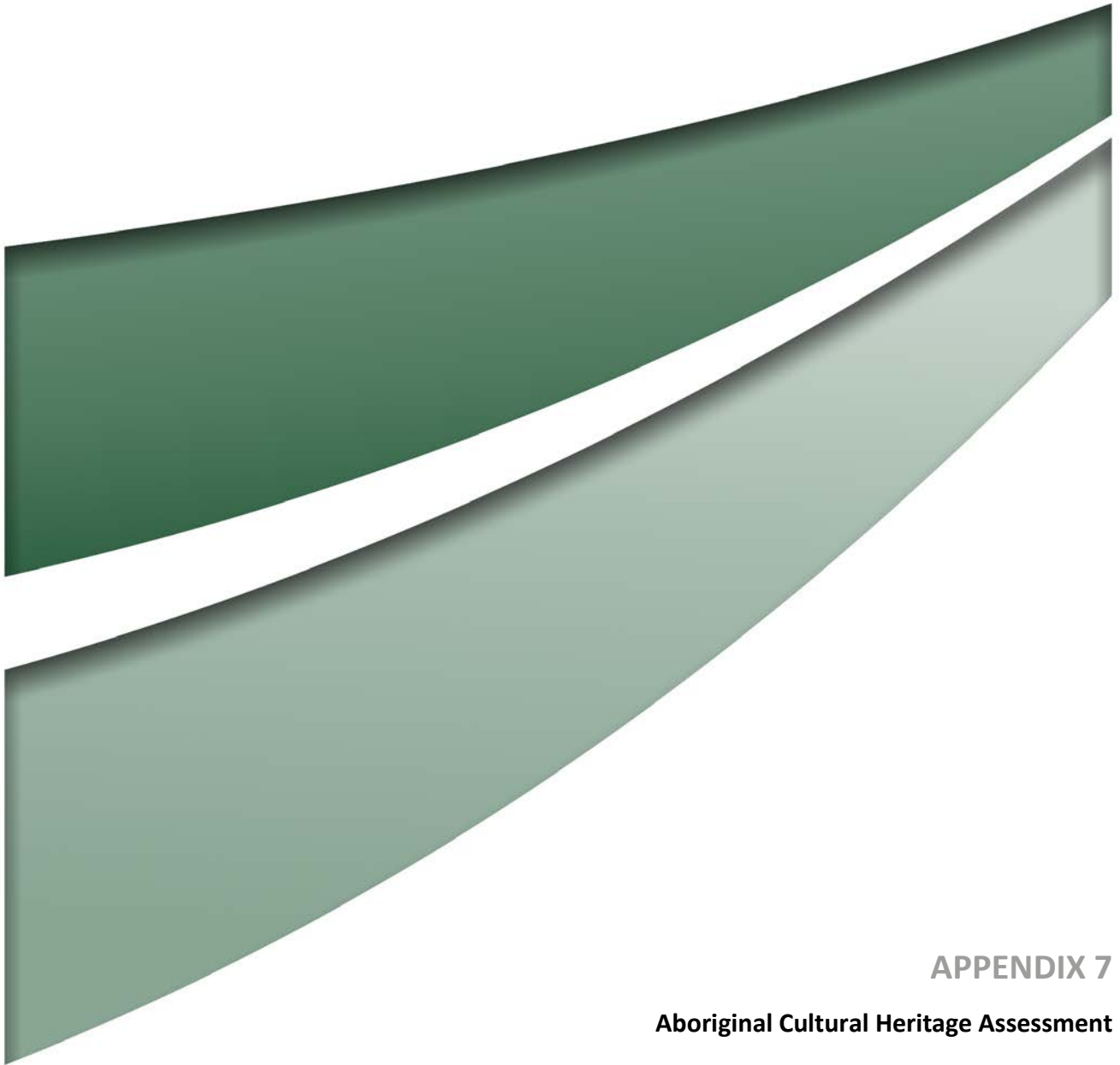




APPENDIX 7

Aboriginal Cultural Heritage Assessment

**ABORIGINAL CULTURAL
HERITAGE AND
ARCHAEOLOGICAL
ASSESSMENT**

Haerses Road Quarry

FINAL

September 2016

ABORIGINAL CULTURAL HERITAGE AND ARCHAEOLOGICAL ASSESSMENT

Haerses Road Quarry

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Dixon Sand

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Report No. 3479/R03/V3
Date: September 2016



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This report was prepared using
Umwelt's ISO 9001 certified
Quality Management System.

Acknowledgement

Dixon Sand (Penrith) Pty Ltd (Dixon Sand) and Umwelt would like to acknowledge the Traditional Custodians of the Maroota area and pay respect to their cultural heritage, beliefs and continuing relationship with the land.

Dixon Sand and Umwelt would also like to acknowledge the post-contact experiences of Aboriginal peoples who have attachment to the Maroota area.

We pay our respect to the Elders – past, present and future – for they hold the memories, traditions, culture and hopes of Aboriginal peoples in the area.

Dixon Sand and Umwelt thank the registered Aboriginal parties for their participation in this project and for their valuable contribution to the assessment report.

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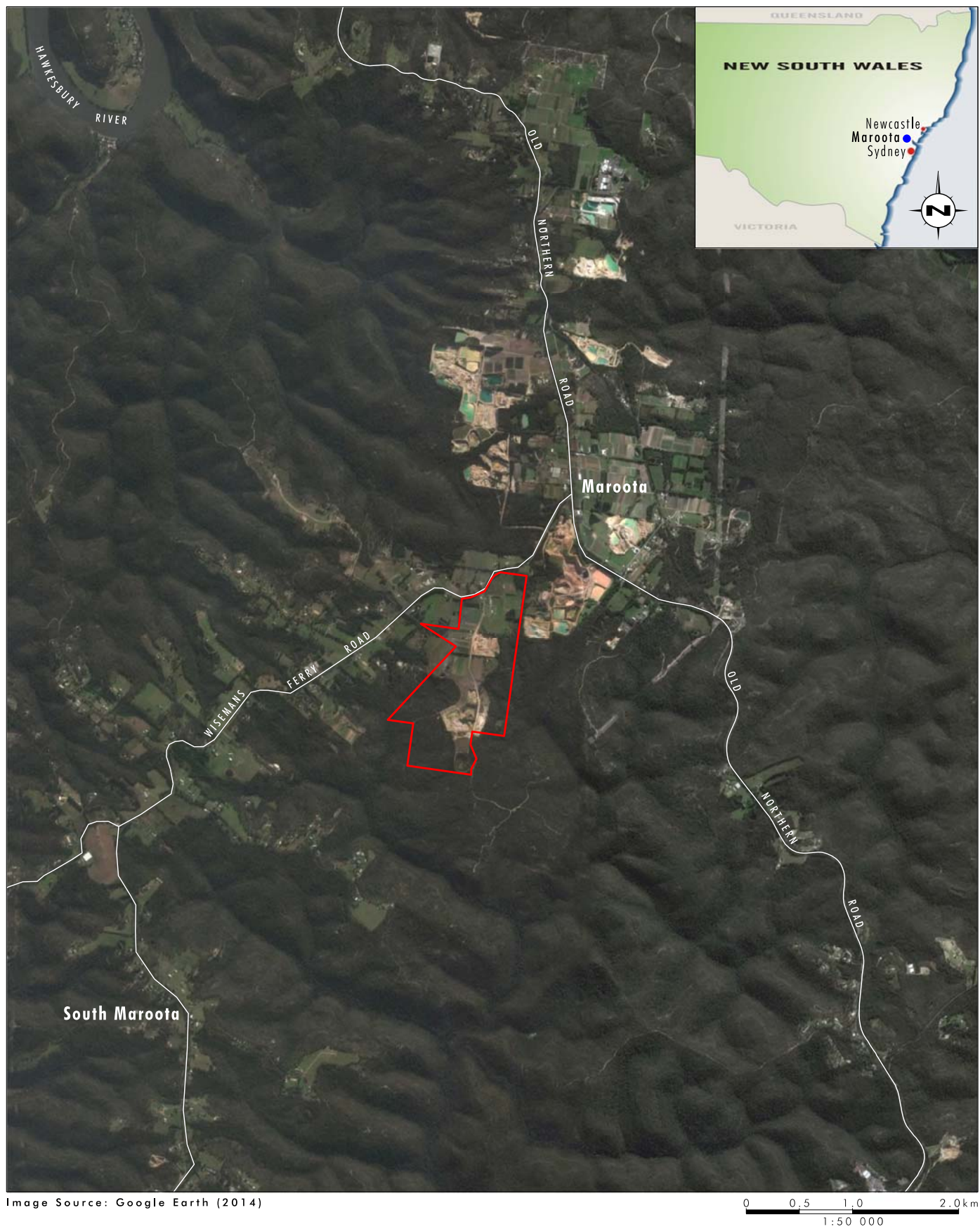
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1.0 Introduction

The Haerses Road Quarry, owned by Dixon Sand (Penrith) Pty Limited (Dixon Sand), is located on Haerses Road Maroota, NSW (refer to **Figure 1.1**). Haerses Road Quarry extracts Tertiary Maroota Sand from Lot 170 DP 664767, Lots A and B DP 407341, and Lots 176 and 177 DP 752039 (the site) in accordance with development consent DA 165-7-2005 (refer to **Figure 1.2**).

Dixon Sand was granted development consent for the State Significant Development DA 165-7-2005 under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) by the Minister for Planning on 14 February 2006. The development consent provides for the operation of a sand quarry on Haerses Road at Maroota with a total extraction of 7 million tonnes from the site over 25 years at a rate of 250,000 tonnes per annum (tpa). The consent allows for hauling of 190,000 tpa of screened sand to the processing facility at Dixon Sand's nearby Old Northern Road quarry and hauling of 60,000 tpa of screened sand direct to local and regional markets.

Due to the recent increase in demand for medium to coarse grain sands and specialist sands in the Sydney market, Dixon Sand is seeking a modification to DA 165-7-2006-5 for the Haerses Road quarry to increase the extraction area and to increase the volume of sand sold direct to market from the site. Umwelt (Australia) Pty Limited (Umwelt) has been engaged by Dixon Sand to prepare the necessary environmental assessments for the proposed modification, including this Aboriginal cultural heritage and archaeological assessment.



Legend
 Haerses Road Quarry Site

FIGURE 1.1
Locality Map

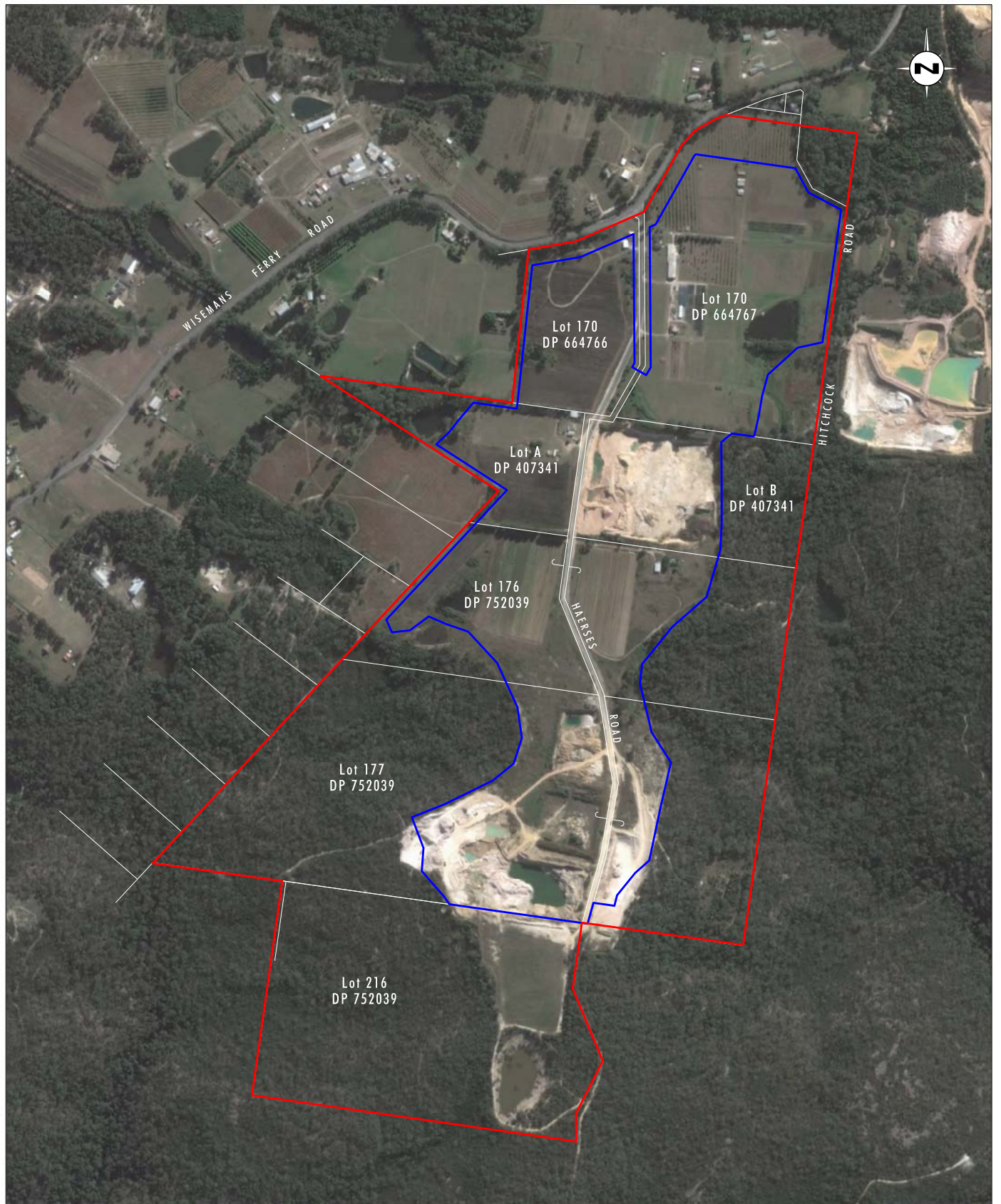


Image Source: Google Earth/DigitalGlobe (May/2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

