



**ELIZABETH DRIVE UPGRADE
STAGE 3 PACHCI**

Aboriginal Cultural Heritage Assessment Report

PUBLIC RELEASE VERSION

Prepared for Transport for NSW

Penrith, Liverpool & Fairfield Local Government Areas

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Portions of this document have been redacted for reasons of confidentiality and to protect sensitive cultural information.

Executive Summary

Transport for NSW ('Transport') is planning to upgrade Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW ('the proposal'). Elizabeth Drive is a major east-west corridor between the Liverpool region and surrounding suburbs in western Sydney.

Future projected and planned growth in the region is expected with the development of the Western Sydney International Airport. This will see an expansion of industrial and commercial precincts associated with the development of the Western Sydney Aerotropolis and related planned land releases for residential precincts and employment zones in the area leading to a need for increased capacity on Elizabeth Drive. The proposed works comprise an upgrade from a two-lane road, to a four-lane road (two lanes in each direction) with provision of a central median to allow for widening to six lanes in the future.

Transport engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare an Aboriginal cultural heritage assessment report (CHAR) for the proposal. The CHAR has been prepared in accordance with Stage 3 of the Transport *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) and the Heritage NSW (formerly Office of Environment and Heritage (OEH)) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*. The CHAR is supported by an Aboriginal archaeological assessment undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. Aboriginal community consultation has been undertaken in accordance with the PACHCI and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

Aboriginal archaeological assessment undertaken in accordance with the *Code of Practice* and Transport PACHCI identified 11 Aboriginal archaeological sites (comprising 15 AHIMS registrations) that would be at least partially impacted by the proposal, all open context artefact sites (both surface and subsurface). Archaeological significance of the identified Aboriginal sites is defined by the information exhibited by each site. The archaeological sites located within the proposal area are a mix of low and moderate significance sites.

Several portions of the study area are overlapped by existing approvals for major infrastructure projects, including the M12 Motorway (SSI 9364), AWRC (SSI 8609189), The Northern Road upgrade (SSI 7127) and the Western Sydney Airport. These approvals are active/current where they intersect the current study area, and include conditions related to Aboriginal heritage considerations within their boundaries. These areas are therefore excluded from impact assessment for the current project, and Transport must ensure that any works for the current project undertaken within these existing approvals comply with all relevant conditions.

Archaeological impact mitigation (salvage excavation) is recommended where sites of at least moderate significance are to be impacted, as the scientific and archaeological value of the sites is linked to the information the sites contain. Salvage excavation is recommended for the impacted portions of Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), EDU South Creek AFT 1 and EDU Kemps Creek AFT 1. Salvage excavations must be completed prior to any activities which may harm Aboriginal objects at these site locations.

Salvage mitigation for low significance sites EDU Badgerys Creek IF 1, Elizabeth Precinct Artefact Scatter 05 (EP AS 05), PAD 2001-6, Mamre Road Kemps Creek AFT 1, KC/ED2, and CP AS1 / P-CP9 is not warranted as these sites are located in disturbed contents. Archaeological significance of harm to these sites is considered to be low and does not warrant non-practicable avoidance or mitigation. Community collection of surface artefacts is recommended for all sites where these have been recorded and may be undertaken concurrent with the proposed salvage program.

An Aboriginal Heritage Impact Permit (AHIP) issued under Section 90 of the *National Parks and Wildlife Act 1974* is required for the proposal. The AHIP should be sought for the entirety of the lands subject to the proposed works (excluding existing approval areas) and Aboriginal objects associated with the archaeological sites that will be impacted:

| Name | AHIMS | Nature/Extent of Impact | Significance of Impact |
|--|--------------------------------------|-------------------------|------------------------|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Direct / Partial | Moderate |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Direct / Partial | Moderate |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Direct / Total | Low |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Direct / Total | Low |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Direct / Partial | Moderate |
| EDU South Creek AFT 1 | 45-5-5734 | Direct / Total | Moderate |

| Name | AHIMS | Nature/Extent of Impact | Significance of Impact |
|------------------------------|--------------------------|-------------------------|------------------------|
| PAD 2001-6 | 45-5-3999 | Direct / Total | Low |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Direct / Total | Moderate |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Direct / Partial | Low |
| KC/ED2 | 45-5-2310 | Direct / Total | Low |
| CP AS1 / P-CP9 | 45-5-4374 / 45-5-2307 | Direct / Total | Low |

Management measures have been recommended for Aboriginal objects situated within the non-impacted portions of Aboriginal archaeological sites only partially within the impact area/AHIP area. These portions of the sites should be avoided by all proposed construction activities. The non-impacted portions of the sites (outside of the AHIP boundary) should be fenced along the AHIP boundary and marked as environmentally sensitive “no-go zones” on the Construction Environmental Management Plan prior to construction activities to ensure the site areas are avoided and not impacted by the proposed works. Workers should be inducted as to appropriate protection measures for Aboriginal heritage.

This CHAR has been prepared to support the application for an AHIP. It has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the PACHCI. The CHAR builds on the results of previous assessments and consultation regarding the proposal.

Contents

| | |
|--|-----------|
| FIGURES | V |
| TABLES | V |
| PLATES | V |
| 1 INTRODUCTION..... | 1 |
| 1.1 PROPONENT AND CONSULTANTS..... | 1 |
| 1.2 LOCATION AND SCOPE OF ACTIVITY | 1 |
| 1.3 STATUTORY CONTROLS AND DEVELOPMENT CONTEXT..... | 2 |
| 1.4 NATIONAL PARKS AND WILDLIFE ACT 1974 | 2 |
| 1.5 OBJECTIVES OF THE CHAR | 5 |
| 2 ENVIRONMENTAL CONTEXT..... | 6 |
| 2.1 REGIONAL CONTEXT, HYDROLOGY AND LANDFORMS | 6 |
| 2.2 GEOLOGY | 6 |
| 2.3 SOIL LANDSCAPES | 6 |
| 2.4 VEGETATION AND LAND USE..... | 7 |
| 3 ETHNOHISTORIC CONTEXT | 13 |
| 4 ARCHAEOLOGICAL CONTEXT..... | 15 |
| 4.1 STAGE 2 PACHCI ARCHAEOLOGICAL SURVEY REPORT & ADDENDUM (KNC 2018 & 2019)..... | 16 |
| 4.2 STAGE 2 PACHCI ARCHAEOLOGICAL SURVEY REPORTS (AECOM 2022A & 2022B)..... | 17 |
| 4.3 STAGE 3 PACHCI TEST EXCAVATION REPORT (KNC 2023) | 18 |
| 5 ABORIGINAL COMMUNITY CONSULTATION..... | 21 |
| 5.1 STAKEHOLDER IDENTIFICATION AND REGISTRATION OF INTEREST..... | 21 |
| 5.2 PROVISION OF PROPOSED ASSESSMENT METHODOLOGY | 22 |
| 5.3 REVIEW OF DRAFT CHAR..... | 23 |
| 5.4 ABORIGINAL CULTURAL HERITAGE VALUES..... | 23 |
| 6 SUMMARY AND ANALYSIS OF BACKGROUND INFORMATION..... | 24 |
| 6.1 SUMMARY OF IDENTIFIED ABORIGINAL ARCHAEOLOGICAL SITES / PADS WITHIN THE STUDY AREA | 26 |
| 7 CULTURAL HERITAGE VALUES AND STATEMENT OF SIGNIFICANCE | 30 |
| 7.1 SIGNIFICANCE ASSESSMENT CRITERIA | 30 |
| 7.1.1 <i>Cultural / social values</i> | 30 |
| 7.1.2 <i>Historic values</i> | 31 |
| 7.1.3 <i>Scientific / archaeological values</i> | 31 |
| 7.1.4 <i>Aesthetic values</i> | 31 |
| 7.2 STATEMENTS OF SIGNIFICANCE..... | 32 |
| 8 IMPACT ASSESSMENT | 33 |
| 8.1 THE PROPOSED ACTIVITY | 33 |
| 8.2 IMPACT REDUCTION/AVOIDANCE | 33 |
| 8.3 PROPOSED IMPACTS TO ABORIGINAL ARCHAEOLOGICAL SITES | 33 |
| 9 MITIGATING HARM..... | 36 |
| 9.1 ECOLOGICALLY SUSTAINABLE DEVELOPMENT PRINCIPLES..... | 36 |
| 9.1.1 <i>The Precautionary Principle</i> | 36 |
| 9.1.2 <i>The Principle of Inter-Generational Equity</i> | 36 |
| 9.2 MITIGATION MEASURES | 37 |
| 10 SUMMARY AND RECOMMENDATIONS | 39 |
| REFERENCES..... | 42 |

| | | |
|-------------------|---|-----------|
| APPENDIX A | ADVERTISEMENT FOR REGISTRATION OF INTEREST | 44 |
| APPENDIX B | AFG MINUTES | 45 |
| APPENDIX C | ABORIGINAL COMMUNITY CONSULTATION | 47 |
| APPENDIX D | ARCHAEOLOGICAL SALVAGE METHODOLOGY | 61 |

Figures

| | |
|---|----|
| Figure 1. Location of the proposal (overview) | 3 |
| Figure 2. Study area (detail) | 4 |
| Figure 3. Topography of the study area | 8 |
| Figure 4. Geology of the study area | 9 |
| Figure 5. Soil Landscapes of the study area | 10 |
| Figure 6. Identified Aboriginal archaeological sites within the study area | 25 |
| Figure 7. Study area (impact area) and Aboriginal heritage including existing approvals | 35 |
| Figure 8. AHIP application area boundary..... | 41 |

Tables

| | |
|--|----|
| Table 1. Test excavation results summary | 19 |
| Table 2. Registered Aboriginal parties | 21 |
| Table 3. Identified Aboriginal archaeological features within the study area..... | 26 |
| Table 4. Summary of significance of archaeological features located in the study area | 32 |
| Table 5. Impact of proposed activities on Aboriginal archaeological sites within the study area..... | 34 |
| Table 6. Mitigation measures for impacted Aboriginal site | 38 |
| Table 7. Aboriginal archaeological sites and scope of AHIP | 39 |

Plates

| | |
|--|----|
| Plate 1. Parish of Claremont, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140702 | 12 |
| Plate 2. Parish of Bringelly, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140325 | 12 |
| Plate 3. Parish of Melville, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140671 | 12 |
| Plate 4. Parish of Cabramatta, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140704 | 12 |

1 Introduction

1.1 Proponent and consultants

Transport for NSW ('Transport') is planning to upgrade Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW ('the proposal'). Elizabeth Drive is a major east-west corridor between the Liverpool region and surrounding suburbs in western Sydney.

Future projected and planned growth in the region is expected with the development of the Western Sydney International Airport. This will see an expansion of industrial and commercial precincts associated with the development of the Western Sydney Aerotropolis and related planned land releases for residential precincts and employment zones in the area leading to a need for increased capacity on Elizabeth Drive. The proposed works comprise an upgrade from a two-lane road, to a four-lane road (two lanes in each direction) with provision of a central median to allow for widening to six lanes in the future.

Transport is committed to supporting the delivery of the Western Sydney International Airport and the Western Parkland City. The upgrade of Elizabeth Drive will support the projected and planned development in the region. Transport also recognises the need for the provision of pedestrian, cycling and bus stop infrastructure along Elizabeth Drive as there is currently minimal infrastructure for supporting these needs.

