

WAMBO COAL PTY LIMITED



WAMBO COAL MINE LONGWALL 24 TO 26 MODIFICATION

MODIFICATION REPORT

For the Modification of DA 305-7-2003 (MOD 19)
Optimisation and Continued Operation
of the Approved South Bates Extension Underground Mine

APPENDIX H

Land Contamination Assessment

Peabody



Preliminary Site Investigation

Longwalls 24 – 26 Modification

Wambo Coal Pty Ltd

02 June 2022

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Executive summary

GHD Pty Ltd (GHD) was engaged by Wambo Coal Pty Ltd (WCPL) to undertake a Preliminary Site Investigation (PSI) on an approximate 70 hectare (ha) portion of land outside of existing Wambo Coal Mine mining leases to support the Longwalls 24-26 Modification of the Wambo Coal Mine (hereafter referred to as the “Site”).

The PSI is required under *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP), as the land use will change from bushland and agriculture to underground mining as a result of the Longwalls 24-26 Modification. In accordance with Resilience and Hazards SEPP, the PSI has been prepared with reference to the New South Wales Environment Protection Authority’s (NSW EPA) (2020) *Contaminated Land Guidelines – Consultants reporting on contaminated land*.

The objectives of the investigation are to detail the existing and potential contamination issues at the Site prior to the commencement of the Longwalls 24-26 Modification.

In accordance with the objectives detailed in Section 1.1, and based on the information contained within this assessment and limitations outlined in Section 1.3, the following conclusions are made:

- The desk top review identified the following:
 - The Site is zoned as RU1 - Primary Production land.
 - The Site has been used for a mix of both cleared agricultural land (grazing) and undisturbed bushland since the 1950’s. No man-made structures, with the exception of fence lines and tracks/trails were evident from the aerial photograph review.
 - Some small buildings/sheds were identified off-site but directly adjacent to the southern boundary in historical aerial photographs from 2008 and 2009 to 2013 where they were no longer visible. These structures may have been part of a drilling/exploration area.
 - A review of the South Bates Extension Modification Stage 1 Preliminary Contamination Investigation (GHD 2016) which is located to the south and south-west of the Site indicated that the overall likelihood for significant contamination to be present was low but there was the potential for contamination to be associated with two areas of former occupation (Pinegrove Property and Water Tank Area).
 - No NSW EPA contaminated land records/notices or *Protection of the Environment Operations Act 1997* (POEO) licences were reported for the Site.
- At the time of the site inspection, the Site consisted of relatively dense bushland with small clearings/grassed areas along access tracks in the south and central portions of the Site and cleared agricultural land (open grassed areas and dams) in the northern portion of the Site. There were cattle present in the northern area of the Site where the vegetation was cleared.
- Based on the desktop review and site inspection, the following potential contamination sources have been identified:
 - Potential for imported fill from unknown sources to have been brought to site for road and access track construction.
 - Potential for past burial of household and farming material and presence of waste, including hazardous wastes (asbestos) within areas of the Site not inspected.
 - Historical use of herbicides or pesticides across the Site.
- Based on the results of this investigation, the overall likelihood for significant chemical contamination to be present within the Site is considered to be low.

Based on this PSI, the Site is considered to be suitable for the proposed development (underground mining). However, it is recommended that WCPL employ measures for the management of soils (including unexpected finds protocols) in the event that potential contamination impacts are identified during future site works.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

List of abbreviations

Abbreviation	Definition
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
ACM	Asbestos Containing Material
BTEXN	Benzene, Toluene, Ethyl benzene, Xylenes, Naphthalene
CLM Act	Contaminated Land Management Act 1997
CSM	Conceptual Site Model
DA	Development Application
DP	Deposited Plan
NSW EPA	New South Wales Environment Protection Authority
ha	Hectare
LEP	Local Environmental Plan
LGA	Local Government Area
mbgl	Metres below ground level
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
OCP	Organochlorine Pesticide
OPP	Organophosphate Pesticide
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POEO Act	Protection of the Environment Operations Act 1997
PSI	Preliminary Site Investigation
SEPP	State Environmental Planning Policy
TRH	Total Recoverable Hydrocarbons
WCPL	Wambo Coal Pty Ltd

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1. Introduction

The Wambo Coal Mine is an underground coal mining operation located approximately 15 kilometres (km) west of Singleton, near the village of Warkworth, New South Wales (NSW). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

GHD Pty Ltd (GHD) was engaged by WCPL to undertake a Preliminary Site Investigation (PSI) on an approximate 70.24 hectare (ha) portion of land outside of existing mining leases to support the Longwalls 24-26 Modification of the Wambo Coal Mine (hereafter referred to as the "Site"). The Site locality plan is presented in Figure 1, Appendix A.

1.1 Purpose

The PSI is required under *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP), as the land use will change from bushland and agriculture to underground mining as a result of the Longwalls 24-26 Modification. In accordance with Resilience and Hazards SEPP, the PSI has been prepared with reference to the New South Wales Environment Protection Authority's (NSW EPA) (2020) *Contamination Guidelines - Consultants Reporting on Contaminated Land*.

The purpose of the PSI was to detail the existing and potential contamination issues at the Site prior to the commencement of the modification assessment.

1.2 Scope of work

The scope of work for the PSI comprised of a desktop investigation and site inspection including the following:

- Site history review including review of any available existing information including previous soil and groundwater reports, interviews with employees etc.
- Review of geology, hydrology and topography information for the Site.
- Review of historical aerial photographs.
- A review of NSW EPA notices under the Contaminated Land Management Act 1997 (CLM Act).
- A search of Water NSW database on groundwater information for the area.
- A general inspection of the Site to identify areas of potential contamination concern.
- Preparation of this report with reference to NSW EPA 2020 and the National Environment Protection Council NEPC (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended 2013 (NEPM) summarising the results of the desktop reviews and site inspection, provision of recommendations for further investigations (as required) and a statement of whether the Site is suitable for the proposed use.

Due to the nature of the Site and previous and current land use, a review of the SafeWork NSW hazardous chemical notifications database (formerly Dangerous Goods search) was not undertaken.

1.3 Limitations

This report: has been prepared by GHD for Wambo Coal Pty Ltd and may only be used and relied on by Wambo Coal Pty Ltd for the purpose agreed between GHD and Wambo Coal Pty Ltd as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Wambo Coal Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Inspections undertaken in respect of this Report are limited to visual inspections only and are constrained by the particular site conditions, such as access to roads and tracks and dense vegetation.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

GHD has prepared this report on the basis of information provided by WCPL and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Site information

2.1 Site identification

A summary of the site identification details are provided in Table 2.1. The Site location is shown on Figure 1 in Appendix A.

Table 2.1 Site identification summary

Information	Details
Street address/location	2337 Jerrys Plains Road, Warkworth, NSW 2330 The Site is located to the north-west of the current South Bates Extension Underground Mine operations
Lot and DP number	The Site consists of: – Portions of lots 3, 10, 11, 22, 68, 71, 72, 73 and 166 in DP 753817.
Site area	Approximately 70 ha
Local Government Area (LGA)	Singleton Council
Land Use Zoning and current LEP	The Site is zoned as RU1 - Primary Production land under <i>Singleton Local Environmental Plan 2013</i>
Current site use	Agricultural (grazing land) and natural bushland
Proposed Land Use	Underground coal mining - Longwalls 24-26 Modification
Surrounding land use	North– Mixture of cleared and partially vegetated agricultural (grazing) land South – Cleared agricultural land with patches of bushland and North Wambo Creek West – Undisturbed bushland and Jerrys Plains Ridge which forms the Wollemi National Park East – Bushland and an operational open cut coal mine

2.2 Site observations

A GHD environmental scientist completed a site inspection on 9 February 2022. The main features observed at the Site during the walkover are summarised in Table 2.2 below and shown in Figure 2, Appendix A with reference to selected photographs as provided in Appendix B.