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Legend

- ▭ Haerses Road Quarry Site
- ▭ Approved Extraction Area

FIGURE 1.2

Haerses Road Quarry Site

2.0 Project Description

The proposed modification to DA 165-7-2006-5, being sought for the Haerses Road Quarry involves increasing the extraction area (as currently approved) as well as including a provision for mobile plant and equipment to be utilised on the site to avoid double handling and double processing of the product. The proposed modifications are:

- Increasing the extraction area by approximately 19.5 hectares to allow extension into the friable sandstone resource within Lots 177 DP 752039 and 216 DP 752039 (refer to **Figure 2.1**). The friable sandstone would be extracted using similar methods and equipment as currently used at the site, being a dozer, excavator, trucks and a loader. The existing dozer would be used to rip the friable sandstone on site which was not required for tertiary sand deposit in the original consent. The existing dry screening plant would utilise mobile crushers (one jaw crusher and one rotary crusher) to break sandstone clumps prior to screening
- No new traffic movements would be generated by the proposal with a reduction in traffic generation between quarries as a result of the proposed modification i.e. the modification would utilise existing traffic movements between Old Northern Rd and Haerses Rd Quarries to allow for blending of speciality sands
- Importation of up to 100,000 tpa of clean recycled sands for reprocessing (Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM)) from approved sites
- Use of mobile washing and processing plant on site, utilising water from existing water licence provisions
- Installation of detention basins
- Establishment of site office, workshop and weighbridge.

For the purposes of this assessment, the broader site area, including in the current operations and the modification is known as the Project Site. The current assessment is focused on the proposed modification covering the additional extraction area, comprising the western side of Lot 177 and Lot 216 of DP752039, and is referred to as the Project Area.

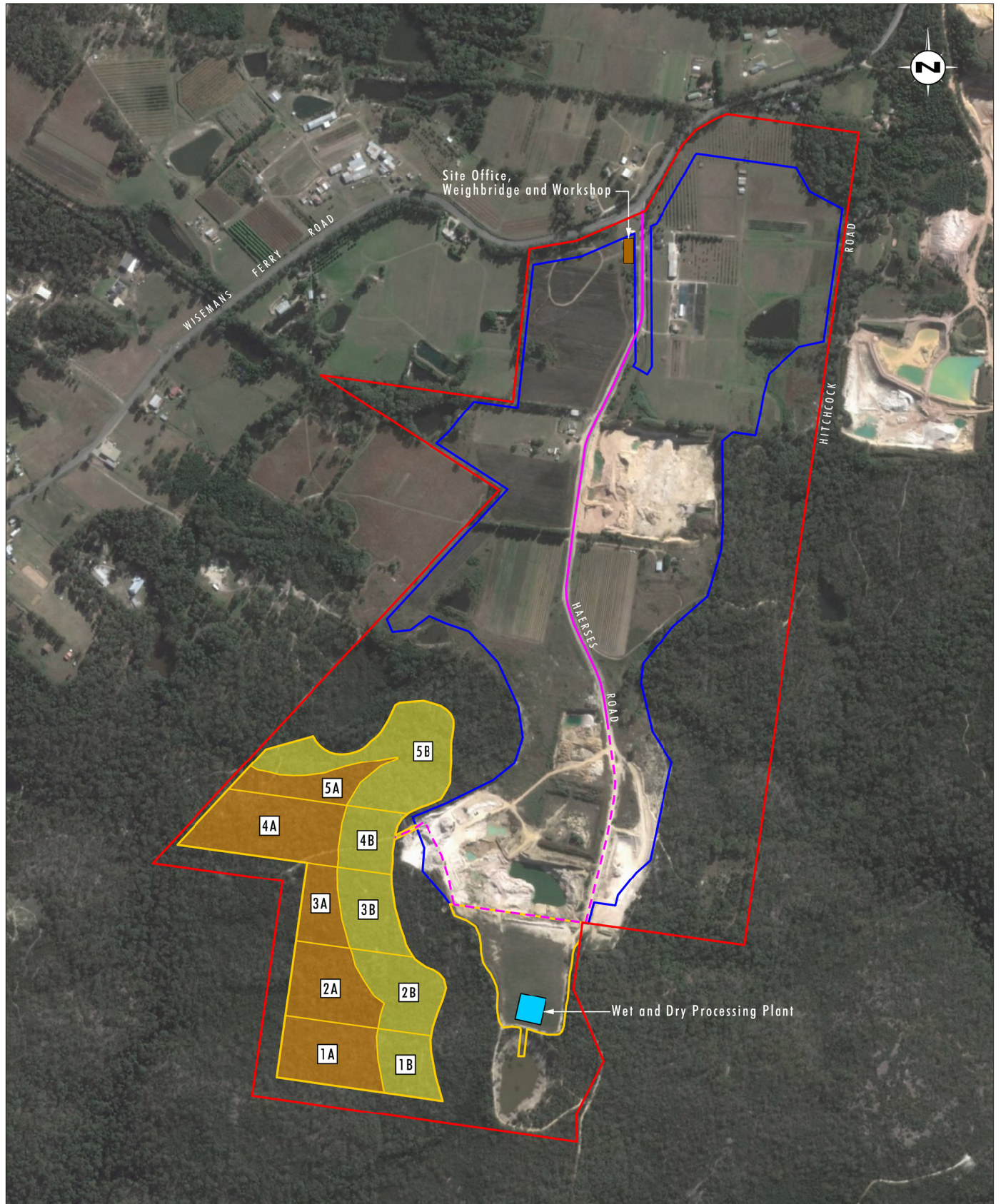


Image Source: Google Earth - DigitalGlobe (May 2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

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Legend

- | | |
|--|--|
| Haereses Road Quarry Site | Site Office, Weighbridge and Workshop |
| Approved Extraction Area | Wet Processing Plant |
| Modification Disturbance Area | Indicative Unsealed Haul Road |
| Proposed Extraction Area A | Sealed Haul Road |
| Proposed Extraction Area B | |
| 1 Extraction Cell Number | |

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FIGURE 2.1
Proposed Modification

3.0 Registered Aboriginal Party Consultation

The Aboriginal consultation regarding this Project has been undertaken in compliance with the Department of Environment, Climate Change and Water (DECCW, now Office of Environment and Heritage (OEH)) Aboriginal Cultural Heritage Consultation Requirements (ACHCRs) for proponents (2010a).

Registered Aboriginal Parties were encouraged to provide comments on the Aboriginal cultural values and significance of the extraction area and on a draft of this report for inclusion in this Aboriginal Cultural Heritage and Archaeological Assessment Report. A full consultation log and consultation records are attached in **Appendix A**.

3.1 Aboriginal Party Identification

In accordance with the ACHCRs, Umwelt, on behalf of Dixon Sand contacted the following organisations on 22 September 2015 to identify the upcoming Aboriginal heritage assessment in the Hearses Road quarry area and to request notification of any Aboriginal parties who may have an interest in participating in the assessment:

- Deerubbin Local Aboriginal Land Council (DLALC)
- Native Title Services Corp
- NSW and ACT Registry
- Office of the Registrar of Traditional Owners
- Office of Environment and Heritage
- Hawkesbury City Council
- Greater Sydney Local Land Services.

The closing date for the above agencies to identify Aboriginal parties who may have an interest in the Project was 7 October 2015.

The National Native Title Tribunal replied with a Native Title Search that indicated there were no registered Native Title applications in their search area, which covered Maroota Township.

Responses were received from DLALC, the Office of the Registrar and OEH advising of thirteen Aboriginal groups who may have an interest in being involved in consultation for the Project.

Based on the agency responses, two Local Aboriginal Land Councils were identified as having an interest in the Project site. OEH identified both DLALC and Metropolitan Local Aboriginal Land Council (MLALC) as the relevant Land Councils for consultation. The Land Council boundaries were investigated and it was found that the Project site falls within the DLALC boundary (refer to **Figure 3.1**), and therefore DLALC was the correct Land Council for consultation.

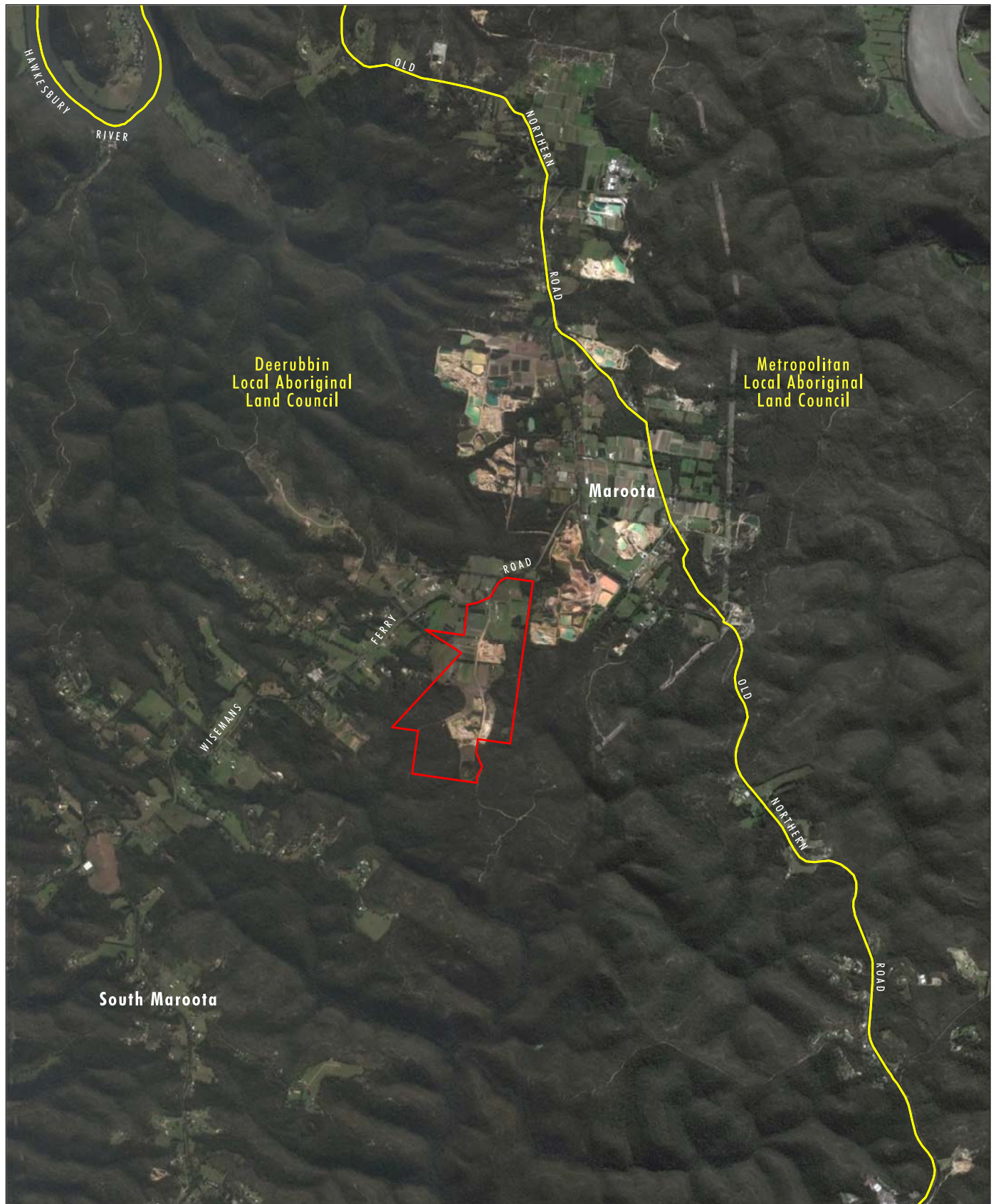


Image Source: Google Earth (2014)

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Legend

- Haerses Road Quarry Site
- Local Aboriginal Land Council Boundary

FIGURE 3.1

Haerses Road Quarry and
Local Aboriginal Land Council Boundaries

Local media advertising was also conducted to identify any additional interested Aboriginal Parties, with advertisements appearing in the Hawkesbury Gazette on 23 September 2015 and the Hawkesbury Courier on 24 September 2015, both with a closing date for registration of 7 October 2015.