Transport engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare an Aboriginal cultural heritage assessment report (CHAR) for the proposal. The CHAR has been prepared in accordance with Stage 3 of the Transport *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (Roads and Maritime Services 2011) and the Heritage NSW (formerly Office of Environment and Heritage (OEH)) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011a).

The CHAR is supported by an Aboriginal archaeological assessment (including test excavation) undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a). Aboriginal community consultation has been undertaken in accordance with the PACHCI and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH 2010b).

1.2 Location and scope of activity

Elizabeth Drive is approximately 14 kilometres in length and is mainly a two-lane undivided road, with no footpaths or median. Elizabeth Drive has a sign posted speed limit of 80 km/h except through the village of Kemps Creek where the speed is signposted at 60km/h. The surrounding land use is rural and rural industrial. Elizabeth Drive services a combination of passenger and heavy vehicle traffic. The section between Mamre Road and the M7 Motorway currently experiences higher traffic volumes due to traffic moving between St Marys and the surrounding suburbs, the Western Sydney Employment Area and the M7 Motorway.

The proposal is split into two sections (east and west) on either side of the planned future M12 connection into the Western Sydney International Airport at Badgerys Creek (Figure 1). The western section comprises about 3.6 kilometres of Elizabeth Drive from The Northern Road at Luddenham to near Badgerys Creek Road at Badgerys Creek, where it would connect with the future M12 Motorway. The eastern section comprises about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway to about 600 metres east of Duff Road at Cecil Hills. Together, these two sections comprise the 'study area' for this assessment (Figure 2). In total, the study area is approximately 12 kilometres in length and is located within the Penrith, Liverpool and Fairfield Local Government Areas (LGAs).

The main components of the proposed Elizabeth Drive Upgrade project include:

- Upgrade of about 11.4 kilometres of Elizabeth Drive from two lanes to four lanes between The Northern Road at Luddenham and about 600 metres east of Duff Road at Cecil Hills, including a central median (which would allow for potential future upgrade to six lanes)
- New bridges over Cosgroves Creek, Badgerys Creek, South Creek and Kemps Creek
- Upgrades to six road intersections on Elizabeth Drive at Luddenham Road; Martin Road; Western Road; Salisbury Avenue; Mamre Road; Range Road; and Duff Road
- Active transport provision along the full corridor with the inclusion of shared paths along both sides of the Elizabeth Drive corridor.

The study area also includes areas identified for use as construction compounds and other ancillary areas required to support construction of the project, including areas required for bridge work, access for construction vehicles and plant, drainage infrastructure, key utilities and services adjustments, temporary stockpiles, temporary property adjustments and temporary ancillary facilities. It is considered that the proposed activities would disturb the ground surface within the entirety of the study area.

It should be noted that the actual construction impact area (and subsequent AHIP application area) as assessed in this CHAR is smaller than the extent of the study area, as several existing approvals for major infrastructure projects overlap the study area extent (see Section 8). Transport should consult with the approval-holders to confirm that works for the proposal may be undertaken under these existing approvals, provided that works are undertaken in accordance with relevant conditions.

1.3 Statutory controls and development context

The proposal is for road infrastructure carried out by Transport, to be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Aboriginal objects would be harmed by the proposal and an application for an Aboriginal Heritage Impact Permit (AHIP) would be made under section 90A of the *National Parks and Wildlife Act 1974*.

This Aboriginal CHAR has been prepared to support the AHIP application. It has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011a). The CHAR complies with the *Transport Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (Roads and Maritime 2011).

1.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) is the primary statutory control dealing with Aboriginal heritage in New South Wales. Items of Aboriginal heritage (Aboriginal objects) or Aboriginal places (declared under section 84) are protected and regulated under the NPW Act.

Under the Act, an “Aboriginal object” is defined as “any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains”. As such, Aboriginal objects are confined to physical evidence and are commonly referred to as Aboriginal sites.

Aboriginal objects are protected under section 86 of the Act. It is an offence to harm or desecrate an Aboriginal object, either knowingly [section 86 (1)] or unknowingly [section 86 (2)].

There are offences and penalties relating to harm to, or desecration of, an Aboriginal object or declared Aboriginal place. Harm includes to destroy, deface, damage or move. Penalties are tiered according to offences, which include:

- a person must not harm or desecrate an Aboriginal object that the person knows is an Aboriginal object
- a person must not harm an Aboriginal object (strict liability offence)
- a person must not harm or desecrate an Aboriginal place (strict liability offence)
- failure to notify Office of Environment and Heritage of the location of an Aboriginal object (existing offence and penalty)
- contravention of any condition of an AHIP.

Under section 87 (1) it is a defence against prosecution if “(a) the harm or desecration concerned was authorised by an Aboriginal heritage impact permit and (b) the conditions to which that Aboriginal heritage impact permit was subject were not contravened”.

Section 87 (2) of the Act provides a defence if “the defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed”.

Section 89A of the Act relates to the notification of sites of Aboriginal objects, under which it is an offence if the location of an Aboriginal object is not notified to the Director-General in the prescribed manner within a reasonable time.

Under section 90 (1) of the Act “the Director-General may issue an Aboriginal heritage impact permit”. The regulation of Aboriginal heritage impact permits is provided in Part 6 Division 2 of the Act, including regulations relating to consultation (section 90N).

An AHIP is required for an activity which will harm an Aboriginal object.

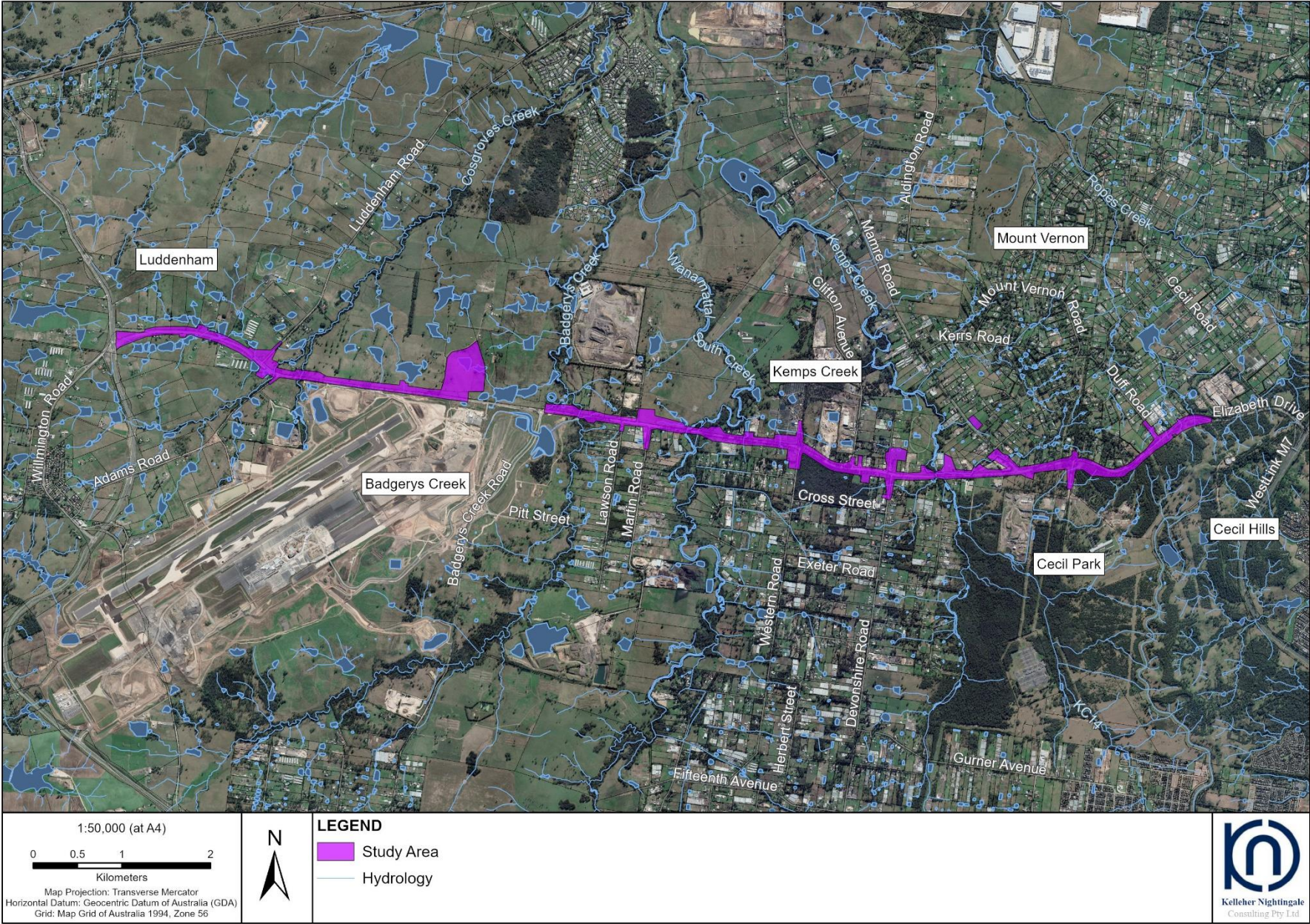


Figure 1. Location of the proposal (overview)



Figure 2. Study area (detail)

1.5 Objectives of the CHAR

The proposed infrastructure works will impact on some Aboriginal objects (sites). Approval obtained under the *National Parks and Wildlife Act 1974* is required for these Aboriginal objects prior to any impact or harm. The proponent would apply for an AHIP under section 90A of the Act.

Clause 61 of the *National Parks and Wildlife Regulation 2019* requires that an application for an AHIP is accompanied by a CHAR. The CHAR is to provide information on:

- the significance of the Aboriginal objects or Aboriginal places that are the subject of the application
- the actual or likely harm to those Aboriginal objects or Aboriginal places from the proposed activity that is the subject of the application
- any practical measures that may be taken to protect and conserve those Aboriginal objects or Aboriginal places
- any practical measures that may be taken to avoid or mitigate any actual or likely harm to those Aboriginal objects or Aboriginal places.

The *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011a) provides further guidance on the preparation of a CHAR. This report has been prepared in accordance with the requirements of the Regulation and the OEH guide.

This CHAR has been prepared to accompany an application for an AHIP made by Transport for NSW for Aboriginal objects within the study area, including those associated with Aboriginal archaeological sites which will be wholly or partially impacted by the proposal.

2 Environmental Context

2.1 Regional context, hydrology and landforms

The study area is located within the south western Cumberland Plain, a low lying and gently undulating sub-region of the Sydney Basin bioregion (NSW National Parks and Wildlife Service (NPWS) 2003). The Sydney Basin is a large geological feature stretching from Batemans Bay in the south to Newcastle in the north and Lithgow in the west. The formation of the basin began between 250 to 300 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow (Clark and Jones 1991). The Cumberland Plain extends from 10 kilometres north of Windsor in the north to Picton in the south. The western boundary of the plain is along the Nepean/Hawkesbury River, while the eastern boundary occurs at the shale/sandstone interface near the inner west suburbs of Sydney. The region is characterised by low rolling hills and wide valleys on Triassic shales and sandstones in a rain-shadow area near the Blue Mountains. There are volcanic rocks from low hills in the shale landscapes and swamps and lagoons occur along the Nepean Hawkesbury floodplain. At the time of European settlement, the Cumberland Plain contained 1070 kilometres² of woodlands and forests. Today, only 13% of these woodlands and forests remain uncleared.