Table 2.2 Site inspection summary

Items	Comments
Site conditions	<p>The Site consisted of semi cleared agricultural grazing land with surrounding undisturbed bushland, various current and former fence lines and gates, unsealed access tracks and fire trails. No areas of former buildings or structures (dwellings, sheds, tanks, windmills etc) were identified.</p> <p>There was no evidence of any unauthorised access and fly tipping (household wastes, asbestos containing materials (ACM) within the areas of the Site observed. There was no evidence of deposited or buried farm wastes (drums, ACM, machinery, fencing materials) and no stockpiles (soil or vegetation) were observed in inspected areas of the Site. It must be noted that not all portions of the Site were accessible. Minor amounts of igneous cobble sized fill were observed placed in a low lying portion of the access track as a measure to prevent vehicle damage and bogging.</p> <p>No staining or odorous soils were noted. The inspection focussed on cleared areas of the Site and patches of bare ground that may have been former areas of structures or stored materials.</p> <p>No man-made water collection or drainage structures were observed on Site (erosion berms, dams, wells/bores, dish drains, creek/gully crossings).</p> <p>A large dam and water tanks were observed towards the north.</p>

Items	Comments
Ground surface and site drainage	<p>The Site is wholly unsealed with either cleared grass areas and scattered trees (agricultural grazing land) or undisturbed bushland. All vegetation was observed to be in a good condition with no signs of stress observed.</p> <p>The Site comprises several heavily vegetated drainage gullies that drain towards the north, to a large dam and then north east towards Waterfall Creek (750 m (metres)). It is assumed that surface water would infiltrate into surface soils and flow with the site topography toward the north.</p>
Potentially Contaminating Activities	<p>There was no evidence as to the presence of potentially contaminating activities on the Site with no former buildings, tanks, dumped farm wastes, stockpiles or staining observed. Structures observed on site were limited to current and former (derelict) fence lines and unsealed tracks and fire trails.</p> <p>There is a potential for fill materials to have been used during construction of roads/tracks. There was some evidence of minor road repairs using a large, igneous cobbles to prevent bogging in low lying areas. However, based on the isolated nature of the Site, most tracks are likely cut from natural local materials.</p> <p>There is a potential for past burial of household and farming material and presence of waste, including hazardous wastes (asbestos) within areas of the Site not inspected.</p> <p>Based on the current and former use of the Site for agricultural purposes (particularly the northern portion) there is a potential for the previous use of pesticides (insecticides, herbicides etc) and fertilizers.</p>

3. Environmental setting

The following section provides an overview of the environmental setting of the Site obtained from publicly available information and information provided by WCPL.

3.1 Topography

The Site is located between approximately 160 m Australian Height Datum (AHD) in the southern portion of the site up to 220 m AHD in the central portion and falling to 120 m AHD in northern portions of the site towards Waterfall Creek (Source <http://maps.six.nsw.gov.au/>). The Site topography is undulating and rises steeply towards the west to Jerrys Plains Ridge.

3.2 Soils and geology

Reference to the 1:250,000 Soil Landscape Sheet of the Singleton Region, published for the Soil Conservation Service of NSW (Kovac & Lawrie, 1985), indicates that the Site mainly consists of Bulga Soloths soils with Lees Pinch Shallow soils in the south west.

The terrain soil landscape unit (Bulga Soloths) is comprised of Permian sandstone, conglomerate, claystone, shale, mudstone and coal seams. The soil landscape unit occurs on smooth slopes with sandstone colluvium, relief of 20-40 m, slopes up to 10%. The Site may also contain yellow and brown Solodic soils, and brown earths on lower slope. Human activity through agriculture may have caused soil disturbance.

According to the Environment NSW eSpade website, there is no mapped evidence to suggest the occurrence of acid sulfate soils (ASS).

3.3 Hydrology

Tributaries of Waterfall Creek were observed in the northern portion of the Site which flow north towards a dam and then north east towards Waterfall Creek which flows to the Hunter River approximately 3 km to the north east. No dams were observed on Site although two were observed off Site; to the north (100 m) and the south (200 m) of the Site.

3.4 Hydrogeology

GHD obtained database information from the NSW Office of Water Groundwater database (<http://allwaterdata.water.nsw.gov.au/water.stm>) on 21 February 2022. The search was conducted to identify registered groundwater boreholes in close proximity to the Site and to record information such as groundwater use and final depth. The results of this search indicated that there are two registered groundwater wells located south east of the site which are groundwater monitoring sites operated by WCPL. Summary information for the two wells within the Site is provided in Table 3.1 and results are presented in Appendix C.

Table 3.1 Summary of Groundwater Database Search

Borehole ID	Approx. Distance to Site	Standing Water Level (mbgl)	Final Depth (m)	Intended Purpose
GW200831	800 m south east	-	12 m	Monitoring Bore
GW200832	1 km south east	-	14 m	Monitoring Bore

4. Desk top information

4.1 Historical aerial photographs

A selection of historical aerial photographs was examined in order to assess past activities and land uses at the Site. Photographs were examined from the years 1963, 1971, 1983, 1992, 2001, 2003, 2008, 2009, 2013, 2015, 2018 and 2021.

The historical aerial photographs are provided in Appendix D and a summary of the information gained from their review for the Site and its surrounds are provided in Table 4.1.

Table 4.1 Review of historical aerial photographs

Photograph	Site observations
1963 Type: B & W NSW 1186 5130 Scale 1:38000 26/7/63	<p>The Site is predominantly vegetated with scattered areas of cleared vegetation. There was a mixture of light vegetation and agricultural land in the southern and northern areas of the site. Tributaries of Waterfall Creek are visible to in the northern portion of the Site and Jerrys Plains Ridge crosses through the central portion of the Site. There is a perimeter trail that travels through the north west of the Site, along the ridge line. North Wambo Creek is visible to the south of the Site. Cleared agricultural land with scattered timber was located in the northern and southern portions of the site.</p> <p>The surrounding area consisted of heavily vegetated bushland to the west (Wollemi National Park) and generally agricultural land use to the north, south and east.</p>
1971 Type: B & W NSW 1954 5078 Scale: 1:82 000 16/10/71	<p>The Site remains generally similar to the previous photograph with increased clearing of vegetation in the south.</p> <p>The surrounding area is generally similar to the previous photograph. Clearing of vegetation was noted to have occurred to the north east of the Site.</p>
1983 Type: B & W NSW 3360 5057 Scale : 1:25 000 21/12/83	<p>The Site and surrounding areas remain generally similar to the previous photograph.</p> <p>The dams to the north and south of the Site are visible.</p>
1992 Type: Colour NSW 4089 5049 Scale : 1:25 000	<p>The Site and surrounding areas remain generally similar to the previous photograph.</p>
2001 Type: Colour NSW 4580 125 Scale: 1:25,000 29/10/2001	<p>The Site remains generally similar to the previous photograph. Vegetation in the southern portion of the site is regenerating with less cleared areas visible.</p>
2003 Source: Google Earth Pro	<p>As above however two small white structures are noted within a clearing, immediately south of the Site (proposed lease area boundary).</p>
2008 Source: Six Maps http://maps.six.nsw.gov.au/	<p>The Site is generally similar to the previous photograph. The northern portion of the Site remains cleared and used for agricultural purposes (grazing land). Vegetation in the southern portion of the site has continued to regenerate with limited cleared areas visible.</p> <p>A collection of structures, potentially sheds, can be observed along the southern boundary of the Site. These structures appear to be offsite, within the boundary of ML1806 to the south. These structures maybe a drilling/exploration site.</p> <p>The Wambo Coal Mine is present to the east of the Site.</p>

Photograph	Site observations
2009 Source: Google Earth Pro	The Site is generally similar to the previous photograph.
2013 Source: Google Earth Pro	<p>The Site is generally similar to the previous photograph except that the observed buildings/sheds in 2008 and 2009 may have been mostly removed. One white object remains which may be a small shed or water tank.</p> <p>A section of the open cut mine to the east is visible.</p>
2015 Source: Google Earth Pro	The vegetation on the Site appears more dense which may be due to a greater amount of rainfall in the region. The open cut mine has extended further north and west, to the east of the Site.
2018 Source: Google Earth Pro	The Site is generally similar to the previous photograph. The open cut mine has extended further north.
2021 Source: Google Earth Pro	<p>The vegetation on the Site appears more dense which may be due to a greater amount of rainfall in the region. The open cut mine has extended further north and west, alongside the Site.</p> <p>An additional white building/object can be seen west of the other object mentioned in 2013. However, it may have remained there but not shown up in the previous photographs.</p>

Based on the review of historical aerial photographs, the Site has generally been used for agriculture (grazing) and the remaining land was heavy vegetated. No structures were noted on Site between 1963 and 2021.