On 28 October 2015, all Aboriginal parties identified during the notification process were sent a letter with a brief project introduction and information about the groups identified during the notification process. A proposed survey strategy and proposed project timeframe were included in the letter, asking groups to provide any comments or raise any concerns they may have with either. Those groups who had not previously registered an interest were also invited to register an interest in consultation for the Project by 12 November 2015.

As a result of the above notification process, the following organisations registered an interest in consultation for the Project:

- Deerubbin Local Aboriginal Land Council (DLALC)
- Darug Land Observations (DLO)
- Tocomwall
- Kawul Cultural Services.

On 21 December 2015 Darug Aboriginal Cultural Heritage Assessments (DACHA) contacted Umwelt, advising they only just received notification of the project through NTS Corp. The notification letter sent as a result of the OEH notification had also not been received. As a result, their registration in the project was accepted and a summary of the survey results was provided.

3.2 Registered Aboriginal Party Consultation and Involvement

OEH guidelines for Aboriginal heritage assessment and management acknowledge that it is primarily Aboriginal people who should determine the significance of their heritage and therefore OEH require applicants to demonstrate that Aboriginal people have been involved in the identification, assessment and management decisions relating to their heritage.

All registered Aboriginal parties were consulted throughout the course of the Aboriginal heritage assessment process from the time of their registration. In summary, this involved: attending meetings; providing cultural input throughout the assessment process; involvement in the archaeological surveys and review of key documents (including the draft survey strategy and draft assessment report). Copies of correspondence to registered Aboriginal parties are provided in **Appendix A**.

Appendix A of this report also contains a copy of all registered Aboriginal party statements provided during the course of the Project, including comment on the draft survey strategy, cultural significance and management options and recommendations.

3.2.1 Review of Draft Survey Strategy

A draft survey strategy, suggesting survey of all occurrences of landforms within the Project Area, which included two first order creek lines, spur crests and hill slopes, was provided to all registered Aboriginal parties and potential registrants identified by the agencies contacted in a letter sent out on 28 October 2015. The closing date for the return of comments was 23 November 2015. The survey strategy proposed to survey both creek lines, the spur crests and the slopes within the project Area.

Written comment on the draft survey strategy was received from one (Kawul Cultural Services) of the four registered Aboriginal parties by 23 November 2015, agreeing with the proposed survey strategy. Prior to undertaking the survey, on 8 December 2015, all registered Aboriginal parties were asked to confirm that they were satisfied with proposed survey strategy, or if they wished to raise any concerns with the survey strategy. No further comments regarding the proposed survey strategy were made. Registered Aboriginal party comments on this draft survey strategy are summarised in **Section 7.0** and included in **Appendix A**.

3.2.2 Fieldwork Participation

In recognition of the essential involvement of registered Aboriginal parties in the fieldwork program, Dixon Sand provided all registered Aboriginal parties with the opportunity to participate in the survey. All of the Aboriginal parties who had registered an interest in the Project at the time of the survey participated in the survey. Registered Aboriginal party participation in the fieldwork program is detailed in **Section 8.1**.

Darug Aboriginal Cultural Heritage Assessments (DACHA) registered for the project after the survey had taken place. Their registration was accepted and a summary of the survey and results was provided to them.

3.2.3 Review of Draft Aboriginal Archaeological Assessment Report

The draft Aboriginal cultural heritage and archaeological assessment report was provided to all registered Aboriginal parties on *3 May 2016* with 28 days provided for review and provision of advice and comments. Any comments on the draft report received from the Aboriginal parties are summarised below and included in full in **Appendix A**.

3.2.3.1 Darug Aboriginal Cultural Heritage Assessments (DACHA)

DACHA provided verbal comment in a phone call on 1 June 2016 stating they were happy with the assessment process, with nothing further to add to the report.

3.2.3.2 Darug Land Observations (DLO)

DLO provided written comment on 9 May 2016 requesting the opportunity to monitor the topsoil removal and all other works to be carried out on site. DLO also recommends that in the event of an artefact salvage under a Aboriginal Heritage Impact Permit the artefacts should be reburied on country within the study area.

3.2.3.3 Deerubbin Local Aboriginal Land Council (DLALC)

DLALC stated that as no Aboriginal cultural material was found they have no objection to the Haerses Road Quarry on the grounds of Aboriginal cultural heritage.

3.2.3.4 Tocomwall

Tocomwall provided via email on 31 May 2016 that they had no comments to make in relation to the assessment.

3.2.3.5 Kawul Cultural Services (KCS)

Despite numerous attempts via phone and email to contact KCS, they did not provide any comment on the report.

4.0 Environmental Context

The decisions that people make regarding such things as where they live, the range of resources they use and other aspects of daily life may be influenced by the environment in which they live. The preservation and visibility of sites is also affected by environmental factors such as vegetation cover, past land-use and disturbance. A review of the environmental context and historical land use of the Project Area is therefore integral to considerations of site visibility, preservation and occurrence within the Project Area.

4.1 Landscape Context

Knowledge about the landscape characteristics and resources of a region is important to the investigation of past Aboriginal landscape use and the analysis of the potential distribution of archaeological sites. The Project Area is bounded to the south by the Maroota Nature Reserve, which includes a series of ridges running towards the Hawkesbury River, which is situated eight kilometres to the north west. To the east it is bounded by the existing Haerses Road quarry, with rural properties and some of bushland to the north.

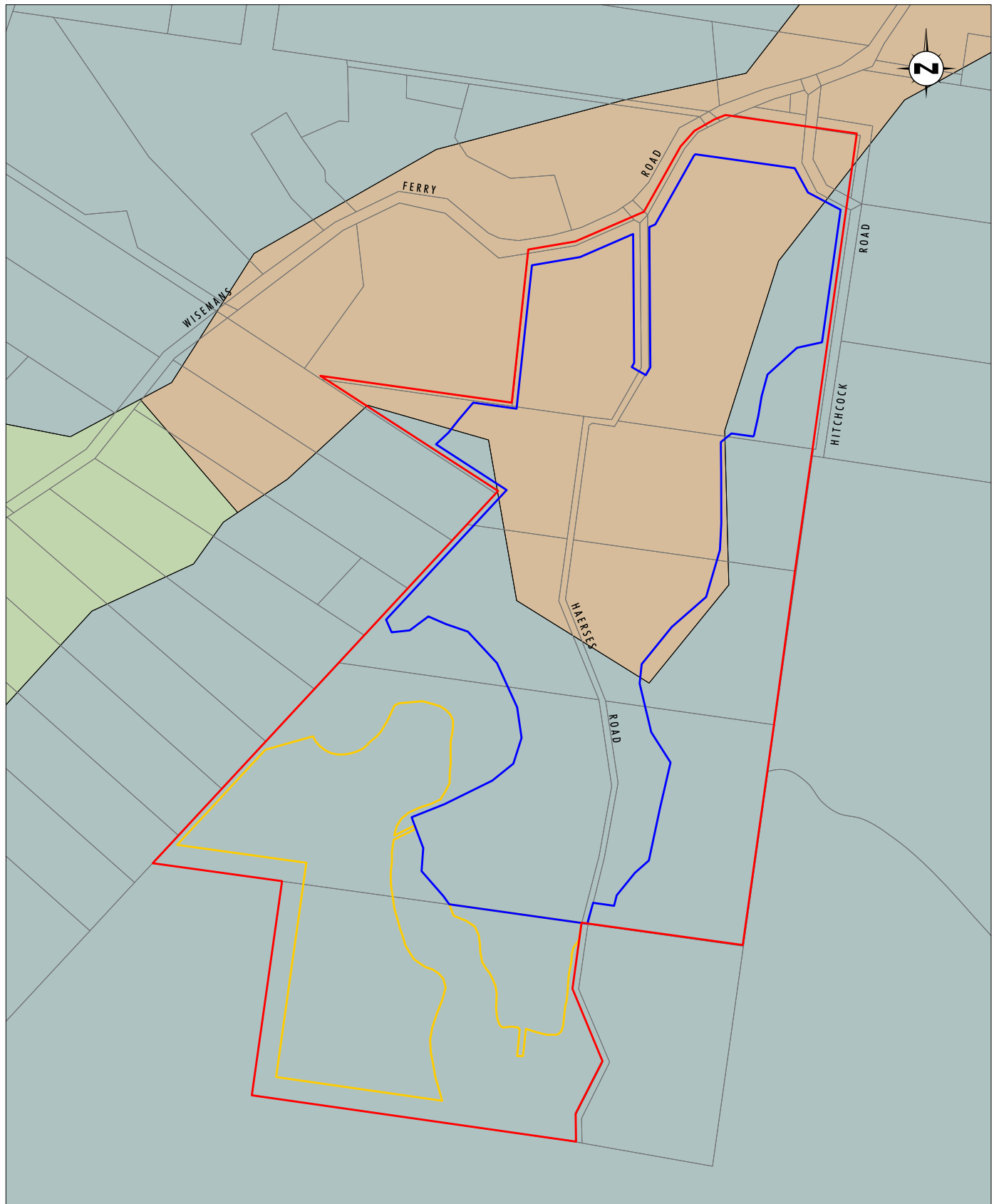
4.1.1 Geology

The Project Area is located in the Sydney Basin, which is generally composed of Narrabeen and Hawkesbury sandstones and shales (NPWS, 2001c). The Project Area is underlain by Hawkesbury Sandstone (McInnes, 1997) (refer to **Figure 4.1**).

Outcropping sandstone platforms used for grinding implements and sandstone overhangs used for shelter and rock art (paintings and engravings) have been identified throughout the Sydney Basin as being of importance to Aboriginal people (NPWS, 2003). There is a significant representation of these features in the region surrounding the Project Area (McInnes, 1997), however there are no outcropping sandstone platforms within the Project Area.

A key characteristic of the geology of the region that is of relevance to this assessment is the occurrence of surface outcrops of sandstone, which were used by Aboriginal people for the making of stone tools and engravings.

Where outcrops of sandstone are suitable, grinding grooves associated with creating cutting edges on tools such as stone axes, hatchets, adzes, chisels and fire hardened spear points are sometimes located. Most often this is in association with creek beds where water collects in rock pools or potholes, however grinding grooves have also been recorded on sandstone outcrops on ridge tops (Umwelt 2013: 4.2). These grinding grooves are located in association with depressions and potholes where water accumulates after rain. Outcrops of sandstone on ridge tops have also been used by Aboriginal people for rock engravings. Where sandstone outcrops exist in areas of steep terrain, sandstone outcrops may also form rockshelters. These sheltered areas were sometimes targeted by Aboriginal people for habitation or ceremonial purposes, and sometimes retain evidence of this use where floor deposits remain. As the geology of the extraction area is reliant on the presence of sandstone, there is the likelihood that visible sandstone suitable for grinding or engravings may be present.



Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014), Mineral Resources NSW, December 2003

0 100 250 500m
1:10 000

Legend

- Haereses Road Quarry Site
- Approved Extraction Area
- Modification Disturbance Area
- Tertiary (Sand, silt, clay & gravel)
- Bringelly Shale, Minchinbury Sandstone, Ashfield Shale
- Hawksbury Sandstone

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FIGURE 4.1
Geology

4.1.2 Soils

The Project Area is located predominantly in the GyMEA soil landscape with some small sections of Maroota soil landscape (refer to **Figure 4.2**).

The soils in the GyMEA soil landscape are generally shallow Lithosols associated with rock outcrops and leading edges of benches. Soils are generally shallow to moderately deep on crests and inside of benches. Drainage lines are generally lined with shallow to moderately deep sands (McInnes 1997: 45). The soils are generally well-drained where overlying sandstone bedrock (McInnes 1997: 47). The soils are generally acidic (4.5 – 6.5 pH) and are generally subject to high levels of erosion when cleared of vegetation (McInnes 1997: 45).