Elizabeth Drive crosses the mid to upper catchment areas of several major creeks which drain in a northerly direction through the Cumberland Plain, and are all part of the South Creek catchment (Figure 3). Many of the smaller watercourses in proximity to the road are minor tributaries (1st and 2nd order streams) of the various major streams which include (from west to east): Cosgroves Creek, Oaky Creek, Badgerys Creek, South Creek and Kemps Creek. These all converge into South Creek between 2.5 – 5 kilometres north of the study area. The elevated hills and ridges around Wallgrove Road immediately east of the study area form the watershed between the South Creek catchment and Hinchinbrook/Cabramatta Creeks further to the east which drain to the Georges River. The ridge landform occupied by The Northern Road in the west fulfills the same function, dividing the South Creek catchment from Mulgoa Creek which flows directly to the Nepean River at Regentville.

South Creek is the major creek line in the study area, with a catchment area of 56 square kilometres and extending for approximately 70 kilometres from near Oran Park in the south to its confluence with the Hawkesbury River at Windsor. Numerous minor order tributaries cross the study area. Dam construction and drainage works have altered the natural hydrological flow of the landscape and major flooding events would also have substantially affected the archaeological integrity of the lands bordering the main waterways. The terrain between watercourses consists of gently undulating spurs, slopes, creekflats and backplains on the creek valley floors. Slope gradients are gentle to moderate with broad crests. The eastern part of the study area is underlain by rolling hills with steeper slopes and narrower crests east of Mamre Road.

2.2 Geology

Underlying geology of the study area is predominantly Bringelly Shale (Figure 4), a complex formation of different lithologies forming the upper unit of the Wianamatta group of Triassic Period sedimentary shales (Clark & Jones 1991). The Wianamatta group was deposited during the subsidence of an alluvial plain and represents the continuous supply of sediment filling the Sydney Basin and pushing the original shoreline out. The group grades upwards from shallow marine deposits through a shoreline sand, with the uppermost unit representing the increasingly terrestrial alluvial deposits. This uppermost unit is the Bringelly Shale, consisting of claystone/siltstone, shale, carbonaceous claystone, laminate, fine to medium-grained lithic sandstone, rare coal and occasional tuff. Deposits of more recent Quaternary alluvium are present across the length of the study area, deposited in association with flooding activity and channel development along Cosgroves, Oaky, Badgerys, South and Kemps Creeks (Figure 6). The sediments consist of fine grained sand, reddish brown silt and clay, derived from the Wianamatta Group shales and Hawkesbury sandstone. Raw materials suitable for artefact manufacture occur widely across the Cumberland Plain, in the form of rock outcrops, large cobbles and various river gravels, with cobbles and clasts deposited across the landscape by the complex network of stream channels.

2.3 Soil landscapes

Soils within the study area are influenced by the underlying geology and topography. Soils from four soil landscapes are present along Elizabeth Drive within the study area as characterised by Bannerman and Hazelton (1990) (Figure 5).

The residual *Blacktown Soil Landscape* is present on the broad rounded crests and ridges and gently inclined slopes of the study area between drainage lines. These soils are primarily derived *in situ* from underlying lithologies and are common on low gradient lower slopes and flats (Figure 5). The Blacktown soil landscape consists of shallow to moderately deep hard-setting mottled texture contrast soils, primarily Red, Brown and Yellow Podzolic soils. Soil fertility and soil drainage are low. Sheet and gully erosional susceptibility of this soil landscape is relatively low but is increased where surface vegetation is not maintained. Blacktown soils are conducive to artefact survivability; however, their acid chemistry quickly removes organics and their deflationary tendency often results in a temporal collapse where archaeological objects from multiple time periods accumulate within a single cultural soil layer (e.g. A1-A2 horizon).

Archaeologically, these soils may retain intact archaeological deposit where disturbance levels are low, but are likely to retain only horizontal integrity. Slope gradient and revegetation contributes to rates of sediment erosion and deflation and disturbance of soils is common on steeper slopes and areas of ground disturbance.

The fluvial *South Creek Soil Landscape* is present across the landforms adjacent to and associated with Cosgroves, Oaky, Badgerys, South and Kemps Creek within the study area alignment (Figure 5). These alluvial soils are characterised by flat landforms with incised channels that are subject to frequent episodes of inundation, erosion and aggradation. Soils are often very deep layered sediments (sands, silts and clays) overlying bedrock or relict soils. Being on active floodplains, this soil landscape is dynamic with multiple and frequent episodes of both erosion and deposition. Aboriginal objects may be present in this soil landscape but their context and stratigraphic integrity will be variably affected by disturbance from flood episodes. Terraces and higher areas of ground near watercourses are more likely to retain objects *in situ*, while those present on the floodplain itself may have originated elsewhere and been deposited during flood events. Context and stratigraphic integrity of archaeological deposits is variably affected by disturbance from these flood episodes and by micro-topographical features. Terraces and higher areas of ground near watercourses are more likely to retain objects *in situ*, while those present on the floodplain itself may have originated elsewhere and been deposited during flood events.

The study area also contains two smaller occurrences of the alluvial *Berkshire Park Soil Landscape*, generally associated with the dissected and gently undulating rises of Tertiary terraces of the Hawkesbury/Nepean system. Isolated occurrences of this soil landscape represent small remnant surfaces of this terrace system between Badgerys, South and Kemps Creeks. Typical landforms comprise flat terraces dissected by small drainage channels and narrow drainage lines with exposed areas of underlying geology due to erosion. These soils derive from the underlying Tertiary geology and consist of sandy loam to sandy clay loam with inclusions of silcrete boulders of up to 20 centimetres in size overlying sandy clay and clay. The soils have a high level of wind erosion where cleared and have gully, sheet and rill erosion within dissected areas.

The higher elevations at the eastern and western extremes of the study area are characterised by the erosional *Luddenham Soil Landscape*. Luddenham soils are generally located on low rolling to steep hills with local relief of 50-120 metres and steeper slope gradients of 5-20%. The Luddenham Soil Landscape is characterised by an A1 horizon of friable dark brown loam to silty clay, an A2 horizon of clay loam to fine sandy clay loam and a B horizon of reddish brown to bright yellowish brown silty clay to heavy clay with shale rock fragments common throughout. Aboriginal sites within the Luddenham soil landscape are likely to be disturbed low-density scatters exposed by the eroding landscape.

2.4 Vegetation and land use

Vegetation within the study area has been extensively modified by European land use practices. Prior to 1788, a mixture of native vegetation communities would have extended across the entirety of the Cumberland Plain with distribution determined by a combination of factors including soil, terrain and climate. The NSW National Parks and Wildlife Service (NPWS) in collaboration with other agencies and government bodies have produced bioregional assessment studies for specific areas in order to identify, describe and map vegetation communities and fauna habitats. These assessments were undertaken in order to provide an identification of conservation values. The study area is located within the Cumberland Plain Western Sydney assessment area (NPWS 2002). Several remnant original vegetation communities (albeit somewhat degraded) have been identified both within and in the immediate vicinity of the study area alignment. These give an indication of the natural resources that would have been available to past Aboriginal people in the area.

Shale Gravel Transition Forest (NPWS 2002: 29-31) was identified in the areas between Badgerys and South Creek as well as west of South Creek but away from flood affected, waterlogged areas. This vegetation community occurs primarily in areas where shallow deposits of Tertiary alluvium overlie shale soils, but also in association with localised concentrations of iron-indurated gravel. Shale Gravel Transition Forest grades into Shale Plains Woodland as alluvial and ironstone influences decline. Dominant tree species include Red Ironbark (*Eucalyptus fibrosa*) with Grey Box (*Eucalyptus moluccana*) and Forest Red Gum (*Eucalyptus tereticornis*) less frequently, but sometimes dominating in the absence of Red Ironbark. White Feather Honey-Myrtle (*Melaleuca decora*) is frequently present in a small tree stratum. Sparse shrubs included species such as Sweet Bursaria (*Bursaria spinosa*), Gorse Bitter-pea (*Daviesia ulicifolia*) and Peach Heath (*Lissanthe strigosa*). A variety of forb species were recorded in high frequencies, including Weeping Grass (*Microlaena stipoides*), Mulga Fern (*Cheilanthes sieberi*), Kangaroo Grass (*Themeda australis*), Twin Leaf Stinkweed (*Opercularia diphylla*), Many Flowered Mat Rush (*Lomandra multiflora*) and Threeawn Speargrass (*Aristida vagans*).

Alluvial Woodland (NPWS 2002: 41-43) was the most extensive vegetation class identified within the study area and its immediate surroundings, located in areas adjacent to Cosgroves, Oaky, Badgerys, South and Kemps Creeks both north and south of Elizabeth Drive. It is the most common community found on soils of recent alluvial deposition. The most common species recorded include Cabbage Gum (*Eucalyptus amplifolia*) and Forest Red Gum, with Rough-barked Apple (*Angophora floribunda*) occurring slightly less frequently. Small trees include Parramatta Wattle (*Acacia parramattensis*), and less frequently Swamp She-oak (*Casuarina glauca*) and sometimes Flax Leaf Paperbark.