4.2 Previous investigation reports

A prior investigation (Stage 1 Preliminary Contamination Investigation) was undertaken by GHD in 2016 for the South Bates Extension Modification. The South Bates Extension Modification is located directly south and south west of the Site.

The South Bates Extension Modification Site consisted of cleared former agricultural land (open grassed paddocks) with surrounding undisturbed bushland. Two areas of former occupation of the South Bates Extension Modification Site were identified as being the Pinegrove Property located in the northern portion and the Water Tank Area located in the central portion of the Site. Former small buildings/sheds associated with the previous agricultural activities were present on South Bates Extension Modification Site.

The overall likelihood for significant chemical contamination to be present within the Site was considered to be low, however there was the potential for chemical contamination associated with:

- The spillage or leakage of oils or fuels historically stored or used
- Historical use of herbicides or pesticides
- General storage of materials and waste
- Fill materials from unknown sources
- The potential use of hazardous building materials such as asbestos, synthetic mineral fibres and lead within buildings on site
- Discharge from former septic system into soil and groundwater

Based on the assessment, the Site was considered to be suitable for the proposed development (underground mining), provided the following measures are undertaken (as required):

- Removal of general building wastes and rubbish with a detailed inspection for potential asbestos containing materials within these areas
- Undertake a hazardous buildings and material survey of structures that may be demolished

4.3 NSW Environment Protection Authority

A search of the datasets maintained by NSW EPA including notices under the *Contaminated Land Management Act 1997* (CLM Act) and *Protection of the Environment Operations Act 1997* (POEO Act) Environment Protection License Register was carried out. The search results are summarised below.

Contaminated land record of notices

A site will be on the Contaminated Land: Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the CLM Act.

A search of the EPA record of notices for the Warkworth and Jerrys Plains area revealed no documented contaminated sites to date.

List of NSW contaminated sites notified to EPA

The sites appearing on the EPA “List of NSW contaminated sites notified to the EPA” indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the EPA has defined the management class as regulation under CLM Act not required.

The search identified two sites within the Warkworth area that have been notified to the NSW EPA the details of which summarised in the following Table 4.2.

Table 4.2 Sites notified to the NSW EPA within suburb of Warkworth

Site Name	Address	Contamination Activity type	Distance from Site	Management Class
United Collieries	134 Jerrys Plains Road	Other industry	5.5 km east	Regulation under CLM Act not required
Emulsion Plant – Dyno Nobel Asia Pacific Pty Ltd	186 Long Road	Chemical industry	16 km south-east	Regulation under CLM Act not required

POEO licence register

The POEO licence register identifies premises that are licensed for certain activities under the POEO Act. Information listed on the Register of particular relevance to this assessment includes site location, activity type, relevant clean up notice and non-compliance information. Each licence provides information on potential point and non-point sources of soil and groundwater contamination that may be generated on site through standard operations, accidental spills and leaks.

A search of the register identified four premises with a POEO Act licence within the Jerrys Plains and Warkworth area. These are summarised in Table 4.3.

Table 4.3 Licensed activities under the POEO Act 1997

Organisation	Name	Address	Activity	Distance	Direction
Wambo Coal Pty Ltd	Wambo Colliery	Jerrys Plains Road, Warkworth	Crushing, grinding or separating Mining for coal Coal works	0 km	Adjacent to Site
Redbank Project Pty Ltd c/Kordamentha Pty Ltd/Verdant Earth Technologies Ltd	Redbank Power Station	112 Longpoint Road, Warkworth	Generation of electrical power from coal. Crushing, grinding or separating coal	13 km	South East
Lemington Coal Mines Pty Ltd	Lemington Coal Mine (now part of HVO)	Comleroi Road, Warkworth	Mining for coal	14 km	East
United Collieries Pty Ltd	United Colliery	134 Jerrys Plains Road, Warkworth	Crushing, grinding or separating Mining for coal Coal works	5 km	East

4.4 SafeWork NSW search

A search of the SafeWork NSW hazardous chemical notifications database (formerly Dangerous Goods search) was not undertaken. However, no records of hazardous chemicals pertaining to the nearby South Bates Extension Modification Site were identified during GHD 2016 (Section 4.2) and it is unlikely, based on the site history that the Site has been used for the storage of hazardous chemicals.

5. Conceptual site model

A Conceptual Site Model (CSM) was developed to provide an understanding of the potential for exposure to contaminants and impacts to beneficial uses from contamination within the Site. The CSM draws together historical data, specific and regional geological, hydrogeological, hydro-geochemical and contamination information to identify potential contamination sources, migration and exposure pathways and sensitive receptors for the Site.

5.1 Sources

Based on the desktop review and site inspection, the following potential contamination sources have been identified:

- Potential for imported fill from unknown sources to have been brought to site for road and access track construction
- Potential for past burial of household and farming material and presence of waste, including hazardous wastes (asbestos) within areas of the Site not inspected
- Historical use of herbicides or pesticides across the Site

5.2 Pathways

The primary pathways by which current and future receptors could be exposed to the potential sources of contamination are considered to be:

- Direct contact (including ingestion) with potentially contaminated soil
- Inhalation of potential contaminants in soil, if disturbed (particularly asbestos if present)
- Lateral migration of potential contaminants to surface water (Waterfall Creek)
- Vertical and horizontal migration of potential contaminants within the groundwater

5.3 Receptors

When evaluating potential adverse health/environmental effects from exposure to a contaminated site, all potentially exposed populations should be considered. For the Site, the key populations or receptors of interest are considered to include:

Human health receptors

- Future occupants of the Site (e.g. workers and subcontractors)
- Visitors to the Site (e.g. members of the public - trespassers)
- Current and future occupants of surrounding properties (e.g. residents, workers and visitors)

Environmental receptors

- Flora and fauna within the Site and surrounding land including Wollemi National Park
- Waterfall Creek to the north
- Groundwater beneath the Site

5.4 Potential for contamination

Table 5.1 summarises the potential areas of environmental concern based on the results of the desk-top review and site inspection.

Table 5.1 Outcomes of desktop review – Potential areas of environmental concern

Description	Rationale/detail	Potential contamination
Fill materials	Fill materials from unknown sources. Potential for surface disposal or burial of household and farming materials.	Total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene and total xylene (BTEX), polyaromatic hydrocarbons (PAHs), phenols, heavy metals, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Presence of surface or buried wastes	Potential for surface disposal or burial of household and farming materials.	TRH, BTEX, PAHs, phenols, heavy metals, OCPs, OPPs PCBs and asbestos.
Site maintenance.	Historical use of herbicides or pesticides across the Site.	Arsenic, OCPs and OPPs.

Based on the results of the desktop assessment, the overall likelihood for significant chemical contamination to be present within the Site is considered to be low.

6. Conclusions and recommendations

GHD was engaged by WCPL to undertake a PSI on an approximate 70 ha portion of land outside of existing Wambo Coal Mine mining leases to support the proposed Longwall 24-26 Modification of the Wambo Coal Mine, located 15 kilometres west of Singleton, near the village of Warkworth, NSW.

The PSI was required under the Resilience and Hazards SEPP, as the land use will change from bushland and agriculture to underground mining as a result of the Longwalls 24-26 Modification. In accordance with Resilience and Hazards SEPP, the PSI has been prepared with reference to NSW EPA 2020.