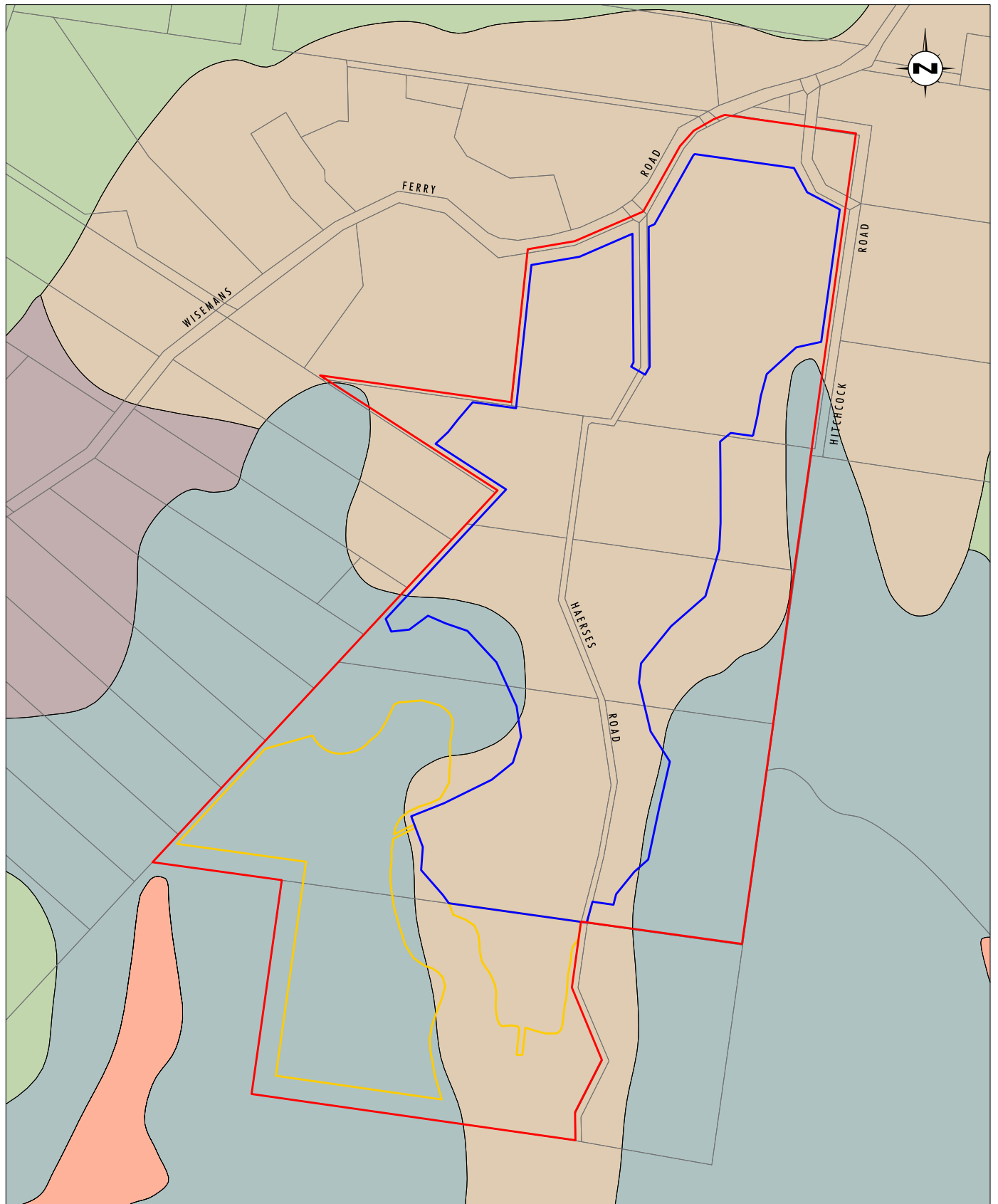
The soils in the Maroota soil landscape are generally moderately deep to deep Yellow Earths on crests and slopes with Podzols associated with drainage lines. The soils are well drained sands on slopes and terraces and poorly drained leached sands along drainage lines. At the heads of drainage lines, the soils generally have deeper deposits accumulated. The soils are acidic (4.5 – 6.5 pH) and are generally subject to high levels of erosion when cleared of vegetation (McInnes 1997: 93).

The preservation of archaeological materials is influenced by many factors, such as soil pH, the activity of soil dwelling micro-organisms and the movement of water across the site. The soil pH levels of the soil landscapes across the Project Area vary between slightly acidic and strongly acidic. This suggests that survival of organics (bones, wooden implements) is unlikely across the Project Area, as neutral to alkaline soils are required for the preservation of organic materials. Water flow, such as would occur along the drainage lines, further aid the survival of the micro organisms, which act to increase decomposition of organic material (Mays, 1998:17-21).

4.1.3 Topography and Hydrology

The GyMEA soil landscape is characterised by undulating to rolling low hills on Hawkesbury Sandstone. Local relief ranges from 20- 80 metres. Outcropping sandstone rock benches often form broken scarps (McInnes 1997: 45). The Maroota soil landscape consists of gently undulating rises on plateau surfaces with local relief limited to 20 metres. Crests tend to be broad, with long, smooth and gently elevated slopes free of rock outcrops (McInnes 1997: 91).

The Project Area is located within low sandstone hills and contains two first order tributaries of Stone Chimney Arm. The tributaries flow into a third order tributary 150 metres outside the Project Area. This tributary joins the main channel of Stone Chimney Arm approximately 250 metres downstream. The maximum height of the elevated hills is 170 metres AHD. Stone Chimney Arm begins 950 metres north-west of and flows north- south immediately west of the Project Area. Two third order streams meet 450 metres from the Project Area. Stone Chimney Arm joins Little Cattai Creek approximately two kilometres south of the Project Area. The close presence of a number of creeks with more reliable water suggests that Aboriginal people would not have relied on the Project Area for fresh water. The creeks flow through steep-sided valleys, and nearby in the Yengo National Park, most of the deeply incised creek lines and rivers have Narrabeen sandstone exposed in the lowest valley levels (McDonald, 2008).



Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014), OEH (2010)

0 100 250 500m
1:10 000

Legend

- ▬ Haereses Road Quarry Project Aite
- ▬ Approved Extraction Area
- ▬ Modification Disturbance Area
- ▬ Gynea Soil Landscape
- ▬ Colo Heights Soil Landscape
- ▬ Watagan Soil Landscape
- ▬ Maroota Soil Landscape
- ▬ Sydney Town Soil Landscape

FIGURE 4.2
Soils Landscapes

4.1.4 Flora and Fauna

The nearby Yengo and Wollemi National Parks (approximately 25 km north west of the Project Area) are part of the Greater Blue Mountains World Heritage area, which was gazetted in 2000 in recognition of its eucalypt habitats, heathlands, swamps, wetlands and grasslands. The World Heritage area has a significant representation of Australian flora, with a significant number of rare or threatened species (UNESCO, 2000) and is habitat to over 400 different faunal species (UNESCO, 2000) with 390 faunal species recorded in the Wollemi National park (NPWS 2001a) and 223 recorded in the Yengo National Park (including 41 mammal species, 128 bird species, 17 amphibian species and 37 reptiles) (NPWS 2001a).

Vegetation identified in the quarried area adjacent to the Project Area prior to sand mining included open forest woodlands of red bloodwood (*Corymbia gummifera*), scribbly gum (*Eucalyptus haemastoma*), forest oak (*Allocasuarina torulosa*), old man banksia (*Banksia serrata*), wattles (*Acacia*) and bracken (*Pteridium esculentum*).

Table 4.1 lists vegetation species identified within the Project Area during the field survey and their known Aboriginal use. As can be seen, the plants currently present within the Project Area provide food, economic and medicine resources and are likely to be representative of vegetation available to Aboriginal people in the past.

Table 4.1 Floral Species Identified in the Project Area and Known Aboriginal Use

Scientific Name	Name	Known Aboriginal Use	Reference
<i>Acacia sp.</i>	Wattle	Economic plant – timber often used for fuel, leaves crushed and soaked with nets to waterproof them – wood used for boomerangs, clubs and digging sticks Food plant – gum that exudes from wounds on trunk eaten; pink witchetty grub live under tree	Australian National Botanic Gardens Education Services, 2000 Gott, 1995 Stewart and Percival, 1997:8 Umwelt 2003
<i>Angophora hispida</i>	Dwarf Apple	Medicine plant – has astringent qualities, used for reducing blood flow and diarrhoea Burls on trunks removed and hollowed for use as containers and to boil water	Low, 1989 Umwelt 2003
<i>Banksia sp.</i>	Banksia	Food plant – nectar eaten Economic plant – cones used to carry fire	Low, 1989; Stewart & Percival, 1997

Scientific Name	Name	Known Aboriginal Use	Reference
<i>Eucalypts sp.</i>	Eucalypts	Food plant – roots chewed for water in dry areas Medicine plant – leaves used to reduce fever Economic plant – bark and heartwood of some species used for wooden bowls, shields, canoes	Australian National Botanic Gardens Education Services, 2000; MacDonald and Davidson, 1998
<i>Grevillea sp.</i>	Silky oak	Food – flowers sucked for nectar	Flood, 1980
<i>Lambertia formosa</i>	Mountain devil	Food plant – nectar sucked from flowers	Low, 1989: 170
<i>Lomandra sp.</i>	Mat rush	Food plant – edible flowers and leaf bases; seeds were husked and ground into flour Economic plant - strong leaves were made into net bags by Aboriginal women	Low, 1989: 131, 174; Zola & Gott, 1992:59
<i>Melaleuca sp.</i>	Paperbark	Medicine Plant – leaves were crushed and inhaled for coughs and colds. Leaves were also soaked to make an infusion to treat sores and burns Economic plant – the bark was used for bedding and for bandages and for wrapping babies and corpses	Low, 1989 Low, 1990: 95 Umwelt, 2003
<i>Persoonia sp.</i>	Geebung	Food plant – ripe fruit pulp eaten Medicine plant – fine scrapings of wood from young stems mixed with breast milk for eye treatment Economic plant – solution made from bark used to strengthen fishing lines	Stewart and Percival, 1997

Fauna that is likely to have occurred in the past would have included kangaroos, wallabies, koalas, wombats, possums, snakes, lizards and various insects. During previous surveys of the adjacent quarry a swamp wallaby was seen.

4.2 Land Use History

Maroota is situated along the Old Northern Road, one of the earliest routes north from Sydney to the Hunter Valley, which was originally surveyed between 1819 and 1833 (Casey & Lowe 1994: 4). The need to expand into the Hunter Valley arose because of the granting of all land on the Cumberland Plain. The first overland route from Sydney to the Hunter Valley, Finch's Track, was officially opened in 1823. By 1825, 283 settlers had arrived in the valley. The majority of these settlers were free immigrants, newly arrived in the Colony. Many appear to have been affluent and demanded the construction of a better road. In April 1826 they sent a petition to the Governor stating that a proper road was essential for the transportation of goods to Sydney (Casey & Lowe 1994: 4).

The supervision of the construction of the line of the Old Northern Road through Maroota is attributed to Lieutenant John Warner, who became Assistant Surveyor for the North Road in 1827. In June 1828 Lieutenant Percy Simpson took over from Warner. The road was constructed by convict work gangs and in March 1829 the section of road near Maroota was described as "the old bush track, merely a bush road" (Casey & Lowe 1994: 4).

The Old Northern Road between Castle Hill and Maroota was apparently abandoned for much of the nineteenth century and was not used during the second-half of the nineteenth century because of the preferred use of McGrath's Hill Road via Maroota and onto Wisemans Ferry. The road came into use again in the 1940s (Casey & Lowe 1994: 4).

Maroota was first settled in 1832 and was known as Forest Glen until the village was formally proclaimed in 1892. Army veterans were encouraged to farm the land, however poor soil quality meant cultivation was not possible and the settlement was closed in 1834 (Rowland, J: 2008).

Today, farming and quarrying are the two main industries in Maroota, with sand quarried to supply the wider Sydney region. The small town is surrounded by largely undeveloped state forest with views across to the Blue Mountains.

Current aerial photography of the Project Area shows that the area is heavily vegetated and the area adjacent to the Project Area has been cleared and impacted by sand quarrying (**Figure 4.3**). Some tracks able to be used for vehicles can be seen. It is likely that prior vegetation clearance may have occurred within the Project Area but sufficient time has elapsed to allow for the establishment of significant regrowth. This previous land use is unlikely to have impacted heavily on any Aboriginal sites that may be present within the Project Area.