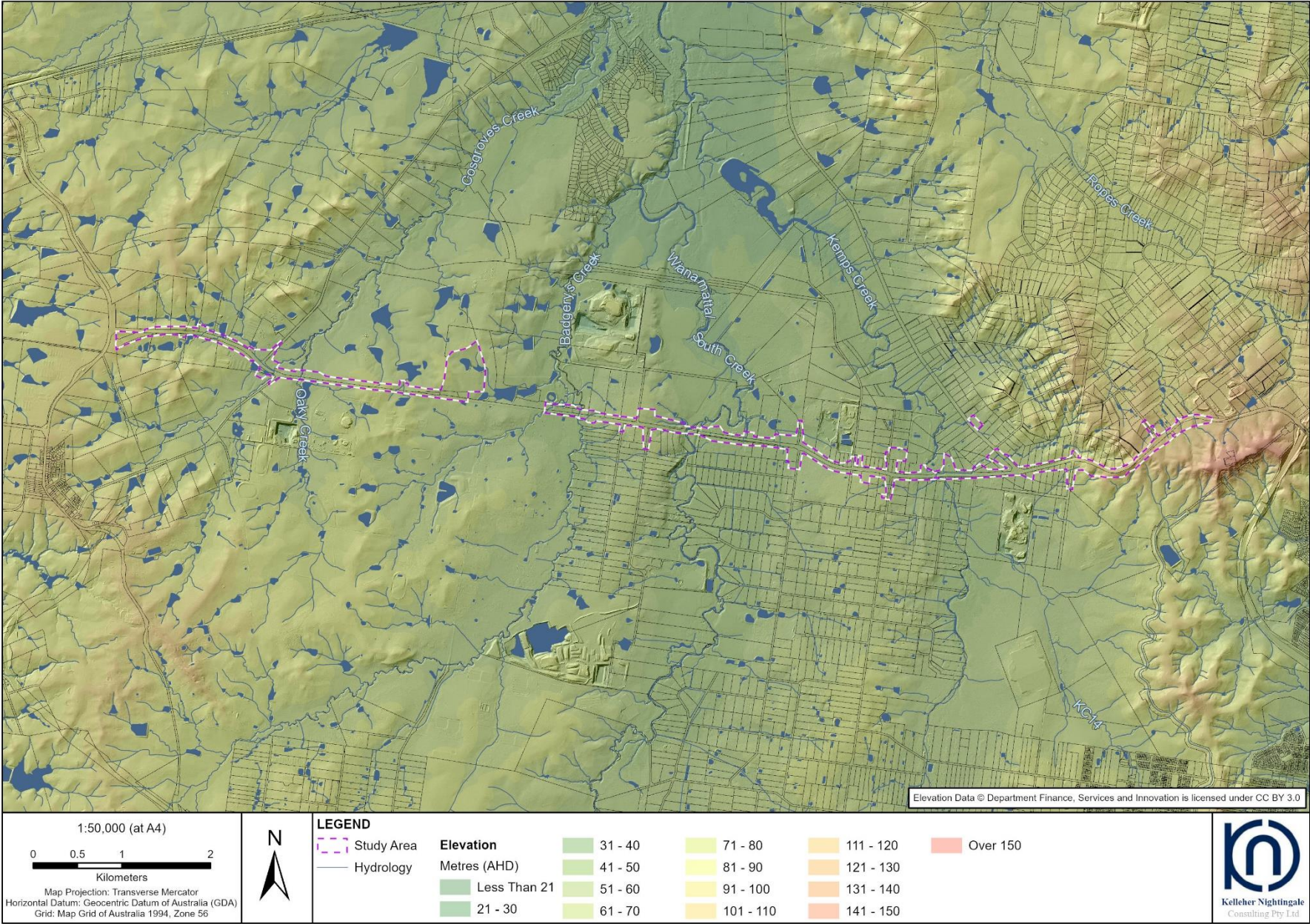


Figure 3. Topography of the study area

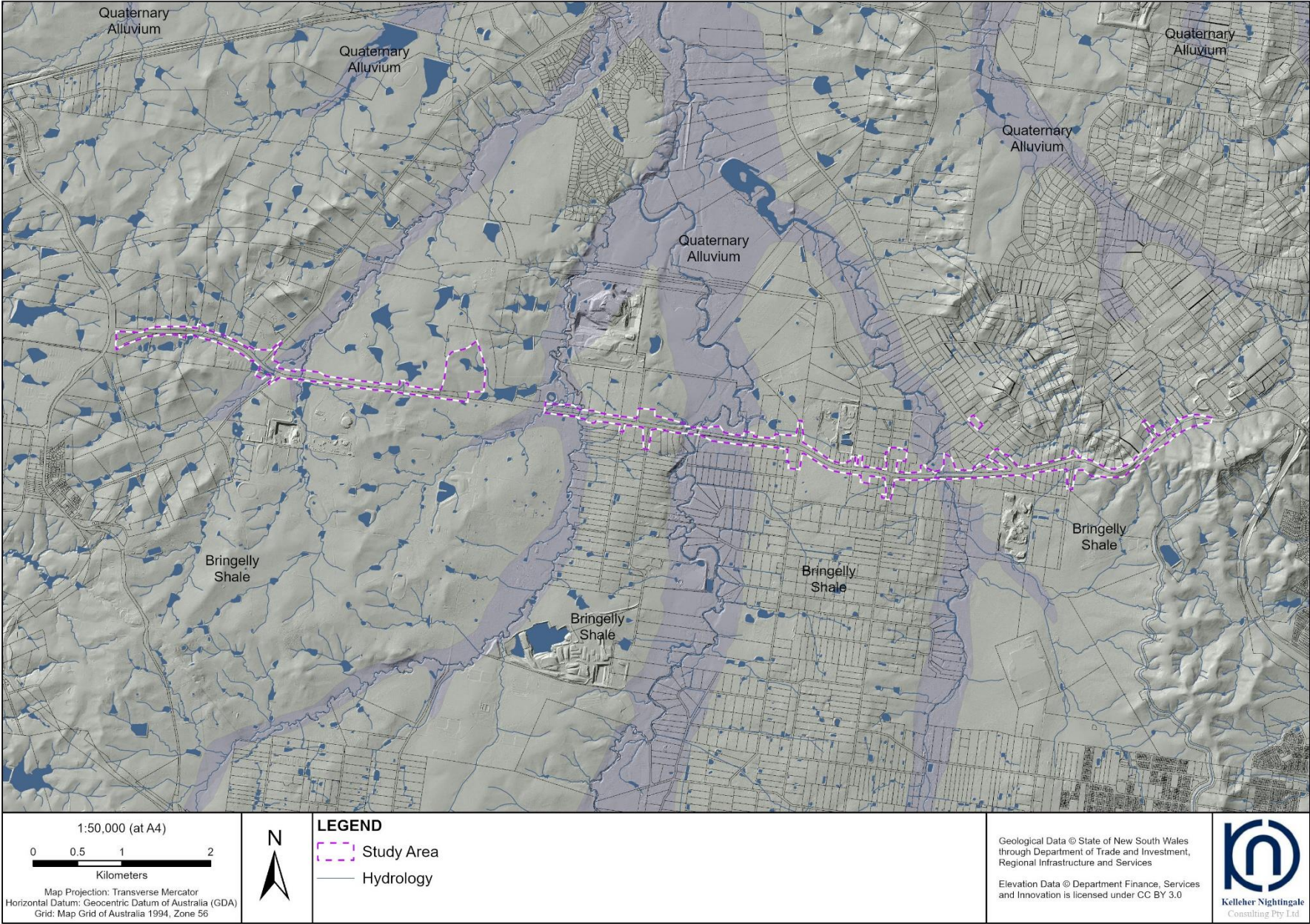


Figure 4. Geology of the study area

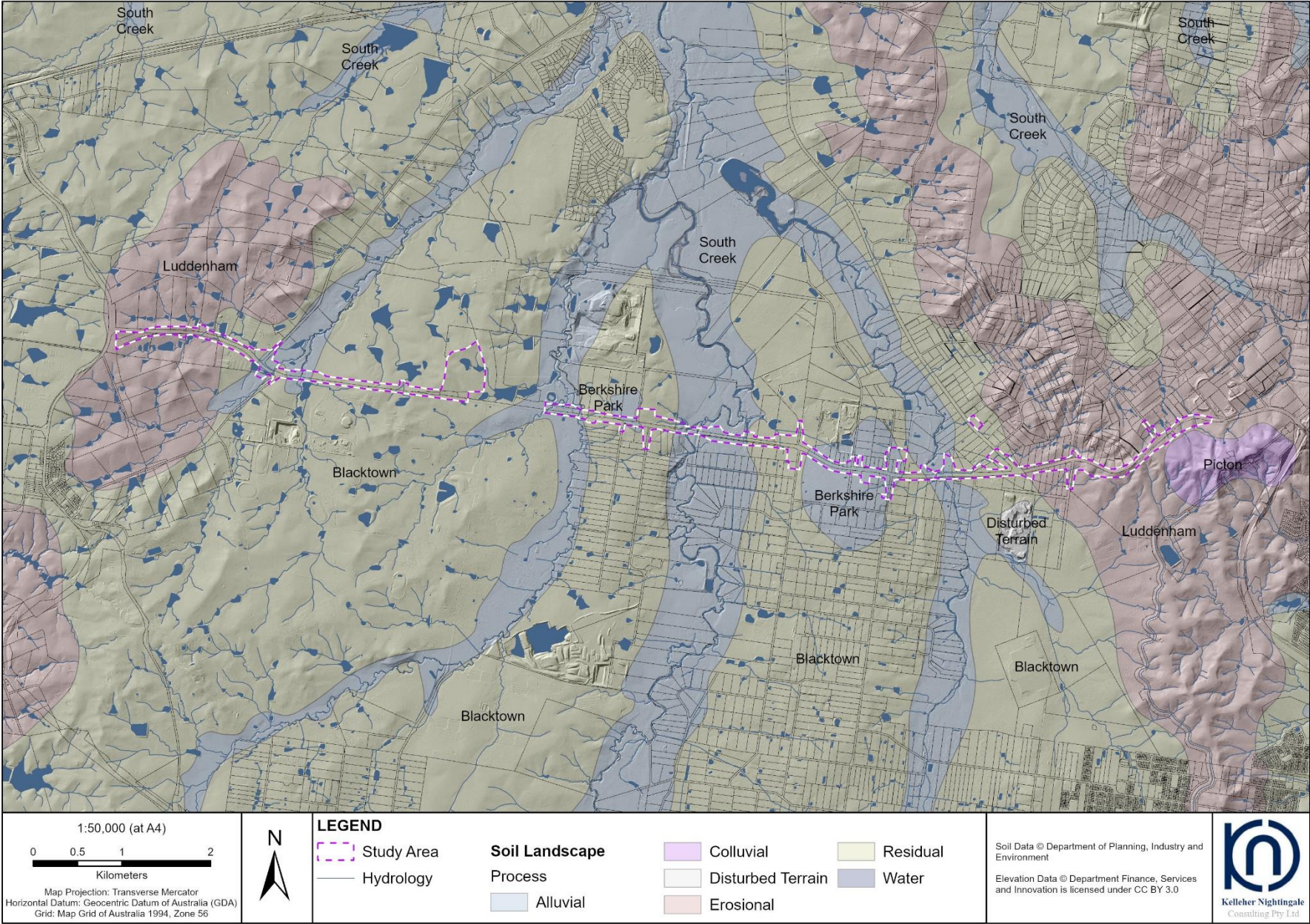


Figure 5. Soil Landscapes of the study area

Shrub is sparse, but if present dominated by Sweet Bursaria. Dense ground cover is dominated by Creeping Beard Grass (*Oplismenus aemulus*), Weeping Grass (*Microlaena stipoides*) and Bordered Panic (*Entolasia marginata*), while herbs species include Forest Nightshade (*Solanum prinophyllum*), Whiteroot Pratia (*Pratia purpurascens*) and Scurvy Weed (*Commelina cyanea*).

Shale Plains Woodland (NPWS 2002: 52-54) was identified across the flats and gentle slopes between Oakly and Badgerys Creeks within the study area. This vegetation community also tends to occur in less drained areas that are infrequently inundated. Dominant tree species include Grey Box (*Eucalyptus moluccana*) and Forest Red Gum (*Eucalyptus tereticornis*), with Narrow-leaved Ironbark (*E. crebra*), Thin-leaved Stringybark (*E. eugeniodes*), and Spotted Gum (*Corymbia maculata*) occurring less frequently. Other species can also occur, such as Native Cherry (*Exocarpus cupressiformis*) and Black Wattle (*Acacia decurrens*). Shrub stratum is dominated by Sweet Bursaria, while the ground species include Kidney Weed (*Dichondra repens*), Threeawn Speargrass (*Aristida vagans*), Blue Yam (*Brunoniella australis*) and Slender Tick-trefoil (*Desmodium varians*).

Cooks River/Castlereagh Ironbark Forest (NPWS 2002: 26-28) was identified primarily between South Creek and Kemps Creek, with a smaller area between Badgerys Creek and South Creek. This vegetation community occurs on clay soils derived from Tertiary Alluvium, or on shale soils adjacent to the boundary with Tertiary Alluvium. It is dominated by Red Ironbark and White Feather Honey-Myrtle, with Woollybutt (*E. longifolia*) occurring at lower frequency. A relatively dense shrub stratum is dominated by Prickly-leaved Paperbark (*M. nodosa*) and Peach Heath. A variety of shrub species occur at relatively low frequencies, including Downy Wattle (*Acacia pubescens*), Pea-flower Shrub (*Dillwynia tenuifolia*), Gorse Bitter-pea, Hairy Bush-pea (*Pultenea villosa*) and Juniper-leaf Grevillea (*Grevillea juniperina*), while the ground stratum is sparse compared to adjoining communities on tertiary alluvium, and include Wiry Panic (*Entolasia stricta*), variable Swordsedge (*Lepidosperma laterale*), Twin Leaf Stinkweed, Kangaroo Grass (*Themeda australis*) and Spreading Flex-lily (*Dianella revoluta* subs. *revoluta*).