In accordance with the objectives detailed in Section 1.1, and based on the information contained within this assessment and limitations outlined in Section 1.3, the following conclusions are made:

- The desk top review identified the following:
 - The Site is zoned as RU1 - Primary Production land.
 - The Site has been used for a mixture of both cleared agricultural land (grazing) and undisturbed bushland since the 1950's. No man-made structures, with the exception of fence lines and tracks/trails were evident from the aerial photograph review.
 - Some small buildings/sheds were identified off-site but directly adjacent to the southern boundary in historical aerial photographs from 2008 and 2009 to 2013 where they were no longer visible. These structures may have been part of a drilling/exploration area.
 - A review of the South Bates Extension Modification Stage 1 Preliminary Contamination Investigation (GHD 2016) which is located to the south and south-west of the Site, indicated that the overall likelihood for significant contamination to be present was low but there was the potential for contamination to be associated with two areas of former occupation (Pinegrove Property and Water Tank Area).
 - No NSW EPA contaminated land records/notices or POEO licences were reported for the Site.
- At the time of the site inspection, the Site consisted of relatively dense bushland with small clearings/grassed areas along access tracks in the south and central portions of the site and cleared agricultural land (open grassed areas and dams) in the northern portion of the Site. There were cattle present in the northern area of the Site where the vegetation was cleared.
- Based on the desktop review and site inspection, the following potential contamination sources have been identified:
 - Potential for imported fill from unknown sources to have been brought to site for road and access track construction.
 - Potential for past burial of household and farming material and presence of waste, including hazardous wastes (asbestos) within areas of the Site not inspected.
 - Historical use of herbicides or pesticides across the Site.
- Based on the results of this investigation, the overall likelihood for significant chemical contamination to be present within the Site is considered to be low.

Based on the PSI, the Site is considered to be suitable for the proposed development (underground mining). However, it is recommended that WCPL employ measures for the management of soils (including unexpected finds protocols) in the event that potential contamination impacts are identified during future site works.

7. References

GHD (2016), *Stage 1 Preliminary Contamination Investigation Wambo Coal Mine, Warkworth, NSW 2330*

Kovac and Lawrie (1985), *Soil Landscapes Singleton 1:250 000 Sheet*, Published by the Soil Conservation Service of NSW

NEPC (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended by the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*, National Environment Protection Council, May 2013

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

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)

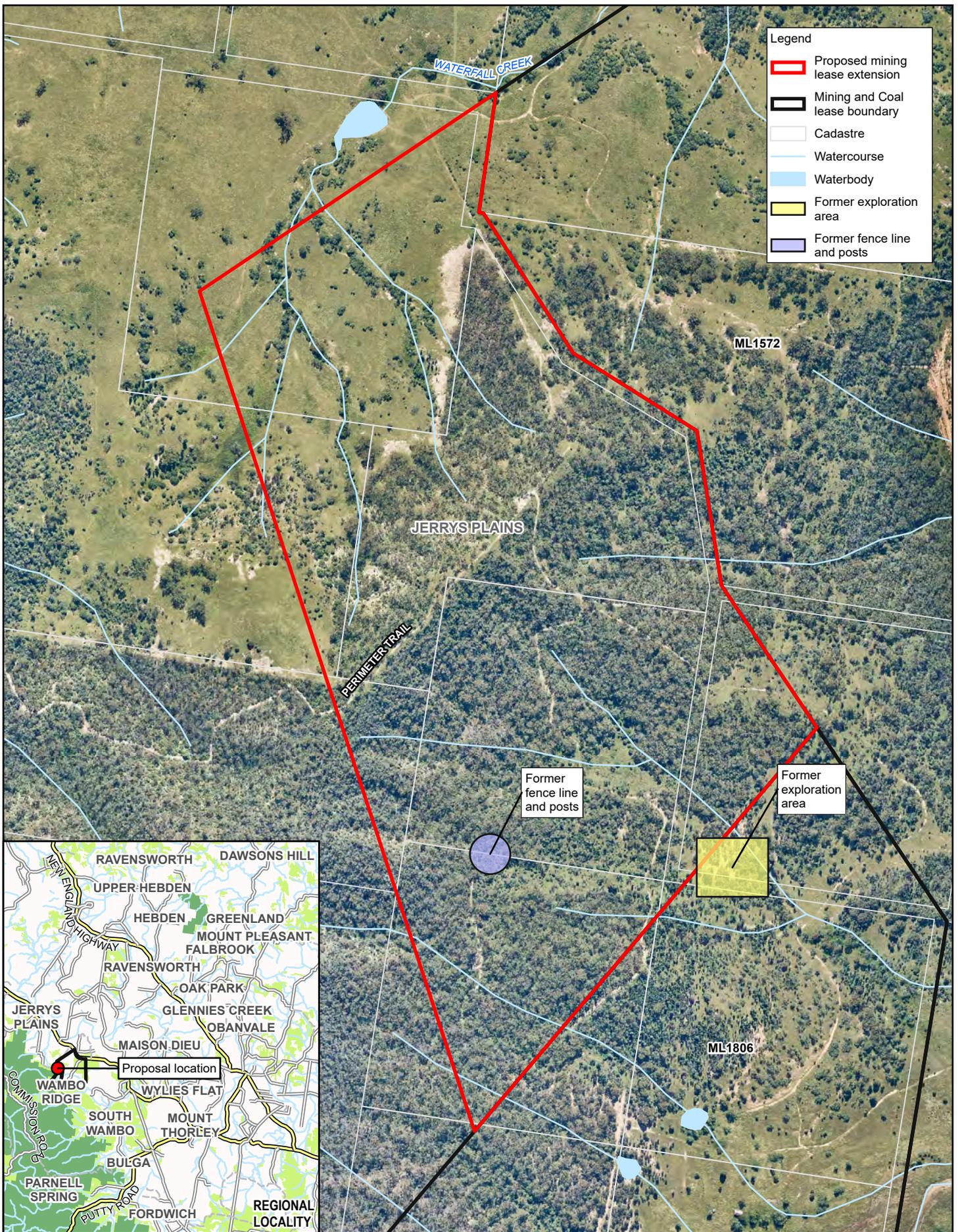
Six Maps <http://maps.six.nsw.gov.au/>

Water NSW – Allwater data base - <http://allwaterdata.water.nsw.gov.au/water.stm>

Appendices

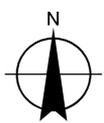
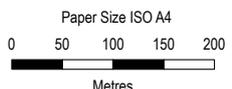
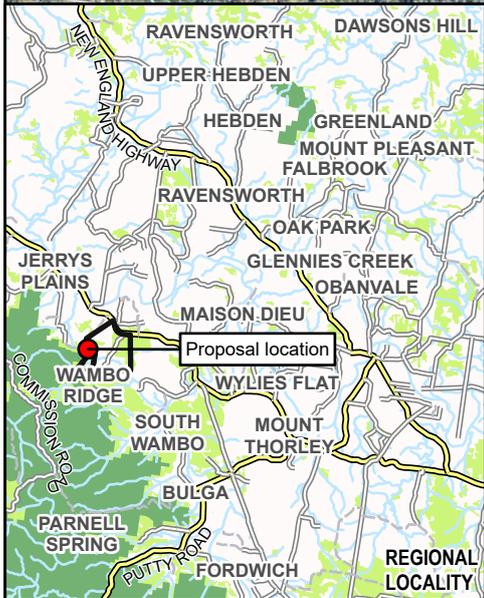
Appendix A

Figures



Legend

- Proposed mining lease extension
- Mining and Coal lease boundary
- Cadastral
- Watercourse
- Waterbody
- Former exploration area
- Former fence line and posts



Wambo Coal Mining Ltd
Phase 1 Contamination Assessment
 – Wambo Longwalls 24-26

Project No. **12573494**
 Revision No. **0**
 Date **18/03/2022**

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56

Site location and main features

FIGURE 1

Appendix B

Photographs

PHOTOGRAPHS



Photograph 1 – Western drainage gully to Waterfall Creek looking north



Photograph 2 – Western drainage gully to Waterfall Creek looking south



Photograph 3 – Central drainage gully to Waterfall Creek looking north



Photograph 4 – Central drainage gully to Waterfall Creek looking south



Photograph 5 – Unvegetated area in north eastern portion of the site, looking east



Photograph 6 – Looking north across the grazing area



Photograph 7 – Northern extent of central drainage gully leading to a dam and Waterfall Creek, looking west



Photograph 8 – Looking north off -site towards water tank and dam



Photograph 9 – former fence line with posts and wire



Photograph 10 – Derelict gateway with posts and wire



Photograph 11 –Open grassed area in south west corner looking east



Photograph 12 – Open grassed area in south west corner looking west



Photograph 13 – Derelict sheds, off site to the south.
Closest buildings.