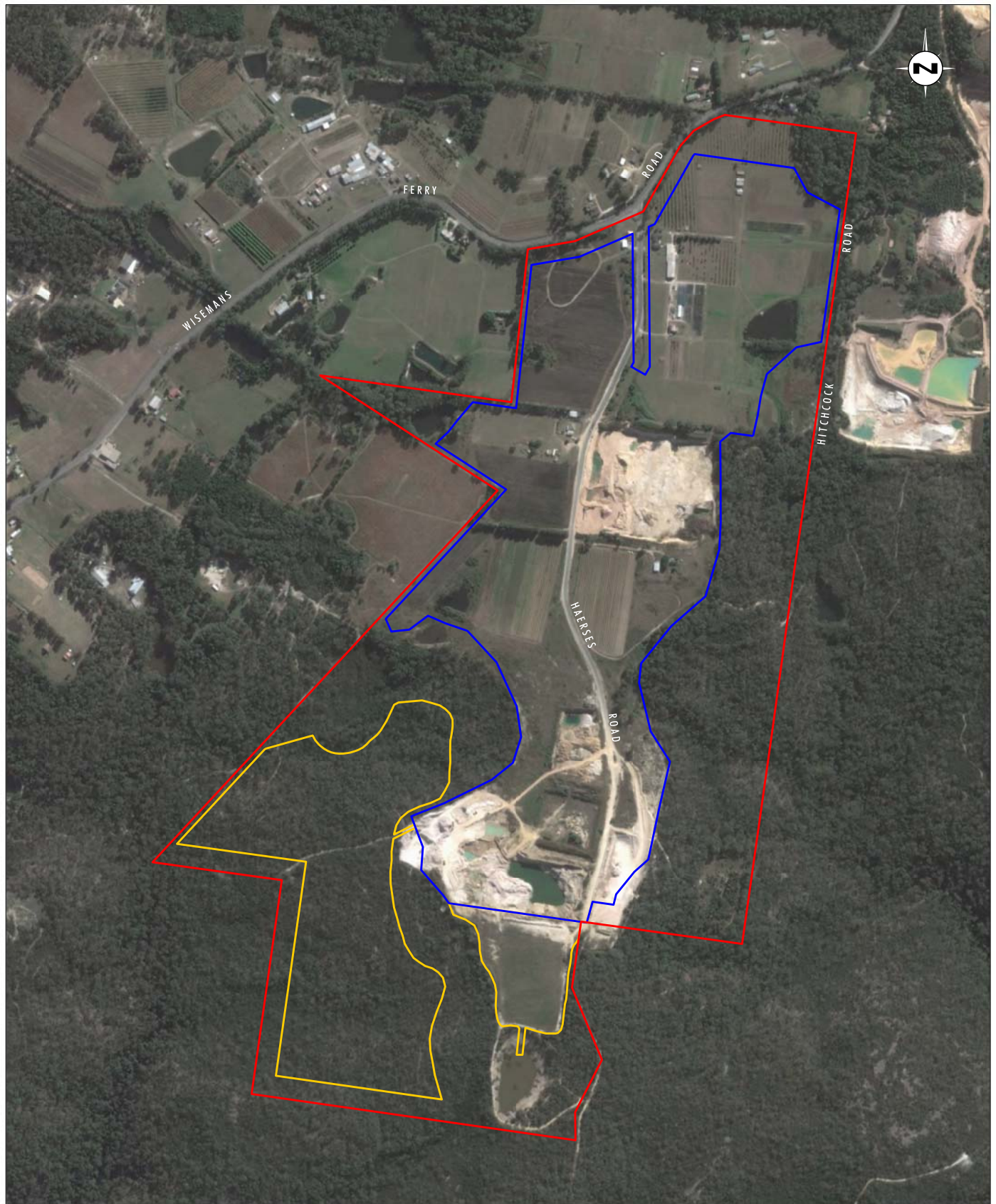


Image Source: Google Earth (2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

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Legend

- ▬ Haerses Road Quarry Project Site
- ▬ Approved Extraction Area
- ▬ Modification Disturbance Area

FIGURE 4.3
Land Use

4.3 Implications

The geology of the Project Area is primarily Hawkesbury Sandstone. Sandstone outcrops are known to have been used by Aboriginal people for grinding stone implements and making engravings. Where evidence of grinding is present, there are often associated pools of water. It is possible that grinding grooves or engravings may be present where there are suitable sandstone outcrops.

Soils are generally shallow and well drained. The ridges and valleys provide a natural boundary between neighbouring Aboriginal groups. If sites of sufficient size and diversity are located within the Project Area, it is possible that their contents may be demonstrative of any natural division. Overhangs are unlikely based on the topography, however if present they may contain evidence of their use by Aboriginal people in the past.

Flora and fauna observed within the Project Area indicate that a range of Aboriginal resources would have been present in the past. A variety of Aboriginal resource plants with food, medicine and economic resources are present within the Project Area.

Historical land use of the Project Area is connected to the short-lived 1832 settlement of Maroota and later farming and quarrying.

5.0 Cultural Context

Historic records, such as official records, personal observations recorded in diaries or publications and paintings, can provide rare information on Aboriginal lifestyles of a region at the time of European contact. Although a valuable source of information, the limitations of these documents must be recognised as colonial observers generally tended to record unusual rather than everyday events, religious and social life rather than economic activity, and men's behaviour rather than that of women and children. As such, ethnohistoric records are neither unbiased nor complete, and they cannot provide a complete understanding of Aboriginal lifestyles at the time of contact. The records are also clouded by the late 19th Century/early 20th Century Anglophile perceptions of the recorders who often did not understand the meaning/background of the events they witnessed and thus may have drawn conclusions/made assessments that were not accurate.

A review of the available archaeological information for the region can assist in identifying patterns in the nature and distribution of archaeological sites. However, this information is also to some extent limited by the distribution and aims of previous archaeological survey.

5.1 Ethno-historic Context

The Project Area is located in the traditional land of the Darug people. The Aboriginal population of the Sydney area consisted of four language groups, the Darkinjung, Guringai, Darug and Tharawal, which were then broken down further into bands and tribes (McDonald 2008: 32). Based on economic behaviour, early sources suggest that Aboriginal people inland had very little contact with those on the coast (McDonald 2008: 22).

Within the Hawkesbury and Hills area Darug people were known to have used the ridgelines and creeklines for travel (Attenbrow 2010). Early observations of the Aboriginal people in the Sydney region were made by soldiers, with differences observed in tribal groups, economic and social divisions (McDonald 2008: 20). Despite a large number of rock art sites being present in the area, very little was described in the early accounts, likely because the creation was not observed.

The Darug people had carefully considered laws to prevent over-gathering or hunting and ensuring all members of the clan were fed (Kohen 1993: 39) The women were responsible to provide the majority of food, fish, fruits and tubers. Men would hunt, catching possums, goannas and wallabies (Turbin 1989: 65). Due to the steep and rugged terrain in the area, the ridgelines were used as travel ways across the landscape, a fact noted by early observers (McDonald 2008: 22).

An early nineteenth century expedition through Darug and Gandangara territories described the foods eaten by the Aboriginal people as possum, squirrels, kangaroo, kangaroo rats, lizards and grubs. The hunting of kangaroo was observed to be troublesome and requiring great numbers for hunting (McDonald 2008: 23). Tools observed for hunting and gathering these food resources include a simple hooked stick for collecting grubs and more complex 'squirrel traps' in hollow trees and decoys for ensnaring birds (McDonald 2008: 24). Early accounts remark on the tree climbing abilities of the men of the inland groups for catching possums. The creation of notches as toe holds in the trees was observed by some (McDonald 2008: 23).

In the vicinity of the Project Area, the narrow ridges and deep, steep sided valleys of the surrounding landscape provide natural features that have been reported by DECCW (2010b) as suitable for use as buffers or boundaries between other groups of Aboriginal Peoples, the Wiradjuri of the south west slopes; the Dharug [Darug] and Darkinjung of the coast and mountains; the Wonnarua of the middle Hunter; and the Kamilaroi of the north-west slopes as far south as the Upper Goulburn River tributaries (DECCW, 2010b). Pathways along the ridges, through the National Parks connect these groups.

5.2 Previously Registered Sites

In Wollemi National Park, 15 kilometres north west of the Project Area, and Yengo National Park, 13 kilometres north of the Project Area, there are more than 650 Aboriginal sites recorded (DECCW 2001b). This large number of sites has been recorded despite the limited number and extent of surveys conducted in these areas (DECCW 2010b). It would appear that given this paucity of research in the wider area that significantly more sites will exist than are currently recorded and registered. The Maroota area extends directly from these parks and it can be considered likely that a similar number and range of sites will be located there.

A search of the OEH Aboriginal Heritage Information Management System (AHIMS) database for the area surrounding the Project Area was undertaken on 5 January 2016 which resulted in identifying 64 Aboriginal sites (refer to **Table 5.1**). The sites identified are show in **Figure 5.1**. Of these sites, five are located within 2 kilometres of the Project Area and one site 45-2-0081 is located 650 metres east of the project Area.

Table 5.1 AHIMS Sites within 10 kilometres of the Project Area

Site Type	Number of Sites
Art (Pigment or Engraved)	20
Art (Pigment or Engraved): Grinding Groove, Water Hole	1
Grinding Groove with Art (Pigment or Engraved)	3
Artefact	5
Grinding Groove	8
Modified Tree (Carved or Scarred)	2
Rockshelter with Potential Archaeological Deposit (PAD)	3
Shelter with Art (Pigment or Engraved)	12
Shelter with Art (Pigment or Engraved): Artefact	6
Shelter with Art (Pigment or Engraved): Grinding Groove, Artefact	2
Shell: Artefact	1
Stone Arrangement	1
Total	64

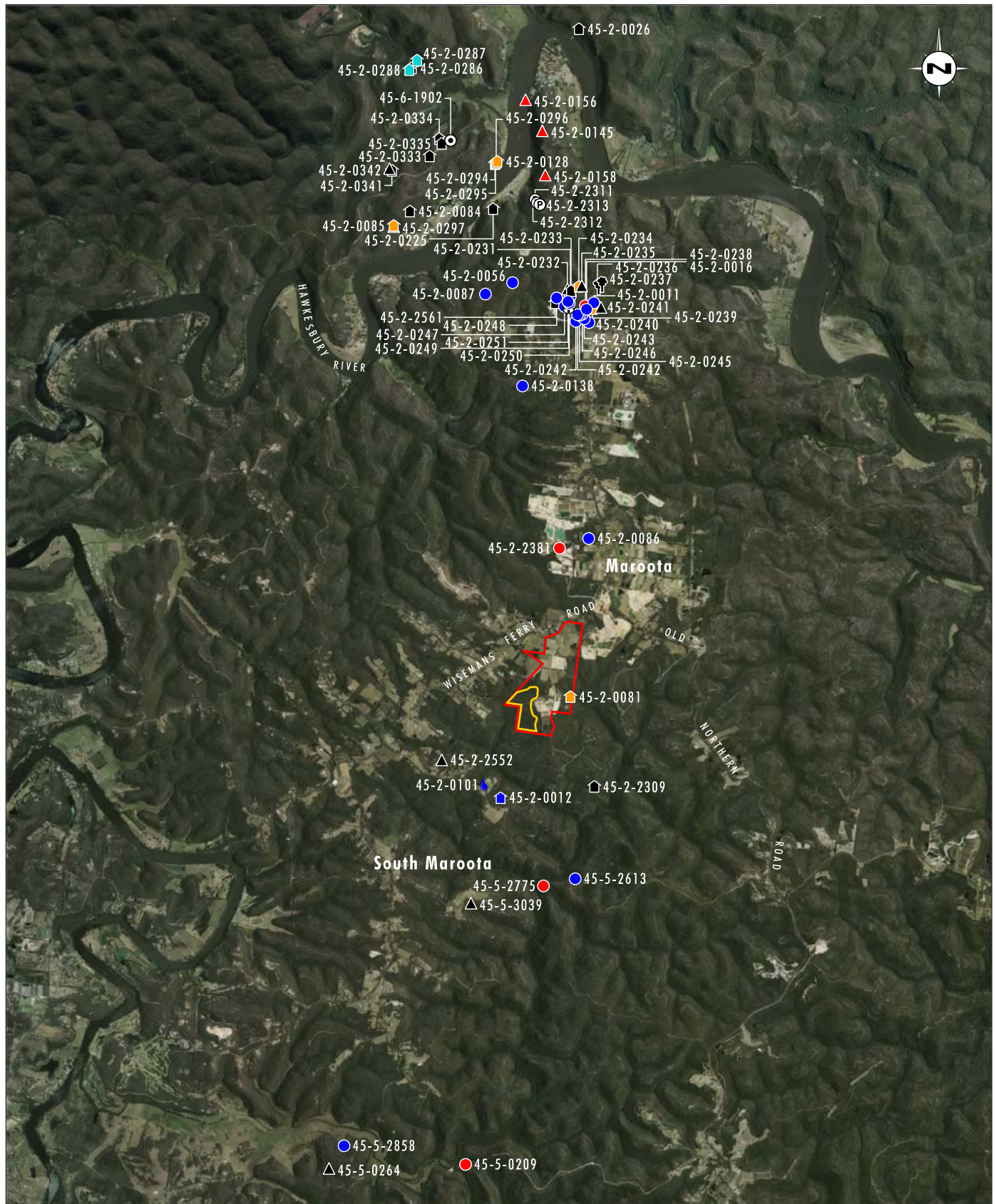


Image Source: Google Earth: Aerometrex (2016), Sinclair Knight Merz (2016), DigitalGlobe (2016), CNES/Astrium (2016)
Data Source: AHIMS (2016)

Legend

- Haerses Road Quarry Site
- Proposed Extraction Area
- Artefact Scatter
- Rock Engraving
- ⊙ Midden
- ⬆ Shelter with Art
- ⬆ Shelter with Deposit
- ⬆ Shelter with Art & Deposit
- ⬆ Scarred Tree
- ▲ Axe Grinding Groove
- ▲ Axe Grinding Groove, Shelter with Art, Shelter with Deposit
- ▲ Axe Grinding Groove, Rock Engraving
- ▲ Axe Grinding Groove, Rock Engraving, Water Hole/Well

FIGURE 5.1

Aboriginal Sites in the
Vicinity of the Project Site

Twenty-three of the sites listed in **Table 5.1** are rockshelter sites with one or more Aboriginal archaeological features, namely artefacts, deposit, art or grinding grooves. In addition, there are 24 rock engraving and grinding groove sites not associated with a shelter.

