and (Dy3.43) in depressions; (iii) undulating plain-like areas with slopes and benches of red and yellow earths including (Gn2.14, Gn2.15, and Gn2.24); (iv) stream valleys of (Um6.11), some with clay D horizons and other (Uc) and (Um) soils; (v) also remains of various soil materials such as ironstone boulders in various situations. Soil dominance is difficult to assess: the most common soils are likely to be the (D) soils as a group but their variety is such that no single (D) soil can, on present data, be regarded as dominant.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO

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Acid Sulfate Soils

56 Hilldowns Road, Kalkite, NSW 2627

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

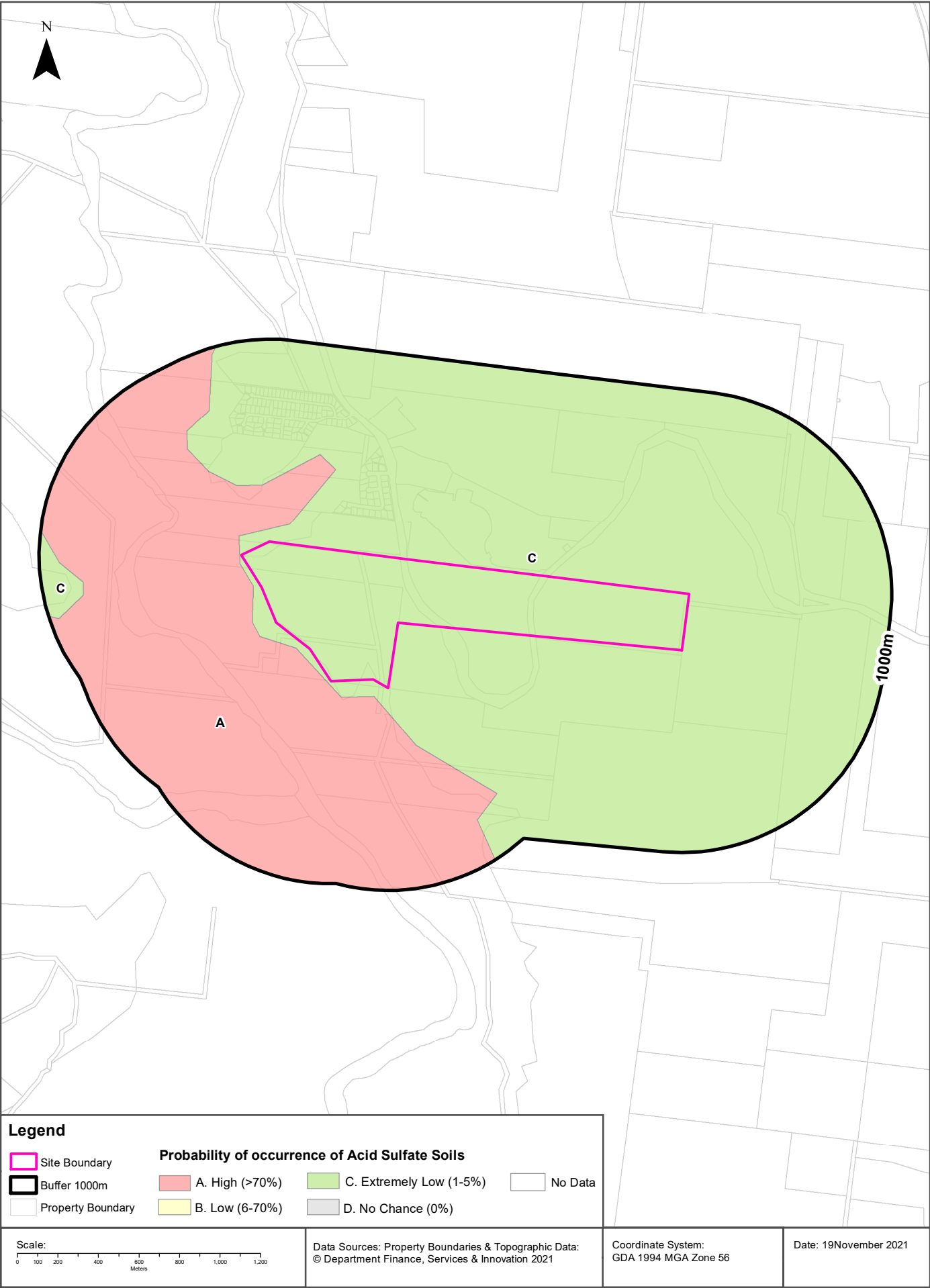
Soil Class	Description	EPI Name	Distance	Direction
N/A				

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Atlas of Australian Acid Sulfate Soils

56 Hilldowns Road, Kalkite, NSW 2627



Acid Sulfate Soils

56 Hilldowns Road, Kalkite, NSW 2627

Atlas of Australian Acid Sulfate Soils

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

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site
A	High Probability of occurrence. >70% chance of occurrence.	11m	West

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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Dryland Salinity

56 Hilldowns Road, Kalkite, NSW 2627

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit

The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.

In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Mining

56 Hilldowns Road, Kalkite, NSW 2627

Mining Subsidence Districts

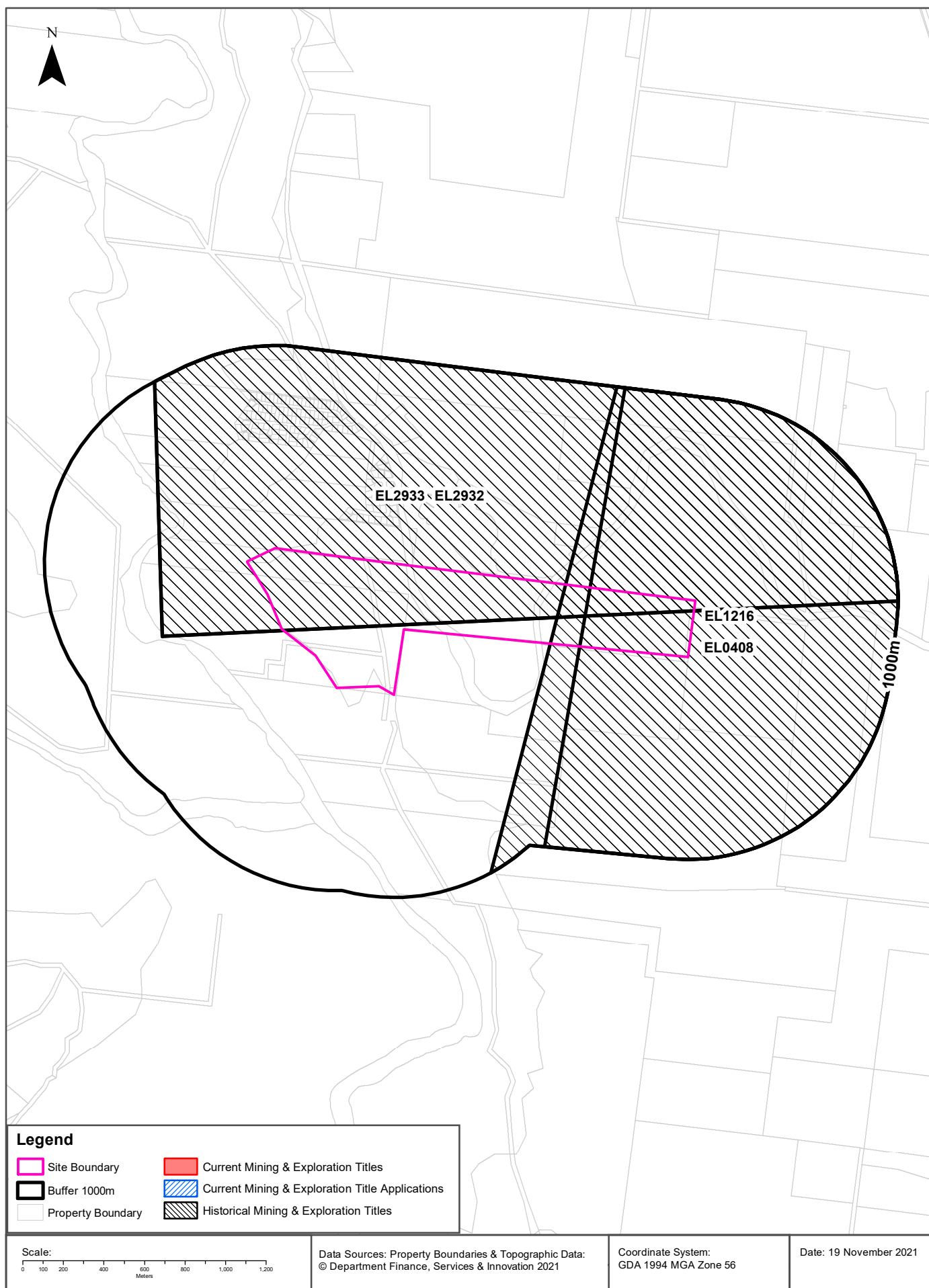
Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)
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Mining & Exploration Titles

56 Hilddowns Road, Kalkite, NSW 2627



Mining

56 Hilldowns Road, Kalkite, NSW 2627

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

56 Hilldowns Road, Kalkite, NSW 2627

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
EL1216	CRA EXPLORATION PTY LIMITED	01 Jan 1979	01 Sep 1981	MINERALS	Diamond	0m	On-site
EL0408	TAMBANIS HOLDINGS PTY LIMITED	01 Jan 1970	01 Jan 1972	MINERALS	Cu Pb Zn Ag Au	0m	On-site
EL2932	RYE, Phillip Michael	01 Oct 1987	01 Dec 1990	MINERALS	Aggregate	0m	On-site
EL2933	RYE, Phillip Michael	01 Oct 1987	01 Dec 1990	MINERALS	Aggregate	0m	On-site

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

State Environmental Planning Policy

56 Hilldowns Road, Kalkite, NSW 2627

State Significant Precincts

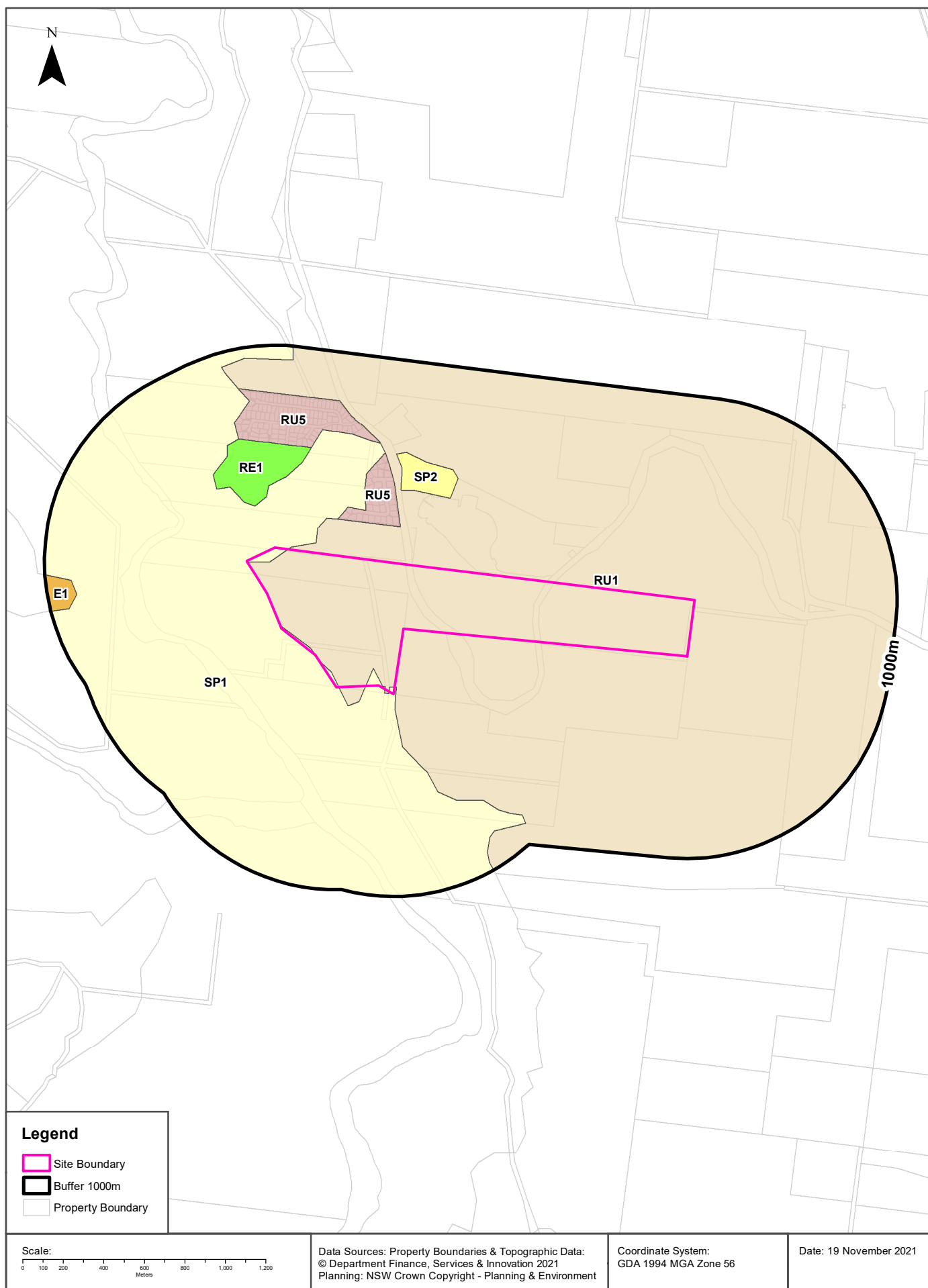
What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

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EPI Planning Zones

56 Hilldowns Road, Kalkite, NSW 2627



Environmental Planning Instrument

56 Hilldowns Road, Kalkite, NSW 2627

Land Zoning

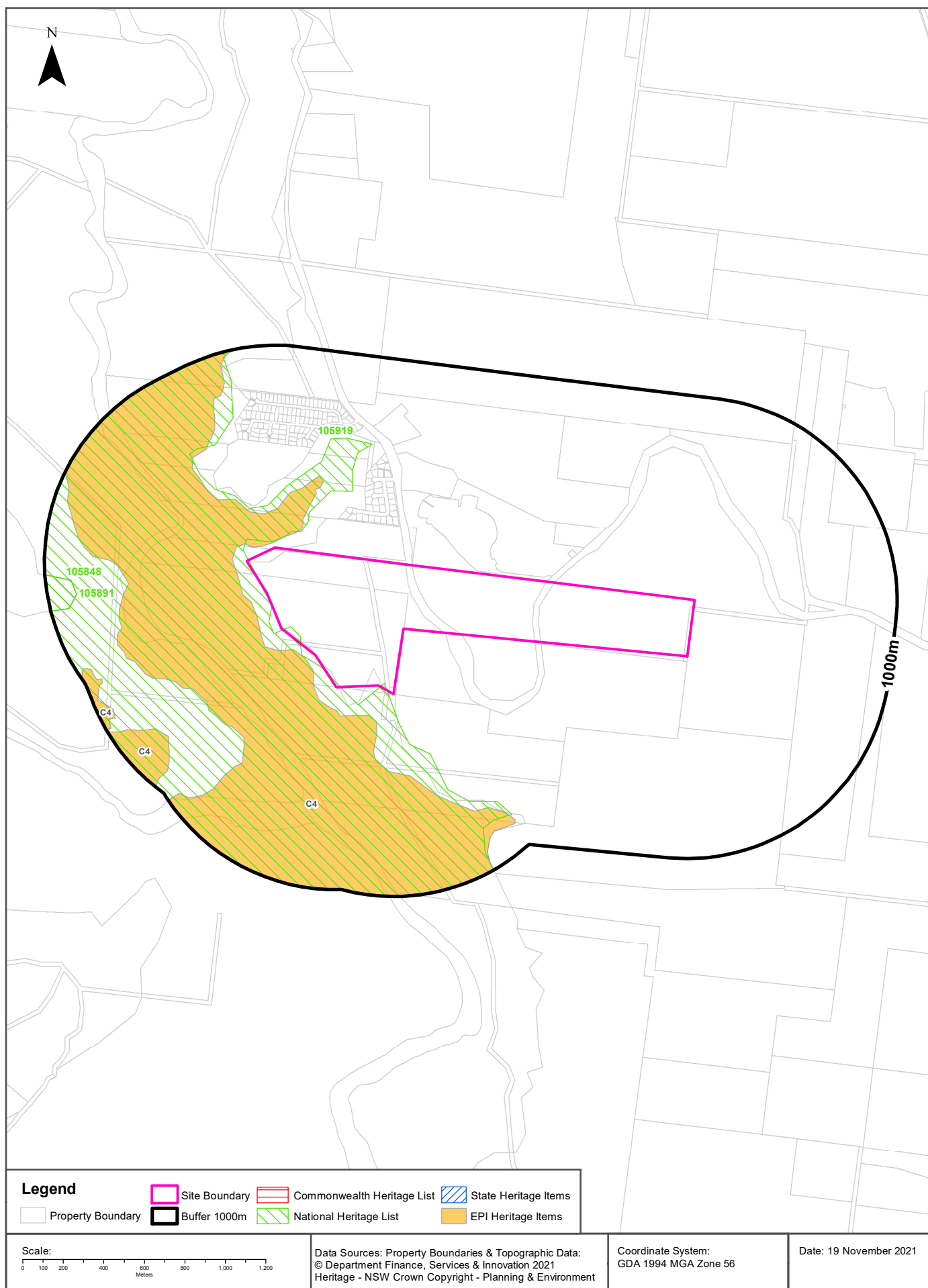
What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP1	Special Activities	Water Supply System	Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		0m	On-site
RU1	Primary Production		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		0m	On-site
RU5	Village		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		181m	North West
RE1	Public Recreation		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		230m	North West
SP2	Infrastructure	Sewage System	Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		354m	North
RU5	Village		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		512m	North West
E1	National Parks and Nature Reserves		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		858m	West

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Heritage Items

56 Hilldowns Road, Kalkite, NSW 2627



Heritage

56 Hilldowns Road, Kalkite, NSW 2627

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
105919	Snowy Mountains Scheme	Snowy Mountains Hwy, Cabramurra NSW	1/08/284/0006	Historic	Nominated place		0m	On-site
105848	Kosciuszko National Park	Snowy Mountains Hwy, Tumut NSW	1/05/345/0001	Natural	Nomination now ineligible for PPAL		858m	West
105891	Australian Alps National Parks and Reserves	The Alpine Way, Thredbo Village NSW	1/08/284/0028	Natural	Listed place	07/11/2008	858m	West

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

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage
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Environmental Planning Instrument - Heritage

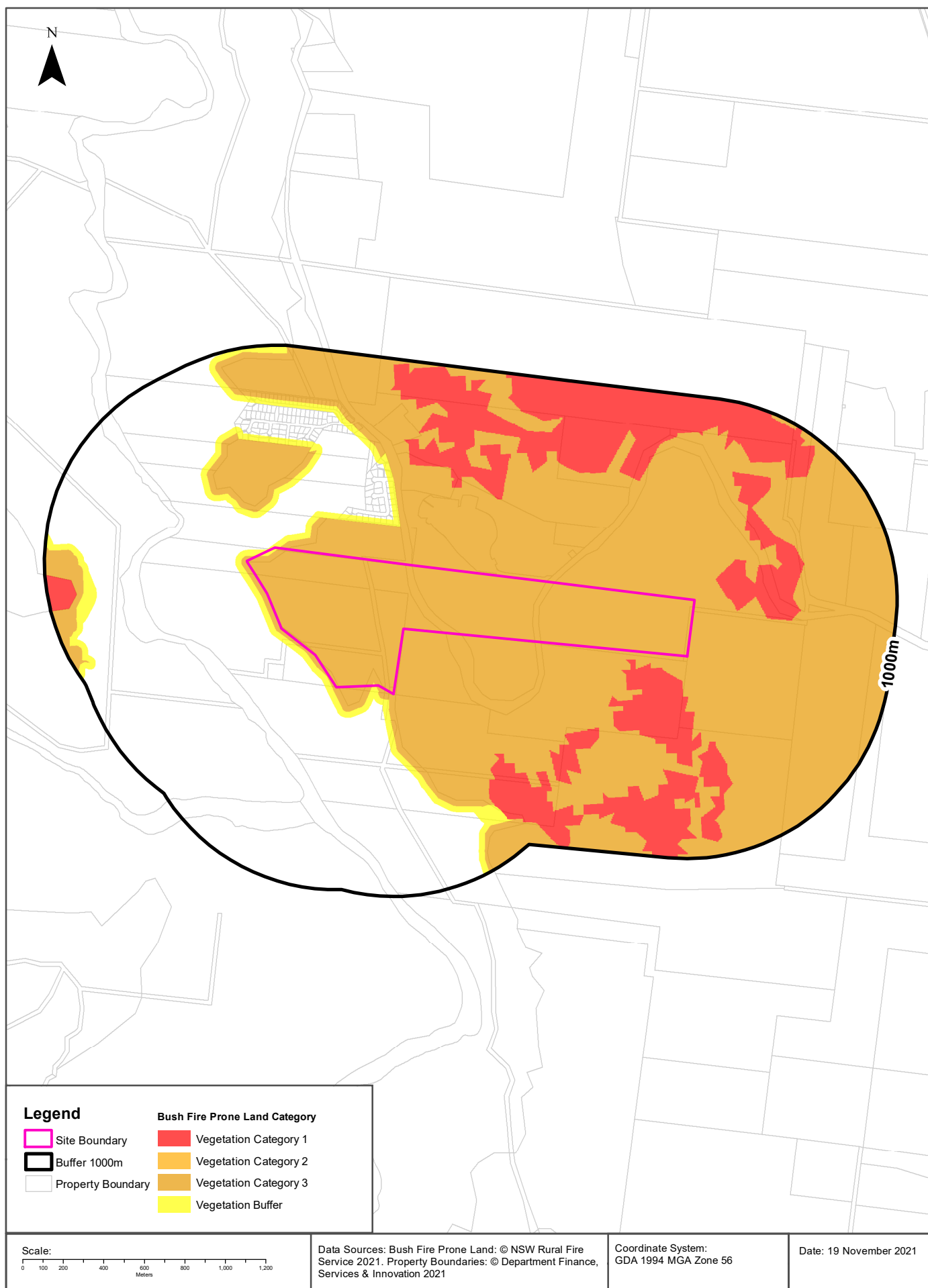
What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
C4	Lake Jindabyne	Conservation Area - General	Local	Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	22/07/2016	25m	West

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Natural Hazards - Bush Fire Prone Land

56 Hilldowns Road, Kalkite, NSW 2627



Natural Hazards

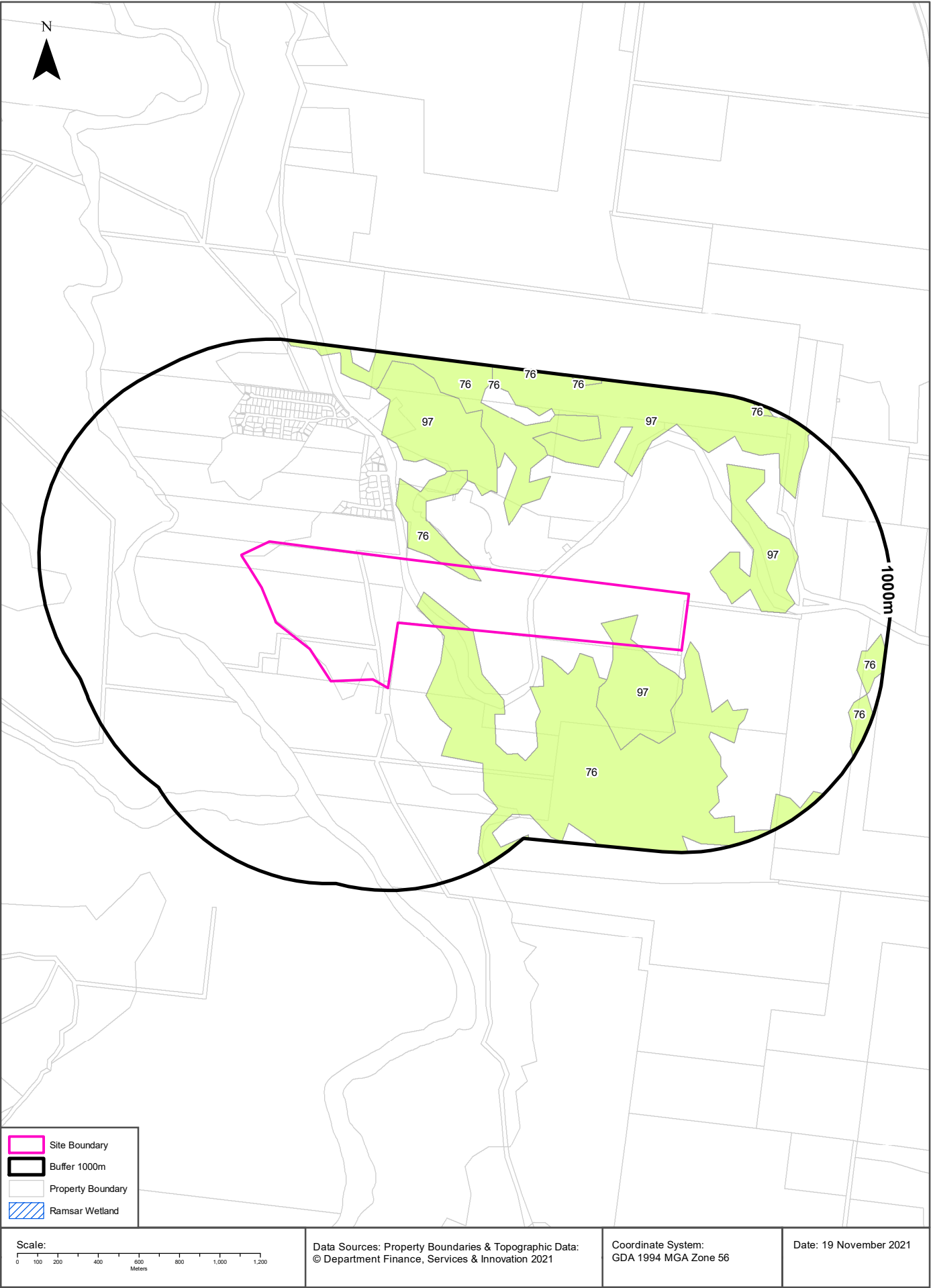
56 Hilldowns Road, Kalkite, NSW 2627

Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Category 3	0m	On-site
Vegetation Buffer	0m	On-site
Vegetation Category 1	39m	South East

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence



Ecological Constraints

56 Hilldowns Road, Kalkite, NSW 2627

Vegetation of the Southern Forests

What vegetation of the Southern Forests exists within the dataset buffer?