Appendix C

Groundwater bore search

WaterNSW

Work Summary

GW200832

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore

Work Status: Equipped

Construct.Method: Auger

Owner Type: Mines

Commenced Date:

Completion Date: 07/10/2009

Final Depth: 14.00 m

Drilled Depth: 14.00 m

Contractor Name: INTERTEC DRILLING SERVICES

Driller: Paul Sheehy

Assistant Driller:

Property:

Standing Water Level
(m):GWMA:
GW Zone:Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

County: HUNTER
Parish: WAMBO
Cadastre: A/33149
Form A: HUNTER
Licensed:

Region: 20 - Hunter

CMA Map: 9032-1N

River Basin: 210 - HUNTER RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: UnknownNorthing: 6396081.000
Easting: 306885.000Latitude: 32°33'21.2"S
Longitude: 150°56'35.4"E

GS Map: -

MGA Zone: 56

Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	2.00	170			Auger
1		Hole	Hole	2.00	14.00	120			Down Hole Hammer
1		Annulus	Concrete	0.00	0.10	170	60		PL:Poured/Shovelled
1		Annulus	Crushed Aggregate	0.10	8.50	120	60		Ungraded, PL:Poured/Shovelled
1		Annulus	Bentonite	8.50	10.50	120	60		PL:Poured/Shovelled
1		Annulus	Waterworn/Rounded	10.50	14.00	120	60		Graded, PL:Poured/Shovelled
1	1	Casing	Pvc Class 18	-0.40	11.00	60			Seated on Bottom, Screwed
1	1	Opening	Screen	11.00	14.00	60		0	PVC Class 18, Screwed, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.10	0.10	Topsoil	Topsoil	
0.10	0.90	0.80	Silt, sandy	Silt	

0.90	1.80	0.90	Clay/Sand	Clay	
1.80	2.20	0.40	Sandstone, grey	Sandstone	
2.20	5.00	2.80	Sandstone/Conglomerate	Sandstone	
5.00	5.50	0.50	Sandstone, grey	Sandstone	
5.50	6.00	0.50	Sandstone/Ironstone	Sandstone	
6.00	14.00	8.00	Sandstone, orange	Sandstone	

Remarks

07/10/2009: Form A Remarks:

Nat Carling, 28-Oct-2010: GPS provided by the driller.

***** End of GW200832 *****

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW200831

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Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore

Work Status: Equipped

Construct.Method: Auger

Owner Type: Mines

Commenced Date:

Completion Date: 08/10/2009

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1	1	Casing	Pvc Class 18	-0.40	6.00	60			Driven into Hole, Screwed
1	1	Opening	Screen	6.00	12.00	60		0	PVC Class 18, Screwed, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.80	1.80	Topsoil	Topsoil	
1.80	2.80	1.00	Sandy Clay	Sandy Clay	

2.80	6.90	4.10	Sandy Clay, gravel bands	Sandy Clay	
6.90	12.00	5.10	Sandstone, orange	Sandstone	

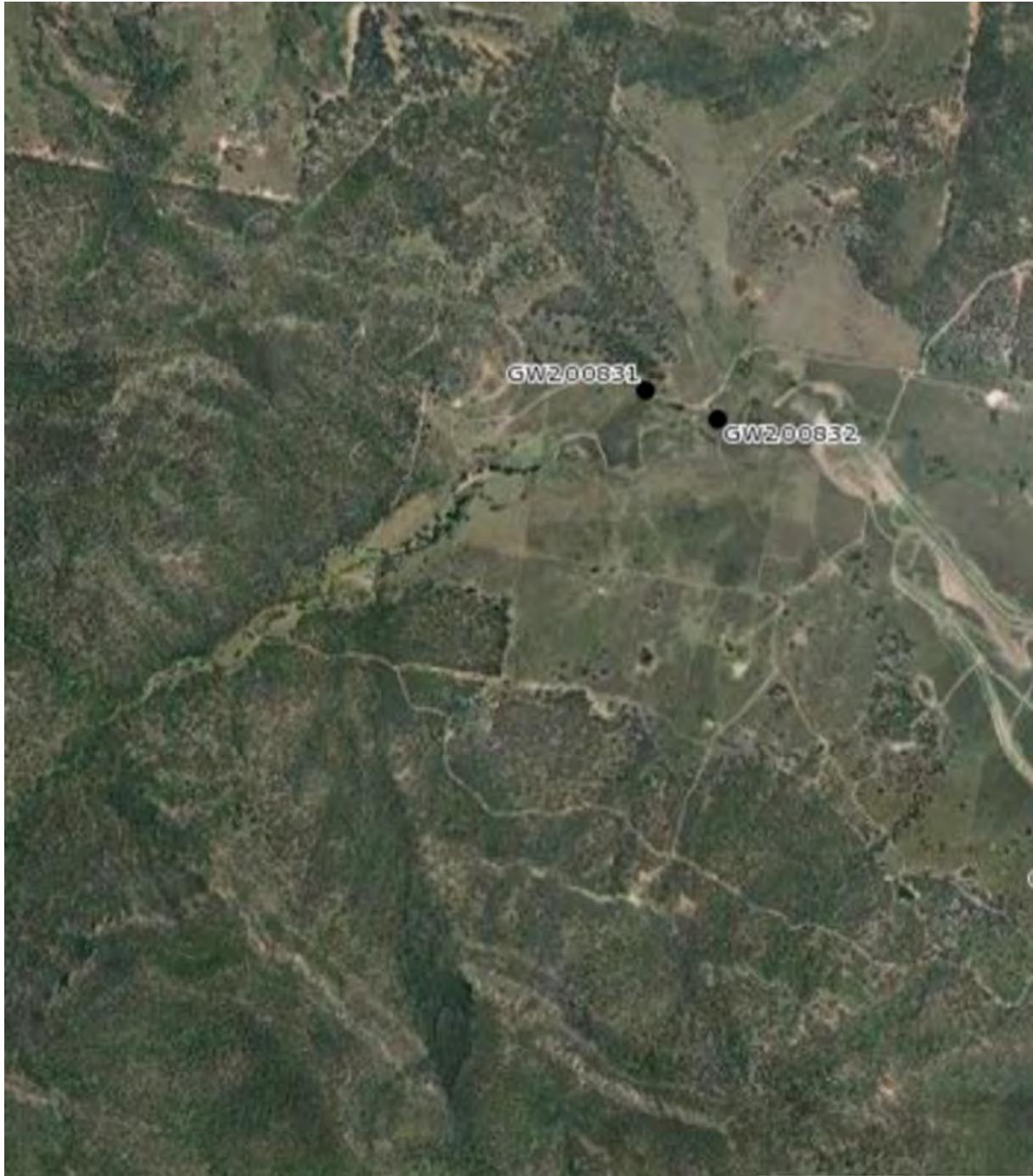
Remarks

08/10/2009: Form A Remarks:

Nat Carling, 28-Oct-2010: GPS provided by the driller.