In a divergence from the typical distribution of sites within NSW, there are relatively few artefact scatter or isolated find sites with only five recorded in the search area. It is likely that many more artefact sites exist, however the limited survey means they have not been identified. The geology and landscape of the region is reflected in the site types located, which is typical for the region.

5.2.1 Previous Archaeological Research

This section discusses a number of archaeological studies that have been undertaken in the area, particularly those associated with sand mining.

5.2.1.1 Sim 1966

Sim (1966) located and recorded 22 groups of rock engravings in the MacDonald River Valley, approximately 30 kilometres north of the Project Area. Within these 22 groups of engravings there were 44 clusters of engravings, with emu tracks represented in a large number of sites. In the discussion of the engravings and the region, Sim notes that the southern section of the MacDonald River region is rugged and infertile, with the ridge tops almost devoid of water, apart from after heavy rains. Sim notes that the engravings are situated along the main ridges, with the majority being on the two ridges that provide routes between the more fertile valley areas in the region.

It was also highlighted that the engravings are limited to the area south of Putty and Wollombi, despite (painted) rockshelter art continuing north and west from the region. Sim avoided interpreting the engravings, apart from noting that many of the engraving sites were probably sacred sites.

Observations about the environment at the time were made, including a note that the MacDonald River had at one stage been a deep, permanent reliable source well stocked with fish, but by 1966 it was silted and shallow. It was also noted that within then living memory a number of reliable water holes at the heads of gullies had been destroyed by silting and scouring.

5.2.1.2 Harris, M 1979

This assessment related to an area approximately three kilometres northwest of the Project Area within which it was proposed to collect bush rock suitable for rockeries. The proposed works included the establishment of a small track, however large rocks and trees were just to be avoided.

The area assessed included rocky hills, noted as having limited water. Outcrops of exposed sandstone were observed, most were rough and some tessellated. There was one small watercourse with rock pools and sandstone platforms, however there were no engravings or grinding grooves located on this. No archaeological sites were located during the inspection of the area and it was assessed that the area had a low probability of containing artefacts.

5.2.1.3 Ross, B 1979

A survey of the current Haerses Road Quarry Project extraction area was undertaken to assess the area for impacts from quarrying. The predictive model for the assessment indicated it was unlikely to contain Aboriginal objects. The previous land use was identified as extensive, with over half of the area cleared for orchards and a substantial amount of the remaining area subject to clay extraction and dam construction. The land around this assessment area was mostly undisturbed.

Locals informed of two rock shelters in the area. One was located on the boundary of the assessment area and Maroota State Forest. The location of the second was not identified, as the knowledge holder was unavailable.

The shelter with art identified in this assessment is located approximately one kilometre east of the Project Area. The art consists of eight white ochre hand stencils in two groups and charcoal drawings, with a boomerang and a man in a canoe. The shelter also has evidence of use with stone artefacts scattered on the floor. No shell or bone was visible on the surface of the floor.

Other exposed sandstone platforms and overhangs were inspected, with no evidence of Aboriginal use observed.

5.2.1.4 Corkill, T 1989

Forty hectares of ridge top land at Maroota, approximately three kilometres north of the Project Area, were surveyed prior to sand mining. Previous land use included orchards and agriculture to the east and sand mining to the north, while the west and south were undisturbed bushland. Past land clearance on access tracks and the remains of a brick building were also observed.

Though the area was already disturbed, it was assessed that the area had the potential to contain rock engravings, grinding grooves and stone artefacts

No Aboriginal archaeological sites were located during the survey, although there were surfaces suitable for grinding grooves or engravings. It was noted, however that engravings were known to be rare on the west side of the ridge in the Maroota area. It was suggested that the rock shelters with pigment art were used as a substitute for engravings, though this was not related to any study. The other option suggested was that any engravings that were made had weathered away.

5.2.1.5 Corkill, T 1991

Corkill (1991) inspected an area proposed for sand mining two kilometres northwest of the Project Area. The area was focused on a two valley system with adjacent ridge tops. The ridge sides were steep with rocky scarps and these were separated by level benches. The ridge line was wide and extended through the central portion of the assessment area. Disturbance of the assessment area included clearance, track making, rubbish dumping and quarrying.

The proposed works were to result in the infilling of a valley over a 20 year period. A full survey of the proposed infill area was undertaken and no archaeological sites were identified during the survey, however one rockshelter with PAD was identified.

Ground surface visibility during the survey was minimal, except on exposed rock and vehicle tracks. The rockshelter with PAD was identified within the proposed infill area, and recommended for test excavation prior to any disturbance. Additionally, there were nine overhangs suitable for habitation identified. None of these had any archaeological material and they were not discussed further.

5.2.1.6 Kohen, J 1992

A survey approximately 3 kilometres north of the Project Area was undertaken, including Portions 196 and 29 at Maroota. This assessment area was located next to another existing sand mine operated by Dixon Sands. The closest previously recorded site was a rock engraving east of the survey area.

The survey area was located on a small ridge running to the southwest from the main ridge line, where the Great North Road passes. The slope was described as gentle, though increasing in steepness as it approached the gullies. The northern section of survey area contained an orchard, while the eastern section was under cultivation. While the southern section of the survey area was heavily vegetated, it was identified as regrowth.

The Maroota area was noted as having a range of archaeological sites, with high likelihood of engraving sites. The survey focused on rock surfaces, overhangs, large trees and ground surface exposures. Ground surface visibility was low in most of the survey area, however the areas of rock outcrop had good visibility. No Aboriginal archaeological sites and no areas of PAD were identified during the survey.

An overhang was located, consisting of an undercut sandstone outcrop, with a sandy alluvial soil. It was suggested that the creek may have flowed through it prior to a dam being constructed. The Project Area was not thought to contain potential archaeological deposits.

5.2.1.7 Corkill 1994

A survey for Aboriginal sites at Maroota, approximately five kilometres north of the Project Area, was undertaken for sand quarrying. The survey area covered 20 hectares on the eastern edge of the north/south trending Maroota Ridge. The survey area sloped gently to Cooper's Creek, which bisected it. Areas of exposed rock were targeted for examination for rock engravings and grinding grooves, and outcrops were targeted for evidence of use as a shelter.

Corkill identified four new archaeological sites during the survey; one grinding groove site with twenty grooves, one engraving and grinding groove site with two engravings and 11 grooves and two rock shelters with archaeological deposit. Artefacts in the shelters were made of silcrete and fine grained siliceous material. It was also noted that there was one rockshelter with PAD that had no visible artefacts. The archaeological significance of the sites was assessed as being high and it was recommended that the sites be protected.

5.2.1.8 Edgar, J 1995

Edgar undertook a survey of an area proposed for sand mining approximately one kilometre northeast of the Project Area. The area contained a number of ploughed fields, gentle slopes with regrowth vegetation, orchards and one area of steep hillside. Ground surface visibility was good in most part of the survey area due to extensive clearing and ploughing of fields in the survey area.

Three sites were located during the survey, one artefact scatter and two isolated artefacts. The isolated artefacts were not recorded as sites beyond their mention in the report. All three sites were in disturbed contexts. Artefacts were mudstone, silcrete and fine grained siliceous materials. The artefact scatter, MR1, consisted of five artefacts on a large cleared area. The artefacts consisted of three mudstone flakes, a red silcrete flaked piece and a fine grained siliceous flake. The two isolated finds each contained a mudstone flaked piece.

A lack of open artefact sites in the region was identified, increasing their significance, however the disturbed context of the sites limited their archaeological significance.

It was recommended that an Aboriginal Heritage Impact Permit be obtained for the artefact scatter site prior to any works occurring.

5.2.1.9 Corkill and Edgar 1999

Corkill and Edgar undertook a survey of an area proposed for sand mining approximately three kilometres northeast of the Project Area. The survey area was along a ridge top with no outcropping sandstone or mature trees. The ridge was thought likely to be part of an Aboriginal pathway between the Parramatta and Hawkesbury Rivers and on to the Hunter Valley. It is likely that areas used for camping were located on the slopes off of the ridge tops, more easily accessible to water.

The survey area contained a number of ploughed fields, gentle slopes, a steep earth bank, a knoll that had been cut and filled and an area of excavation and stockpiling. Previous land disturbance was extensive and no suitable rock outcrops were observed.

No Aboriginal archaeological sites or areas of PAD were identified during the survey and no further recommendations were made.

5.2.1.10 Appleton, J 2000

A survey was undertaken for the proposed installation of a rock crusher. The survey area was 10 kilometres south of Maroota.

The survey area was located perpendicular to the main north south trending ridge that is followed by the Old Northern Road and consisted of the upper slopes of the main ridge line, upper slopes and crest of a spur, steep sloped of a spur ridge and gullies between these.

The survey area had been heavily cleared and developed, with small undisturbed areas. Visibility varied from 5% to 35% across the survey area. No Aboriginal archaeological sites were located in the survey area. Exposed sandstone platforms suitable for engravings or grinding grooves were present within the survey area, although no grinding grooves or engravings were observed. Dams and other impacts to the creek meant that sites that may have been located here would likely have been destroyed. It was suggested that the survey area was used more as a travel way than a camping area.

5.2.1.11 Total Earth Care 2008

In 2008 a study of the Part Lot 3 DP567166 and Part Lot 2 DP510812 Quarry site at Maroota, approximately 4.5 kilometres north east of the Project Area, was undertaken for further sand extraction. The survey identified six previously identified Aboriginal sites, which included three rockshelters with deposit, two grinding grooves and a rock engraving and grinding groove. Two newly identified sites consisted of a set of grinding grooves as well as identifying artefacts within a rockshelter with PAD.

Two artefacts were located in the shelter, a quartz flake and a silcrete cobble used as a core and a hammerstone. The grinding groove site contained two shallow grinding grooves, which were noted as unlikely to be located except after heavy rainfall.

All six sites were identified as having high Aboriginal cultural significance, while two were identified as having high archaeological significance, three with potentially high archaeological significance and one with moderate archaeological significance. The two sites within the proposed extraction area were recommended to be fenced with a buffer to ensure their protection during mining.

5.2.1.12 Umwelt 2010

Umwelt undertook survey and assessment of an area within the Sugarloaf State Conservation Area. The topography of the Sugarloaf Range is similar to the Yengo and Wollemi National Parks, with steep narrow ridges and deep valleys. The ridge and spur crests in the Sugarloaf Range were the Aboriginal pathways through and across the mountains, similar to the main ridgelines through the Yengo and Wollemi National Parks.

The geology of the Sugarloaf Range is similar to that of the Yengo and Wollemi National Parks (refer to Section 3.2), consisting of Narrabeen Group sandstones and conglomerates (Matthei, 1995). Grinding groove sites were the dominant site type in the areas of steep terrain, with artefact sites most often located on spur crests that have access tracks with higher levels of visibility and soils prone to erosion. The ridgelines and gentle spurs in the Sugarloaf Range are known to have been the traditional Aboriginal pathways through the range, with most artefact sites being small scatters, likely to be indicative of transient use rather than prolonged camping.

The Sugarloaf Range differs from the Yengo and Wollemi National Park area, in that there are very few rockshelters with evidence of occupation in the Sugarloaf, as most shelters or overhangs are small with sloping floors and no deposit. There is also only one recorded art site, an engraving site associated with grinding grooves in a creek. Prior to systematic survey being undertaken in the Sugarloaf Range, a similar overall open site distribution to the Yengo and Wollemi National Parks could be seen, with previously recorded sites consisting predominantly of large numbers of grinding grooves in the upper reaches of the creek lines, where sandstone platforms in the creeks were suitable for grinding, with low numbers of other site types, including artefact scatters, isolated finds and scarred trees. The grinding grooves that were recorded were largely recorded by one person, whose activities targeted locating and recording grinding groove sites.

During the Umwelt (2010) survey 62 additional sites were recorded including 20 grinding groove sites, one site that had grinding grooves associated with a rockshelter and isolated artefact, one rockshelter with artefacts and deposit, 36 artefact scatters/isolated finds, three scarred trees and two stone arrangements.