Veg Code	Formation	Class	Group	Distance	Direction
97	04 Montane Tableland Forests	04c ST Montane Mountain Gum-Snow Gum Forests	Montane Acacia-Dry Shrub-Herb-Grass Forest	0m	On-site
76	04 Montane Tableland Forests	04c ST Montane Mountain Gum-Snow Gum Forests	Central Tablelands Shrub-Grass Dry Forest	0m	On-site

Vegetation of the Southern Forests: NSW Office of Environment and Heritage

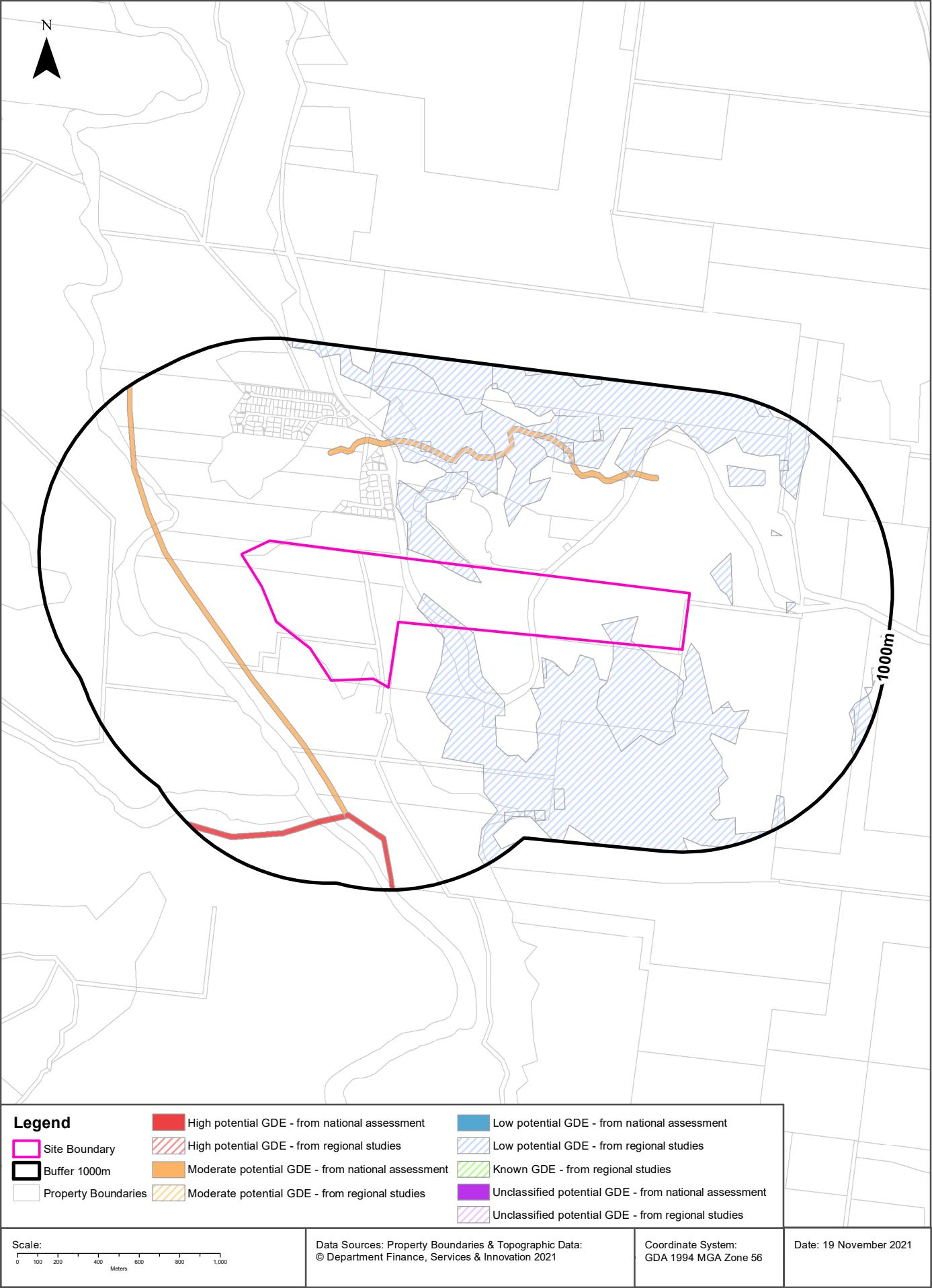
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Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment



Ecological Constraints

56 Hilldowns Road, Kalkite, NSW 2627

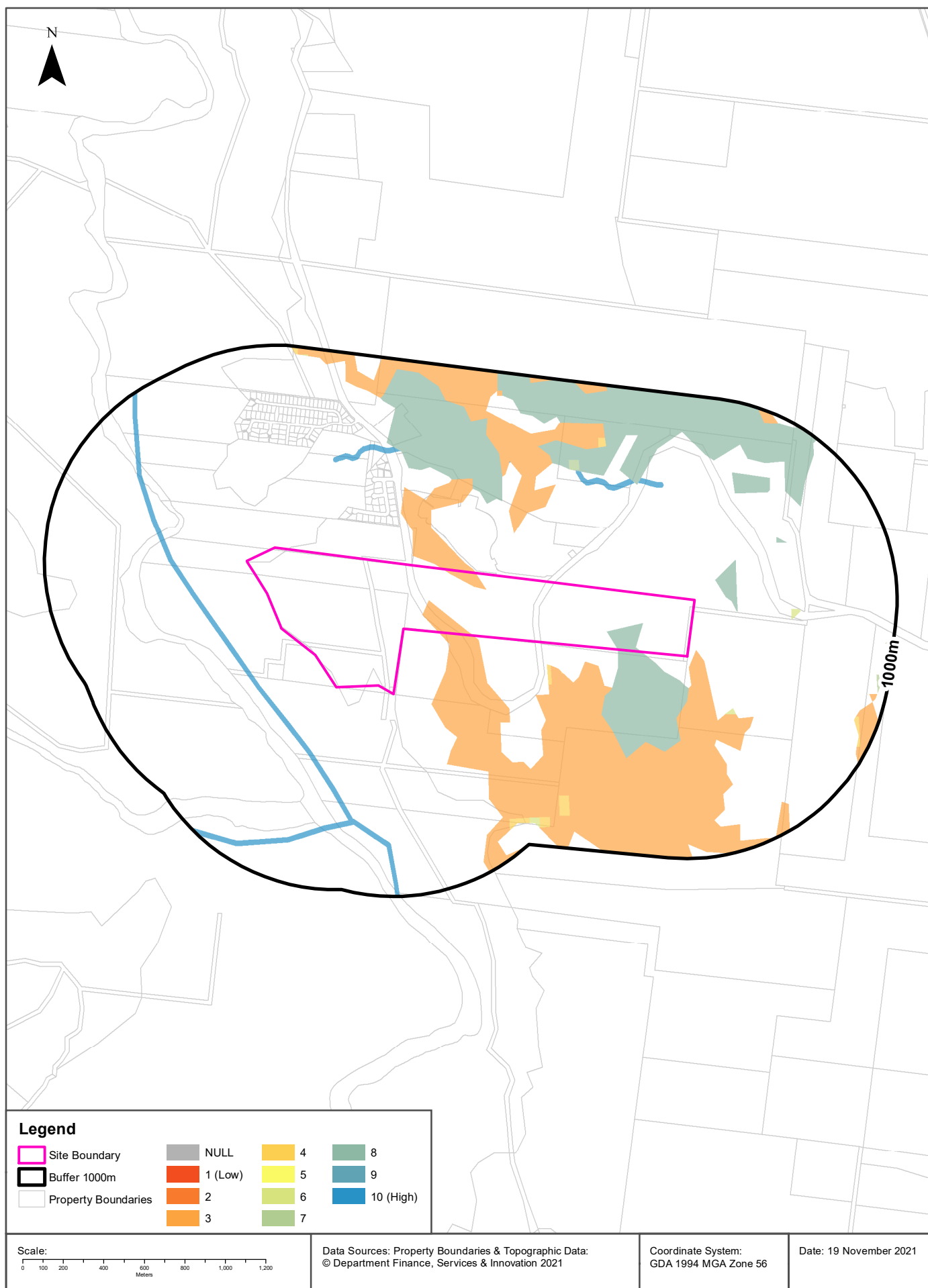
Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	Low potential GDE - from regional studies	Undulating upland plains with some tabular basalt relief and granite tors.	Vegetation		0m	On-site
Terrestrial	Low potential GDE - from regional studies	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	Vegetation		0m	On-site
Aquatic	Moderate potential GDE - from national assessment	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	River		249m	West
Aquatic	Moderate potential GDE - from national assessment	Undulating upland plains with some tabular basalt relief and granite tors.	River		455m	North
Aquatic	High potential GDE - from national assessment	Undulating upland plains with some tabular basalt relief and granite tors.	River		646m	South
Aquatic	High potential GDE - from national assessment	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	River		656m	South West

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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Ecological Constraints - Inflow Dependent Ecosystems Likelihood

56 Hilldowns Road, Kalkite, NSW 2627



Ecological Constraints

56 Hilldowns Road, Kalkite, NSW 2627

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	3	Undulating upland plains with some tabular basalt relief and granite tors.	Vegetation		0m	On-site
Terrestrial	8	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	Vegetation		0m	On-site
Terrestrial	4	Undulating upland plains with some tabular basalt relief and granite tors.	Vegetation		104m	South East
Aquatic	10	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	River		249m	West
Terrestrial	6	Undulating upland plains with some tabular basalt relief and granite tors.	Vegetation		339m	South East
Aquatic	10	Undulating upland plains with some tabular basalt relief and granite tors.	River		455m	North
Terrestrial	6	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	Vegetation		475m	East
Terrestrial	7	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.	Vegetation		563m	North East
Terrestrial	5	Undulating upland plains with some tabular basalt relief and granite tors.	Vegetation		984m	East

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

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Ecological Constraints

56 Hilldowns Road, Kalkite, NSW 2627

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria booroolongensis	Booroolong Frog	Endangered	Not Sensitive	Endangered	
Animalia	Amphibia	Litoria verreauxii alpina	Alpine Tree Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Rhipidura fuliginosa	New Zealand Fantail (Lord Howe Is. subsp.)	Presumed Extinct	Not Sensitive	Extinct	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Cercartetus nanus	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Mastacomys fuscus	Broad-toothed Rat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Calotis glandulosa	Mauve Burr-daisy	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Discaria nitida	Leafy Anchor Plant	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Euphrasia scabra	Rough Eyebright	Endangered	Category 3	Not Listed	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

NSW BioNet: © State of NSW and Office of Environment and Heritage

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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
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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EIL Calculation Sheets

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs
Select contaminant from list below
DDT
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	DDT generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	3	3
Urban residential and open public spaces	180	180
Commercial and industrial	640	640

Inputs
Select contaminant from list below
Naphthalene
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Naphthalene generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	30	10
Urban residential and open public spaces	40	45
Commercial and industrial	50	75

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	50	120
Urban residential and open public spaces	110	270
Commercial and industrial	150	380

Inputs	
Select contaminant from list below	
Cr_III	
Below needed to calculate fresh and aged ACLs	
Enter % clay (values from 0 to 100%)	
10	
Below needed to calculate fresh and aged ABCs	
Measured background concentration (mg/kg). Leave blank if no measured value	
or for fresh ABCs only	
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration	
7	
or for aged ABCs only	
Enter State (or closest State)	
NSW	
Enter traffic volume (high or low)	
low	

Outputs		
Land use	Cr III soil-specific EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	130	140
Urban residential and open public spaces	230	410
Commercial and industrial	340	670

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
5.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Enter organic carbon content (%OC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	45	50
Urban residential and open public spaces	75	120
Commercial and industrial	100	170

Inputs
Select contaminant from list below
Naphthalene
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Naphthalene generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

APPENDIX

E

TRANSPORT IMPACT ASSESSMENT



now



Transport Impact Assessment

Residential Development

50522014



Prepared for
Sacco Building Group

14 April 2022



now



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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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1 Introduction

Cardno was engaged by SACCO Building Group to undertake a local traffic network assessment for a Planning Proposal (PP) at 56 Hilldowns Road on lots DP 529579 and DP 756727, Kalkite. This assessment will seek to identify the broader network impacts of the proposed future development across the surrounding traffic network.

1.1 Scope of services

1.1.1 Literature review and data gathering

Cardno have reviewed information available for the project. This included RTA Guide to Traffic Generating Developments (October 2002) and the RMS Guide to Traffic Generating Developments Updated Traffic Surveys (August 2013).

1.1.2 Traffic modelling

Six (6) intersections within proximity to the development will be investigated in order to determine the flow on affects from this development. Using SIDRA 9 traffic modelling software, Cardno undertook individual modelling of the following sign controlled intersections along Kalkite Road (shown in **Table 1-1**, and **Figure 1-1**).

Table 1-1 Nominated Intersections

No.	Intersection
1.	Lotus Street / Kalkite Road
2.	Gardenia Court / Kalkite Road
3.	Section A Proposed Access / Kalkite Road
4.	Section B Proposed Access / Kalkite Road
5.	Section C Proposed Access / Kalkite Road

1.1.3 Scenario modelling

Cardno modelled the aforementioned intersections in both the AM and PM Peak hours for the future 2031 'With Development' Scenario (New development).

A total of **5 individual models with 2 varying scenarios** each have been created for this exercise. The modelling is aimed to demonstrate the projected impact of development on the external road network.

In addition to the above a **network model (with 2 varying scenarios)** shall also be produced showing the individual intersections linked to ensure delays are distributed throughout the network.

1.1.4 Reporting

Results and findings from the investigations have been compiled and summarised within this report.

Figure 1-2 Locality Plan of the Traffic Network



1.2 Objectives

The purpose of this report is to assess the current operation of the existing local Kalkite Road traffic network and to determine the net effect that the proposed Kalkite residential development will have on the road network.

Cardno have undertaken SIDRA traffic modelling for the local network which includes the traffic generated from existing township dwellings and the proposed Kalkite residential development. The purpose is to achieve in-principal support from Snowy Monaro Regional Council confirming that the proposed development will not have significant detrimental impact on the external road network and the assist in the preparation of the proposed planning proposal.

2 Standards / Review of Literature

The following Standards were used in the preparation of this report:

Table 2-1 Relevant Standards

Standard	Authority	Year
Guide to Traffic Generating Developments (Version 2.2)	Roads and Traffic Authority NSW (now TfNSW)	2002
Guide to Traffic Generating Developments Updated Traffic Surveys	NSW Transport Roads and Maritime Services (now TfNSW)	2013
Snowy River Development Control Plan (Chapter C – General Planning Consideration)	Snowy Monaro Regional Council	2013

3 Proposed Development

The proposed Kalkite residential development is located at upon lots DP 529579 and DP 756727, Kalkite.

Lot DP529579 is located directly south of the existing Kalkite Township and is bound by Lake Jindabyne to the west and Kalkite Road to the east. It is proposed that this lot, described within this report as Section A, will contain a commercial centre and single residential housing.

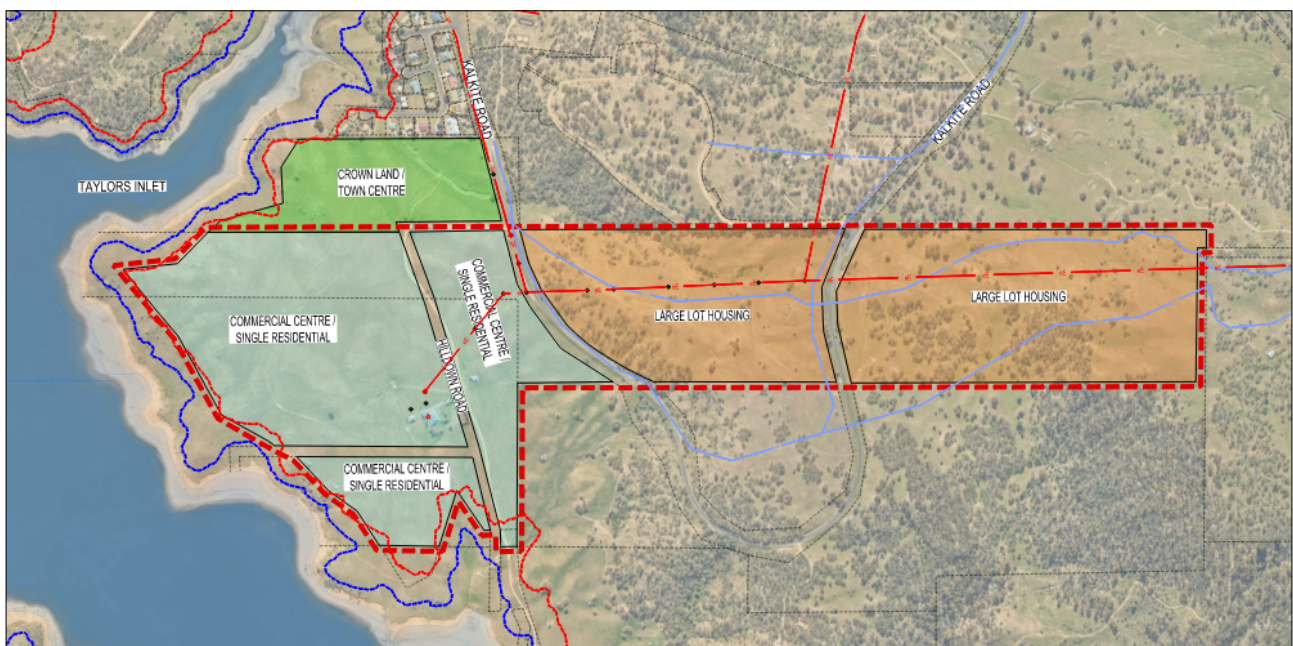
Lot DP 756727 is adjacent to Lot DP529579 and is proposed to house large lot dwellings. For the sake of this report, this lot has been broken into sections B and C and are defined by the proposed access points. The central sections of Lot DP 756727 (Sections B and C) are bound by Kalkite Road to the east and west

The proposed development yields for each section are listed below:

- > Section A – 214 Single Residential Lots, 1 Commercial Lot, and 1 Camping and Caravan Lot;
- > Section B – 4 Large Residential Lots;
- > Section C – 4 Large Residential Lots; and

Refer to **Figure 3-1** for further details.

Figure 3-1 Proposed Kalkite Residential Subdivision draft masterplan



4 Existing Road Network

4.1.1 Kalkite Road

Kalkite Road is classified as a local road and provides a critical link between the Kalkite Township and Kosciuszko Road. This road provides the primary connection between Kalkite and Jindabyne / Cooma. The Hilldowns Road / Kalkite Road T-intersection experiences major vehicle flows of predominately through movements in a north-south direction. This road has a speed limit of 80km/h.

Figure 4-1 Hilldowns Road // Kalkite Road Intersection



4.1.2 Lotus Street

Lotus Street is classified as a local road. This road provides the primary connection between Canberra and the South Coast. Throughout the township of Bungendore, Lotus Street has a speed limit of 50km/h. The street is single carriage with informal parking available along both shoulders of the road.

Figure 4-2 Lotus Street / Kalkite Road Intersection



4.1.3 Gardenia Court

Gardenia Court is classified as a local road and operates as a 50km/h single carriage roadway with informal street parking available along both sides of the road shoulders. Gardenia Court runs perpendicular to Kalkite Road, where both meet in a three way t-intersection. Continuous flow is granted to Kalkite Road, with the east approach (Gardenia Court) operating under give way sign control.