***** End of GW200831 *****

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Appendix D

Historical aerial photographs

Aerial Imagery – 1963, 1971, 1983, 1992 and 2001

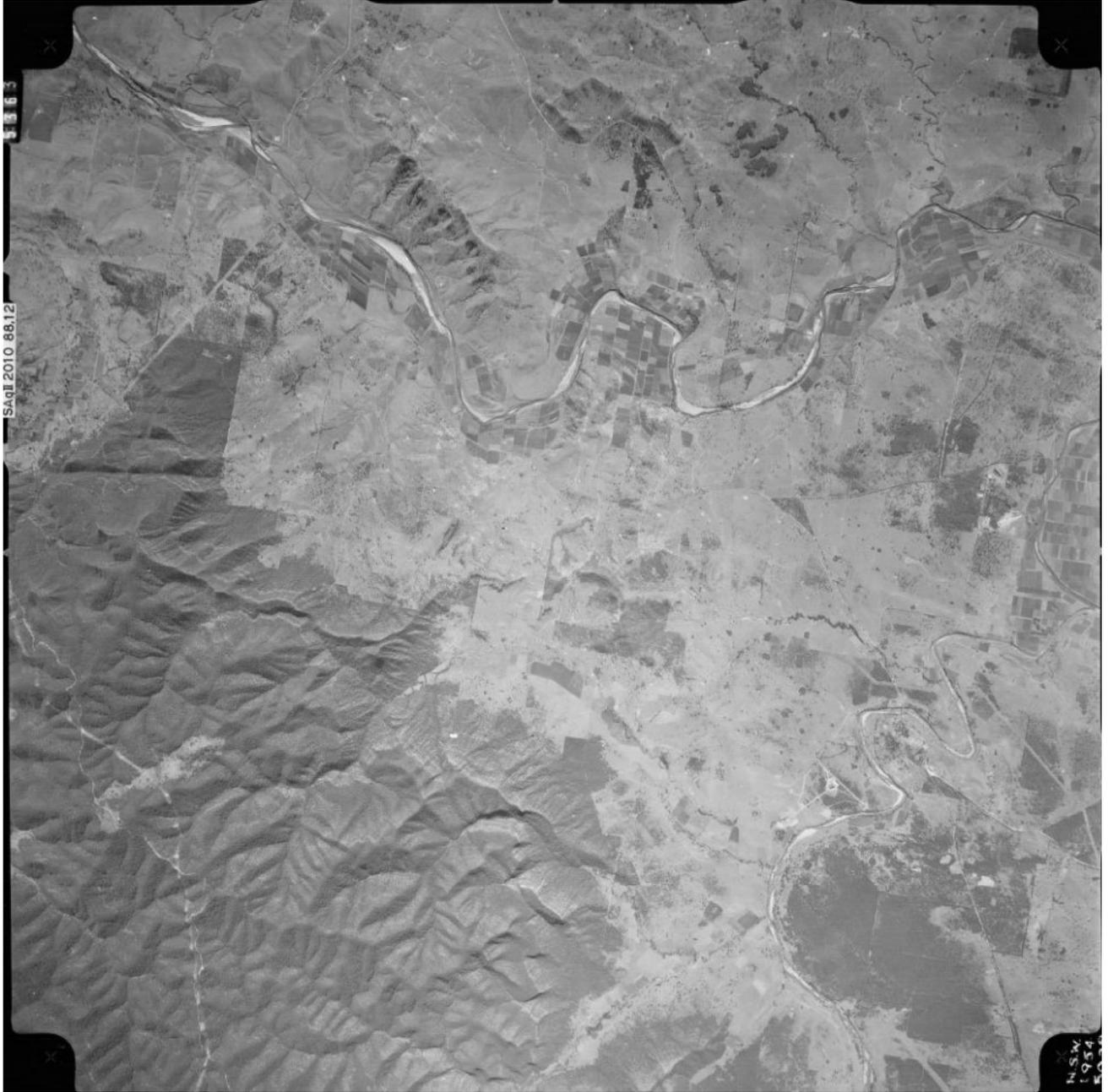
(Note: Site boundary estimate only due to the resolution of the images)