After the systematic survey, that assessed all landforms, including ridges, spur crests, slopes and valleys, the number of recorded artefact sites within the Sugarloaf Range itself increased greatly. The artefacts in the Sugarloaf Range were all recorded on four wheel drive access tracks and motorbike trails on low gradient ridge and spur crests. A pattern of recurring artefact location on crests/benches between the upper tributary water courses rather than beside the water courses was noted. This was suggested to have three potential reasons: the steep gradient of the landforms associated with the watercourses making them unsuitable for camping, the gentle gradient of the spur crests were more suitable for camping and there was poor visibility next to the watercourses.

While this survey area is located a great distance from the Project Area (65 kilometres) the results demonstrate that the paucity of artefact scatters and isolated artefacts in country dominated by sandstone may demonstrate the nature of the survey focus, rather than a lack of artefactual material being present.

5.2.2 Summary

Within the broader region previous archaeological surveys have focussed on the ridges and areas of exposed sandstone. Previous investigations demonstrate that grinding grooves or engravings dominated the sites immediately surrounding the project area. While there are very few artefact sites recorded in the area, studies in comparable landscapes show that artefacts are likely to be present in low densities on ridgelines and travelways.

6.0 Predictive Model

Based on the environmental context of the Project Area it is considered that Aboriginal people may have utilised the area periodically for the purposes of hunting and gathering whilst moving through the landscape. Thus, artefact scatters and isolated finds are the most likely site type to occur in this area and are most likely to be located on the spur crests or in association with the watercourses. Grinding groove sites if they occurred in the vicinity would most likely have been associated with the creek lines, however, grinding grooves are unlikely to have survived due to the highly weathered nature of the sandstone bedrock. Engraving sites can be predicted in any landform where suitable sandstone platforms outcrop. However, like grinding grooves, this type of site is unlikely to have survived (if it ever existed within the Project Area) due to the advanced state of weathering of the sandstone bedrock. Scarred trees may occur if mature trees exist within the Project Area. Other site types such as rockshelters will not be present due to the lack of suitable geology (i.e. cliff lines).

The following predictive model has been formulated based on the information presented in **Sections 4.0** and **5.0** in an endeavour to indicate likely site types, site distribution and integrity for the Project Area. It is assessed that:

- based on the results of previous inspections in the region and the lack of permanent water, there is a very low likelihood that archaeological material/sites reflecting intensive use by Aboriginal people will be located in the Project Area
- if sites are located within the Project Area they are likely to be small artefact scatters and isolated finds resulting from transient use of the area by Aboriginal people
- if small artefact scatter sites and isolated finds are present they are most likely to be identified in areas with high levels of exposure in proximity to creek banks or in areas of prior disturbance
- if artefacts are located they are likely to have been manufactured from quartz, fine grained siliceous materials, quartzite or basalt. Flakes, broken flakes and flaked pieces are the most likely artefact types
- the nature of the sandy soil within the Project Area and surrounds mean that sites containing stone artefacts are likely to have been affected by ongoing taphonomic processes which may have acted to destroy sites through erosion or to bury the artefacts through soil aggradation at the base of slopes or through bioturbation
- the topography of Project Area and its distance from reliable water indicate it is more likely to have been used as a resource gathering area, or travel way to nearby resource gathering areas rather than for camping, with resource gathering and transit activities generally not associated with large amounts of artefact discard and making occupation/use difficult to discern
- grooves resulting from axe, hatchet and adze grinding and resharpening may occur in the Project Area on exposures of sandstone where they are associated with creek lines. Engravings may occur in the project area on sandstone exposures. However the likely occurrence/preservation of these sites is also influenced by the advanced state of weathering of the sandstone bedrock.

7.0 Survey Methodology

7.1 Proposed Survey Strategy

The Project Area is located in the south western portion of the Haerses Road quarry site. As shown on **Figure 7.1**, the survey area was predominantly composed of low gradient spur crests and moderate gradient spur slopes drained by upper order tributaries. Sandstone bedrock in this area is reported to be highly weathered and in a state of decomposition.

Based on the predictive model and on the limited size of the proposed impact area, the survey strategy covered 100% of the spur crests and creek lines and an adequate sample of the spur slopes. A small track was observed identified during the survey and was followed within the Project Area across multiple landforms. It was assessed as the most likely area to have exposures that may have visible artefacts. All sandstone outcrops encountered were inspected for grinding grooves and engravings and any remnant mature trees observed were inspected for scars/carving. The survey transects are mapped in **Figure 7.1** however it is noted that these transects represent the direct line inspected by one archaeologist, forming the centreline of the survey with Aboriginal party participants also walking parallel to the archaeologist, such that survey transects were 50-100m in width, as will be discussed in **Section 8**.

The survey methodology complies with the survey requirements of OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. During the survey all participants had the opportunity to discuss any potential impacts of the project on Aboriginal cultural heritage sites and values. Information recorded during the survey included:

- the nature of the landforms and vegetation;
- the levels of visibility and exposure within the extraction area
- the effects of erosion and disturbance
- the availability of Aboriginal resources, with a particular focus on the types of resource plants (bush tucker) that may be present in the extraction area
- detailed records of archaeological sites present
- the likelihood that potential archaeological deposits may be present within the extraction area
- information provided by Aboriginal parties regarding the cultural significance/or cultural values of the area.

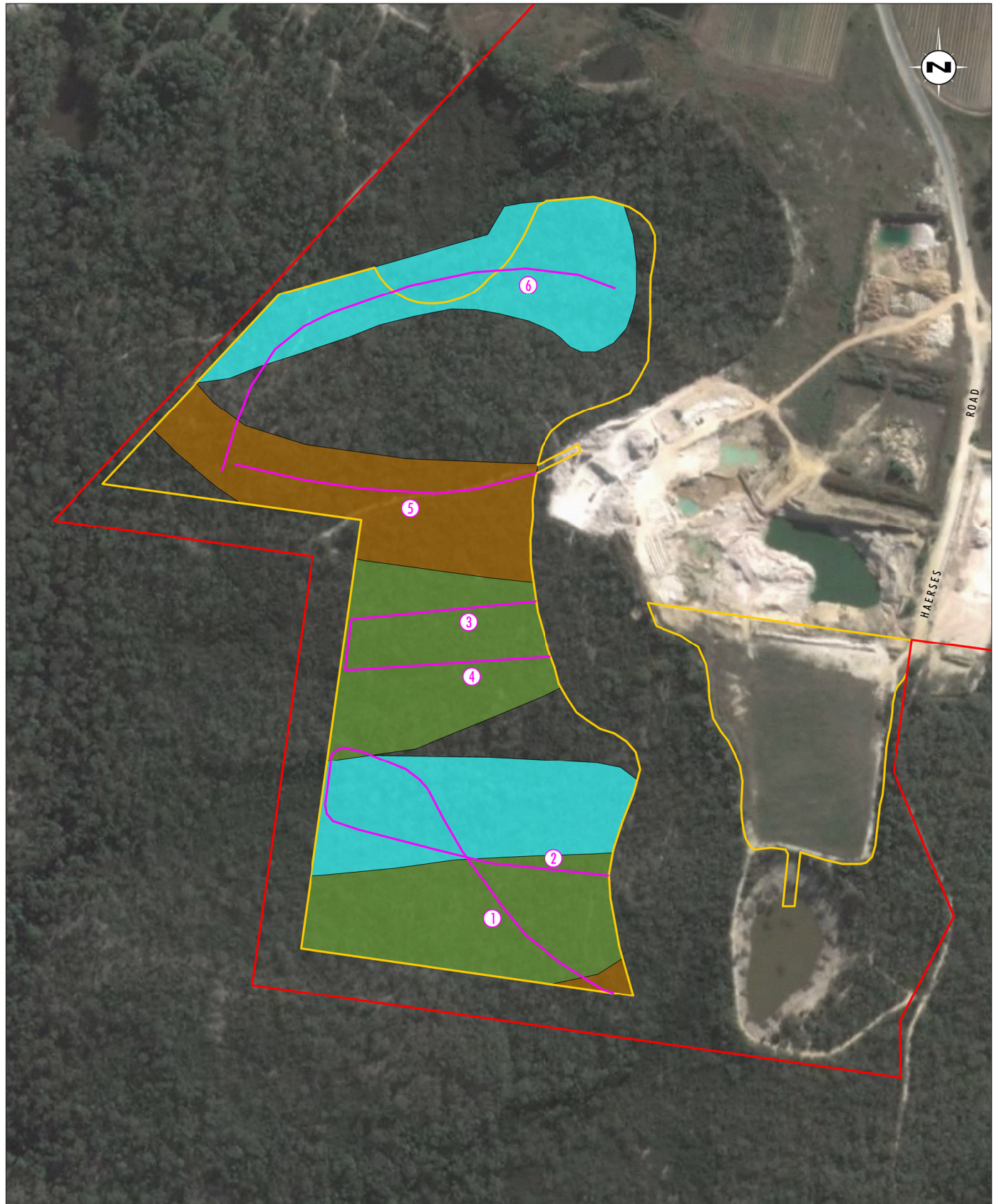


Image Source: Google Earth (2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

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Legend

- Haerses Road Quarry Project Site
- Modification Disturbance Area
- Slope
- Spur Crest
- Creek Line
- Transect

FIGURE 7.1
Survey Transects

8.0 Survey Results

The survey of the extraction area was undertaken on 8 December 2015 by a field team of two Umwelt archaeologists and four Aboriginal party representatives with organisations/individuals involved listed in **Table 8.1**).

8.1 Survey Team

Table 8.1 Field Survey Team

Organisation	Representative
Darug Land Observations	James Eastwood
Deerubbin Local Aboriginal Land Council	Stephen Randall
Kawul Culture Services	Arika Jalomaki
Tocomwall	Jakub Czastka
Umwelt	Amanda Reynolds Kirwan Williams

Darug Aboriginal Cultural Heritage Assessments (DACHA) registered for the project after the survey had taken place. Their registration was accepted and a summary of the survey and results was provided to them.

8.2 Survey Coverage

A total of eight survey transects were conducted across the extraction area as illustrated on **Figure 7.1**. **Table 8.2** provides the survey coverage and effective coverage for each of the transects undertaken.

Table 8.2 Effective Coverage

Transect	Landform	Survey Unit Area (m ²) approx	Visibility %	Exposure %	Effective Coverage
1	Slope	20000m ² (200 x 100m)	0	1	200m ² 1%
2	Creek Line	25000m ² (250 x 100m)	0	0	0
3 + 4	Slope	20000m ² (200 x 100m)	0	0	0

Transect	Landform	Survey Unit Area (m ²) approx	Visibility %	Exposure %	Effective Coverage
5	Spur Crest	35000m ² (350 x 100m)	0	2	700m ² 2%
6	Creek Line	10000m ² (200 x 50m)	0	0	0

As shown in **Table 8.2**, there was no visibility within the extraction area, due to heavy vegetation cover.

8.3 Results

No Aboriginal artefacts were identified during the survey of the extraction area. Outcrops of sandstone were observed on the slopes within the extraction area and were inspected for grinding grooves, engravings and other evidence of Aboriginal people using the landscape. The sandstone was highly weathered and no remains of Aboriginal use were identified.

The soil was observed to be sandy and skeletal. No areas of PAD were identified during the survey. The extraction area is considered to have low archaeological potential based on a number of factors including: the landforms are not suitable for camping, soils are skeletal and unlikely to retain deposit; and water sources in the immediate vicinity of the extraction area are ephemeral at best and would not support prolonged occupation. On this basis it is assessed that while Aboriginal people may have used the extraction area and the Project Area more broadly in a transitional fashion, this is unlikely to have resulted in the formation of archaeological deposits.

8.4 Input from Registered Aboriginal Parties

The registered Aboriginal parties present on-site during the survey indicated that they were happy with the level of survey coverage undertaken. No comments were made about expectations of grinding grooves or engravings.

The registered Aboriginal parties agreed with an on-site discussion suggesting that the slopes of most of the survey area would have limited its use as a camping area.

After the survey DLALC provided a letter summarising their involvement in the survey, noting that there was poor visibility and that no artefacts, engravings or grinding grooves were observed. DLALC raised no objections to the quarry extension.

8.5 Assessment of the Predictive Model

No Aboriginal archaeological sites were located in the survey area and there was no evidence of intensive use of the survey area. Based on the environmental context and ethno-history of the survey area, it was expected that artefact scatters and isolated artefacts would be the most likely artefact types, located on spur crests or associated with watercourses. The watercourses were heavily vegetated and had no water flowing.

The survey area is heavily vegetated and is likely to have been a resource area. While resources may not have been abundant, it is likely that Aboriginal people passing through the area could have obtained basic

resources as they passed. The banks of Stone Chimney Arm, 20 metres west of the extraction area are likely to have been a richer resource area. No significant Aboriginal resource plants were observed in the survey area, however previous European land use may have resulted in the removal of resource plants used by Aboriginal people.

The likelihood of identifying archaeological material was assessed as low. No archaeological evidence was identified, supporting the predictive model.