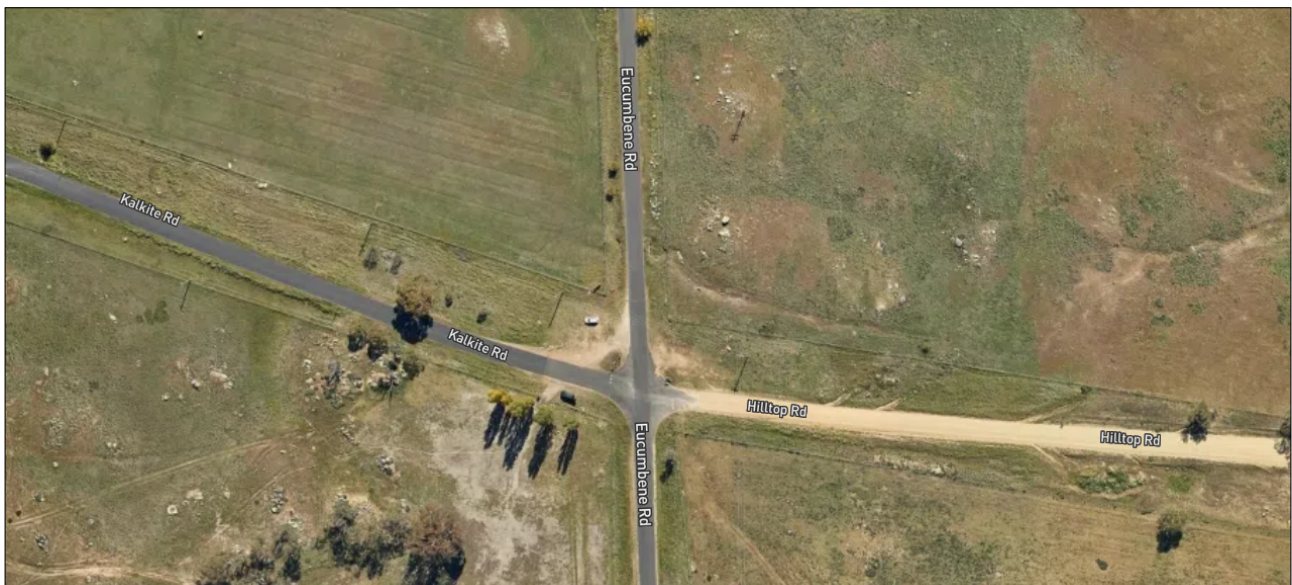
Figure 4-3 Gardenia Court / Kalkite Road Intersection



4.1.4 Eucumbene Road

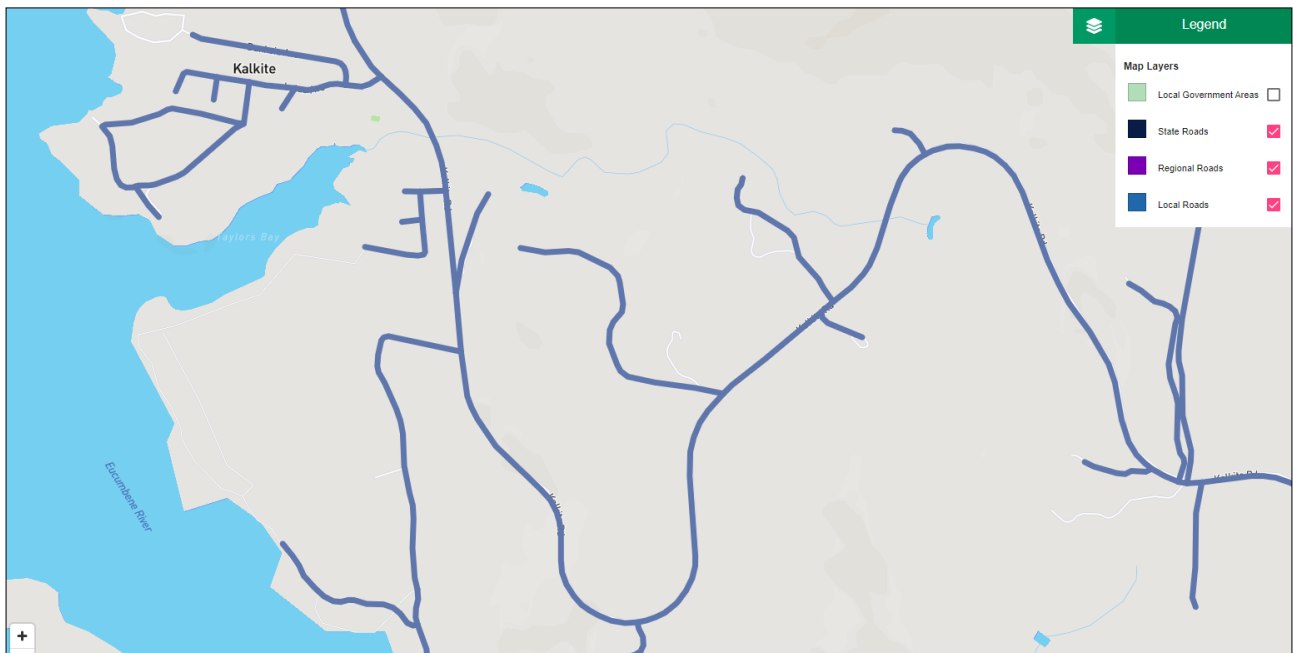
Eucumbene Road is classified as a local road and operates as a single carriage roadway connecting the town of Eucumbene to Kosciuszko Road. Kalkite Road meets Eucumbene Road Both streets meet in a four way cross-intersection, with continuous flow granted to Eucumbene Road. Both east and west approaches of Kalkite Road and Hilltop Road operate under give way sign control.

Figure 4-4 Eucumbene Road / Kalkite Road / Hilltop Road Intersection



In accordance with the Transport for NSW, NSW Road Network Classifications are displayed in **Figure 4-5** below. Of the local roads analysed within this report Kalkite Road has a speed limit of 80km/h to the south of the township and a 50 km/h speed limit upon entering the township before the Gardenia Court / Kalkite Road Intersection. Both Gardenia Court and Lotus Street have a speed limit of 50km/h.

Figure 4-5 TfNSW Road Classification Map



4.2 Road Safety

Cardno have utilised crash history Data from the NSW Centre for Road Safety Interactive crash statistics to review the local and extended traffic network in the context of road safety. Overall, there have been two crashes in the assessment area since 2015. Notable incidents are listed below:

- > There has been two crashes along Kalkite Road in the past five years, one of these crashes resulted in moderate injury and occurred at the Kalkite Road / Eucumbene Road cross intersection. The other crash occurred along Kalkite road and resulted in a tow away without injury.

All crash locations along Kalkite Road are listed in **Figure 4-6** on the following page with additional details listed in **Table 4-1**.

The development has been reviewed in the context of road safety and possible issues arising from the development. The review considered existing transport infrastructure surrounding the site, as well as the proposed interfaces of new connections to be constructed.

Based on the review of available information, the proposed development is unlikely to have an adverse impact on the safety and operability of the road network surrounding the site.

Figure 4-6 Road Crash and Casualty Statistics History Map (Source: Transport for NSW Centre for Road Safety)

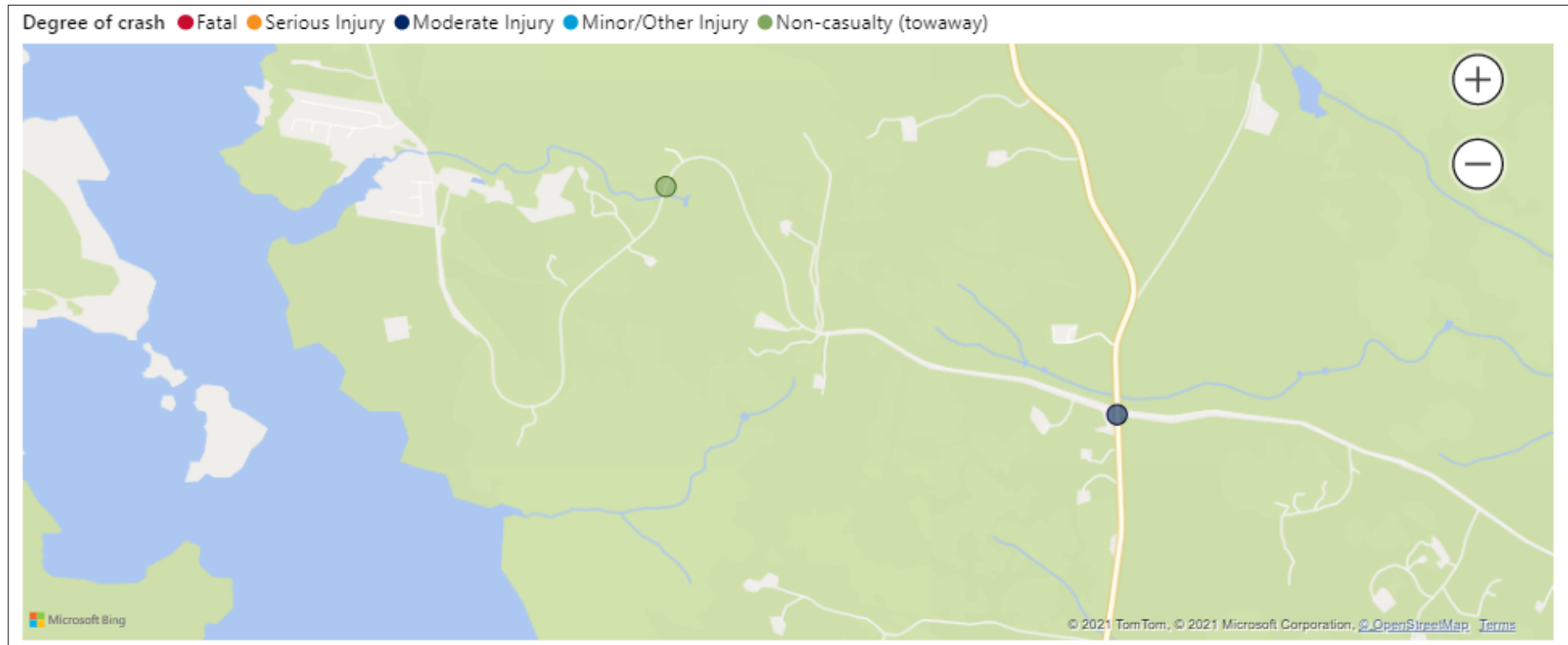


Table 4-1 Road Crash and Casualty Statistics History Table (Source: Transport for NSW Centre for Road Safety)

Reporting	Crash ID	Degree of crash	RUM - code	RUM-description	Type of location	Natural lighting	Longitude	Latitude	No. Killed	No. injured
2016	1114894	Moderate Injury	81	Off left / right bend => obj	X-intersection	Dusk	148.68	-36.35	0	1
2018	1174382	Non-casualty (tow away)	86	Off left / left bend	2-way undivided	Daylight	148.65	-36.34	0	0

5 Traffic Engineering Assessment

5.1 Traffic Generation

The total generated trips associated with the proposed development was calculated with reference to the *RMS Guide to Traffic Generating Developments* (Oct 2002). This guide provides daily vehicle trip rates single dwelling residential housing and commercial retail.

For single dwelling residential dwellings, both AM and PM peak hour trips rates are 1.0 trips per dwelling. A directional split in/out of 26/74 for the AM, where 26% enter the development and 74% exit during the peak hour period. For the PM peak hour, a reduced direction split of 64/36 was assumed, where 64% access the proposed development and 36% exit during this period.

Due to the preliminary nature of the proposed sub division, it has been assumed that an upper limit of 500m² GFA will be allocated for commercial retail as part of the development. A peak hourly trip generation rate of 12.5 vehicles per 100m² GFA was utilised for this analysis.

It is unknown how many camping/caravan sites the proposed site will contain, however, based on the area of the block it is anticipated it will contain a maximum of 20 sites. From other Transport Impact Assessment on camping/caravan parks such as *Discovery Holiday Park Cradle Mtn TIA (2020)* and *Alterations and Additions to Palms Oasis Caravan Park (2018)*, the traffic generation from a caravan park is 1 trip per camping/caravan space in both the AM and the PM. Leaving the site in the AM and entering the site in the PM.

Table 5-1 below summarises the traffic generation for the development.

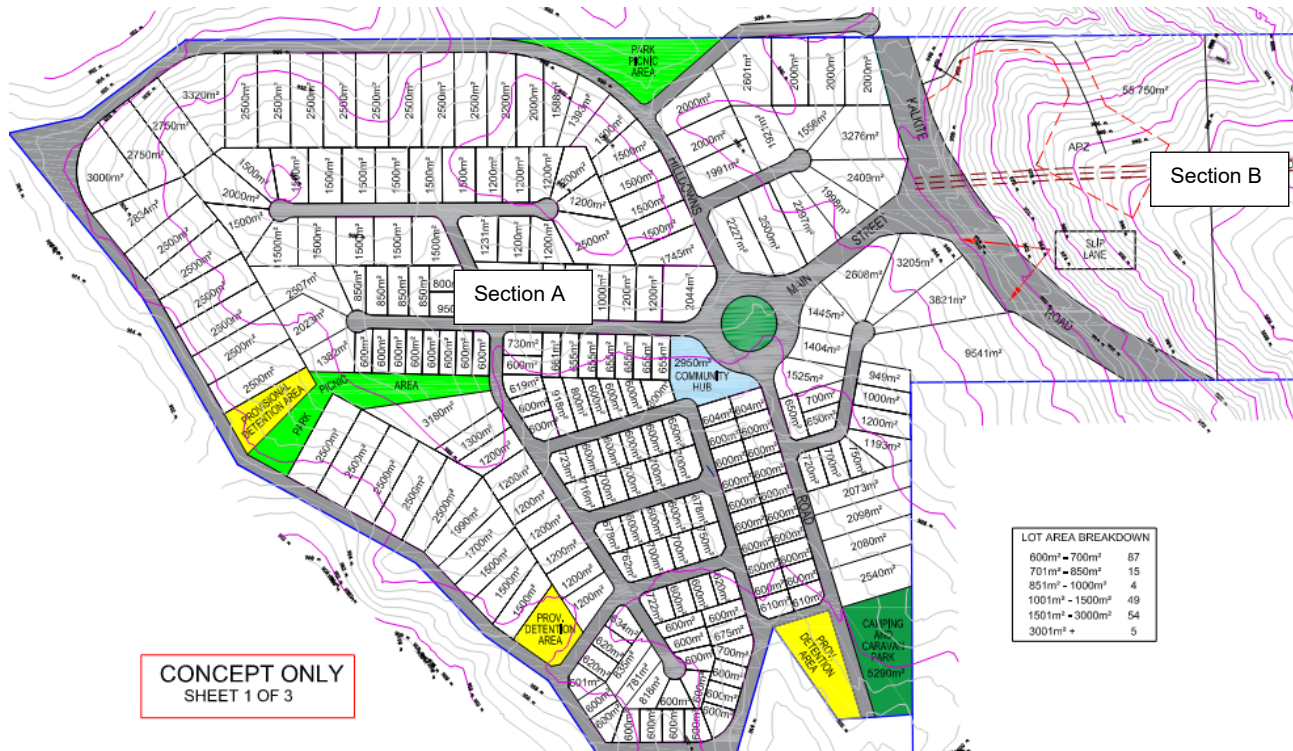
Table 5-1 Proposed Kalkite Development Traffic Generation

Land Use	Yield	Peak Period	Trip Rate	Peak Direction	Peak Split	Total Trips Generated
Single Residential	214 dwellings	AM	0.71	In	0.26	42
				Out	0.74	116
		PM	0.78	In	0.64	111
				Out	0.36	62
Commercial	500m² GFA	AM	0.125	In	0.50	31
				Out	0.50	31
		PM	0.125	In	0.50	31
				Out	0.50	31
Caravan Park	20 Sites	AM	1	In	0.00	0
				Out	1.00	20
		PM	1	In	1.00	20
				Out	0.00	0
Total		AM		In		72
				Out		168
		PM		In		162
				Out		94

5.2 Traffic Distribution

Cardno has developed an assumption of traffic distribution to and from the development based on services in the area surrounding the development. Based on the proposed layout, access has been broken into three intersections, services Sections A, B and C respectively. **Figure 5-1** below illustrates a breakdown of Section A and B. For a full plan of the proposed development, refer to **Appendix C**.

Figure 5-2 Proposed Sections for Development Access



The following assumptions were applied to the 2031 AM and PM SIDRA models for each section.

5.2.2 Section A Traffic Distribution

5.2.2.1 AM peak hour movement splits

Outbound

- > 95% (156 vehicles) turn right onto Kalkite Road from the development;
- > 5% (8 vehicles) turn left onto Kalkite Road from the development;

Inbound

- > 5% (4 vehicles) approach from the north off Kalkite Road;
- > 95% (67 vehicles) approach from the south off Kalkite Road.

5.2.2.2 PM peak hour movement splits

Outbound

- > 95% (87 vehicles) turn right onto Kalkite Road from the development;
- > 5% (5 vehicles) turn left onto Kalkite Road from the development;

Inbound

- > 5% (8 vehicles) approach from the north off Kalkite Road;
- > 95% (150 vehicles) approach from the south off Kalkite Road.

5.2.3 Section B Traffic Distribution

5.2.3.1 AM peak hour movement splits

Outbound

- > 5% (1 vehicle) turn right onto Kalkite Road from the development;
- > 95% (2 vehicles) turn left onto Kalkite Road from the development;

Inbound

- > 95% (1 vehicles) approach from the north off Kalkite Road;
- > 5% (1 vehicles) approach from the south off Kalkite Road.

5.2.3.2 PM peak hour movement splits

Outbound

- > 5% (1 vehicle) turn right onto Kalkite Road from the development;
- > 95% (1 vehicles) turn left onto Kalkite Road from the development;

Inbound

- > 95% (2 vehicles) approach from the north off Kalkite Road;
- > 5% (1 vehicle) approach from the south off Kalkite Road.

5.2.4 Section C Traffic Distribution

5.2.4.1 AM peak hour movement splits

Outbound

- > 95% (2 vehicles) turn right onto Kalkite Road from the development;
- > 5% (1 vehicle) turn left onto Kalkite Road from the development;

Inbound

- > 95% (1 vehicles) approach from the north off Kalkite Road;
- > 5% (1 vehicle) approach from the south off Kalkite Road.

5.2.4.2 PM peak hour movement splits

Outbound

- > 95% (1 vehicles) turn right onto Kalkite Road from the development;
- > 5% (1 vehicle) turn left onto Kalkite Road from the development;

Inbound

- > 95% (1 vehicles) approach from the north off Kalkite Road;
- > 5% (1 vehicle) approach from the south off Kalkite Road.

5.3 Road Volumes

At the time of this study (November 2021), greater New South Wales including the Snowy region were governed by partial Covid-19 related restrictions, this made it impractical to undertake a traffic survey as the data collected would not be representative of the typical movement behaviours in the local network. As such, a base traffic volumes were generated from analysis of existing dwellings and assumed daily trip generation as per the TfNSW Standards.

5.3.1 Trip Generation from Existing Township

Cardno developed background trip generation volumes based on 'RMS Technical Direction TDT 2013/04a – Guide to Traffic Generating Developments (2013)' from total dwellings within direct proximity to each intersection. Analysis of these volumes was undertaken using conservative movement assumptions and growth factors to develop an appropriate base model. Additional traffic generation calculations undertaken to develop the base volumes are listed in **Appendix B – Traffic Data and Calculations**.

5.3.2 Heavy Vehicles

Due to the rural characteristics of Kalkite, the presence of heavy vehicles slightly greater than standard local roads, as such, a heavy vehicle percentage of 6% was applied to all through movements across Kalkite Road traffic network. A lower percentage of 1% was adopted for all the other roads (including all proposed Kalkite development access). To reduce the complexity of the traffic volume application, it was assumed that the 6% will be applied to both eastbound and westbound heavy vehicles throughout modelling.

5.3.3 Growth Rates

A linear growth rate of 2% was applied to the base volumes for the 2031 future 'with development' scenario.

5.4 Construction Traffic

5.4.1 Construction Outline

The proposed subdivision development will involve approximately 118 residential allotments and 5 commercial allotments to be constructed in multiple stages over a 3-year period, commencing in 2025.

Traffic generated by construction activities for the duration of the project will include light vehicles used by construction workers to get to and from the site and heavy vehicles associated with the construction plant, deliveries and removal of materials.

5.4.1.1 Light Vehicles

It is expected that there will be a maximum of approximately 20 construction workers on the work site at any one time.

It is expected that the majority of these workers will reside nearby in Jindabyne and Cooma, which will provide opportunities for carpooling. For this analysis, it has been assumed that the average occupancy rate of light vehicles will be 1.25 workers per vehicles.

From this occupancy rate, the typical traffic generation for the development will be approximately 16 light vehicles per day, arriving in the morning and departing in the evening.

5.4.1.2 Heavy Vehicles

Preliminary estimates of the heavy vehicles associated with the development of the new subdivision is as follows:

- > Truck and dog trailer – will likely be required for the entire of the 3 years of construction with an expected maximum of four to five trucks doing eight to ten movements per day, inbound and outbound.
- > Material deliveries – likely won't be an everyday occurrence, only when materials (mainly pipes and pits) are ready to be installed. Expected maximum of two to three deliveries on these days for total of four to six movements.
- > Concrete truck – likely won't be an everyday occurrence, only when concrete and/or stabilised sand needs pouring. Expected maximum of two to three trucks, four to six movements, per day.

Table 5-2 Peak Vehicle Movements In/Out of Site

Vehicles	Peak Movements (accessing site)	Peak Movements (egressing of site)
Light vehicles	16	16
Truck and dog trailer	4-5	4-5
Material Deliveries	2-3	2-3
Concrete truck	2-3	2-3

5.4.1.3 Oversize Vehicles

A review of the suitability for the local network to handle oversized vehicles should be undertaken independently by the contractor and may require specific traffic control if oversized vehicles are required.

Currently, details of any oversized vehicles needed to transport equipment or plant to the site are not available. However, if it is found that oversized vehicles are required, the contractor will be required to apply for permits from Transport for NSW (TfNSW) and Council, along with the submission of a suitable traffic management and transportation routes plan.

Oversized vehicle routes are to be planned for designated heavy vehicle routes, wherever possible, approved by TfNSW. Additionally, all oversized traffic movements should occur outside of peak times wherever possible to reduce the impact on the road network

5.4.1.4 Construction Traffic Impacts

The number of construction vehicles accessing and egressing the site will need to be confirmed by the contractor as part of the detailed construction planning stage. However, the estimated construction traffic volumes are not expected to adversely affect the existing road network. Furthermore, the predicted

construction traffic is significantly less than the calculated future operational traffic of the proposed development. Therefore, from the completed development TIA, it can be assumed that the network will continue to operate at an acceptable level of service even with the expected impact of construction vehicles.

5.4.2 Construction Compound

The construction compound will be located within the subject site, away from any of the existing roads and move as the stages of development progress. Until the staging for construction can be confirmed, the exact location of the construction compound within the subject site cannot be confirmed.

The entrance to the compound will be fenced off to prevent members of the public from entering the compound.

5.4.3 Preliminary Construction Management Plan

5.4.3.1 Construction Vehicle Access Route

The proposed construction entrance to the subject site will be off Kalkite Road, south of the town centre.

As discussed previously, it is all light and heavy vehicles will be access/egress the subject site to and from the Jindabyne and Cooma area via Kalkite Road.

See **Figure 5-2** below for the proposed vehicle access route.

Figure 5-4 Proposed Construction Traffic Access Route



5.4.3.2 Construction Hours

The NSW Environmental Protection Authority, Draft Construction Noise Guidelines, detail the recommended standard hours for construction works:

- > Weekdays 7:00 am – 6:00 pm.
- > Saturdays 8:00 am – 1:00 pm.
- > Sundays and public holidays, no work.

The construction works for the proposed subdivision will be scheduled to occur during these standard hours.

5.4.3.3 Construction Parking

All expected construction vehicles, both heavy and light vehicles are expected to be able to park within the construction compound, or within the subject site, all of which is away from any public traffic networks.

5.4.3.4 Pedestrian and Bicycle Management

Access to the subject site will be restricted to authorised personnel only.

Due to the subject site's location in relation to the existing township, it is anticipated that there will only be a very minor impact on the construction works or traffic.

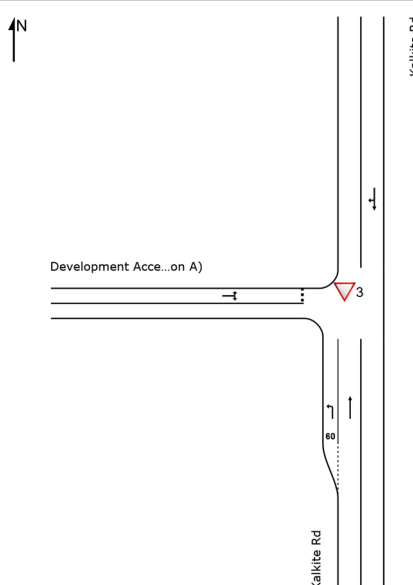
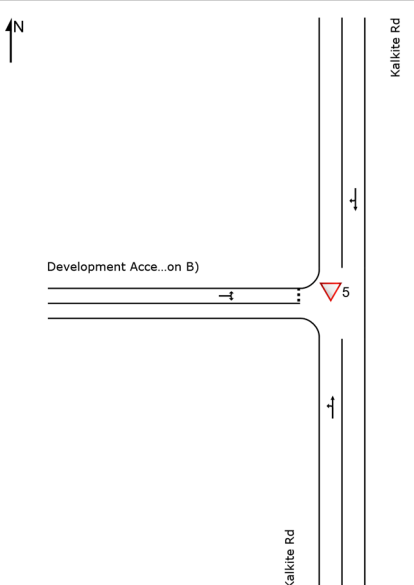
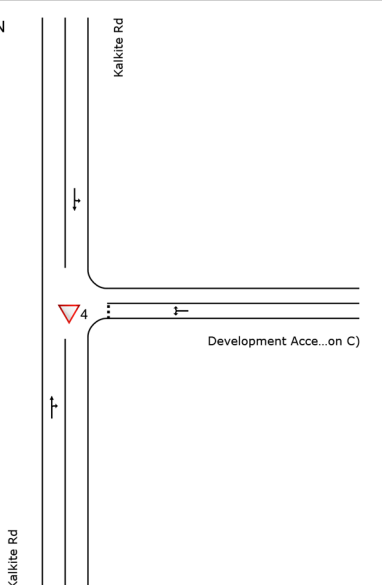
5.4.3.5 Impacts on Public Transport

It is anticipated that the proposed construction works and traffic will have no impact on the existing public transport system in Kalkite.