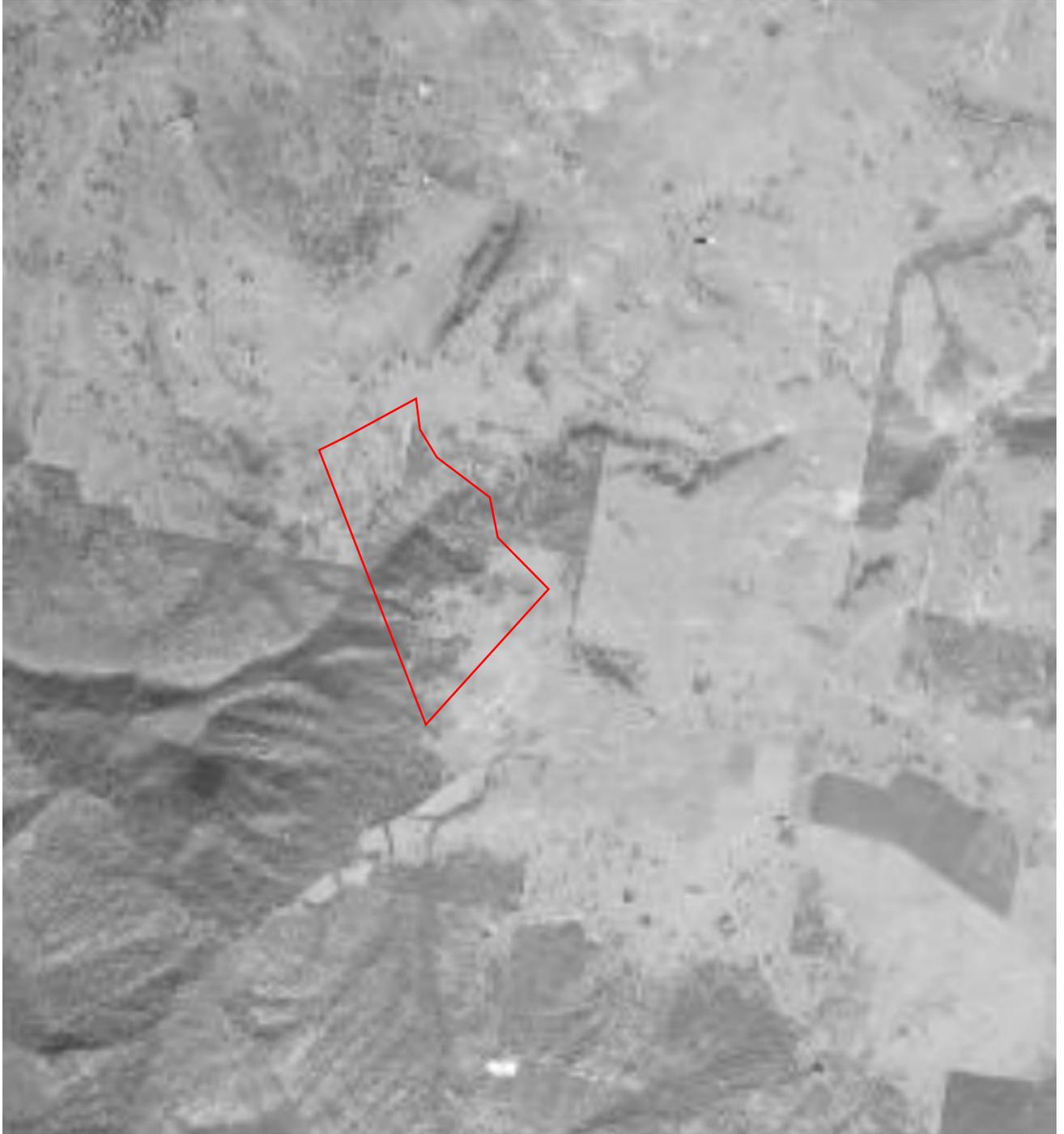
Aerial image 1963



Aerial image 1963 – close up



Aerial image 1971



Aerial image 1971 – close up



Aerial image 1983



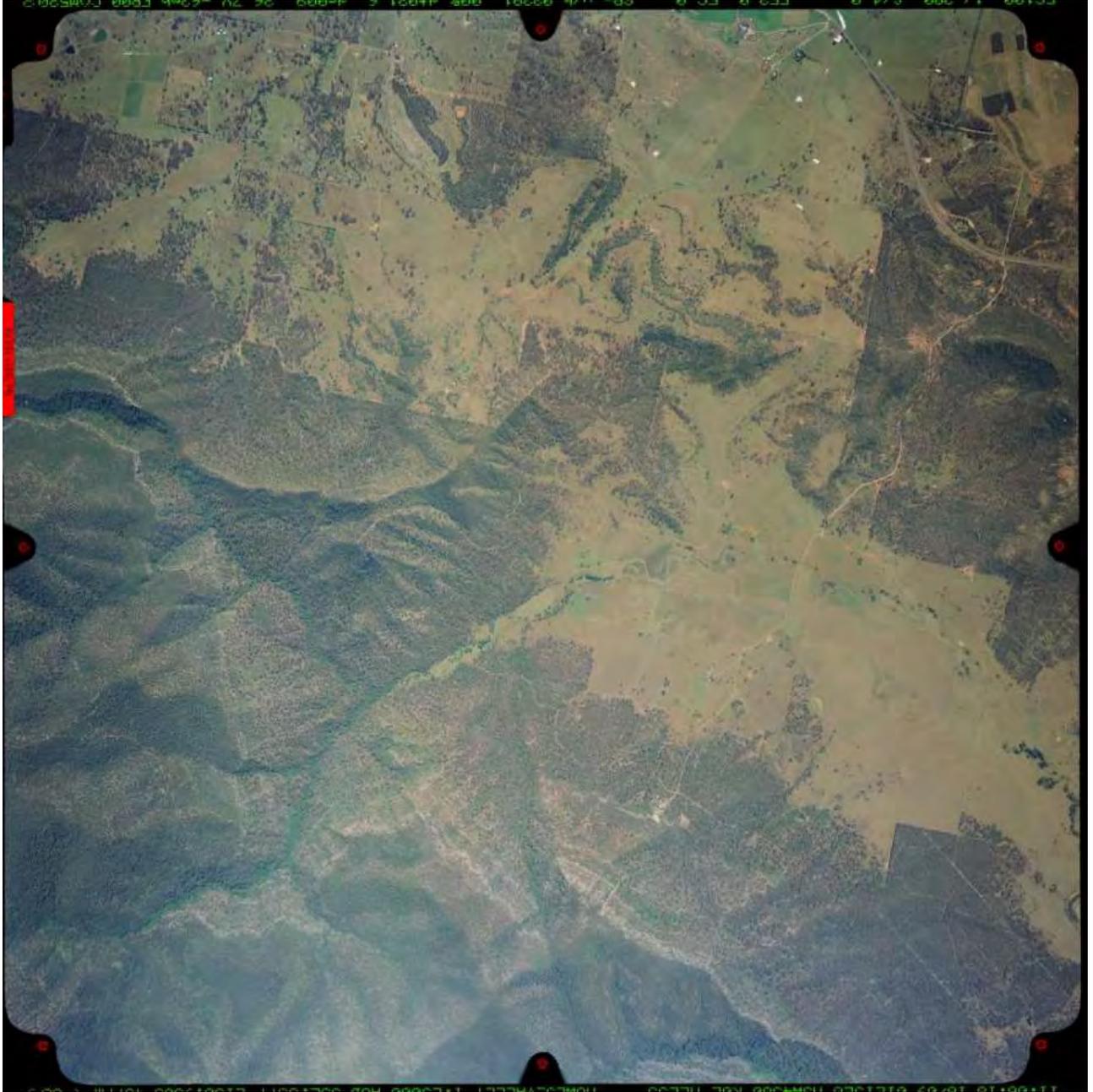
Aerial image 1983 – close up



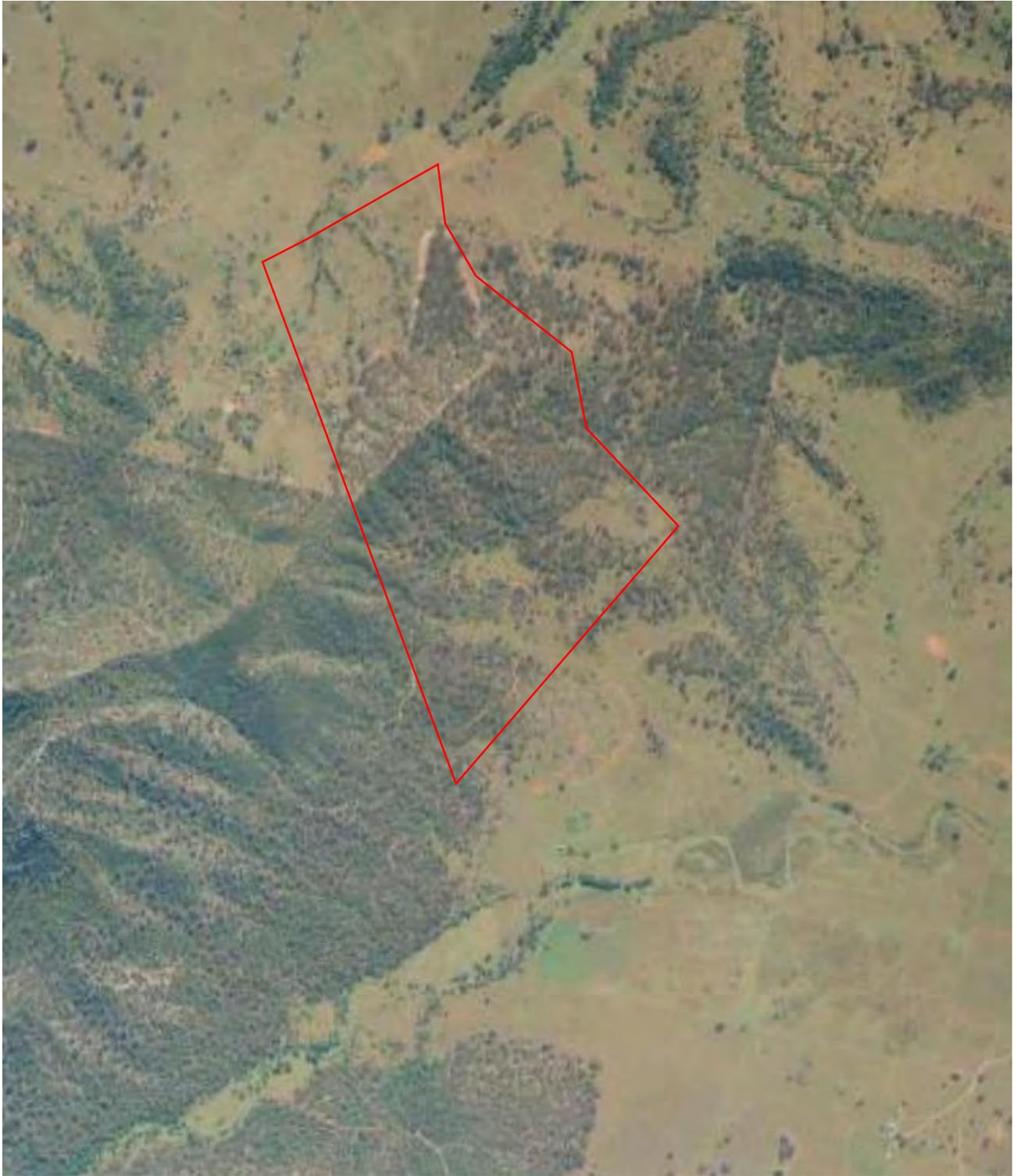
Aerial image 1992



Aerial image 1992 – close up

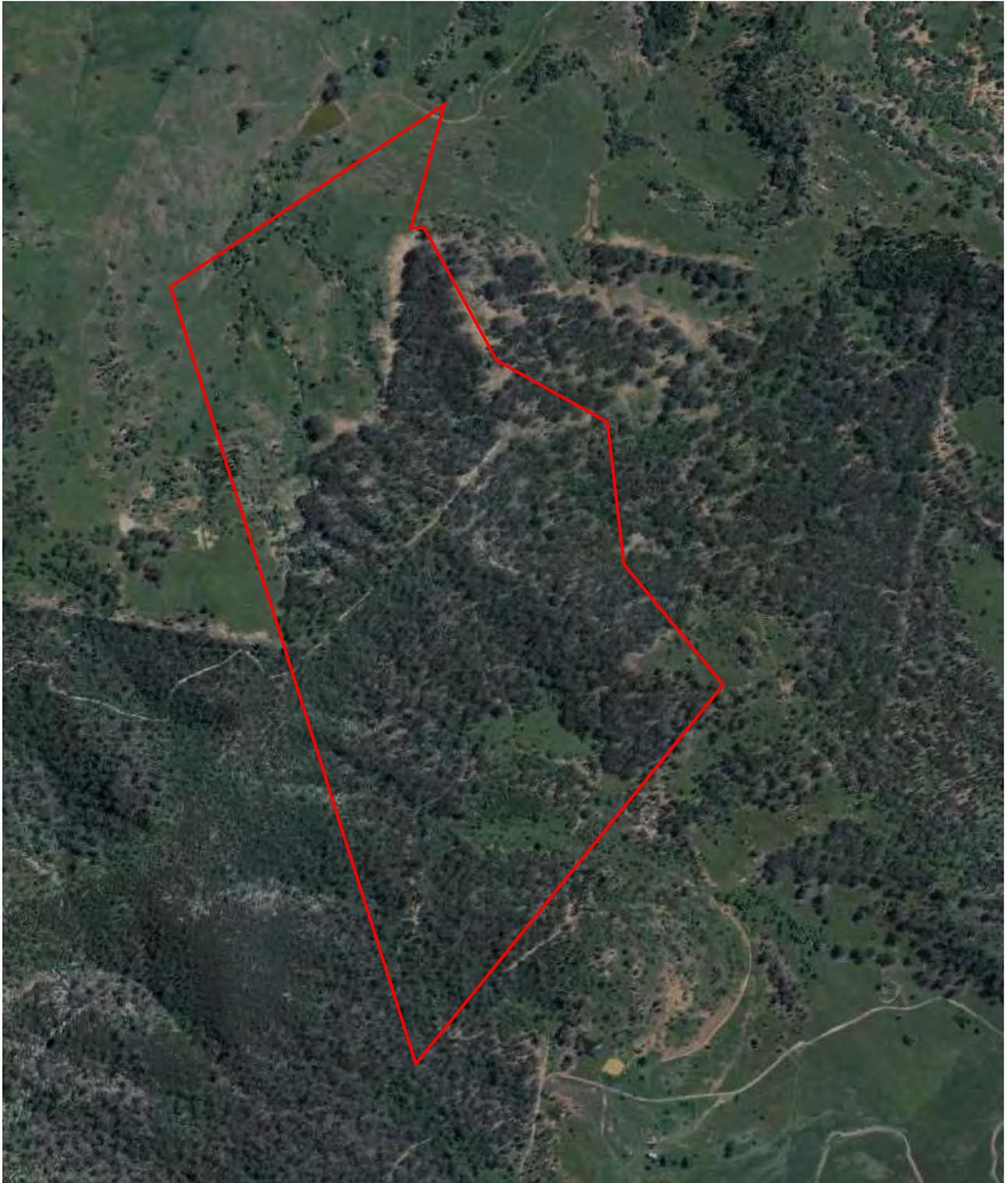


Aerial image 2001



Aerial image 2001 – close up

Longwall 24-26 Six Maps Imagery 2008
(Note: Site boundary estimate only)



2008 Site Image

Longwall 24-26 Google Earth Pro Imagery