Shale Hills Woodland (NPWS 2002: 49-51) dominates the more elevated parts of the study area east of Mamre Road. This vegetation community occurs almost exclusively on shale-based soils with little to no alluvial influence and derived from Wianamatta Shale. It is dominated by Grey Box and Forest Red Gum with Narrow-leaved Ironbark occurring less frequently. A small tree stratum is often present and most frequently includes Hickory Wattle (*Acacia implexa*) together with a variety of the commonly occurring Eucalyptus species. The shrub stratum is typically dominated by *Bursaria spinosa*, and more rarely includes other species such as Sickie Wattle (*A. falcata*) Coffee Bush (*Breynia oblongifolia*), Australian Indigo (*Indigophera australis*) and Hop Bush (*Dodonea viscosa* subsp. *cuneate*). The ground stratum is variable in cover. Often there is a good cover of grass and herb species, but this becomes quite sparse under a dense shrub stratum. Species include Kidney Weed (*Dichondra repens*), Blue Trumpet (*Brunoniella australis*) and Purple Wiregrass (*Aristida ramosa*), and fern species such as *Cheilanthes sieberi* spp. *sieberi*.

European settlement of the area began in the early 19th century with several land grants in the region. The alluvial flats and woodlands that occupied the rolling country of the Sydney hinterlands were quickly recognised as an essential agricultural and pastoral resource for the new colony. By the 1820s and 1830s most of the hinterland had been alienated through a patchwork of land grants. Large estates quickly developed through buying and selling, some controlled by absentee landlords, and others by families who established residential farms. The land grants were primarily utilised for agricultural or pastoral land use and widespread native vegetation clearance was conducted in order to prepare the land. The alignment of Elizabeth Drive also served as the division point between different parishes in the past, nowadays reflected in divisions between LGAs. The study area corridor runs through four parishes, including: Parish of Claremont, north of Elizabeth Drive, from The Northern Road to South Creek (Plate 1); Parish of Bringelly, south of Elizabeth Drive, from The Northern Road to South Creek (Plate 2); Parish of Melville, north of Elizabeth Drive, from South Creek to the eastern end of the study area (Plate 3); and Parish of Cabramatta, south of Elizabeth Drive, from South Creek to the eastern end of the study area (Plate 4). Elizabeth Drive itself dates from the early 1800s and was originally constructed as a 'corduroy' road, using round logs as a base. It was established to provide access to the areas' land grants and was originally known as the Orphan School Road as it extended west from the Orphan School in what is now Bonnyrigg, to Mulgoa. Its name was later changed to Mulgoa Road, in reference to its western extent, but subsequently changed again in 1952 to honour the visit of Queen Elizabeth II.

Land use in the study area has predominantly been rural/semi-rural and includes market gardens, small farm allotments and rural residential. Expected disturbances from these land uses include those from clearing, tillage of soils, cultivation, grazing and sheet erosion. Other key uses include road and power infrastructure, residential and industrial development including quarrying. Large infrastructure developments including the WSA and M12 Motorway are also currently under construction. A large part of the study area along the existing road corridor is highly disturbed by existing road construction, which has included cut and fill earthworks, drainage works and culverts, landscaping and installation of services. Below ground utilities have also been constructed within the study area and where trenching has taken place this has modified the landscape and is likely to have disturbed subsurface deposits. The more severe ground disturbances within roads, tracks, buildings, infrastructure and dam construction have modified the land and limited archaeological potential/sensitivity within these areas. Natural disturbance factors include erosion and soil movement, particularly in higher gradient areas where clearance of original vegetation accelerates erosion, gully and stream bank erosion (incision) along the waterways, and the effects of flooding and alluvial processes along the creeks.

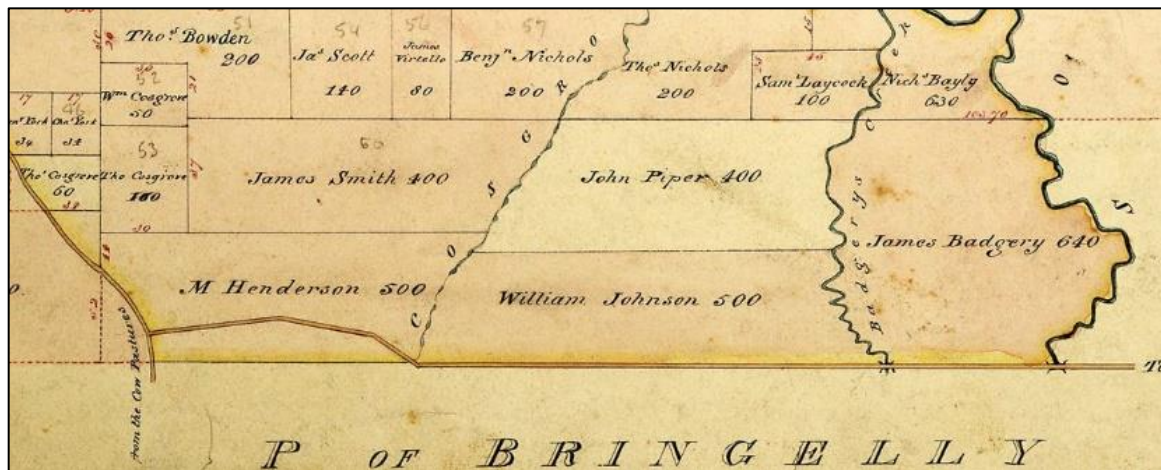


Plate 1. Parish of Claremont, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140702

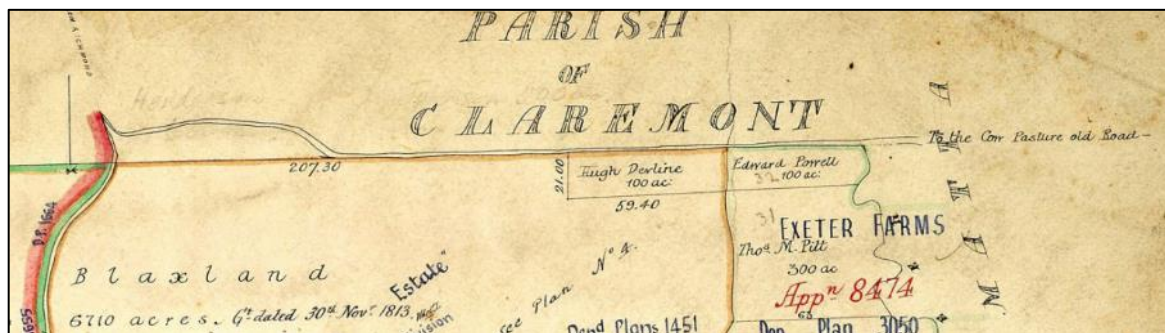


Plate 2. Parish of Bringelly, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140325

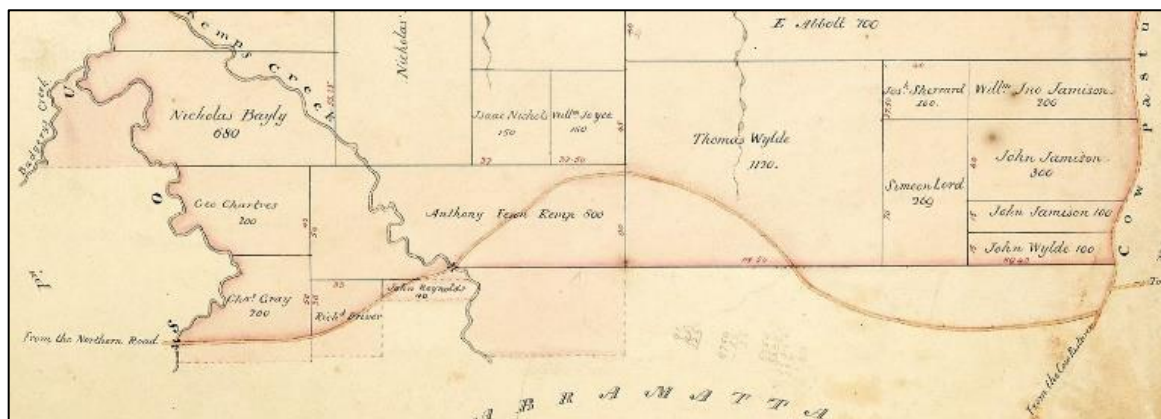


Plate 3. Parish of Melville, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140671

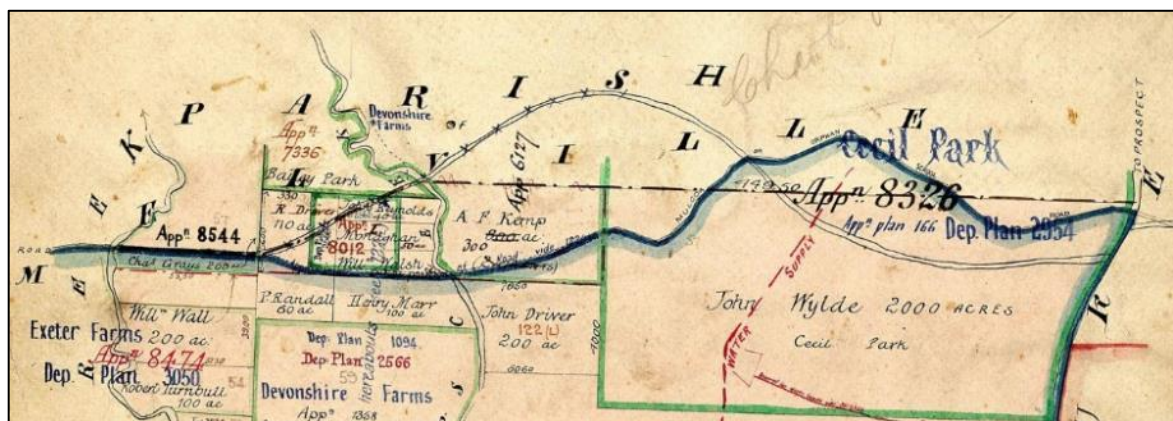


Plate 4. Parish of Cabramatta, County of Cumberland (no date), from NSW LPI Parish Maps collection: 140704

3 Ethnohistoric Context

Aboriginal people living throughout Australia at the time of European invasion belonged to a multitude of groups that spoke approximately 250 distinct languages and several hundred dialects. Historical descriptions of the social organisation, culture and practices of Aboriginal people living in the Sydney region at the time of European invasion is fragmentary due to the generalised nature of early European accounts which provide vague and at times contradictory information. It should also be noted that the early British accounts are observations of Aboriginal people living in the Sydney region during the late 18th and 19th centuries and should not be used to infer the cultural practices of Aboriginal people living in the preceding millennia which are highly unlikely to have been static.