9.0 Significance Assessment

The Burra Charter defines cultural significance in terms of aesthetic, scientific, historic and social values. Aboriginal cultural heritage is typically assessed according to its social and scientific significance; however other values may also be of importance. The assessment of cultural significance is critical in establishing mitigation and management strategies for cultural heritage (refer to Pearson and Sullivan, 1995:21).

The assessment of significance provides a guideline for determining appropriate mitigation and management strategies. The relationship between levels of significance and management strategies can be summarised as follows:

- High significance – the site should be conserved and protected from the impacts of development, where possible.
- Moderate significance – the site should be protected if possible, however, if impacts to the site are unavoidable, appropriate mitigation strategies should be implemented prior to impact.
- Low significance – the site should be protected if possible, however, if impacts to the site are unavoidable, the presence of the site should not impede the proposed development.

9.1 Aboriginal Cultural Significance of the Landscape

As Aboriginal cultural significance relates to the values of a site, place or landscape to Aboriginal people, it must be determined by Aboriginal people. The registered Aboriginal parties participating in the project therefore have the right and obligation for assessing the significance of their cultural heritage. In assessing this significance a range of factors may be considered and this can extend beyond the physical presence of a site and its contents. Archaeological material, cultural knowledge, natural resources and landscape may all be considered.

Aboriginal parties on site during the survey noted that the area was rich with Aboriginal resources and the poor visibility limited the observation of any surface artefacts.

*Any additional comments on the cultural significance of the survey area received from the Aboriginal parties will be summarised below and included in full in **Appendix A**.*

9.2 Archaeological Significance

The criteria applied to the assessment of archaeological significance are listed in **Table 9.1**. As no Aboriginal sites were identified in the survey area, the assessment of archaeological significance is applied to the landscape within the survey area in **Table 9.2**.

Table 9.1 Criteria for Assessment of Archaeological Significance of the Landform

Criterion	Low	Moderate	High
Rarity	The landform within the surrounding landscape, its integrity, contents and/or potential for sub-surface artefacts, are common within the local and regional context.	The landform within the surrounding landscape, its integrity, contents and/or potential for sub-surface artefacts, are common within the regional context but not the local context.	The landform within the surrounding landscape, its integrity, contents and/or potential for sub-surface artefacts, are rare within the local and regional context.
Representativeness	This landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts, is common within a local and regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	This landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts, is uncommon within a local context but common in a regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	This landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts, is uncommon within a local and regional context and sites of similar nature (or in better condition) are not already set aside for conservation within the locality or region.
Research potential	The landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts has limited potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.	The landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts has moderate potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.	The landform, when viewed in relation to its integrity, contents and/or potential for sub-surface artefacts has high potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.

Criterion	Low	Moderate	High
Education potential	The landform is not readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape has limited suitability to be used for educational purposes. Other sites with higher education potential are known to be present in the local area and region.	The landform is not readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape provides a tangible example that is suitable to assist in educating people regarding how Aboriginal people lived in this area or region. However, other sites with higher education potential are known or expected to be present in the local area or region.	The landform is not readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape, provides a very good tangible example that is suitable to assist in educating people regarding how Aboriginal people lived in this area or region. Other sites of higher education potential are generally not known to exist in the local area or region.
Integrity	Stratigraphic integrity of the landform has clearly been destroyed due to major disturbance/loss of topsoil. The level of disturbance is likely to have removed all spatial and chronological information.	The landform appears to have been subject to moderate levels of disturbance, however, there is a moderate possibility that useful spatial information can still be obtained from sub-surface investigation of the site, even if it is unlikely that any useful chronological evidence survives.	The landform appears relatively undisturbed and there is a high possibility that useful spatial information can still be obtained from sub-surface investigation of the site, even if it is still unlikely that any useful chronological evidence survives.

Table 9.2 Assessment of Archaeological Significance

Landform within the survey area	Rarity Value	Representative Value	Research Potential	Educational Potential	Integrity	Overall Archaeological Significance
Creek Line	Low	Low	Low	Low	Low	Low
Spur Crest	Low	Low	Low	Low	Low	Low
Slope	Low	Low	Low	Low	Low	Low

10.0 Management Recommendations

It is recognised that recommendations provided from an Aboriginal cultural perspective may differ to those based on an archaeological perspective. Scope is therefore provided for the inclusion of both sets of recommendations.

10.1 Aboriginal Party Recommendations

The recommendations presented below were discussed and the registered Aboriginal party representatives participating in the survey of the Project Area indicated that the recommendations were suitable provided that there was clarity about the nature and extent of works and that consideration was given to any future works.

The request from DLO to monitor top soil removal and all other works on site is not considered archaeologically necessary (refer to **Section 8.5**). This recommendation was not noted by the other registered Aboriginal parties and is therefore not proposed by Dixon Sand.

10.2 Archaeological Recommendations

The following recommendations have been developed from information detailed in this assessment and current cultural heritage legislation.

- Dixon Sand should ensure that its employees and contractors are aware that it is an offence under Section 86 of the *National Parks and wildlife Act 1974* (NPW Act) to harm or desecrate an Aboriginal object unless that harm or desecration is the subject of an Aboriginal Heritage Impact Permit (AHIP) or other approval.
- The Project Area does not contain any identified Aboriginal archaeological sites and therefore there is currently no requirement to obtain specific approvals relating to Aboriginal cultural heritage. However, in the unlikely event that previously unrecorded artefactual material is exposed during ground disturbance works within the extraction area, work must cease in the vicinity of the artefactual material and the registered Aboriginal parties contacted and the artefactual material managed in accordance with a methodology to be prepared in consultation with the RAPs and OEH, if required;
- In the event that suspected human skeletal material is identified within the Project Area, all works in the immediate vicinity of the suspected human skeletal material will cease and the skeletal material will be inspected to determine if it is human (including assessment by a forensic specialist if required). If the skeletal material is human, the NSW Police and OEH will be contacted. No excavation will proceed until an appropriate course of action has been determined in consultation with NSW Police, OEH and the Aboriginal parties.

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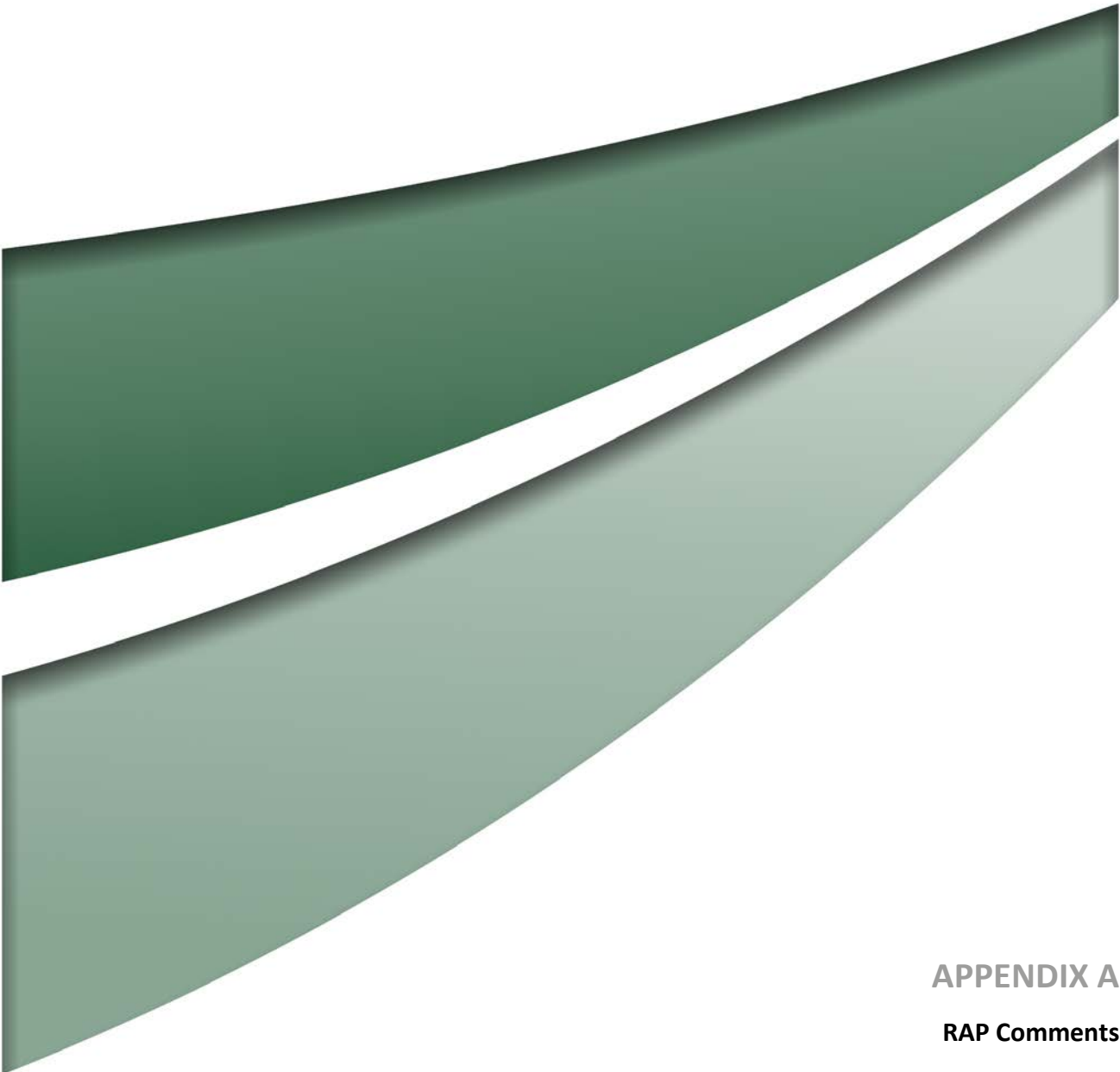
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APPENDIX A
RAP Comments



**DARUG LAND
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9th May 2016

Alison Lamond
Umwelt (Australia) Pty Limited
75 York Street
Teralba NSW 2284

Dear Alison,

RE: Haerses Road Quarry, Haerses Road, Maroota

Aboriginal Cultural Heritage and Archaeological Assessment Report

Darug Land Observations Pty Ltd has reviewed the draft Aboriginal Cultural Heritage and Archaeological Assessment Report, and supports the draft methodology for the operation of a sand quarry on Haerses Road, Maroota.

In relation to the long-term storage of recovered artefacts, if any, Darug Land Observations Pty Ltd strongly believes that recovered artefacts should be re-buried on Country (the study area).

Darug Land Observations Pty Ltd would like to receive a copy of the Section 90 Aboriginal Heritage Impact Permit (AHIP).

Furthermore, Darug Land Observations Pty Ltd would be involved in the monitoring of the topsoil removal and all other form of works to be carried out on the site.

Yours sincerely,

Jamie Workman
Darug Land Observations Pty Ltd

Uncle Gordon Workman
Darug Elder

From: [Jakub Czastka](#)
To: [Alison Lamond](#)
Cc: [Danny Franks](#)
Subject: Re: Hearses Road Quarry
Date: Tuesday, 31 May 2016 1:41:19 PM
Attachments: [8AC97A74-9858-49E4-8975-60A5C1A16263f91.png](#)
[Supply_nation_logof91.png](#)

Alison,

I spoke with Danny this afternoon and he had no comments to make in relation to your ACHAR.

Regards,

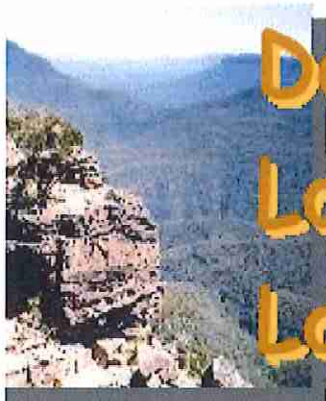
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Dixon Sands (Penrith) Pty Ltd

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PENRITH NSW 2751

Our Ref: 2607

11 January 2016

PROTECTION OF ABORIGINAL CULTURAL HERITAGE

Proposed Quarry Additional Extraction Area

Haerses Road, Maroota

Attention: Mark Dixon,

A Deerubbin Local Aboriginal Land Council representative inspected the abovementioned location on Tuesday, 8 December 2015. An Aboriginal cultural heritage assessment was undertaken to evaluate the likely impact the proposed development has on the cultural heritage of the land.

Much of the proposed sand extraction area has little visibility, no Aboriginal cultural material (in the form of stone artefacts, for example) were found, nor any rock engravings, grinding grooves or habitational shelters.

Deerubbin Local Aboriginal Land Council therefore, has no objection for the proposed quarry extension of Haerses Road, Maroota on the grounds of Aboriginal cultural heritage

Yours Faithfully,

Steven Randall

(Aboriginal Cultural Heritage Officer)

C.c. Miranda Firman – Office of Environment & Heritage

C.c. Amanda Reynolds – Umwelt (Australia) Pty Ltd



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