(Note: Site boundary estimate only due to the angle of the images)



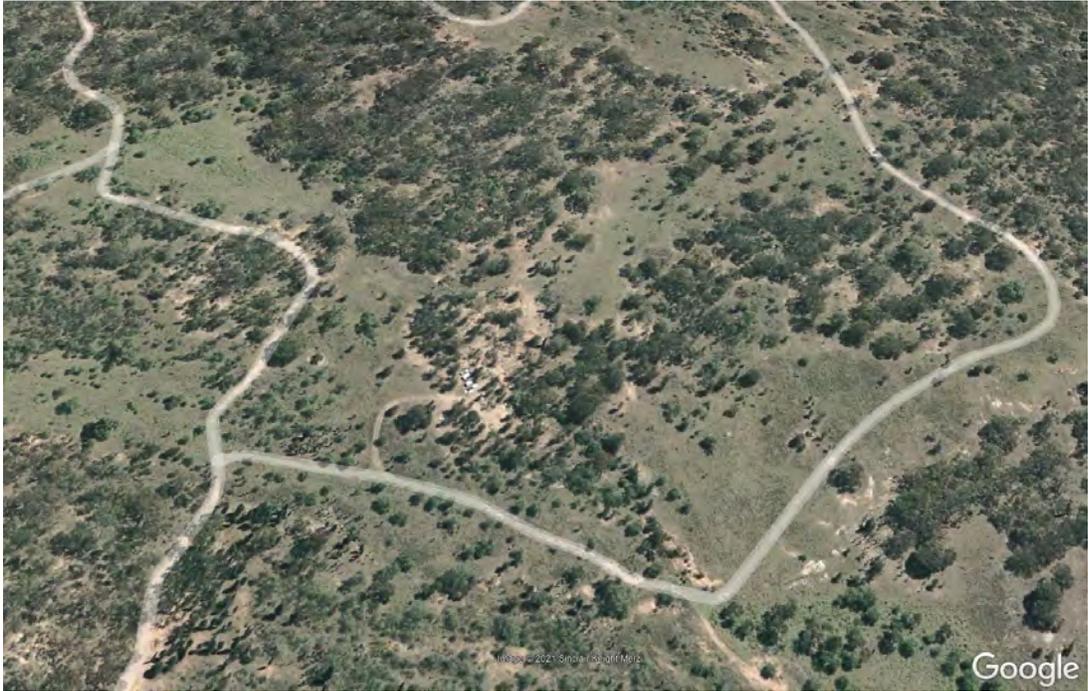
2003 Site Image



Close up of potential drilling / exploration area on southern boundary



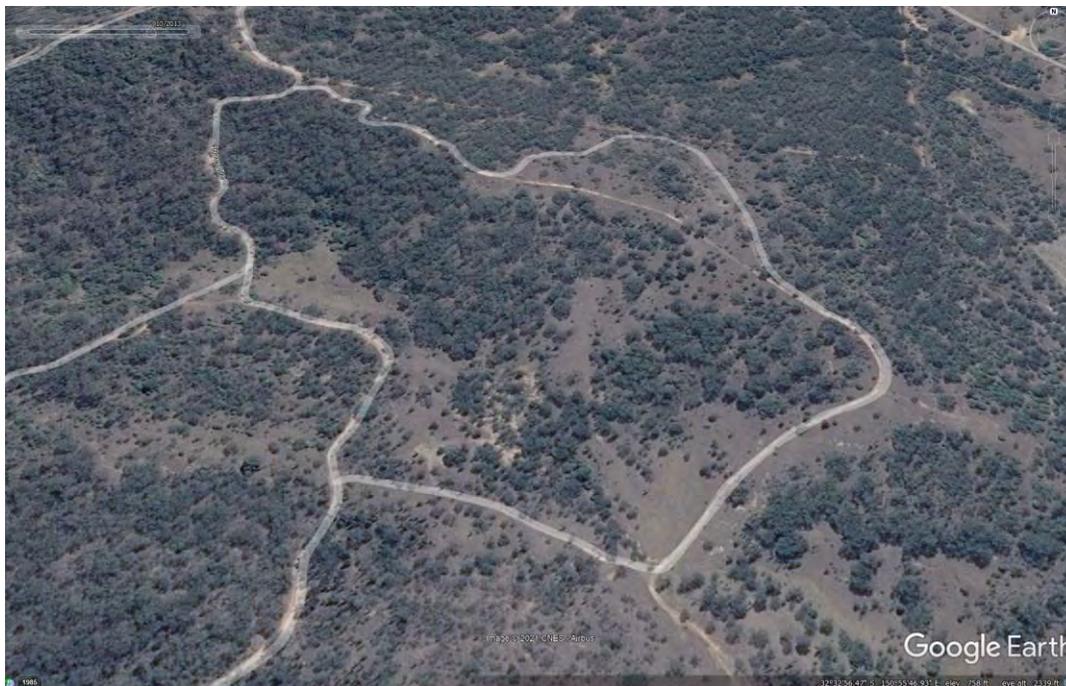
2009 Site Image



Close up of potential drilling / exploration area on southern boundary



2013 Site Image



Close up of potential drilling / exploration area on southern boundary



2015 Site Image



2018 Site Image



2021 Site Image



Close up of potential drilling / exploration area on southern boundary



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