The project area lies within a landscape which was important to, and intensively used by, past Aboriginal peoples (Attenbrow 2002). The diversity of the groups living in the Sydney region was apparent to the British from their earliest interactions despite having arrived with an almost total ignorance of the land and its people. The arrival of European settlers began a cataclysmic series of events which radically changed the lifestyle of Aboriginal people on the Cumberland Plain. Contact with Europeans introduced diseases, such as smallpox, that drastically altered the size and structure of the Aboriginal population, whilst the expansion of settlements and establishment of farmland subsumed the traditional areas used to meet subsistence needs (Attenbrow 2002). After their arrival in Sydney Cove in 1788, the British set about exploring the surrounding area. In the first three years of settlement many areas of the region were explored including Broken Bay, Botany Bay, Rose Hill (Parramatta), Prospect Hill and overland to the Nepean, Hawkesbury and Georges Rivers. During these explorations some of the British Officers, including Governor Phillip and Captain Watkin Tench, made a number of written observations regarding the local Aboriginal people that they met and travelled with (Attenbrow 2002:13).

Early historical observations described the Cumberland Plain as a mosaic of Aboriginal groups associated with particular areas of land. These groups were described as 'tribes' in many historical observations, when in fact they were more likely small territorial clans or local clans consisting of extended family groups, forming larger land-using bands linked through marriage and communal participation in subsistence gathering activities (Attenbrow 2002:22, Brook and Kohen 1991:2). The British noted a difference between the dialect of the Aboriginal people along the coast compared with those further inland on the Cumberland Plain. Captain Tench observed when two Aboriginal men from the coast conversed with an Aboriginal man further inland "they conversed on a par and understood each other perfectly, yet they spoke different dialects of the same language; many of the most common and necessary words used in life bearing no similitude, and others being slightly different" (Tench 1793:122). None of the British observations from the late 18th and early 19th Century refer to any name for the different dialects or wider language groups that they noted (Attenbrow 2002:33). It was only in the late 19th Century that the name Darug (also referred to as Daruk, Dharuk, Dharook, and Dharug) was used to refer to the language of the traditional inhabitants of the Cumberland Plain (Attenbrow 2002:33). In the early 20th Century, anthropologist/linguist R H Matthews noted that "the Dharuk speaking people adjoined the Thurrawal on the north, extending along the coast to the Hawkesbury River, and inland to what are now Windsor, Penrith, Campbelltown, and intervening towns" (Matthews 1901:155 [in Attenbrow 2002: 32]).

As well as differences in the dialect spoken between the coastal inhabitants and those further inland, the British also observed differences in subsistence activities. Brook and Kohen (1991:3) noted that "the Dharug people were apparently divided into two distinct sub-tribes: those along the coast, who lived on fish; those inland, who were frequently referred to as the 'woods tribes'". David Collins, deputy judge advocate and lieutenant-governor of the colony, noted that the Aboriginal people living inland, who he referred to as the 'woods tribes', and the Aboriginal people living along the coast had different dialects, songs, dances, subsistence and some implements (Collins 1798: 557-589). Collins noted that the inland groups had spears inlaid with stones instead of oyster shell and used a type of mesh unlike the nets of the people living along the coast (Collins 1798: 589). Tench recorded differences in the food eaten and methods used to acquire these resources between the inhabitants of the coast and those to the west of Rose Hill (Parramatta). On one occasion Tench observed a method of climbing trees for animals that involved cutting notches in the trunk and using these as toe-holds to climb the tree (Tench 1793:82).

Kohen (1986:77) explains that the Aboriginal people who lived between Parramatta and the Blue Mountains were not as dependant on fish and shellfish as groups closer to the coast, but relied on small animals and plant foods in addition to seasonally available freshwater mullet and eels. Tench (1793:230) observed that 'they depend but little on fish, as the river yields only millets and that their principal support is derived from small animals which they kill and some roots (a species of wild yam chiefly) which they dig out of the earth'. These wild yams were found in considerable quantities along the banks of the Nepean and Hawkesbury Rivers. Berries, Banksia flowers and wild honey were also recorded as foods of the local inhabitants (Collins 1798). A particularly important plant food was the Burrawong (*Macrozamia communis*), which provided a nutritious nut that was pounded and soaked in running water to leach out toxins before the flour-like extract was made into small cakes and baked over a fire (Kohen 1993:8). Small animals provided the protein component of the Aboriginal diet on the Cumberland Plain, with hunting comprising a major economic role of the men. Along the river, traps and snares were set for bandicoots and wallabies, while decoys for snaring birds were also a commonly employed technique, 'these are formed of underwood and reeds, long and narrow, shaped like a mound raised over a grave, with a small aperture at one end for the admission of the prey' (Tench 1793). Possums and gliders

were particularly common in the open woodland across the Cumberland Plain and probably formed the main sources of animal food. These were hunted in a number of ways, including smoking out the animal by lighting a fire in the base of a hollow tree, burning large tracts of land and gathering the stranded animals, as well as cutting toe-holds in trees mentioned above (Kohen 1993:10; Tench 1793:82).

Not only were food resources plentiful throughout the area, so too were stone sources. In the context of the Sydney Basin, the Cumberland Plain was a region where stone materials were abundant. Today, surviving artefacts generally occur as open camp sites, surface scatters or isolated finds. Most are made of silcrete, a stone which occurs in association with the St Mary's Geological Formation. Silcrete is a brittle and resistant material consisting of detrital quartz grains embedded in a replaced clay matrix. When fractured, it breaks through the quartz grains, making it ideal to produce stone tools with durable sharp edges. Sources of silcrete occur across the Cumberland Plain, often as outcrops on ridgelines. Other stone materials available across the region were indurated mudstone/silicified tuff (IMT), chert, petrified wood, quartz, basalt, hornfels and quartzite, primarily sourced from creek or river gravels. Sandstone formations located along the Parramatta and Georges Rivers were also known to contain quartz and chert sources, as were the Hornsby and Woronora Plateaus. However, the ubiquitous occurrence of silcrete artefacts at open sites indicates it was the most accessible stone material available to Aboriginal people in the region.

Flaked stone was used for many different purposes. It was essential to produce hunting gear, shields, weapons, utensils and for day to day activities, such as animal butchery, hide working, plant food preparation and craft work. The size and shape of individual flaked stone artefacts generally prescribed their particular use. At one end of the spectrum were the larger implements which were indispensable for heavy duty chopping and scraping. At the other end were smaller implements which were crucial to precision carving, piercing and incision. Certain flaked stone was also reserved for special ceremonial practices, such as scarification. As mentioned above, the Cumberland Plain was a region where stone materials were easy to come by. In most cases, an implement was selected, for immediate use, from a mass of freshly knapped stone on the basis that it possessed a suitably sharp edge and fitted the hand well. This approach to tool production was well adapted to a highly mobile hunter-gatherer lifestyle. Importantly, people were not wasteful of stone resources. Some of the larger flaked stone implements were recycled, possibly years, or even generations, after they were discarded. For example, cores were reused as choppers, axes recycled as anvils and smaller implements were made from the fragments of larger ones. However, the secondary modification (retouch) of the working edge of an implement was undertaken infrequently and it is assumed that many unmodified flaked stone implements (i.e. flakes and flake fragments) were discarded after use with little or no detectable damage to their edges.

Non-lithic material culture was also abundant however such items rarely survive in the archaeological record. Bark and fibre containers were used for gathering food including fruits, berries, tubers and vegetables and for collecting and transporting water. Bark was also used for shields and canoes. Kangaroo and possum skins were treated and sewn into cloaks and personal accessories and adornments, important items which offered an opportunity for artistic expression laden with social meaning and were practical for warmth and protection from the elements. Woven and thatched baskets were used as carry bags and for food preparation. Hafted hatchets/axes were used to chop wood, remove bark from trees and carve toeholds in tree trunks for climbing. Woven nets and traps were used for catching birds and small game, and as fish and eel traps along watercourses and in swampy areas. The use of bark for shelters was also observed. These were described as consisting "of pieces of bark laid together in the form of an oven, open at one end, and very low, though long enough for a man to lie at full length in ... they depend less on them for shelter, than on the caverns with which the rocks abound" (Tench 1793:80). Collins observed that the huts were 'often large enough to hold six to eight people' (Collins 1798:555). These shelters were often grouped together. Given the absence of suitable sandstone outcropping on the Cumberland Plain it is likely that bark shelters such as these were used by Aboriginal people as they moved around the landscape.

The study area is not mentioned directly in any historical accounts of interactions between Aboriginal people and European settlers but it forms part of a landscape where such interactions were commonplace, especially as the British presence became entrenched. During the first half of the 19th century, the Aboriginal people of the south western Cumberland Plain lived in a range of circumstances that were increasingly entangled with the British economically while also remaining socially separate. The settlements and land grants restricted access to areas that were traditionally used by Aboriginal people and drove the groups who had traditionally lived in these areas to move away or to seek employment as labourers or stockmen in settlements and on the large land grants in the region. James Hassall wrote that Aboriginal people were occasionally employed by his father to burn off dead timber Denbigh (Hassall 1902: 3). Aboriginal man Budbury lived on the Macarthurs property at Camden where he worked as a labourer until at least 1859 (Liston 1988: 59). James Backhouse, who visited Samuel Marsden's Mamre property in 1835, noted that several Aboriginal families from South Creek "assist in the agricultural activities of the settlers" (Backhouse 1843: 304).

Aboriginal culture and cultural heritage are dynamic and continues to evolve in contemporary times. The region remains important to Aboriginal people, who have maintained their traditional ties to the area. Aboriginal culture endures to this day across the Cumberland Plain and has influenced many aspects of Australian culture including in the names of animals, localities, creeks and rivers (Walsh 1993). Members of the contemporary Aboriginal community continue to experience connection with the area through cultural and family associations.

4 Archaeological Context

The current scientific understanding of the human occupation of the Australian continent is that Aboriginal people have lived in Australia for at least the last 40,000-60,000 years. Archaeological evidence shows that the Sydney Region has been occupied since at least 18,000 years ago (Attenbrow 2010: 3). Aboriginal archaeological sites with deposits that have returned earlier dates have been reported; however, these dates are problematic due to the limitations of the technology and evidence being used (Attenbrow 2010: 3-4).

Archaeological investigation is reliant on the artefacts or physical evidence of human activities which have survived anywhere from centuries to thousands of years. The oldest of these artefacts are likely to represent a small fraction of the objects that were used by Aboriginal people with even the most robust organic materials unlikely to survive in contexts older than 6,500 years (Attenbrow 2010: 3). The most numerous surviving artefacts in the Sydney Region were made from stone and were discarded in either open landscape settings or within closed landscape settings, primarily rock shelters. The accumulation of stone artefacts in both settings may have occurred over a large time span and have been subject to a range of geomorphic processes and human activities; however, due to the nature of closed context sites, the artefacts deposited within these sites may retain some level of chronological association within stratigraphically distinct units while open context sites are generally palimpsests in which chronological association between stone artefacts and any datable features present are often difficult to determine (see Attenbrow 2010; White 2017).

British accounts from the late eighteenth and nineteenth centuries portrayed the lifestyle and culture of Aboriginal people as static and unchanging; however, information from archaeological investigations demonstrate that this is incorrect. Instead, archaeological investigations have shown that significant changes have occurred within the types of artefacts used, artefact raw materials and the spatial distribution and density of Aboriginal archaeological sites while Aboriginal people adapted to an ever-changing landscape and environment.