5.5 Proposed Intersection Design

Based upon the proposed masterplan and access arrangements for the Kalkite residential sub division, the following intersection designs were adopted for the modelling of each scenario. Streetlighting will be required for each intersection to ensure compliance with relevant RMS standards.

Table 5-3 Proposed Intersection Geometry

Section A Access / Kalkite Road Intersection	Section B Access / Kalkite Road Intersection	Section C Access / Kalkite Road Intersection
Widened T-intersection with extra short left turning auxiliary with give way signage for east approach	Widened T-intersection, with give way signage for west approach	Widened T-intersection, with give way signage for west approach
		

6 Intersection Capacity Assessment

Intersection capacity has been assessed using SIDRA 9.0 which is a micro-modelling software package. SIDRA provides an indication of an intersection's performance capacity through the following key outputs:

- > Degree of Saturation (DOS) - Ratio of Demand to Capacity;
- > Average Delay (in seconds);
- > 95th Percentile Queue Length (in metres);
- > The Level of Service (LOS) criteria.

The SIDRA NETWORK model determines the backward spread of congestion as queues on downstream lanes block upstream lanes (queue spillback). SIDRA applies capacity constraint to oversaturated upstream lanes, hence limiting the flows entering downstream lanes. These two elements are highly interactive with opposing effects. A network wide iterative process is used to find a solution that balances these opposing effects.

Each model was set to 30 iterations which is the maximum number of iterations permissible by SIDRA.

The following sections discuss the capacity modelling for the key external intersections.

6.1 Level of Service Criteria

Level of Service (LOS) is determined by the average delay for each vehicle (RMS NSW method). The range definitions for LOS are indicated in **Table 6-1** below.

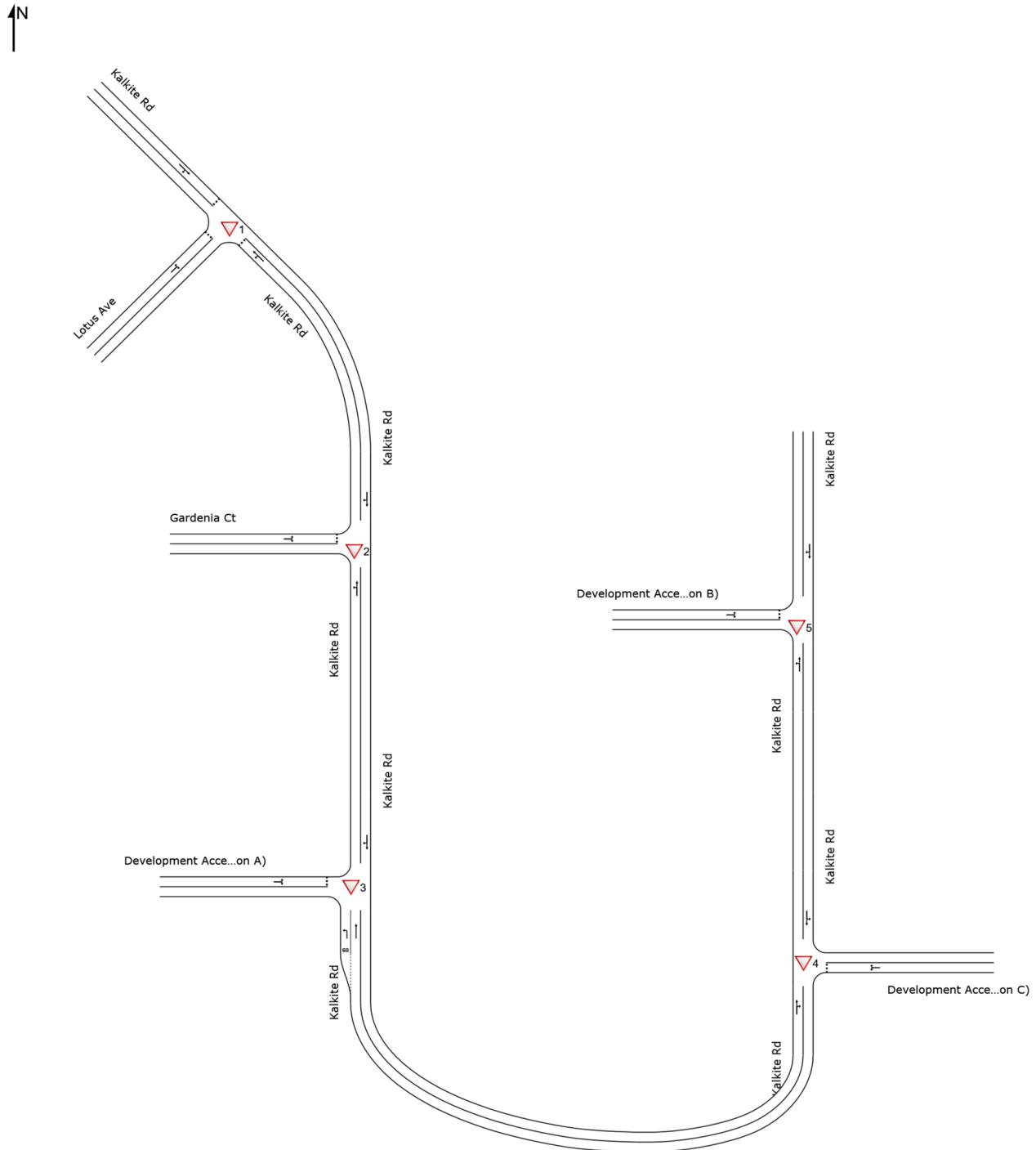
Table 6-1 Level of Service Definition Table

Level of Service	Average Delay / Vehicle (sec/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
LOS A	<10	Good operation	Good operation
LOS B	11 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
LOS C	29 to 42	Satisfactory	Satisfactory, accident study required
LOS D	43 to 56	Operating near capacity	Near capacity, accident study required
LOS E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode.
LOS F	>70	Over capacity requires investigation of other control modes.	Over capacity, requires other control mode.

In general, intersections should operate at a minimum of LOS C to operate under satisfactory conditions. Note: For priority control signalised intersection (With Stop and Give Way signs or operating under the T-junction rule) the critical movement for Level of Service assessment should be that with the worst movement delay.

Figure 6-1 on the following page shows the 2031 'With Kalkite Development' network layout and intersection numbering utilised for reference during the assessment.

Figure 6-2 Future 2031 Network Layout (With Kalkite Development)



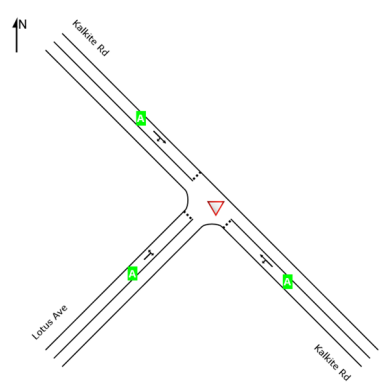
SITES IN NETWORK	
Site ID	Site Name
▽1	Lotus Street / Kalkite Road
▽2	Gardenia Court / Kalkite Road
▽3	Section A Proposed Access / Kalkite Road
▽4	Section C Proposed Access / Kalkite Road
▽5	Section B Proposed Access / Kalkite Road

6.2 AM Peak Scenario

6.2.1 Lotus Street / Kalkite Road Intersection

Table 6-2 below summarises the results of the modelling of the Lotus Street / Kalkite Road Intersection in the AM Peak hour.

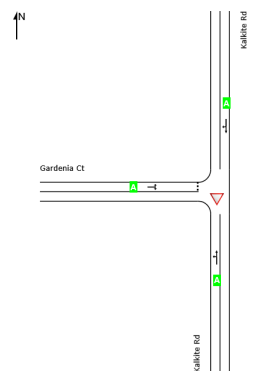
Table 6-2 Lotus Street / Kalkite Road Intersection AM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.015
Average Delay (sec)	6.1
95 th Percentile Queue (m)	0.3
Level of Service (LOS)	LOS A
Summary	

6.2.2 Gardenia Court / Kalkite Road Intersection

Table 6-3 below summarises the results of the modelling of the Gardenia Court / Kalkite Road Intersection in the AM Peak hour.

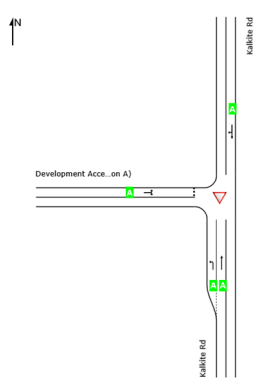
Table 6-3 Gardenia Court / Kalkite Road Intersection AM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.040
Average Delay (sec)	2.9
95 th Percentile Queue (m)	0.4
Level of Service (LOS)	LOS A
Summary	

6.2.3 Section A Access / Kalkite Road Intersection

Table 6-4 below summarises the results of the modelling of the Section A Access / Kalkite Road Intersection in the AM Peak hour.

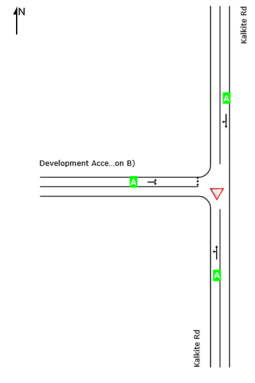
Table 6-4 Section A Access / Kalkite Road Intersection AM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.170
Average Delay (sec)	4.0
95 th Percentile Queue (m)	5.2
Level of Service (LOS)	LOS A
Summary	

6.2.4 Section B Access / Kalkite Road

Table 6-5 below summarises the results of the modelling of the Section B Access / Kalkite Road Intersection in the AM Peak hour.

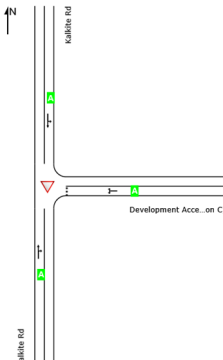
Table 6-5 Section B Access / Kalkite Road Intersection AM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.173
Average Delay (sec)	0.1
95 th Percentile Queue (m)	0.1
Level of Service (LOS)	LOS A
Summary	

6.2.5 Section C Access / Kalkite Road

Table 6-6 below summarises the results of the modelling of the Section C Access / Kalkite Road Intersection in the AM Peak hour.

Table 6-6 Section C Access / Kalkite Road Intersection AM Peak Hour

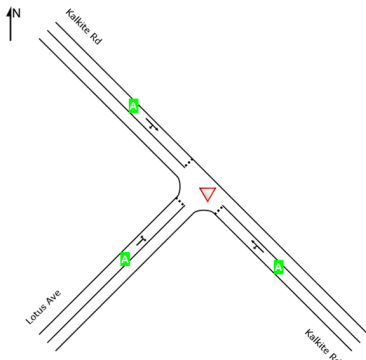
Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.175
Average Delay (sec)	0.1
95 th Percentile Queue (m)	0.1
Level of Service (LOS)	LOS A
Summary	

6.3 PM Peak Scenario

6.3.1 Lotus Street / Kalkite Road Intersection

Table 6-7 below summarises the results of the modelling of the Lotus Street / Kalkite Road Intersection in the PM Peak hour.

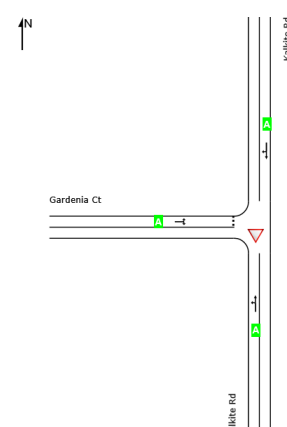
Table 6-7 Lotus Street / Kalkite Road Intersection PM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.039
Average Delay (sec)	6.1
95 th Percentile Queue (m)	0.8
Level of Service (LOS)	LOS A
Summary	

6.3.2 Gardenia Court / Kalkite Road Intersection

Table 6-8 below summarises the results of the modelling of the Gardenia Court / Kalkite Road Intersection in the PM Peak hour.

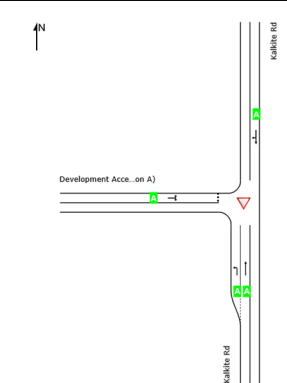
Table 6-8 Gardenia Court / Kalkite Road Intersection PM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.047
Average Delay (sec)	2.1
95 th Percentile Queue (m)	0.2
Level of Service (LOS)	LOS A
Summary	 <p>The diagram illustrates the intersection of Gardenia Ct and Kalkite Rd. A north arrow points upwards. Gardenia Ct is a two-lane road with a green arrow indicating traffic flow towards the intersection. Kalkite Rd is a three-lane road with a green arrow indicating traffic flow towards the intersection. The intersection is marked with a red triangle. The Level of Service (LOS) is indicated as 'A' in green boxes on the approach lanes.</p>

6.3.3 Section A Access / Kalkite Road Intersection

Table 6-9 below summarises the results of the modelling of the Section A Access / Kalkite Road Intersection in the PM Peak hour.

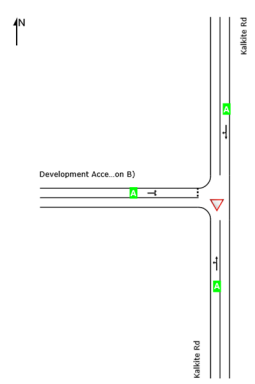
Table 6-9 Section A Access / Kalkite Road Intersection PM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.101
Average Delay (sec)	4.4
95 th Percentile Queue (m)	2.9
Level of Service (LOS)	LOS A
Summary	 <p>The diagram illustrates the intersection of Development Access on A and Kalkite Rd. A north arrow points upwards. Development Access on A is a two-lane road with a green arrow indicating traffic flow towards the intersection. Kalkite Rd is a three-lane road with a green arrow indicating traffic flow towards the intersection. The intersection is marked with a red triangle. The Level of Service (LOS) is indicated as 'A' in green boxes on the approach lanes.</p>

6.3.4 Section B Access / Kalkite Road

Table 6-10 below summarises the results of the modelling of the Section B Access / Kalkite Road Intersection in the PM Peak hour.

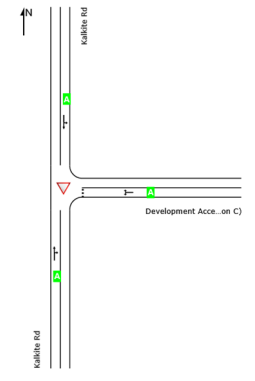
Table 6-10 Section B Access / Kalkite Road Intersection PM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.165
Average Delay (sec)	0.1
95 th Percentile Queue (m)	0.1
Level of Service (LOS)	LOS A
Summary	

6.3.5 Section C Access / Kalkite Road

Table 6-11 below summarises the results of the modelling of the Section C Access / Kalkite Road Intersection in the PM Peak hour.

Table 6-11 Section C Access / Kalkite Road Intersection PM Peak Hour

Scenario	2031 'With Development Model'
Degree of Saturation (DOS)	0.162
Average Delay (sec)	0.1
95 th Percentile Queue (m)	0.1
Level of Service (LOS)	LOS A
Summary	

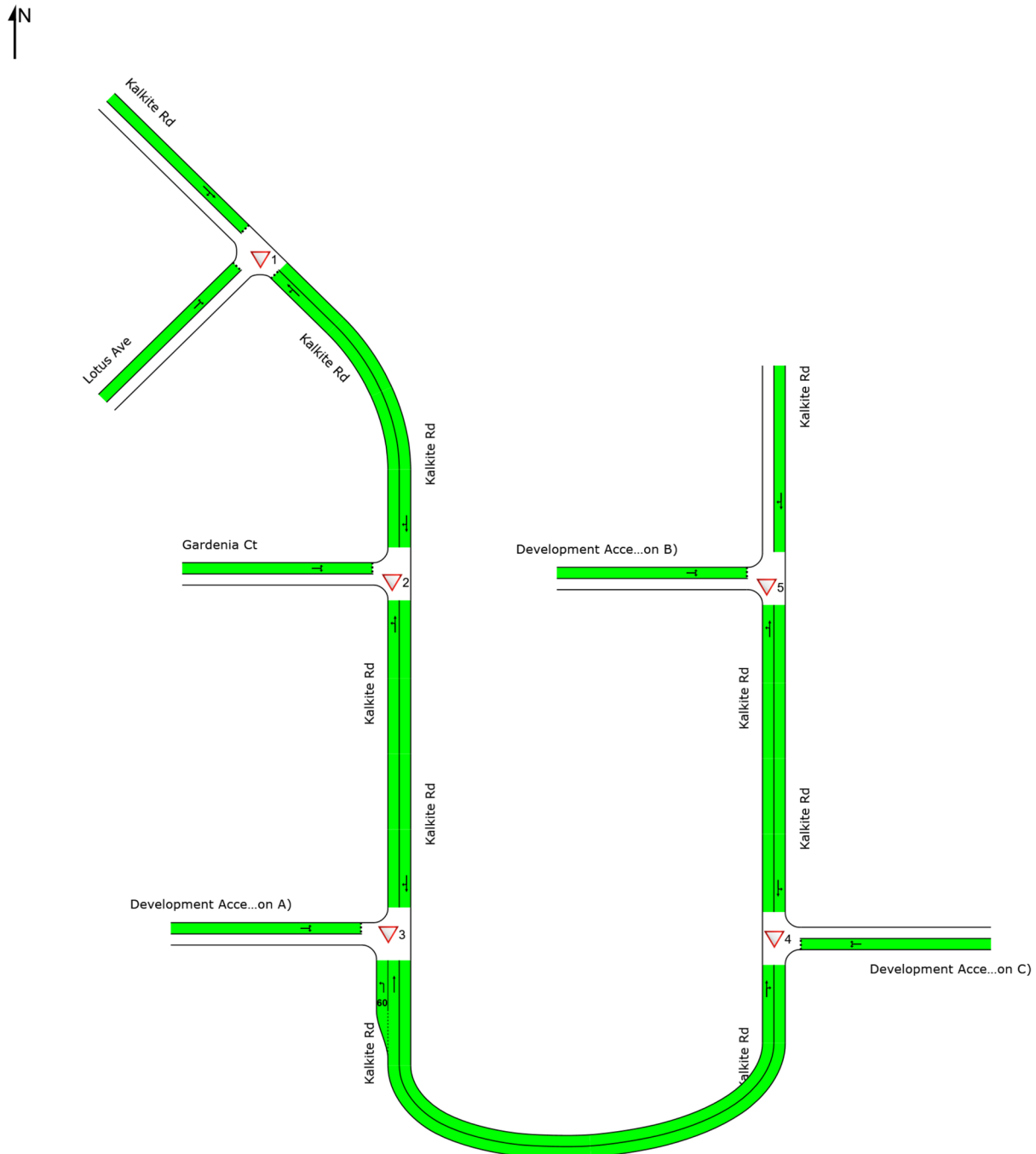
7 Traffic Network operation

In addition to **Section 6** above, the following section provides a network wide visual representation of the level of service, queue distance and network summary modelling during each scenario

7.1 2031 'With Kalkite Development Model' Scenario

7.1.1 2031 AM 'With Kalkite Development Model' Scenario

Figure 7-1 2031 AM 'With Kalkite Development Model' Level of Service (LOS)

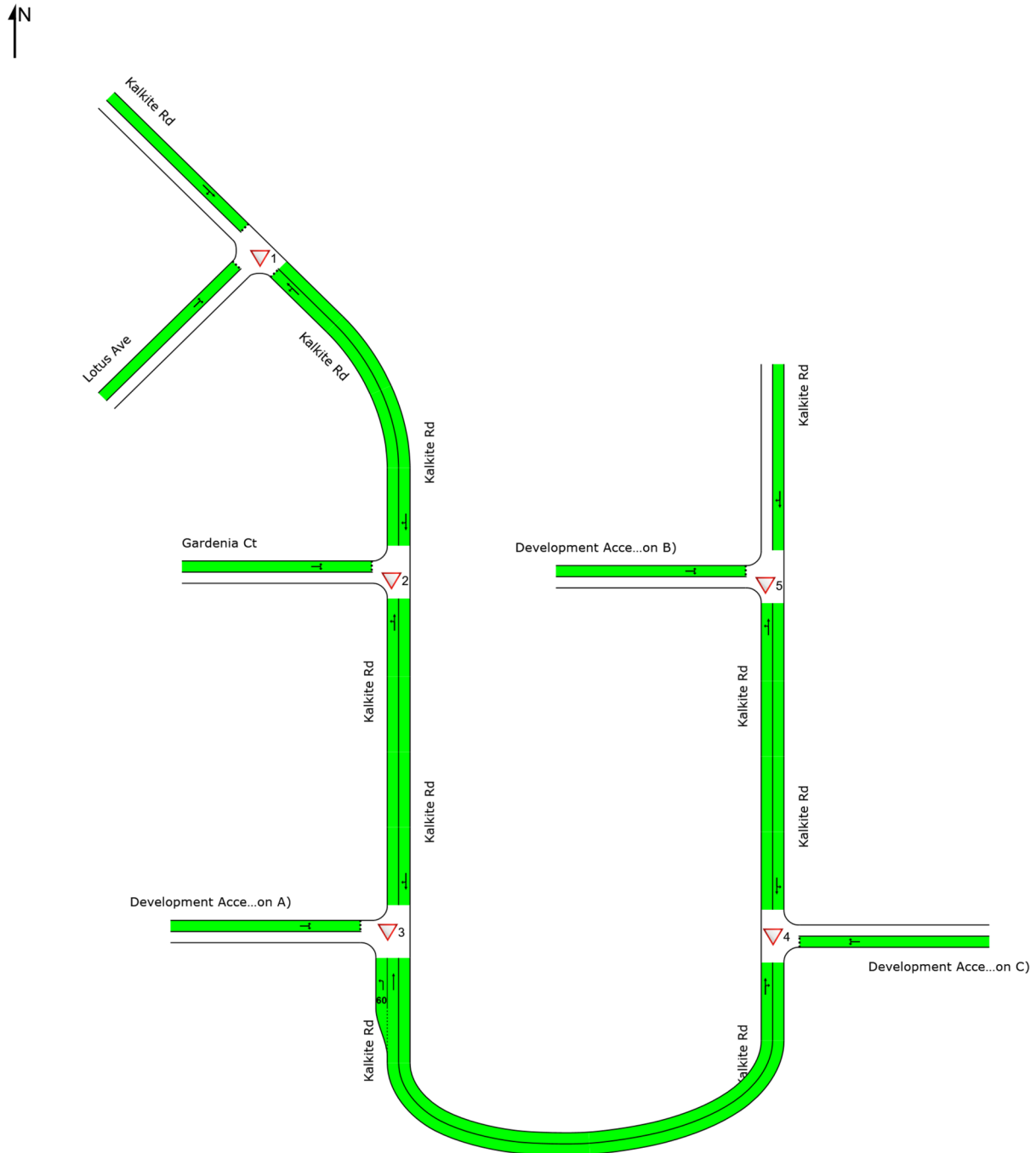


Colour code based on Level of Service

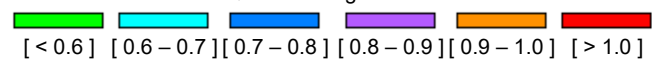
LOS A LOS B LOS C LOS D LOS E LOS F

Delay Model: SIDRA Standard (Geometric Delay is included).

Figure 7-2 2031 AM 'With Kalkite Development Model' Queue Length (95th Percentile)



Colour code based on Queue Storage Ratio



Queue Model: SIDRA Standard.