Archaeological excavations at Aboriginal archaeological sites with stratified deposits during the twentieth century, such as Emu Cave near Lapstone Creek, demonstrated that the types and abundance of artefacts and raw materials changed over the last 10,000 years (Attenbrow 2012: 102-103). Around 10,000 years ago, the artefact assemblage from Aboriginal archaeological sites in the region was characterised by a preference for relatively large artefacts made from indurated mudstone/tuff (IMT) using free hand percussion. Formal tools were predominantly retouched flakes while flaked pebble tools have also found at some sites dating to this phase.

Approximately 5,000 years ago, there was a general decline in IMT artefacts, an increase in smaller artefacts made from locally available materials, higher artefact density and the introduction of backed artefacts and edge ground artefacts. Small, flaked stone artefacts with steep retouch known as backed artefacts were extensively made across the region between 3,500 and 1,500 years ago (Robertson, Attenbrow, and Hiscock 2009: 296). Residue and use-wear analysis of backed artefacts indicate that they were used for cutting, incising, and scraping of animal and plant materials (Robertson, Attenbrow, and Hiscock 2009: 298).

Edge ground hatchets, which are frequently referred to by the British during the late eighteenth and early nineteenth centuries, occur in the archaeological record of south eastern Australia from around 4,000 years ago while significantly older examples have been recovered in the north of Australia (Attenbrow 2002: 102). Edge ground hatchets were made primarily made from water worn metamorphic stone that was ground on an abrasive surface, such as sandstone, to produce an edge and were used primarily for cutting wood, stripping bark and other woodworking tasks (Corkill 2005: 48; Stokes 2015: 70). Analysis of edge ground hatchets from the region have shown that the metamorphic and igneous stone required were only accessible at certain locations such as the Hawkesbury/Nepean River and the Shoalhaven River (Stokes 2015). The distribution of sandstone outcrops would have also influenced the creation and maintenance of edge ground hatchets.

During the last 1,500 years, the use of backed artefacts substantially decreased or disappeared across the region and there was a general increase in edge ground hatchets during this period. Along the coast and within sandstone geology, archaeological assemblages from this period contain a larger proportion of quartz and bipolar artefacts while silcrete and IMT continued to be used on the western Cumberland Plain. The general variation in artefact assemblages from Aboriginal archaeological sites on coastal and inland sites has been interpreted as suggesting social changes occurred during this period which restricted the access of coastal groups to the raw materials of the western Cumberland Plain.

Archaeological sites in the region generally occur as surface artefact scatters and isolated finds. Relatively elevated landforms along the margins of creeks, especially those offering permanent water and associated environmental resources would have been favourable for occupation by Aboriginal people. Elevated locations on hilltops and ridge crests tend to display a different archaeological signature, chiefly a sparser artefact distribution and less evidence for 'everyday' or utilitarian activities, suggesting that these areas were often used differently. A diverse range of lithic types used for knapping and ground stone tool production would have been sourced from locally occurring outcrops and/or

alluvial/colluvial gravel and cobble deposits including quartz, chert, silcrete, quartzite, acidic/basic volcanics, and IMT (indurated mudstone/tuff).

The preservation of Aboriginal archaeological material in the region has been variably impacted by natural process and land use practices. Major activities that would significantly disturb or remove subsurface Aboriginal objects within the study area include the construction of roads, driveways and farm dams, modification of natural drainage for agricultural purposes and utility installation. Other agricultural practices such as vegetation clearing, grazing, ploughing, cropping and fencing construction are likely to have affected the integrity of subsurface archaeological deposits but would not necessarily have caused their outright removal. Sheet and creek bank erosion is likely to have displaced any cultural material present on landforms affected by these processes, and Aboriginal objects are unlikely to survive in situ within these contexts. Slope gradient also contributes to rates of sediment erosion and deflation, and disturbance of soils and any archaeological materials they contained is common on steeper slopes and areas of ground disturbance.

Archaeological assessment for the Elizabeth Drive Upgrade project has been undertaken following the process outlined in the PACHCI and *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*. A summary of the PACHCI Stage 2 investigations is presented in the following sections. Test excavation results for the current project (PACHCI Stage 3) are summarised in Section 4.3 and presented in detail in the test excavation report (KNC 2023), which also contains a wider review of previous archaeological investigations in the local area including Brayshaw's (1995) initial EIS assessment in the 1990s.

4.1 Stage 2 PACHCI Archaeological Survey Report & Addendum (KNC 2018 & 2019)

KNC was engaged by Roads and Maritime Services to prepare an Aboriginal archaeological survey report to inform the Preliminary Environmental Investigation and concept design for the proposed upgrade to Elizabeth Drive (KNC 2018). The study area for the assessment comprised the existing road corridor (road reserve) of Elizabeth Drive between The Northern Road in the west and the M7 Motorway in the east, excluding four sections which were covered under existing assessments for The Northern Road Upgrade and the proposed M12 Motorway to the north of Elizabeth Drive. The overall study area included a 100 metre buffer on either side of the road reserve.

The assessment included a review of the landscape context, previous archaeological investigations and an archaeological field survey. The landscape context and previous archaeological investigation reviews covered a 200 metre wide corridor centred on the existing Elizabeth Drive between The Northern Road in the west and the M7 Motorway in the east. The assessment noted that previous archaeological investigations had shown that higher density artefact scatters were often located along South Creek where permanent water and associated environmental resources would have been favourable for occupation by Aboriginal people.

Review of background information, AHIMS records and previous archaeological assessments identified five archaeological sites within the 200 metre wide study area corridor around Elizabeth Drive: B95 (AHIMS 45-5-4762), PAD 2001-6 (AHIMS 45-5-3999), KC/ED2, PCP-9 and CP-AS 1. Five of the areas of PAD previously identified by Brayshaw (1995) were also confirmed to be located within the broader study area (PADs 1, 2, 4, 5 and 6). B95 comprised an open artefact scatter recorded over a 100 metre x 7 metre area on a dam wall and drainage line east of Oaky Creek, approximately 65 metres south of Elizabeth Drive. The site is outside the current study area and has since been salvaged and destroyed by Stage 1 earthworks for the Western Sydney Airport. PAD 2001-6 (AHIMS 45-5-3999) was a PAD identified south of Elizabeth Drive, west of Devonshire Road during an assessment for Sydney Water. The PAD was located across an area of low gradient and low disturbance with a vantage over Kemps Creek. Subsequent testing of the PAD recovered one isolated artefact (see Section 4.3 below).

The archaeological survey was limited to the existing Elizabeth Drive road corridor due to access constraints in the adjacent properties. Archaeological field survey identified a low density surface artefact scatter (Elizabeth Drive AFT 1) on the elevated landform previously identified by Brayshaw as an area of PAD (PAD 2), approximately 150 metres west of where Elizabeth Drive crosses South Creek. The site was identified on the northern road verge above a cutting, on the northern edges of an elevated spur crest/slope bisected by Elizabeth Drive. Five red and yellow silcrete artefacts (core fragment, flakes and medial flake fragment) were identified in an area of sheet erosion exposure. While potential for intact sub surface deposit was considered low-moderate in the road reserve due to disturbance, the remnant landform in the adjacent paddock was considered to display moderate archaeological potential. Subsequent testing of site confirmed the presence of subsurface deposit (see Section 4.3 below).

The archaeological field survey found that overall ground surface exposure across the surveyed area was low and restricted to areas where natural processes or land use practices including erosion, vehicle movement and disturbance had removed vegetation or restricted its growth. Limitations to visibility within these areas included detritus and introduced material such as blue metal adjacent to the road. The ground surface was not visible within the majority of the surveyed area due to dense grasses and other vegetation cover in addition to agricultural, commercial and residential structures and roads. The majority of the road corridor was found to be highly disturbed with low to no potential for intact archaeological deposits. Where archaeological potential/sensitivity was noted on landforms outside

of the road corridor survey area (but within the 200 metre overall study area corridor) these were in the assessment. In the majority of cases, these areas did not extend within the road corridor (survey area) which was generally highly disturbed. These areas were not formally recorded as PADs and it was recommended that future survey/assessment of the wider 200 metre study area corridor should ensure that these areas were considered.

Based on a study area wide impact assessment, all identified sites and PADs within the 200 metre study area corridor would have been at least partially impacted by the proposed works. Field survey was recommended for the remainder of the 200 metre study area outside of the road corridor as the project progressed. It was identified that additional assessment was required under Stage 3 of the PACHCI to determine impacts. It was recommended that future design for the project should take the location of the identified sites into consideration and avoid impact where possible. If impact to identified sites cannot be avoided, an Aboriginal Heritage Impact Permit (AHIP) would be required prior to impacting Aboriginal archaeological sites.

An addendum Aboriginal archaeological assessment, including an archaeological survey, was later undertaken for an additional area along the Elizabeth Drive upgrade corridor associated with a proposed intersection servicing the Western Sydney Airport development at Badgerys Creek (KNC 2019). The assessment identified a low density surface artefact scatter (Elizabeth Drive AFT 2) on the landform previously identified by Brayshaw as an area of potential archaeological deposit (PAD 1). The artefact scatter consisted of one silcrete flake, one IMT flake, one quartz proximal flake fragment and one quartz flaked piece. This area was subsequently included within the eastern site extent of Badgerys West B (BWB) (AHIMS 45-5-5298) as assessed for the M12 Motorway project (Jacobs 2019). The portion of site BWB/Elizabeth Drive AFT 2 within the M12 approval area has now been destroyed. Part of the remaining site extent overlaps the current study area north of the new roundabout intersection into the WSA precinct.

Overall, the field survey confirmed that the Elizabeth Drive corridor had been extensively altered by ground surface disturbance related to road construction, drainage and utilities, reducing the likelihood of Aboriginal objects or intact archaeological deposit to occur.

4.2 Stage 2 PACHCI Archaeological Survey Reports (AECOM 2022a & 2022b)

AECOM undertook more recent assessment for the current project, divided into two portions for the two sections of the current study area: West (AECOM 2022a) and East (2022b). The assessment was undertaken in accordance with Stage 2 of the PACHCI and included background research, environmental and landscape assessment, field survey, consultation with Gandangara and Deerubbin LALCs, and incorporation of the previous results from the KNC 2018 PACHCI Stage 2 assessment.

Background research for the western portion of the study area identified two previously recorded sites in or within the vicinity of the proposed upgrade route: Elizabeth Drive/Adams Road AFT 1 around Oaky Creek and Cosgroves Creek and B95 within the WSA lands (since destroyed by the WSA development). Review of the environmental and landscape context identified that the underlying local geology, soils and topography were generally conducive to the survival of archaeological sites in open contexts, but that the study area had been variably disturbed by historical and contemporary land use practices, development, dam construction and modifications to hydrology, as well as flood effects on lower-lying landforms and along the major creeklines.

Archaeological predictions for the study area based on background information review included that if present, any remaining archaeological deposits within the study area would consist of surface and/or subsurface distributions of stone artefacts, and be restricted to areas of minimally or moderately disturbed terrain. It was noted that historical and recent ground disturbance activities across much of the study area would have destroyed all but a fraction of its associated Aboriginal archaeological record. It was considered that the complexity of any extant deposits would vary in relation to landform and stream order, with larger, more complex deposits occurring in association with higher order creeks. Stone artefact assemblages from the local area were principally dominated by silcrete although a range of other raw materials were also utilised, and flake debitage made up the primary component of assemblages.