7.1.2 2031 PM 'With Kalkite Development Model' Scenario

Figure 7-3 2031 PM 'With Kalkite Development Model' Level of Service (LOS)

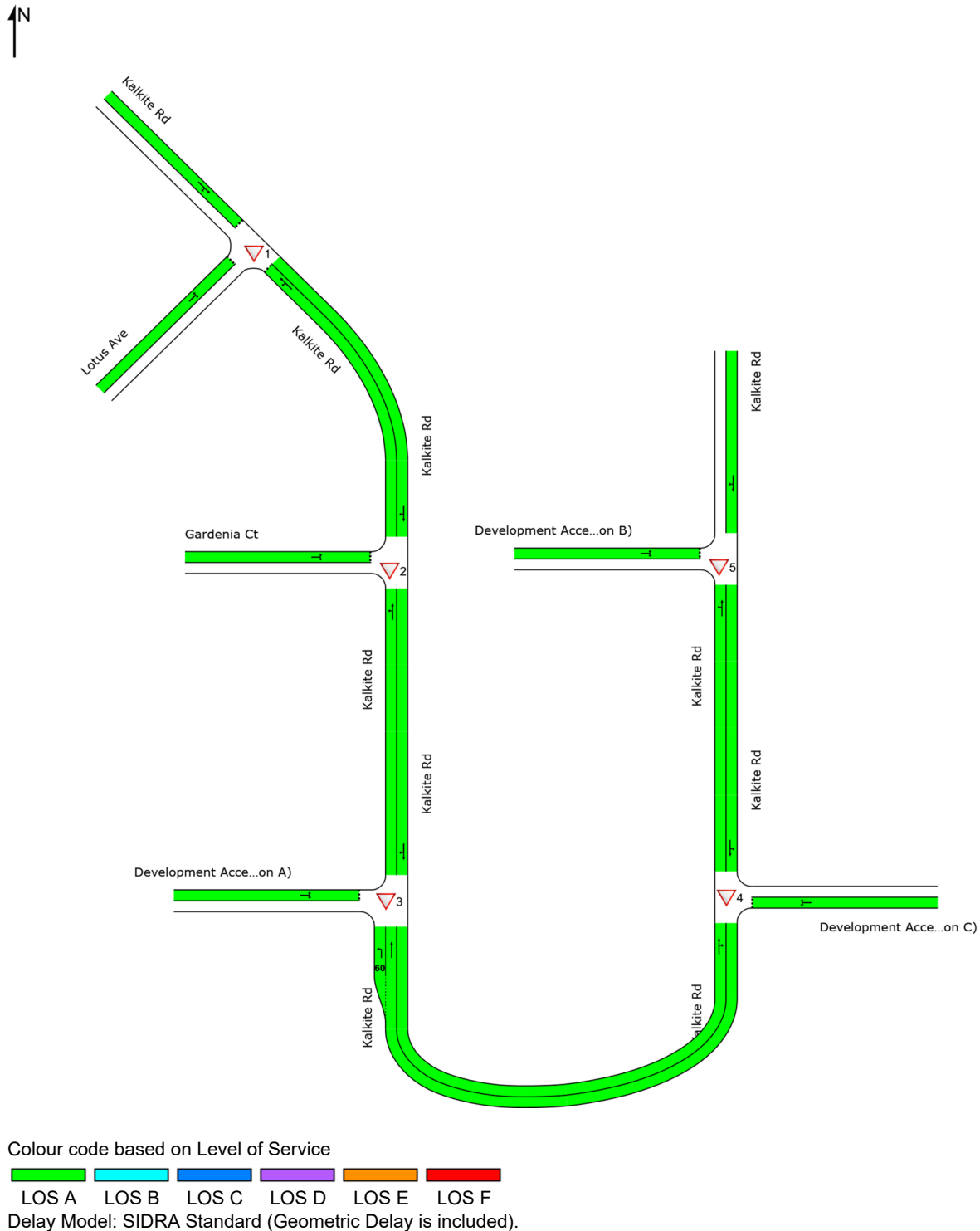
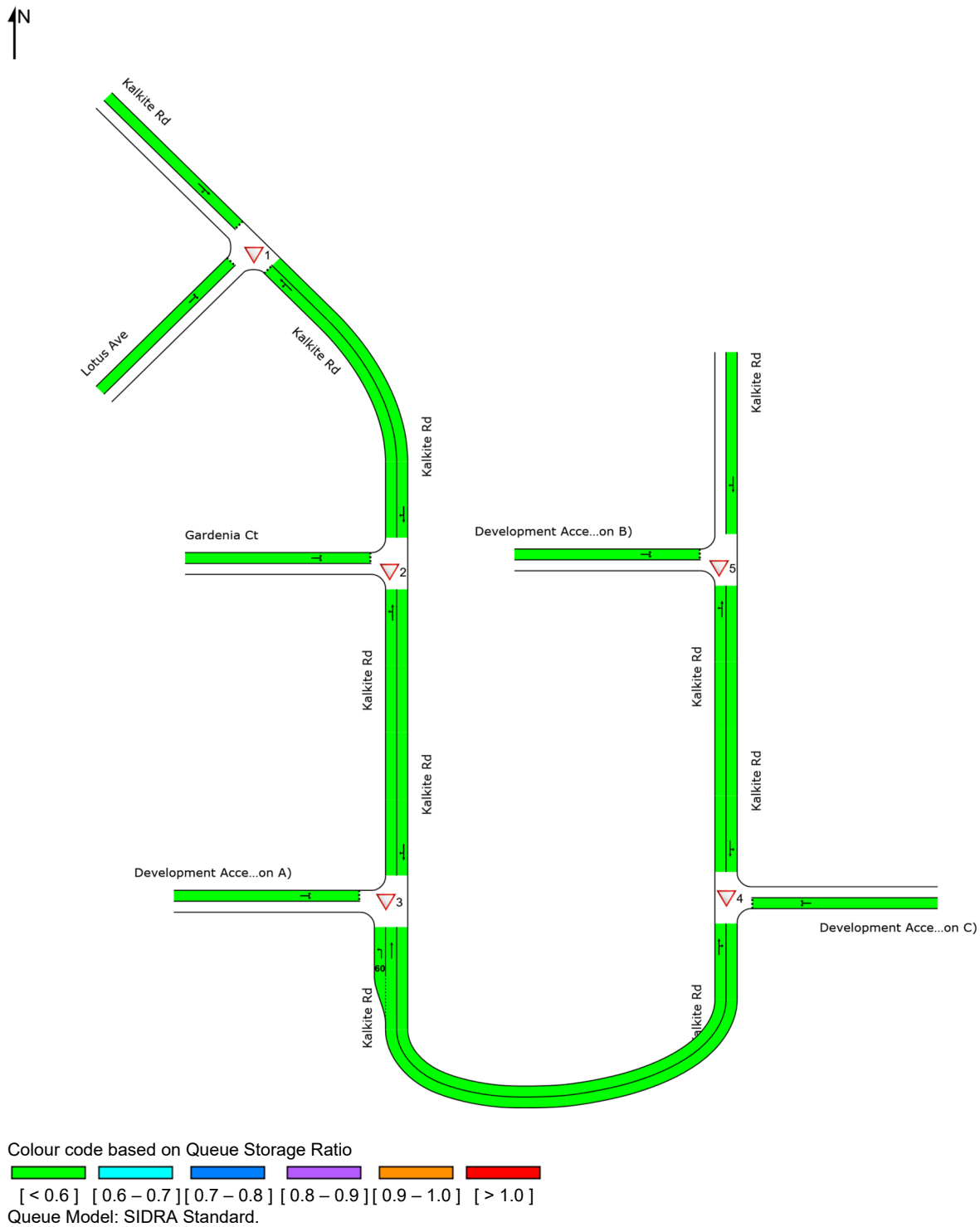


Figure 7-4 2031 PM 'With Kalkite Development Model' Queue Length (95th Percentile)



8 Summary and Recommendations

8.1 Detailed Intersection Summary

An assessment of the existing and proposed intersections across the Kalkite Road traffic network including four proposed access points to the Kalkite residential subdivision was undertaken to determine the impact of the proposed the new subdivision development on the local traffic network. **Tables 8-1** through to **8-10** below describe the increase in vehicles as a result of the proposed development across the three SIDRA modelling scenarios. These volumes are presented to provide context in determining the net impact of the development across the local network. **Tables 8-11** presents the level of service (LOS) outputs for each intersection approach leg across all scenarios and provides a key metric for analysing intersection performance.

Additional intersection performance information detailing traffic volumes, degree of saturation, queue length, average delay and sign control analysis are listed in individual movement, lane and control summaries attached in **Appendix A**.

8.1.1 Lotus Street / Kalkite Road and Gardenia Court / Kalkite Road Intersections

The performance of the upstream intersections across the Kalkite Road traffic network does not see any significant impact to the key performance indicators with the increase in traffic volumes as a result of the proposed development access and additional traffic generation.

The intersection displays good levels of Degree of Saturation and Average Delay across the 2031 'with development' design year. The level of service remains at LOS A – Good operation across all approaches during both AM and PM peak hour periods.

The 95th percentile queuing is minimal for both AM and PM scenarios across both sites.

8.1.2 Section's A, B and C Access points / Kalkite Road Intersections

The three proposed access points experience moderate increases in traffic volumes associated with the proposed development. However, the performance of these intersection experience negligible impact to all key performance indicators.

All intersections display good levels of Degree of Saturation and Average Delay across the 2031 'with development' design year. The level of service remains at LOS A – Good operation across all approaches during both AM and PM peak hour periods.

The 95th percentile queuing is minimal for both AM and PM scenarios across all sites.

It is expected that the proposed development will have negligible impact to the overall Kalkite road network performance in future "2031 with development" design year.

Table 8-1 Increase in Lotus Street / Kalkite Road AM Traffic Volume with Development

Intersection No.	AM TRAFFIC					
	Lotus Street / Kalkite Road Intersection					
	Intersection Legs (Clockwise: North-South-West)					
1	North		South		West	
	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	6	0	18	2	0	10
2031 Without Development	8	0	23	3	0	12
2031 With Development	8	0	23	3	0	12
Additional Trips (with development)						
Percentage of Total						

Table 8-2 Increase in Gardenia Court / Kalkite Road AM Traffic Volume with Development

Intersection No.	AM TRAFFIC					
	Gardenia Court / Kalkite Road Intersection					
	Intersection Legs (Clockwise: North-South-West)					
2	North		South		West	
	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	59	0	5	21	0	14
2031 Without Development	72	0	6	25	0	17
2031 With Development	72	0	6	25	0	17
Additional Trips (with development)						
Percentage of Total						

Table 8-3 Increase in Section A Access / Kalkite Road AM Traffic Volume with Development

	AM TRAFFIC					
	Section A Access / Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-South-West)					
3	North		South		West	
	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	69	0	0	24	0	0
2031 Without Development	85	0	0	30	0	0
2031 With Development	85	4	67	30	8	156
Additional Trips (with development)	4		67		8	
Percentage of Total	100%		100%		100%	

Table 8-4 Increase in Section B Access / Kalkite Road AM Traffic Volume with Development

	AM TRAFFIC					
	Section B Access / Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-South)					
5	North		South		West	
	North Approach - Kalkite Rd		South Approach - Section B Access		West Approach - Kalkite Rd	
	T	R	L	T	L	R
2021 Base	24	0	0	69	0	0
2031 Without Development	30	0	0	85	0	0
2031 With Development	123	1	1	313	2	1
Additional Trips (with development)	93	1	1	229	2	1
Percentage of Total	76%	100%	100%	73%	100%	100%

Table 8-5 Increase in Section C Access / Kalkite Road AM Traffic Volume with Development

Intersection No.	AM TRAFFIC					
	Section C Access / Kalkite Road Intersection					
	Intersection Legs (Clockwise: North-South-West)					
	North		East		South	
4	North Approach - Kalkite Rd		East Approach - Kalkite Rd		South Approach - Kalkite Rd	
	L	T	L	R	T	R
2021 Base	0	24	0	0	73	0
2031 Without Development	0	30	0	0	89	0
2031 With Development	1	92	1	2	316	1
Additional Trips (with development)	1	63	1	2	227	1
Percentage of Total	100%	68%	100%	100%	72%	100%

Table 8-6 Increase in Lotus Street / Kalkite Road PM Traffic Volume with Development

Intersection No.	PM TRAFFIC					
	Lotus Street / Kalkite Road Intersection					
	Intersection Legs (Clockwise: North-South-West)					
	North		South		West	
1	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	3	0	50	6	0	28
2031 Without Development	4	0	61	7	0	34
2031 With Development	4	0	61	7	0	34
Additional Trips (with development)						
Percentage of Total						

Table 8-7 Increase in Gardenia Court / Kalkite Road PM Traffic Volume with Development

	PM TRAFFIC					
	Gardenia Court / Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-South-West)					
2	North		South		West	
	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	31	0	13	56	0	8
2031 Without Development	38	0	16	68	0	9
2031 With Development	38	0	16	68	0	9
Additional Trips (with development)						
Percentage of Total						

Table 8-8 Increase in Section A Access / Kalkite Road PM Traffic Volume with Development

	PM TRAFFIC					
	Section A Access / Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-South-West)					
3	North		South		West	
	North Approach - Kalkite Rd		South Approach - Kalkite Rd		West Approach - Section A Access	
	T	R	L	T	L	R
2021 Base	37	0	0	66	0	0
2031 Without Development	45	0	0	80	0	0
2031 With Development	45	8	150	80	5	87
Additional Trips (with development)	8		150		5	
Percentage of Total	100%		100%		100%	

Table 8-9 Increase in Section B Access / Kalkite Road PM Traffic Volume with Development

	PM TRAFFIC					
	Section B Access/ Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-South)					
5	North		South		West	
	North Approach - Kalkite Rd		South Approach - Section B Access		West Approach - Kalkite Rd	
	T	R	L	T	L	R
2021 Base	66	0	0	37	0	0
2031 Without Development	80	0	0	45	0	0
2031 With Development	300	2	1	171	1	1
Additional Trips (with development)	220	2	1	126	1	1
Percentage of Total	73%	100%	100%	74%	100%	100%

Table 8-10 Increase in Section C Access / Kalkite Road PM Traffic Volume with Development

	PM TRAFFIC					
	Section C Access / Kalkite Road Intersection					
Intersection No.	Intersection Legs (Clockwise: North-South-West)					
4	North		East		South	
	North Approach - Kalkite Rd		East Approach - Kalkite Rd		South Approach - Kalkite Rd	
	L	T	L	R	T	R
2021 Base	0	66	0	0	39	0
2031 Without Development	0	80	0	0	48	0
2031 With Development	2	298	1	1	172	1
1	2	218	1	1	125	1
Percentage of Total	100%	73%	100%	100%	72%	100%

8.2 Level of Service Performance Summary

As discussed in **Section 6-1**, for priority-controlled intersections, the critical movement for Level of Service should be that with the worst movement delay.

The performance of each intersection in each scenario is summarised in **Table 8-11** below.

Table 8-11 Intersection Performance Summary

Intersection	Leg	2031 AM 'With Development Model'	2031 PM 'With Development Model'
Lotus Street / Kalkite Road	<i>North</i>	LOS A	LOS A
	<i>South</i>	LOS A	LOS A
	<i>West</i>	LOS A	LOS A
	Intersection	LOS A	LOS A
Gardenia Court / Kalkite Road	<i>North</i>	LOS A	LOS A
	<i>South</i>	LOS A	LOS A
	<i>West</i>	LOS A	LOS A
	Intersection	LOS A	LOS A
Section A Access / Kalkite Road	<i>North</i>	LOS A	LOS A
	<i>South</i>	LOS A	LOS A
	<i>West</i>	LOS A	LOS A
	Intersection	LOS A	LOS A
Section B Access / Kalkite Road	<i>North</i>	LOS A	LOS A
	<i>East</i>	LOS A	LOS A
	<i>South</i>	LOS A	LOS A
	<i>West</i>	LOS A	LOS A
	Intersection	LOS A	LOS A
Section C Access / Kalkite Road	<i>North</i>	LOS A	LOS A
	<i>East</i>	LOS A	LOS A
	<i>South</i>	LOS A	LOS A
	Intersection	LOS A	LOS A

The net impact of the proposed Kalkite development upon the local AM traffic network is highlighted above in **Table 8-11**. The local network experiences negligible impact to the Level of Service for all intersection approaches listed above with the overall intersection level of service remaining at “Good Operation” service.

APPENDIX

A

SIDRA OUTPUTS

MOVEMENT SUMMARY

▼ Site: 3 [AM - Kalkite Rd / Development Access (Section A)
(Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	73	1.0	73	1.0	0.039	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	66.7
2	T1	32	3.0	32	3.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		104	1.6	104	1.6	0.039	4.9	NA	0.0	0.0	0.00	0.44	0.00	70.0
North: Kalkite Rd														
8	T1	89	3.0	89	3.0	0.050	0.0	LOS A	0.0	0.2	0.02	0.03	0.02	78.2
9	R2	4	1.0	4	1.0	0.050	7.0	LOS A	0.0	0.2	0.02	0.03	0.02	66.6
Approach		94	2.9	94	2.9	0.050	0.3	NA	0.0	0.2	0.02	0.03	0.02	77.5
West: Development Access (Section A)														
10	L2	8	1.0	8	1.0	0.170	4.7	LOS A	0.7	5.2	0.28	0.56	0.28	29.6
12	R2	164	1.0	164	1.0	0.170	5.6	LOS A	0.7	5.2	0.28	0.56	0.28	29.6
Approach		173	1.0	173	1.0	0.170	5.5	LOS A	0.7	5.2	0.28	0.56	0.28	29.6
All Vehicles		371	1.7	371	1.7	0.170	4.0	NA	0.7	5.2	0.13	0.39	0.13	62.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 1 [AM - Kalkite Rd / Lotus Ave (Site Folder: 2031 With Development Model)]

Network: N05 [AM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Kalkite Rd														
21	L2	24	1.0	24	1.0	0.015	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	53.7
22	T1	3	3.0	3	3.0	0.015	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	68.5
Approach		27	1.2	27	1.2	0.015	6.8	LOS A	0.0	0.0	0.00	0.63	0.00	57.1
NorthWest: Kalkite Rd														
28	T1	8	3.0	8	3.0	0.005	5.8	LOS A	0.0	0.2	0.11	0.55	0.11	70.4
29	R2	1	1.0	1	1.0	0.005	8.1	LOS A	0.0	0.2	0.11	0.55	0.11	66.2
Approach		9	2.8	9	2.8	0.005	6.0	LOS A	0.0	0.2	0.11	0.55	0.11	69.9
SouthWest: Lotus Ave														
30	L2	1	1.0	1	1.0	0.012	4.6	LOS A	0.0	0.3	0.05	0.54	0.05	65.4
32	R2	13	1.0	13	1.0	0.012	4.7	LOS A	0.0	0.3	0.05	0.54	0.05	31.3
Approach		14	1.0	14	1.0	0.012	4.7	LOS A	0.0	0.3	0.05	0.54	0.05	41.1
All Vehicles		51	1.5	51	1.5	0.015	6.1	NA	0.0	0.3	0.04	0.59	0.04	58.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [AM - Kalkite Rd / Gardenia Ct (Site Folder: 2031 With Development Model)]

Network: N05 [AM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	6	1.0	6	1.0	0.017	7.0	LOS A	0.0	0.0	0.00	0.13	0.00	40.7
2	T1	26	3.0	26	3.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	74.5
Approach		33	2.6	33	2.6	0.017	1.3	NA	0.0	0.0	0.00	0.13	0.00	63.2
North: Kalkite Rd														
8	T1	76	3.0	76	3.0	0.040	3.1	LOS A	0.0	0.0	0.00	0.42	0.00	67.1
9	R2	1	1.0	1	1.0	0.040	6.7	LOS A	0.0	0.0	0.00	0.42	0.00	27.8
Approach		77	3.0	77	3.0	0.040	3.1	NA	0.0	0.0	0.00	0.42	0.00	65.6
West: Gardenia Ct														
10	L2	1	1.0	1	1.0	0.016	4.4	LOS A	0.1	0.4	0.16	0.53	0.16	25.5
12	R2	18	1.0	18	1.0	0.016	4.7	LOS A	0.1	0.4	0.16	0.53	0.16	25.5
Approach		19	1.0	19	1.0	0.016	4.7	LOS A	0.1	0.4	0.16	0.53	0.16	25.5
All Vehicles		128	2.6	128	2.6	0.040	2.9	NA	0.1	0.4	0.03	0.36	0.03	61.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▼ Site: 5 [AM - Kalkite Rd / Development Access (Section B)
(Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	1	1.0	1	1.0	0.173	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	12.9
2	T1	329	3.0	329	3.0	0.173	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		331	3.0	331	3.0	0.173	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.6
North: Kalkite Rd														
8	T1	132	3.0	132	3.0	0.070	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	79.8
9	R2	1	1.0	1	1.0	0.070	7.8	LOS A	0.0	0.1	0.01	0.01	0.01	73.7
Approach		133	3.0	133	3.0	0.070	0.1	NA	0.0	0.1	0.01	0.01	0.01	79.8
West: Development Access (Section B)														
10	L2	2	1.0	2	1.0	0.003	5.6	LOS A	0.0	0.1	0.38	0.54	0.38	64.0
12	R2	1	1.0	1	1.0	0.003	6.4	LOS A	0.0	0.1	0.38	0.54	0.38	28.8
Approach		3	1.0	3	1.0	0.003	5.9	LOS A	0.0	0.1	0.38	0.54	0.38	60.4
All Vehicles		466	3.0	466	3.0	0.173	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 4 [AM - Kalkite Rd / Development Access (Section C)
(Site Folder: 2031 With Development Model)]

Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
2	T1	333	3.0	333	3.0	0.175	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	80.0
3	R2	1	1.0	1	1.0	0.175	7.0	LOS A	0.0	0.1	0.00	0.00	0.00	74.2
Approach		334	3.0	334	3.0	0.175	0.0	NA	0.0	0.1	0.00	0.00	0.00	79.9
East: Development Access (Section C)														
4	L2	1	1.0	1	1.0	0.003	4.8	LOS A	0.0	0.1	0.25	0.54	0.25	29.1
6	R2	2	1.0	2	1.0	0.003	6.3	LOS A	0.0	0.1	0.25	0.54	0.25	29.1
Approach		3	1.0	3	1.0	0.003	5.8	LOS A	0.0	0.1	0.25	0.54	0.25	29.1
North: Kalkite Rd														
7	L2	1	1.0	1	1.0	0.052	5.4	LOS A	0.0	0.0	0.00	0.01	0.00	12.0
8	T1	99	3.0	99	3.0	0.052	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	79.1
Approach		100	3.0	100	3.0	0.052	0.1	NA	0.0	0.0	0.00	0.01	0.00	71.1
All Vehicles		437	3.0	437	3.0	0.175	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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LANE LEVEL OF SERVICE

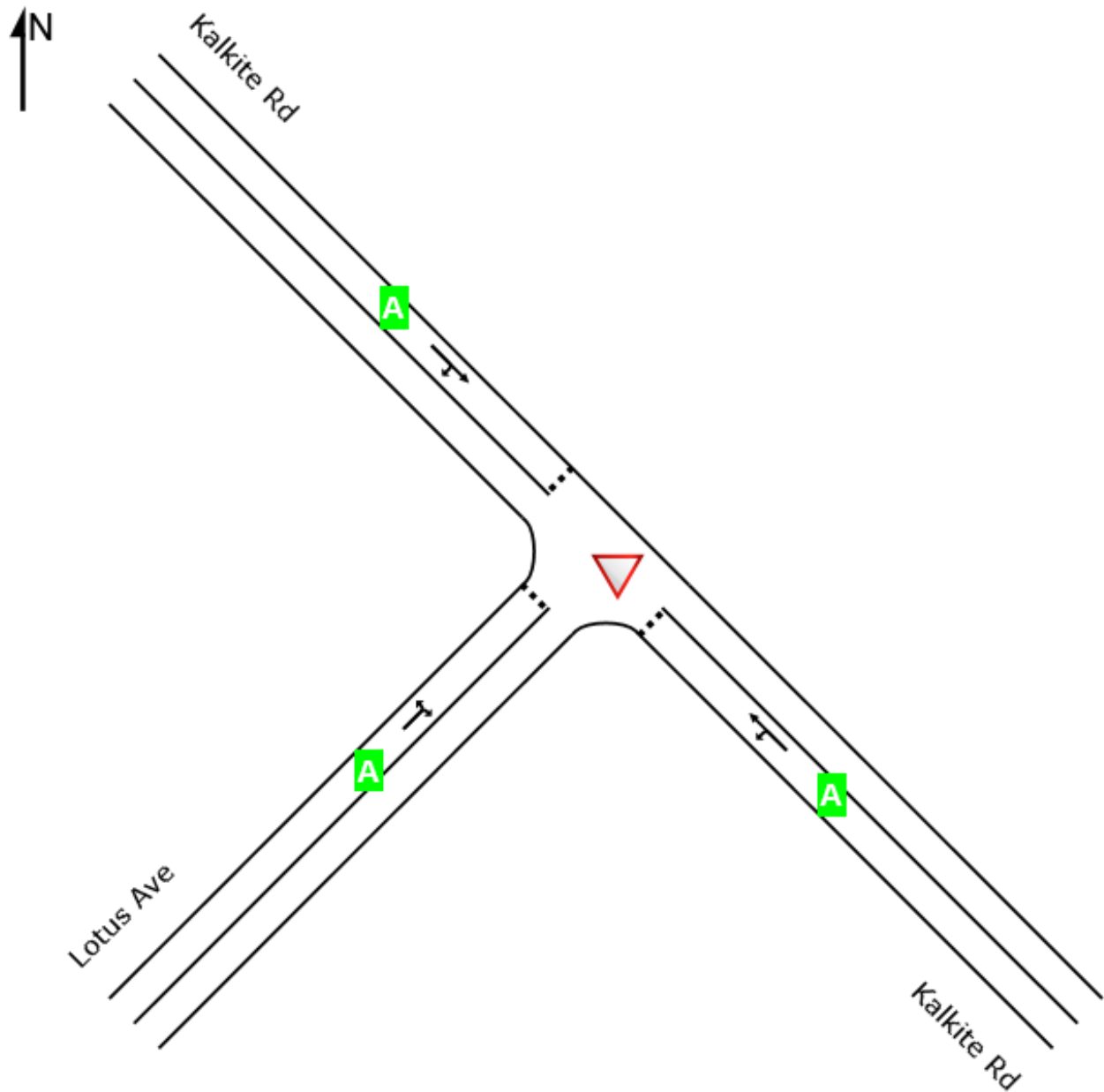
Lane Level of Service

▼ Site: 1 [AM - Kalkite Rd / Lotus Ave (Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

	Approaches			Intersection
	Southeast	Northwest	Southwest	
LOS	A	A	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

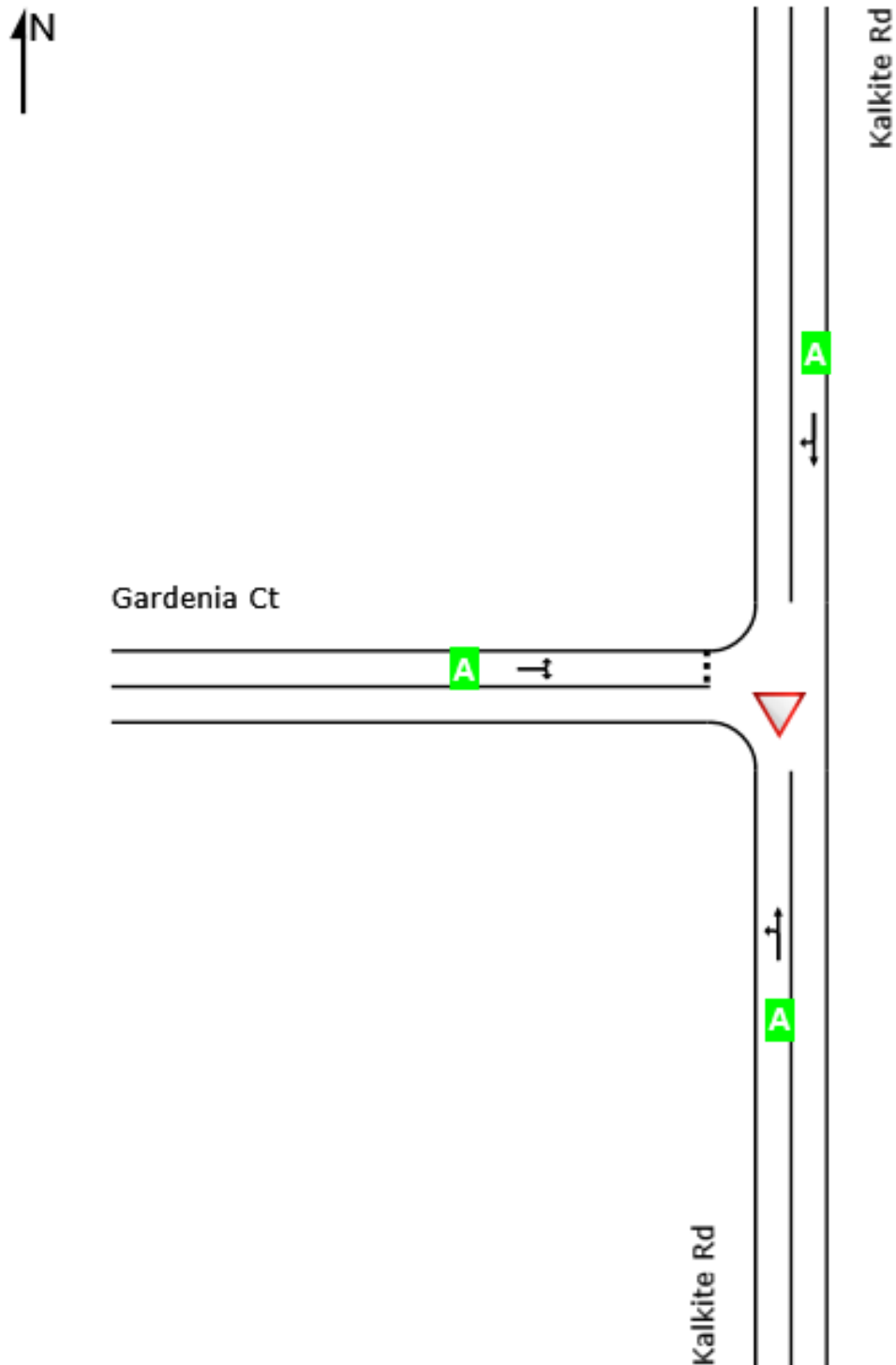
Lane Level of Service

▼ Site: 2 [AM - Kalkite Rd / Gardenia Ct (Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

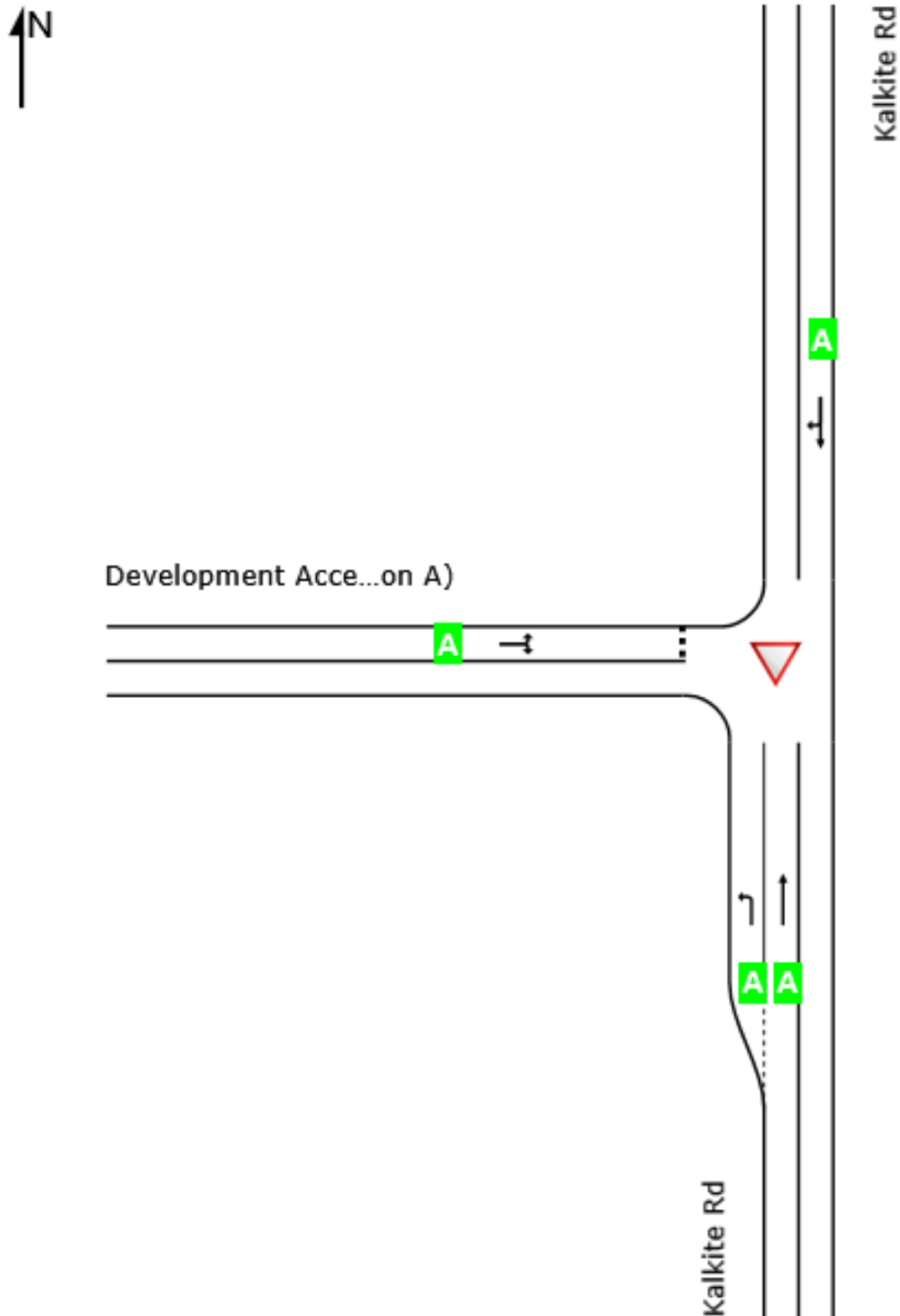
Lane Level of Service

▼ Site: 3 [AM - Kalkite Rd / Development Access (Section A)
(Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

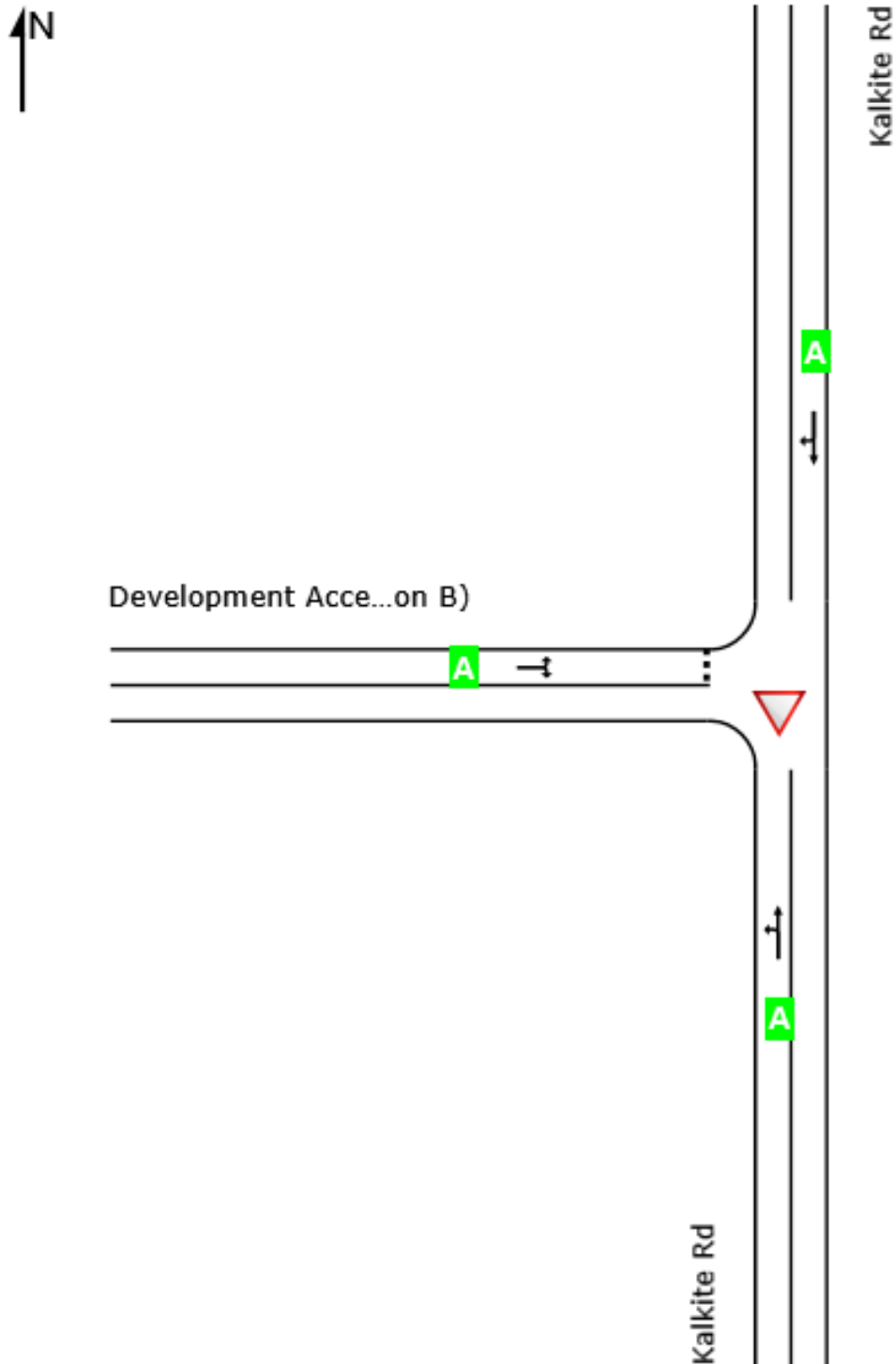
Lane Level of Service

▼ Site: 5 [AM - Kalkite Rd / Development Access (Section B)
(Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

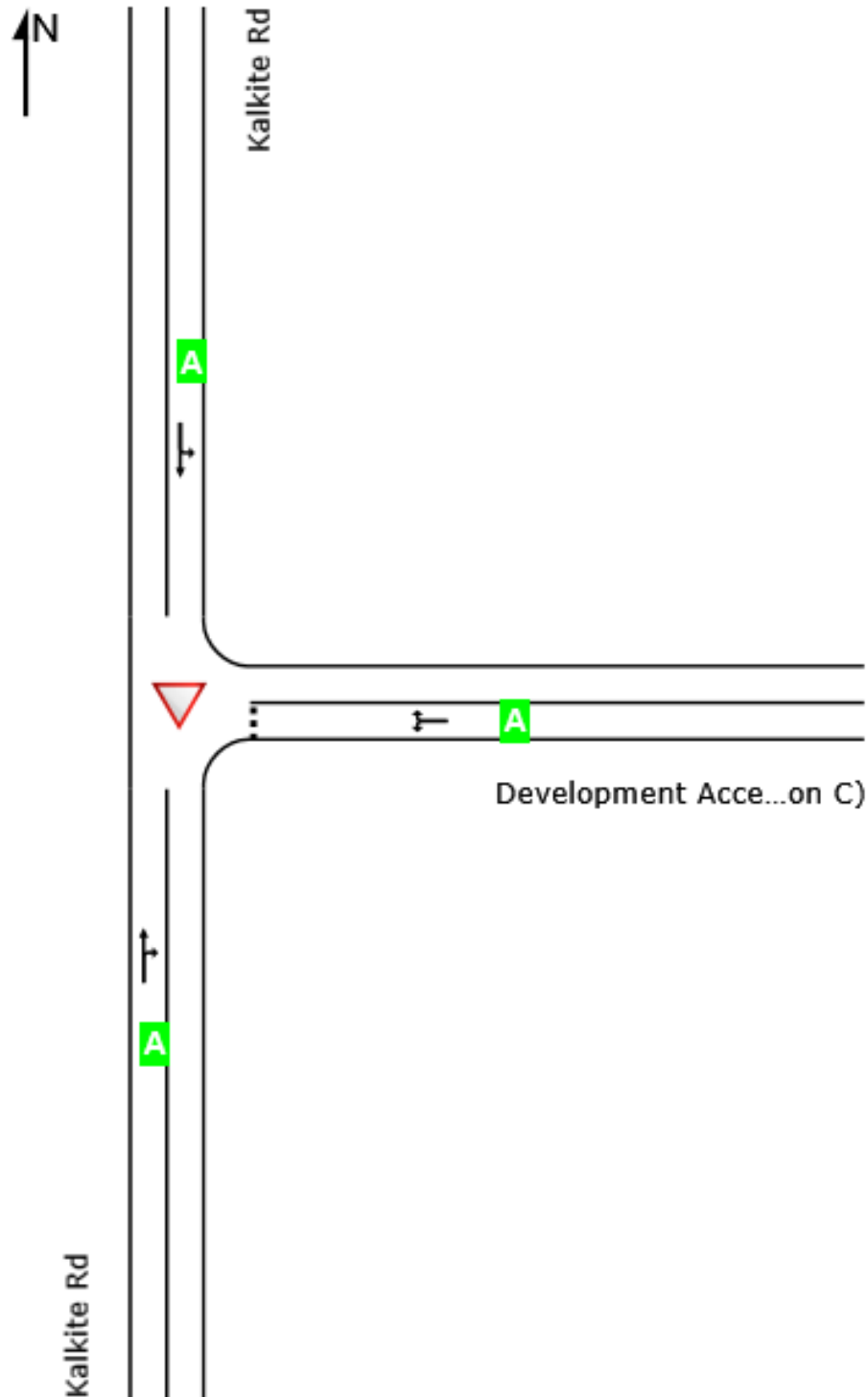
Lane Level of Service

▼ Site: 4 [AM - Kalkite Rd / Development Access (Section C)
(Site Folder: 2031 With Development Model)]

■ Network: N05 [AM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 1 [PM - Kalkite Rd / Lotus Ave (Site Folder: 2031 With Development Model)]

Network: N06 [PM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
SouthEast: Kalkite Rd														
21	L2	64	1.0	64	1.0	0.039	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	53.6
22	T1	7	3.0	7	3.0	0.039	5.8	LOS A	0.0	0.0	0.00	0.63	0.00	68.5
Approach		72	1.2	72	1.2	0.039	6.8	LOS A	0.0	0.0	0.00	0.63	0.00	56.7
NorthWest: Kalkite Rd														
28	T1	4	3.0	4	3.0	0.003	5.8	LOS A	0.0	0.1	0.20	0.51	0.20	69.9
29	R2	1	1.0	1	1.0	0.003	8.9	LOS A	0.0	0.1	0.20	0.51	0.20	65.8
Approach		5	2.6	5	2.6	0.003	6.4	LOS A	0.0	0.1	0.20	0.51	0.20	68.9
SouthWest: Lotus Ave														
30	L2	1	1.0	1	1.0	0.034	4.6	LOS A	0.1	0.8	0.10	0.53	0.10	65.2
32	R2	36	1.0	36	1.0	0.034	4.8	LOS A	0.1	0.8	0.10	0.53	0.10	30.9
Approach		37	1.0	37	1.0	0.034	4.8	LOS A	0.1	0.8	0.10	0.53	0.10	35.1
All Vehicles		114	1.2	114	1.2	0.039	6.1	NA	0.1	0.8	0.04	0.59	0.04	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 2 [PM - Kalkite Rd / Gardenia Ct (Site Folder: 2031 With Development Model)]

Network: N06 [PM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	17	1.0	17	1.0	0.047	7.0	LOS A	0.0	0.0	0.00	0.12	0.00	40.8
2	T1	72	3.0	72	3.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	74.6
Approach		88	2.6	88	2.6	0.047	1.3	NA	0.0	0.0	0.00	0.12	0.00	63.4
North: Kalkite Rd														
8	T1	40	3.0	40	3.0	0.022	3.1	LOS A	0.0	0.0	0.01	0.42	0.01	66.8
9	R2	1	1.0	1	1.0	0.022	6.9	LOS A	0.0	0.0	0.01	0.42	0.01	27.7
Approach		41	2.9	41	2.9	0.022	3.2	NA	0.0	0.0	0.01	0.42	0.01	64.1
West: Gardenia Ct														
10	L2	1	1.0	1	1.0	0.009	4.5	LOS A	0.0	0.2	0.18	0.52	0.18	25.3
12	R2	9	1.0	9	1.0	0.009	4.7	LOS A	0.0	0.2	0.18	0.52	0.18	25.3
Approach		11	1.0	11	1.0	0.009	4.7	LOS A	0.0	0.2	0.18	0.52	0.18	25.3
All Vehicles		140	2.6	140	2.6	0.047	2.1	NA	0.0	0.2	0.02	0.24	0.02	62.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 3 [PM - Kalkite Rd / Development Access (Section A)
(Site Folder: 2031 With Development Model)]

Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	156	1.0	156	1.0	0.084	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	66.7
2	T1	84	3.0	84	3.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		240	1.7	240	1.7	0.084	4.5	NA	0.0	0.0	0.00	0.41	0.00	70.5
North: Kalkite Rd														
8	T1	47	3.0	47	3.0	0.032	0.2	LOS A	0.1	0.5	0.12	0.10	0.12	73.7
9	R2	8	1.0	8	1.0	0.032	7.6	LOS A	0.1	0.5	0.12	0.10	0.12	63.9
Approach		56	2.7	56	2.7	0.032	1.3	NA	0.1	0.5	0.12	0.10	0.12	71.7
West: Development Access (Section A)														
10	L2	5	1.0	5	1.0	0.101	4.8	LOS A	0.4	2.9	0.33	0.57	0.33	29.1
12	R2	92	1.0	92	1.0	0.101	5.9	LOS A	0.4	2.9	0.33	0.57	0.33	29.1
Approach		97	1.0	97	1.0	0.101	5.8	LOS A	0.4	2.9	0.33	0.57	0.33	29.1
All Vehicles		393	1.7	393	1.7	0.101	4.4	NA	0.4	2.9	0.10	0.41	0.10	67.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▼ Site: 5 [PM - Kalkite Rd / Development Access (Section B)
(Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
1	L2	1	1.0	1	1.0	0.095	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	12.9
2	T1	180	3.0	180	3.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		181	3.0	181	3.0	0.095	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.4
North: Kalkite Rd														
8	T1	314	3.0	314	3.0	0.165	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	79.9
9	R2	2	1.0	2	1.0	0.165	7.3	LOS A	0.0	0.1	0.01	0.00	0.01	73.7
Approach		316	3.0	316	3.0	0.165	0.1	NA	0.0	0.1	0.01	0.00	0.01	79.8
West: Development Access (Section B)														
10	L2	1	1.0	1	1.0	0.002	5.1	LOS A	0.0	0.0	0.30	0.52	0.30	64.3
12	R2	1	1.0	1	1.0	0.002	6.6	LOS A	0.0	0.0	0.30	0.52	0.30	29.2
Approach		2	1.0	2	1.0	0.002	5.8	LOS A	0.0	0.0	0.30	0.52	0.30	57.8
All Vehicles		499	3.0	499	3.0	0.165	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▼ Site: 4 [PM - Kalkite Rd / Development Access (Section C)
(Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Kalkite Rd														
2	T1	181	3.0	181	3.0	0.095	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	79.9
3	R2	1	1.0	1	1.0	0.095	7.8	LOS A	0.0	0.1	0.01	0.00	0.01	74.2
Approach		182	3.0	182	3.0	0.095	0.1	NA	0.0	0.1	0.01	0.00	0.01	79.9
East: Development Access (Section C)														
4	L2	1	1.0	1	1.0	0.002	5.5	LOS A	0.0	0.1	0.38	0.54	0.38	28.6
6	R2	1	1.0	1	1.0	0.002	6.5	LOS A	0.0	0.1	0.38	0.54	0.38	28.6
Approach		2	1.0	2	1.0	0.002	6.0	LOS A	0.0	0.1	0.38	0.54	0.38	28.6
North: Kalkite Rd														
7	L2	2	3.0	2	3.0	0.162	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	12.0
8	T1	312	1.0	312	1.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.3
Approach		314	1.0	314	1.0	0.162	0.0	NA	0.0	0.0	0.00	0.00	0.00	74.0
All Vehicles		498	1.7	498	1.7	0.162	0.1	NA	0.0	0.1	0.00	0.01	0.00	78.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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LANE LEVEL OF SERVICE

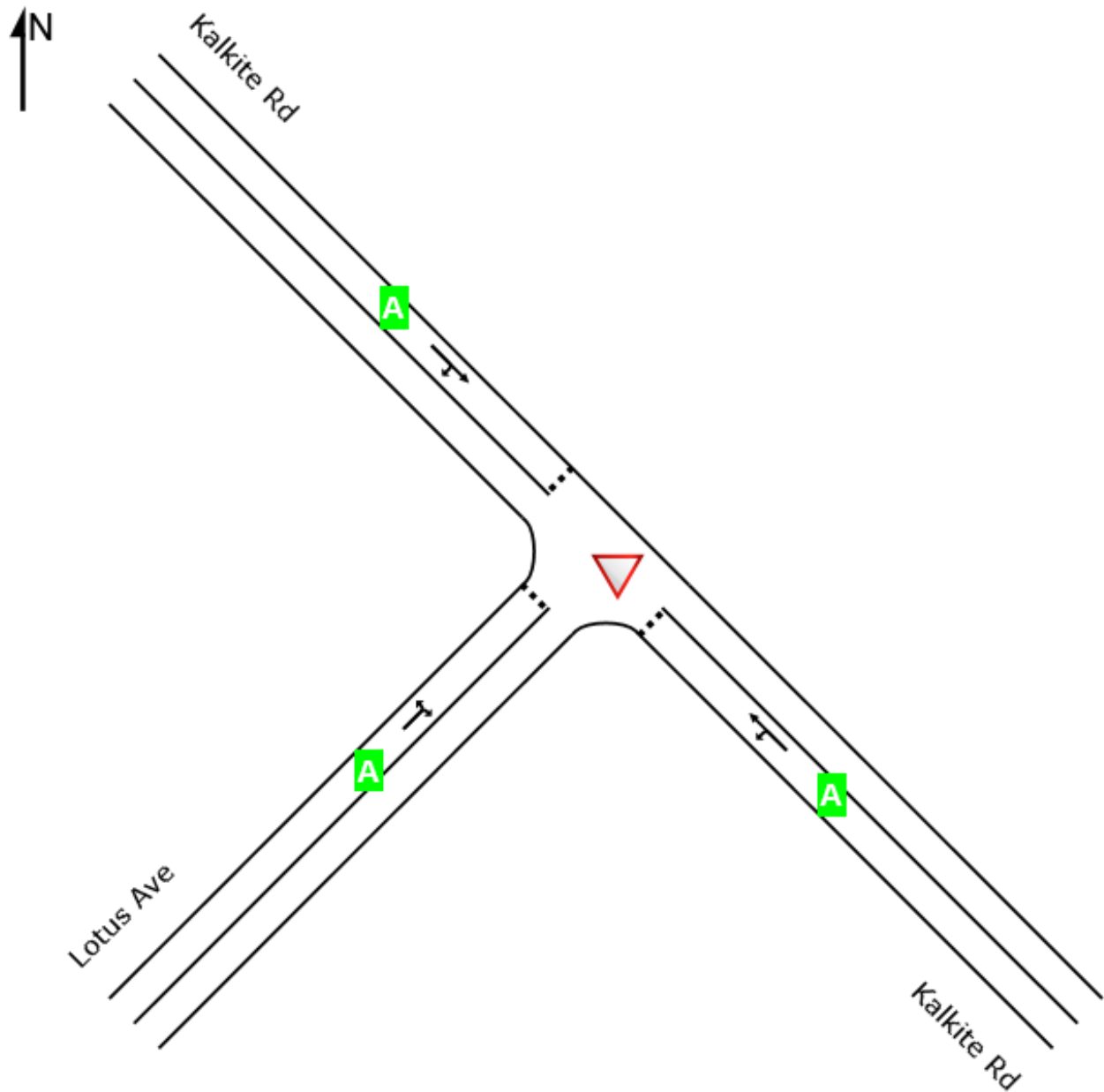
Lane Level of Service

▼ Site: 1 [PM - Kalkite Rd / Lotus Ave (Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

	Approaches			Intersection
	Southeast	Northwest	Southwest	
LOS	A	A	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

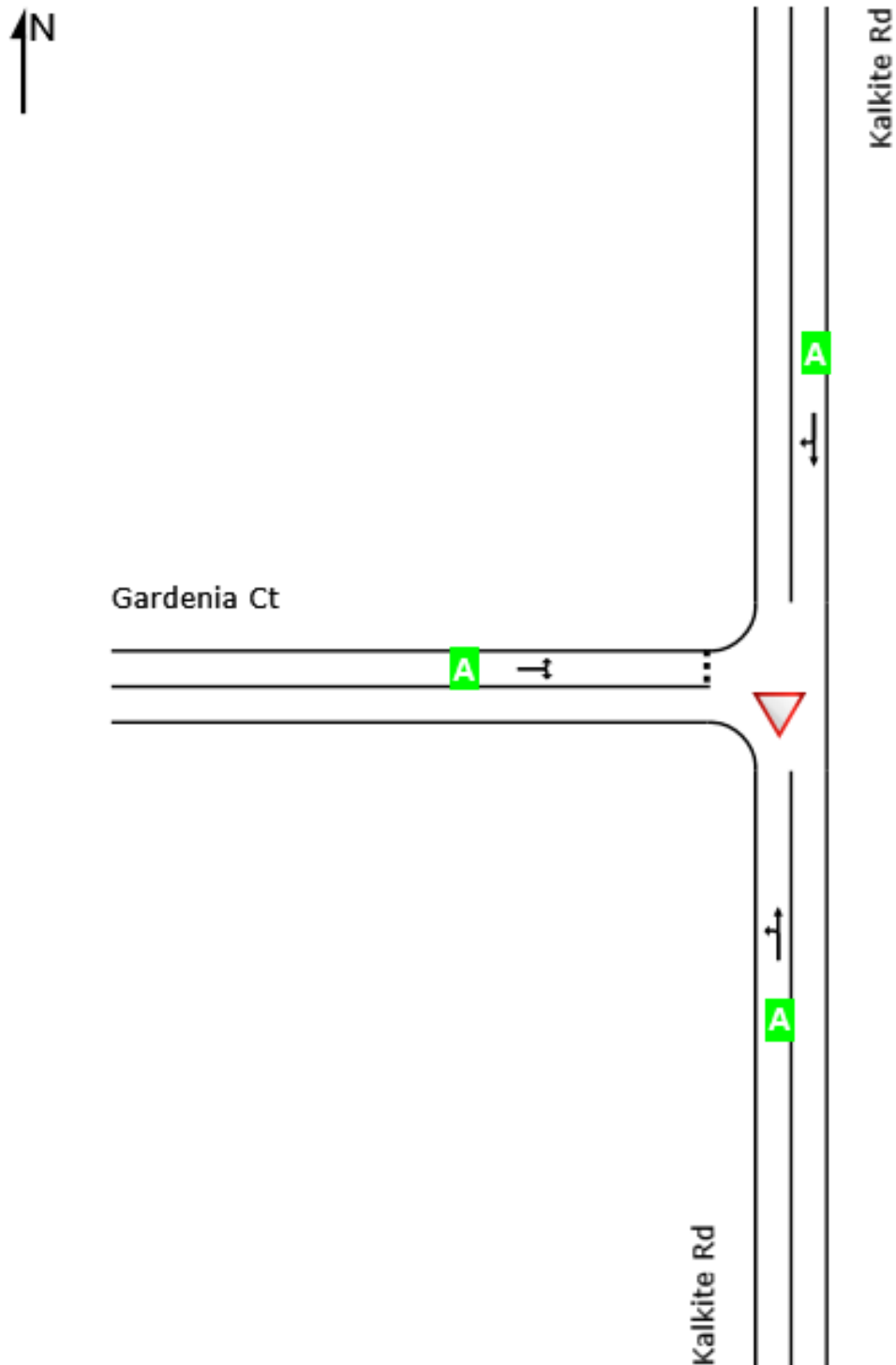
Lane Level of Service

▼ Site: 2 [PM - Kalkite Rd / Gardenia Ct (Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031 With Development Model (Network Folder: 2031 With Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Existing Design
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

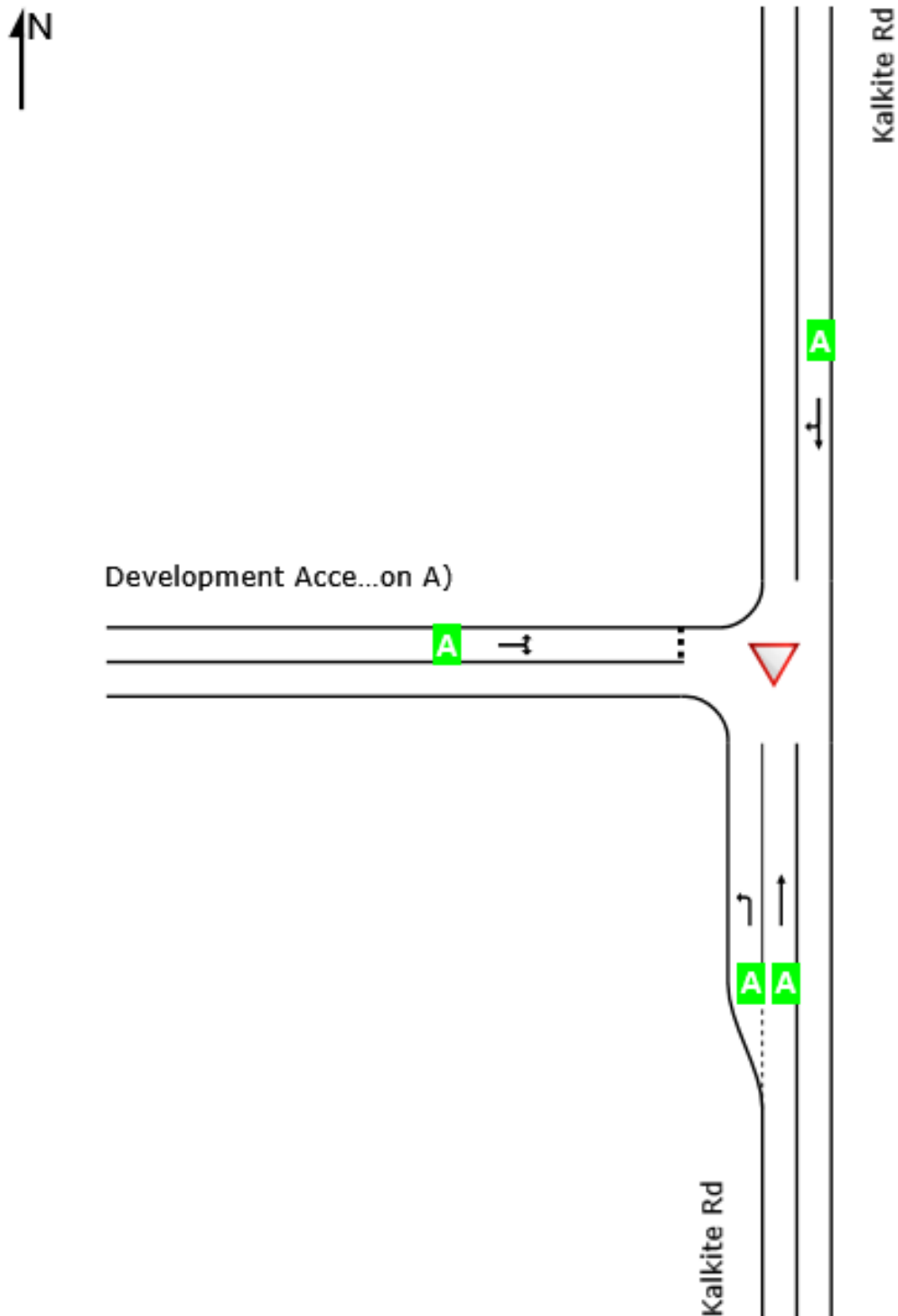
Lane Level of Service

▼ Site: 3 [PM - Kalkite Rd / Development Access (Section A)
(Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

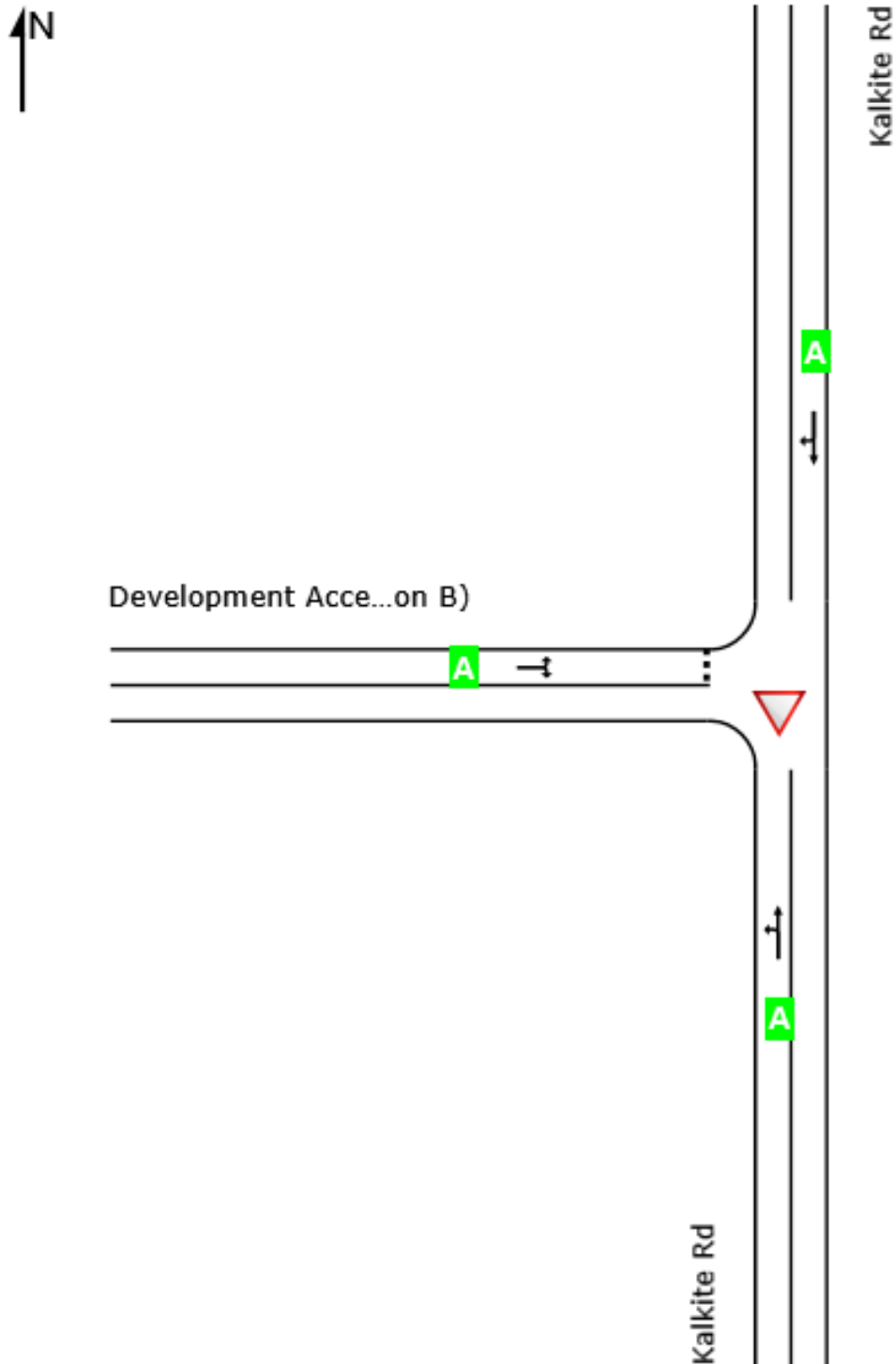
Lane Level of Service

▼ Site: 5 [PM - Kalkite Rd / Development Access (Section B)
(Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

LANE LEVEL OF SERVICE

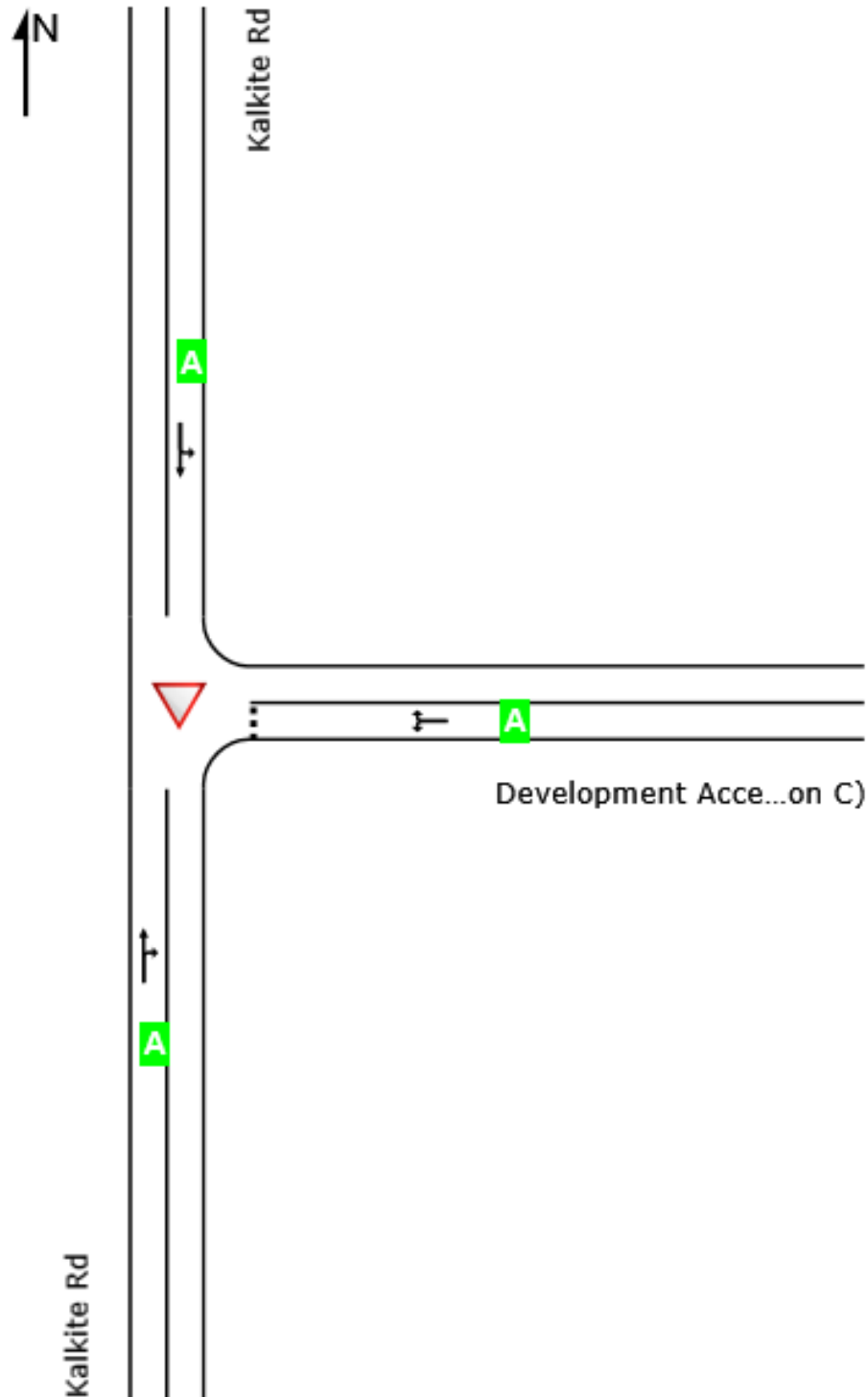
Lane Level of Service

▼ Site: 4 [PM - Kalkite Rd / Development Access (Section C)
(Site Folder: 2031 With Development Model)]

■ Network: N06 [PM - 2031
With Development Model
(Network Folder: 2031 With
Development Model)]

Kalkite Traffic Impact Assessment
Site Category: Proposed Design 1
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

APPENDIX

B

TRAFFIC DATA AND CALCULATIONS

Lotus Avenue / Kalkite Road Intersection Trip Generation Calculations

Land use	Unit	Trip Rate		Inbound		Outbound	
		AM	PM	AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%	36%

Total	Land use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Direct Trips	Single Residential	100	18	10	50	28
Upstream	Single Residential	12	2	6	6	3

Growth Rate

2%

Gardenia Court / Kalkite Road Intersection Trip Generation Calculations

Land use	Unit	Trip Rate		Inbound		Outbound	
		AM	PM	AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%	36%

Total	Land use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Direct Trips	Single Residential	27	5	14	13	8
Upstream	Single Residential	112	21	59	56	31

Growth Rate	2%
-------------	----

Section A

Development Access / Kalkite Road Intersection Trip Generation Calculations

Lots sizes	Land Use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Section A						
600m2 - 700m2	Single Dwelling	87	16	46	43	24
701m2 - 850m2	Single Dwelling	15	3	8	7	4
851m2 - 1000m2	Single Dwelling	4	1	2	2	1
1001m2 - 1500m2	Single Dwelling	49	9	26	24	14
1501m2 - 3000m2	Single Dwelling	54	10	28	27	15
3000+m2	Single Dwelling	5	1	3	2	1
Caravan	Caravan Park	20	0	20	20	0
Retail	Commercial	500	31	31	31	31
Total			71	164	158	91

Section B						
Large Block	Single Dwelling	4	1	2	2	1

Section C						
Large Block	Single Dwelling	4	1	2	2	1

Upstream	Single Dwelling	139	26	73	69	39
----------	-----------------	-----	----	----	----	----

Land use	Unit	Trip Rate	Inbound		Outbound	
			AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%
Commercial	GFA	0.125	0.125	50%	50%	50%

Growth Rate	2%
-------------	----

Section B

Development Access / Kalkite Road Intersection Trip Generation Calculations

Lots sizes	Land Use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Section A						
600m2 - 700m2	Single Dwelling	87	16	46	43	24
701m2 - 850m2	Single Dwelling	15	3	8	7	4
851m2 - 1000m2	Single Dwelling	4	1	2	2	1
1001m2 - 1500m2	Single Dwelling	49	9	26	24	14
1501m2 - 3000m2	Single Dwelling	54	10	28	27	15
3000+m2	Single Dwelling	5	1	3	2	1
Caravan	Caravan Park	20	0	20	20	0
Retail	Commercial	500	31	31	31	31
Total			71	164	158	91

Section B						
Large Block	Single Dwelling	4	1	2	2	1

Section C						
Large Block	Single Dwelling	4	1	2	2	1

Upstream	Single Dwelling (Existing)	139	26	73	69	39
	Single Dwelling (Proposed)	218	40	115	109	61
	Commercial (GFA)	500	31	31	31	31
	Caravan Park (Sites)	20	0	20	20	0
Total			97	239	229	131

Land use	Unit	Trip Rate	Inbound		Outbound		
		AM	PM	AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%	36%
Commercial	GFA	0.125	0.125	50%	50%	50%	50%

Growth Rate	2%
-------------	----

Section C

Development Access / Kalkite Road Intersection Trip Generation Calculations

Lots sizes	Land Use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Section A						
600m2 - 700m2	Single Dwelling	87	16	46	43	24
701m2 - 850m2	Single Dwelling	15	3	8	7	4
851m2 - 1000m2	Single Dwelling	4	1	2	2	1
1001m2 - 1500m2	Single Dwelling	49	9	26	24	14
1501m2 - 3000m2	Single Dwelling	54	10	28	27	15
3000+m2	Single Dwelling	5	1	3	2	1
Caravan	Caravan Park	20	0	20	20	0
Retail	Commercial	500	31	31	31	31
Total			71	164	158	91

Section B						
Large Block	Single Dwelling	4	1	2	2	1

Section C						
Large Block	Single Dwelling	4	1	2	2	1

Upstream	Single Dwelling (Existing)	139	26	73	69	39
	Single Dwelling (Proposed)	218	40	115	109	61
	Commercial (GFA)	500	31	31	31	31
	Caravan Park (Sites)	20	0	20	20	0
Total			97	239	229	131

Land use	Unit	Trip Rate	Inbound		Outbound	
			AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%
Commercial	GFA	0.125	0.125	50%	50%	50%

Growth Rate	2%
-------------	----

Proposed Dwellings

Lots sizes	Land Use	Dwellings	Trips			
			AM		PM	
			In	Out	In	Out
Section A						
600m2 - 700m2	Single Dwelling	87	16	46	43	24
701m2 - 850m2	Single Dwelling	15	3	8	7	4
851m2 - 1000m2	Single Dwelling	4	1	2	2	1
1001m2 - 1500m2	Single Dwelling	49	9	26	24	14
1501m2 - 3000m2	Single Dwelling	54	10	28	27	15
3000+m2	Single Dwelling	5	1	3	2	1
Caravan	Caravan Park	20	0	20	20	0
Retail	Commercial	500	31	31	31	31
Section B						
Large Block	Single Dwelling	4	1	2	2	1
Section C						
Large Block	Single Dwelling	4	1	2	2	1

Unit	Trip Rate		Inbound		Outbound	
	AM	PM	AM	PM	AM	PM
Dwelling	0.71	0.78	26%	64%	74%	36%
Site	1	1	0%	100%	100%	0%
GFA	0.125	0.125	50%	50%	50%	50%

Existing Dwellings Traffic Calculations

Northern Section								
Street	Land Use	Dwellings	Trips					
			AM			PM		
			In	Out		In	Out	
Banksia Ave	Single Dwelling	43	8	23		21	12	
Lotus Ave	Single Dwelling	37	7	19		18	10	
Lantana Dr	Single Dwelling	9	2	5		4	3	
Nemesia Ct	Single Dwelling	5	1	3		2	1	
Oleander Ct	Single Dwelling	6	1	3		3	2	
Total			18	53		50	28	

Land use	Unit	Trip Rate		Inbound		Outbound	
		AM	PM	AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	26%	64%	74%	36%



Southern Section								
Street	Land Use	Dwellings	Trips					
			AM			PM		
			In	Out		In	Out	
Gardenia Ct	Single Dwelling	7	1	4		3	2	
Magnolia Ave	Single Dwelling	16	3	8		8	4	
Rosemary Ct	Single Dwelling	4	1	2		2	1	
Total			5	14		13	8	



APPENDIX

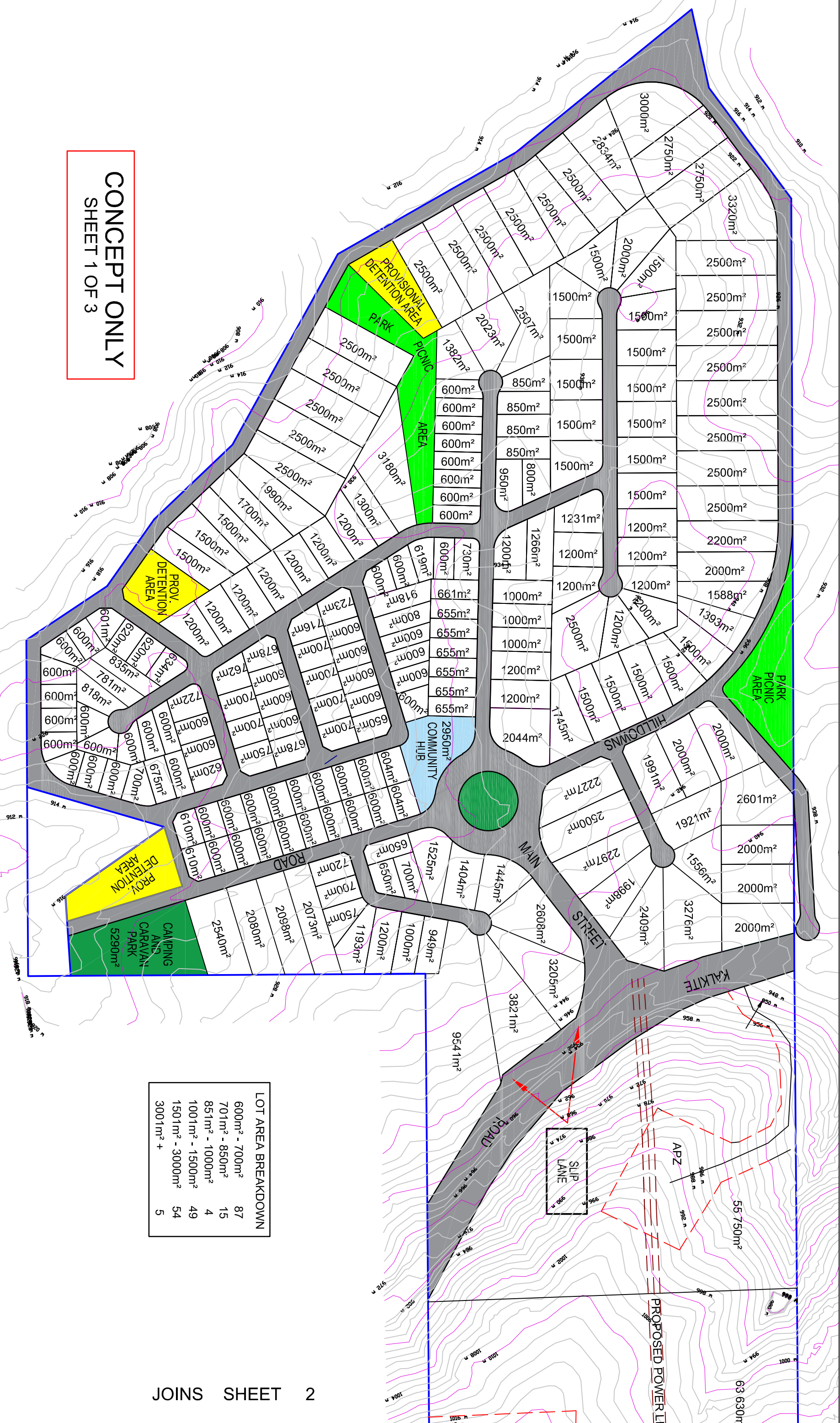
C

CONCEPT SUBDIVISION LAYOUT



now





CONCEPT ONLY
SHEET 1 OF 3

CLIENT: JOHN SACCO ENTERPRISE

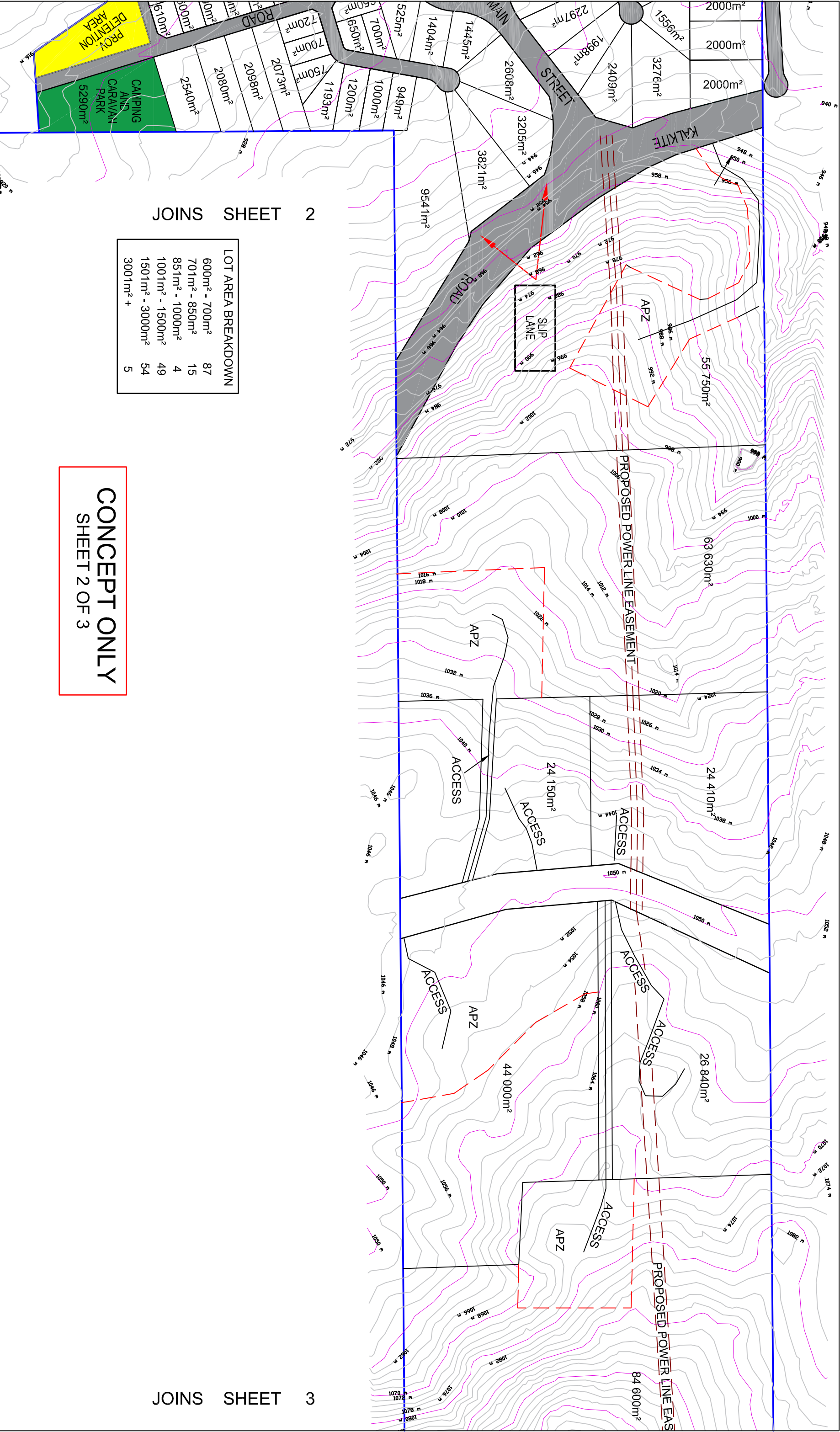
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PLAN OF PROPOSED
SUBDIVISION
AT 56 HILLDOWNS ROAD
KALKITE

LOT AREA BREAKDOWN		
600m² - 700m²	87	
701m² - 850m²	15	
851m² - 1000m²	4	
1001m² - 1500m²	49	
1501m² - 3000m²	54	
3001m² +	5	



JOINS SHEET 2

JOINS SHEET 3

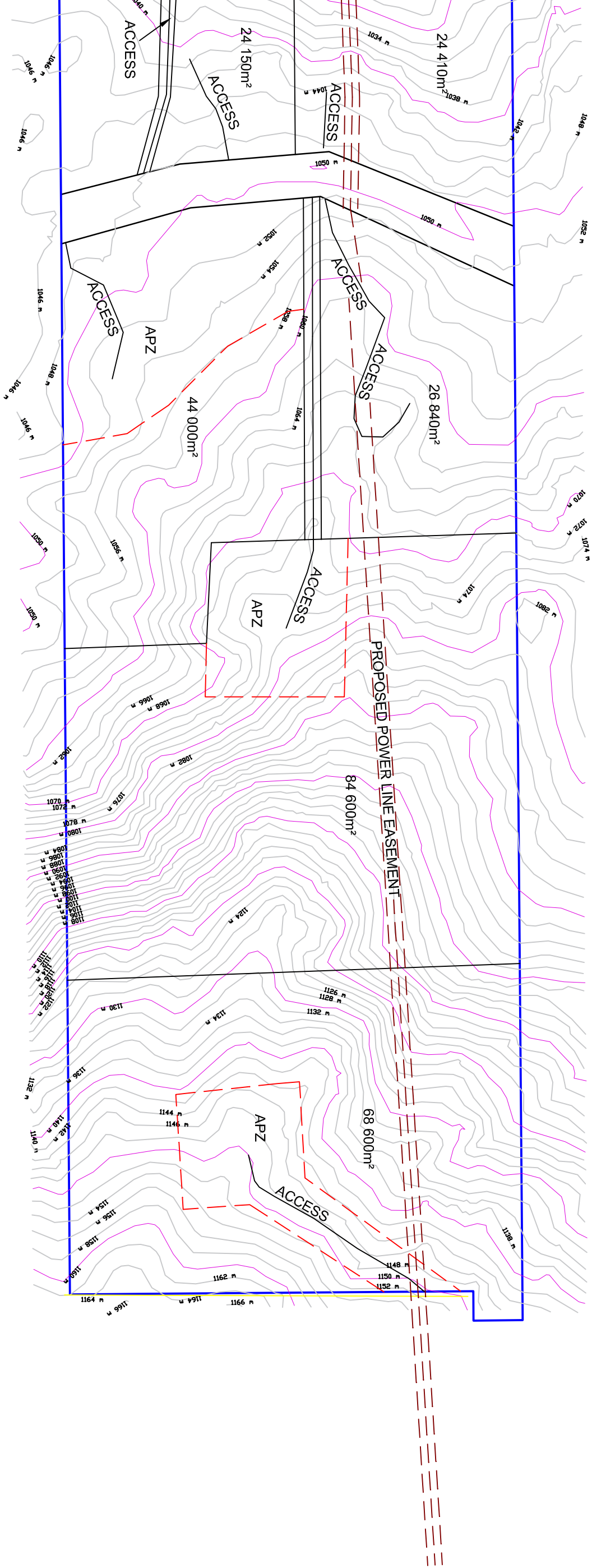
CONCEPT ONLY
SHEET 2 OF 3

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JOINS SHEET 3

CONCEPT ONLY
SHEET 3 OF 3

LOT AREA BREAKDOWN		
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APPENDIX

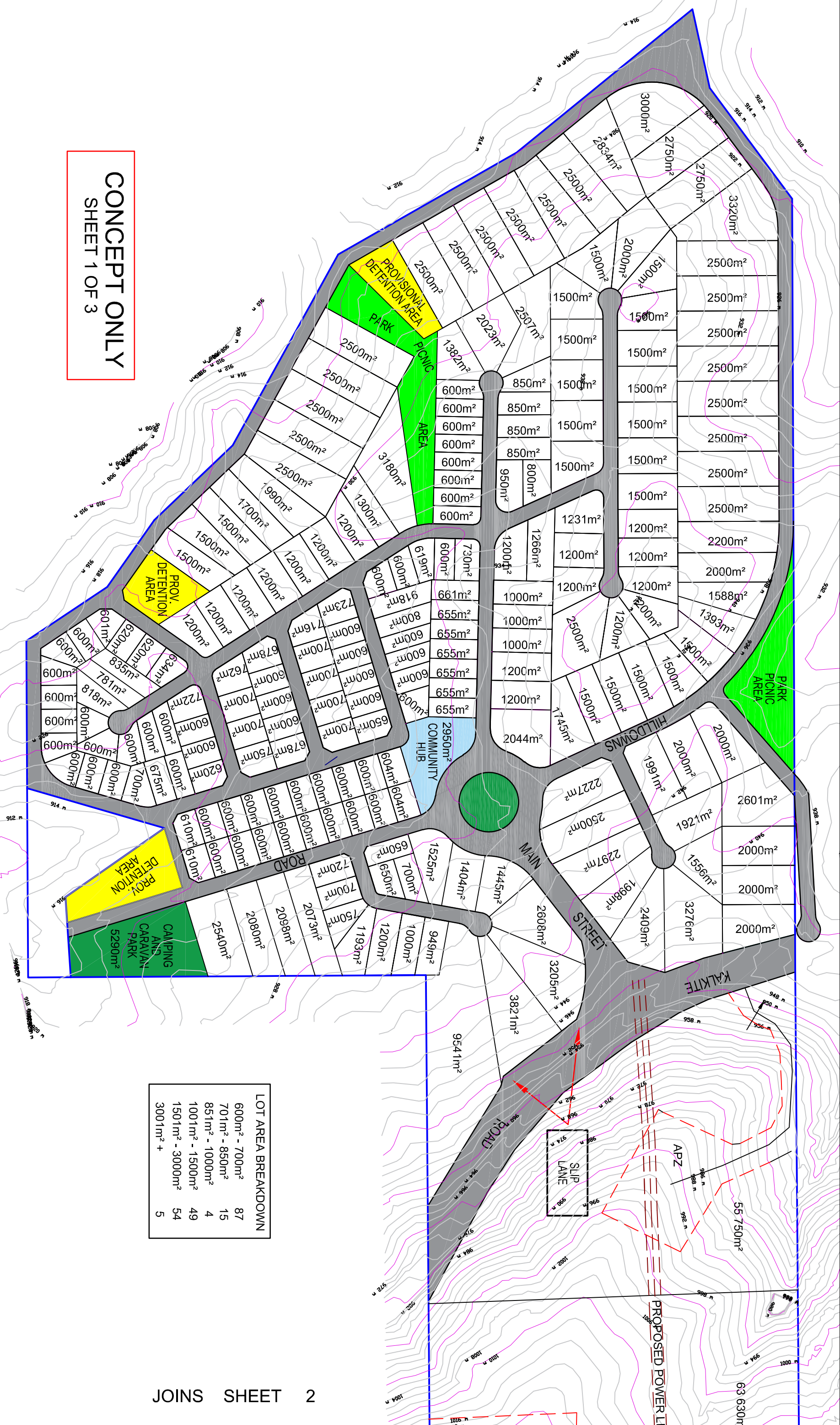
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CONCEPT SUBDIVISION LAYOUT



now





CONCEPT ONLY
SHEET 1 OF 3

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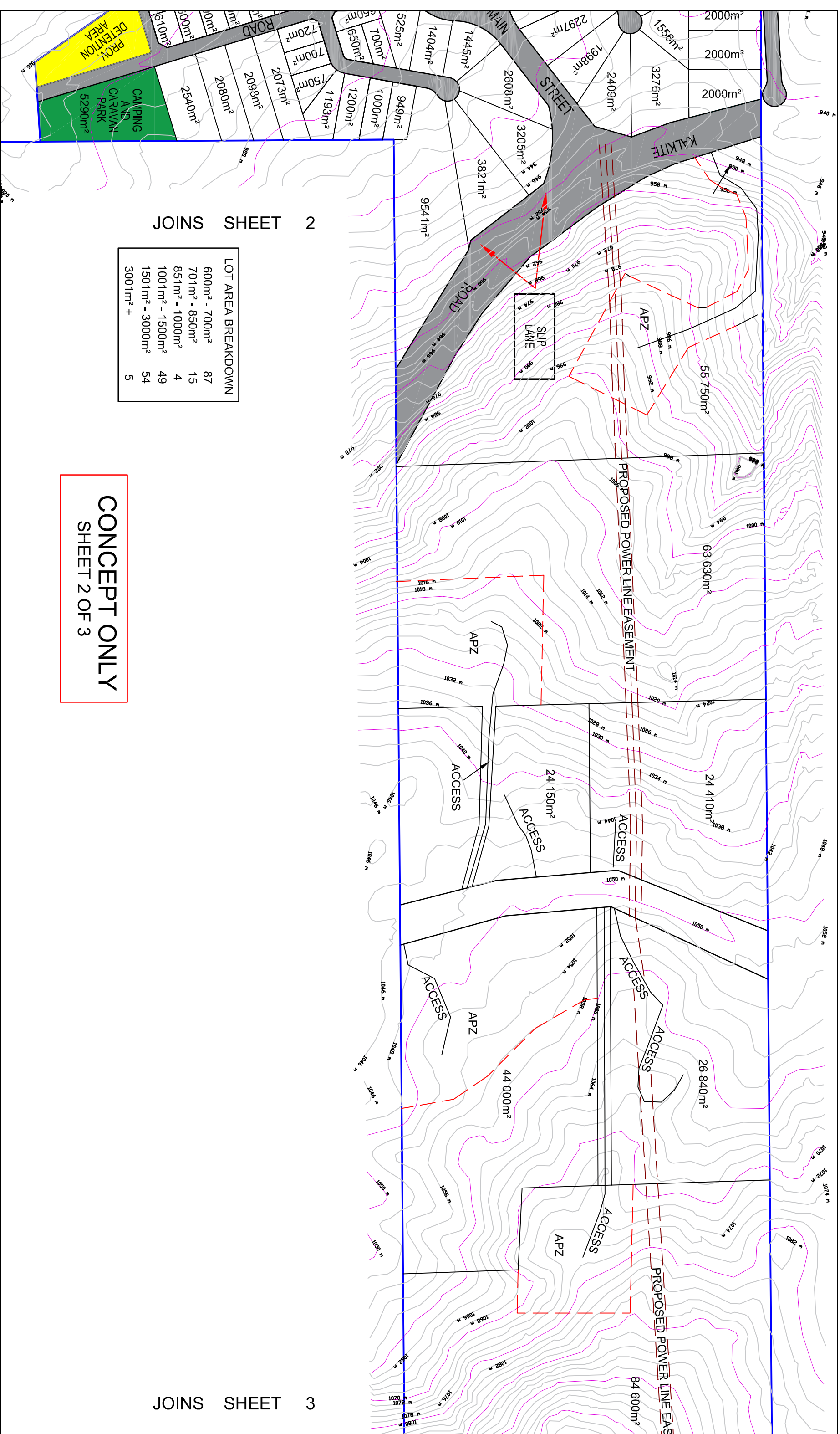
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JOINS SHEET 2

LOT AREA BREAKDOWN	
600m ² - 700m ²	87
701m ² - 850m ²	15
851m ² - 1000m ²	4
1001m ² - 1500m ²	49
1501m ² - 3000m ²	54
3001m ² +	5

CONCEPT ONLY
SHEET 2 OF 3

JOINS SHEET 3

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PLAN OF PROPOSED

SUBDIVISION

AT 56 HILLDOWNS ROAD

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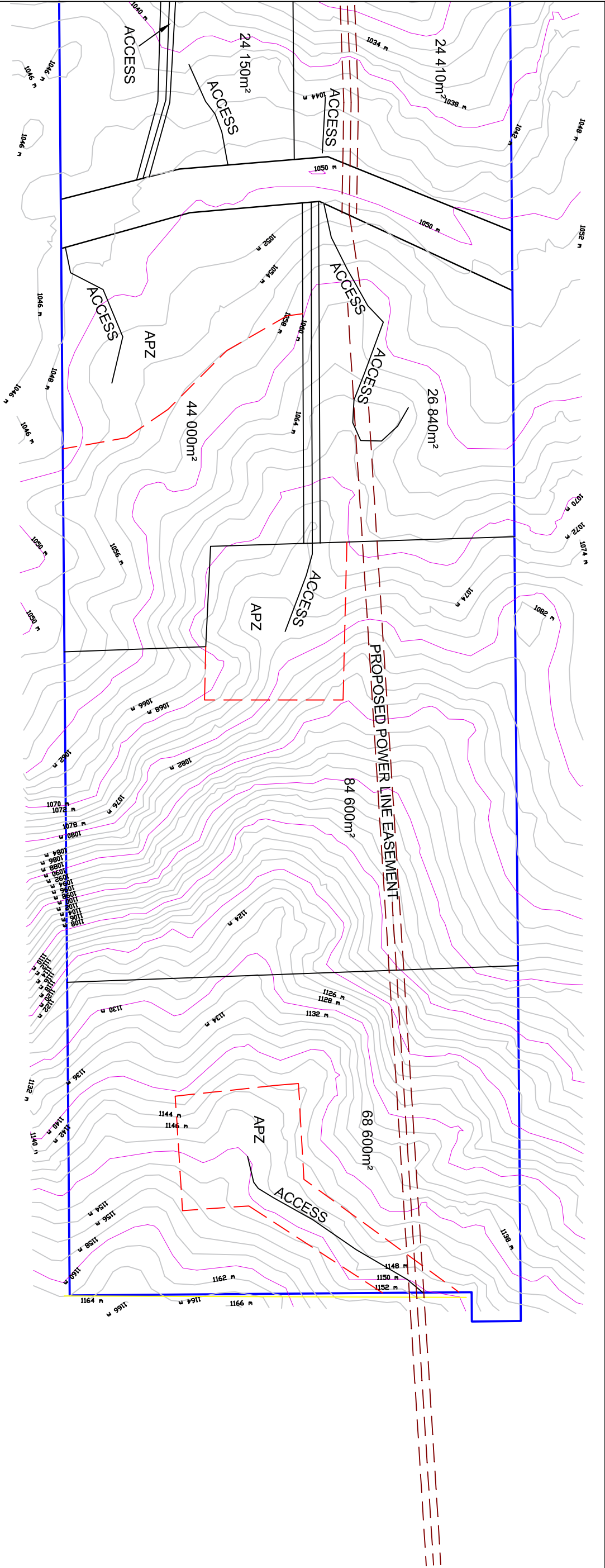
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CONCEPT ONLY
SHEET 3 OF 3

LOT AREA BREAKDOWN	
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