Archaeological field survey was carried out of accessible private properties bordering the road corridor (additional survey was not carried out in areas covered by other infrastructure and development approvals). Survey effort focused on landforms around Cosgroves Creek/Oaky Creek and tributaries where greater archaeological sensitivity had been identified. Ground surface visibility was limited and generally poor, restricted to access tracks, exposed ground surfaces around dams and other areas of disturbance or vegetation die-off. Survey confirmed the location and extent of previously recorded site Elizabeth Drive/Adams Road AFT 1 around Cosgroves and Oaky Creeks. Survey did not identify any new archaeological sites.

Overall, the assessment for the western portion of the study area identified that Elizabeth Drive/Adams Road AFT 1 would be at least partially impacted by the proposal and further assessment under Stage 3 of the PACHCI was recommended, including a test excavation program.

The updated assessment for the eastern portion of the current study area involved the same process of background information review and archaeological field survey. Background research identified 13 previously registered AHIMS sites in or within 50 metres of the study area boundary, all comprising open context artefact sites (artefact scatters or isolated finds) and areas of PAD both with and without surface artefacts. It was also identified that three of the PAD sites previously recorded by Brayshaw (1995) but not registered on the AHIMS database partially overlapped the study area: PADs 2, 3 and 4. It was noted that numerous existing or forthcoming infrastructure/development approvals overlapped the proposal area and that the status of sites would require confirmation prior to any AHIP application being made for the proposal. Review of landscape context including detailed assessment of historical aerial photographs identified high levels of direct ground disturbance for the majority of the eastern portion of the study area (more so than the western portion), primarily related to construction of existing roads, drainage works around and along the creeklines, and a higher level of residential, commercial and industrial development.

The field survey focussed on accessible private properties not subject to significant ground surface disturbances or part of existing SSI approvals within the study area, conducted over three days with representatives from Deerubbin and Gandangara LALC. The survey also revisited and reassessed areas of potential sensitivity identified by KNC during the 2018 assessment. Ground surface visibility across the study area was generally poor with visibility ranging from 10 per cent in areas with extensive grasses to 60 per cent on access tracks, and exposed ground surface around dams. The archaeological survey of the western portion of the study area did not identify any new archaeological sites but did result in the confirmation of existing recordings and a reassessment of the previously identified areas of sensitivity. This included the confirmation of an area previously identified as sensitive by KNC during the 2018 assessment as a PAD (KNC-PAD4-18). KNC-PAD4-18 was located on a series of alluvial flats adjacent to the main South Creek corridor to the north of Elizabeth Drive, dissected by former (anabranch) channels. This PAD is located to the south west of PAD 3 as identified by Brayshaw (1995), which is positioned on a more defined, elevated area adjacent to the creek bend >50 metres outside the current study area boundary. The southern extension of PAD 3 as mapped by AECOM was therefore incorporated into the KNC-PAD4-18 area during the PACHCI Stage 3 assessment. Subsequent testing in this area identified subsurface archaeological deposit (see Section 4.3 below).

One further PAD area was identified, EDU PAD 1. This PAD incorporated an area of high archaeological sensitivity associated with a small terrace landform on the eastern side of Badgerys Creek, north of Elizabeth Drive, with low levels of apparent disturbance. Subsequent testing of the PAD recovered one isolated artefact (see Section 4.3 below).

A preliminary significance assessment was undertaken and ascribed low to moderate significance to the identified sites within the assessment area, with sites varying in complexity, integrity, representativeness and research potential. No high significance sites were identified. Impact assessment found that all sites and PADs within the project corridor (both eastern and western sections) would be impacted either wholly or partially by the proposal. Further assessment under Stage 3 of the PACHCI was therefore recommended, including a program of Aboriginal community consultation and a test excavation program for areas that were identified as requiring further archaeological investigation.

4.3 Stage 3 PACHCI Test Excavation Report (KNC 2023)

KNC was subsequently engaged to undertake PACHCI Stage 3 assessment for the Elizabeth Drive upgrade. Previous investigations undertaken as part of the PACHCI Stage 2 assessment, and additional review of background information for the PACHCI Stage 3 assessment, identified 11 extant Aboriginal archaeological sites/PADs within the study area.

Seven sites/PADs were assessed as displaying at least moderate archaeological potential and further assessment including test excavation was recommended to obtain further information in regard to the nature and significance of the Aboriginal cultural heritage resource at these locations. The purpose of the test excavation program was to collect information about the nature and extent of subsurface Aboriginal objects through excavation of a sample of the identified site/PAD areas. NB: no test excavation was required for Badgerys West B (BWB) / Elizabeth Drive AFT 2 as sufficient data existed from previous excavations to adequately characterise the site and the likely impacts of the proposal.

A test excavation methodology was developed for the proposed test program by KNC as part of the PACHCI Stage 3 process in consultation with the registered Aboriginal stakeholders. In total, six Aboriginal archaeological sites/PADs were recommended for the test excavation program. The investigation area was restricted to the proposed impact corridor. Testing was undertaken at the following areas:

- Elizabeth Drive/Adams Road AFT 1
- EDU PAD 1
- Elizabeth Drive AFT 1
- KNC-PAD4-18
- PAD 2001-6
- PAD 4

Archaeological test excavation was carried out by KNC and field representatives from registered Aboriginal parties in March and April 2023 in accordance with the PACHCI and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. Testing was undertaken at the six recommended locations along the study area corridor. Three locations were associated with previously registered AHIMS recordings, and three were at PAD areas identified during previous surveys for the project.

A total of 84, 50 x 50 centimetre test squares were excavated across the project impact area during the test excavation program, giving a total sample of 21m² across the six test areas. Test squares were placed on regular intervals across transects placed to sample the identified site/PAD areas within the impact corridor. A total of 180 artefacts were recovered from the test program, with artefacts confirmed at each of the six test areas (Table 1). The majority of artefacts were recovered from two sites, Elizabeth Drive AFT 1 (n=79) adjacent to the western side of South Creek and Elizabeth Drive/Adams Road 1 (n=65) around Oaky and Cosgroves Creeks. Both of these sites displayed high peak densities >80 artefacts/m² in individual test squares. Low-moderate density deposits (mean c. 5 artefacts/m²) were identified at KNC-PAD4-18 (now named EDU South Creek AFT 1, eastern side of South Creek) and PAD 4 (now named EDU Kemps Creek AFT 1, western side of Kemps Creek), with peak density ranging from 12 artefacts/m² to 28 artefacts/m² respectively. Isolated artefacts were recovered from both EDU PAD 1 (now named EDU Badgerys Creek IF 1) and PAD 2001-6.

Table 1. Test excavation results summary

| Archaeological site/PAD | Total sample | Total artefacts | No. of squares / positive squares | Mean artefact density | Peak artefact density |
|--|---------------------|-----------------|-----------------------------------|-----------------------|-----------------------|
| Elizabeth Drive / Adams Road AFT 1 | 5.75 m ² | 65 | 23 / 14 | 11.3 /m ² | 80 /m ² |
| EDU PAD 1 (now EDU Badgerys Creek IF 1) | 2.25 m ² | 1 | 9 / 1 | 0.4 /m ² | 4 /m ² |
| Elizabeth Drive AFT 1 | 3.75 m ² | 79 | 15 / 10 | 21.1 /m ² | 92 /m ² |
| KNC-PAD4-18 (now EDU South Creek AFT 1) | 3.75 m ² | 19 | 15 / 9 | 5.1 /m ² | 12 /m ² |
| PAD 2001-6 | 2.5 m ² | 1 | 10 / 1 | 0.4 /m ² | 4 /m ² |
| PAD 4 (now EDU Kemps Creek AFT 1) | 3m ² | 15 | 12 / 5 | 5 /m ² | 28 /m ² |

In general, results supported the existing understanding of the archaeological landscape within this part of the Cumberland Plain, namely that more intensive, focused and/or repeated Aboriginal occupation took place on landforms associated with the larger creek corridors. The majority of the study area traverses undulating low crests and slopes intersected by north-running drainage of the South Creek catchment. Higher rolling hills and ridgelines at the eastern and western boundaries of the study area form the watersheds dividing South Creek from Hinchinbrook/Cabramatta Creeks (Georges River catchment) and Mulgoa Creek (Nepean River catchment) respectively. The long, linear nature of the study area therefore provides almost a full cross section of the broader South Creek valley. Within this section of the valley, the key creek corridors include Cosgroves/Oaky Creek, South Creek and Kemps Creek. The test program sampled landforms adjacent to these three key landscape features, as well as more marginal areas at a greater distance from the creek corridors.

Silcrete dominated the assemblage, accounting for 78.3% of artefact raw materials (n=141). A relatively high proportion of IMT was also recorded (17.2%, n=31), found across five of the six tested areas. Chert (n=1) occurred only at Elizabeth Drive AFT 1, while MGS (n=1) was restricted to Elizabeth Drive/Adams Road AFT 1, and quartz (n=4) was found at both of these sites. FGS (n=2) was present at Elizabeth Drive AFT 1 and EDU South Creek AFT 1. The presence of cores, flakes, and broken flaked debitage within the test excavation assemblage indicates that activities across the study area included lithic reduction, mostly secondary/tertiary but with some limited initial primary reduction evidenced by occasional highly cortical pieces of flake debitage in sites on all three primary creek systems. Cores were mostly unifacial or multidirectional in form and did not display targeted or carefully-controlled reduction strategies geared towards the production of specific tool forms. Two bipolar cores were recovered, both of silcrete, from Elizabeth Drive AFT 1 and Elizabeth Drive/Adams Road AFT 1.

Formal tool types included backed artefacts found at four sites, including a geometric microlith, Bondi point and other backed blades and fragments, and several point forms including one with usewear. Retouched artefacts were found at three sites, and several specimens had usewear. Artefacts tended to be small, with almost three quarters of the total test assemblage under 20mm in maximum dimension (n=134, 74.4%). This indicates that the more elevated landforms targeted as part of the test program, which contained the highest density of Aboriginal objects, are above the primary flood effects of the adjacent waterways, which tend to winnow out smaller objects from the deposit over time when flood energy/velocity is high. Overall, the recovered assemblages are typical of generalised Aboriginal land use during the Holocene. The sites identified within the study area thus express both a physical cross-section and a representative sample of the South Creek valley's Aboriginal archaeological record: they range from relatively intact high density deposits to isolated objects representing lost or discarded cultural material from the general area, dispersed as 'background scatter' across the landscape.

The South Creek valley would have contained numerous resources used by Aboriginal people, including varied flora and fauna across the differing vegetation communities, permanent fresh water and a variety of landform types suitable for different activities. The gently undulating country, abundant water sources and soils suitable for agriculture also made the area an early focus of European land use in the region, with Elizabeth Drive a key transport corridor from very early in British settlement. This has resulted in a long and cumulative history of land use disturbance from vegetation clearance, agricultural and pastoral practices, residential, commercial and industrial uses including quarrying, dam construction and drainage modifications, and road and services infrastructure. These disturbances also tend to exacerbate natural processes of erosion, colluvial movement and alter the hydrological flood regime. The cumulative impact on Aboriginal archaeological deposits within the study area is significant, with the existing road corridor and adjacent areas of development retaining low to no archaeological potential. The test program targeted those remaining areas assessed as displaying moderate archaeological potential and confirmed that all contained subsurface artefacts, indicating that archaeological deposit can and does survive where favourable conditions exist within the study area.

Background research, review of previous investigations, PACHCI Stage 2 assessment and the PACHCI Stage 3 test excavation program identified a confirmed total of 11 Aboriginal archaeological sites (comprising 15 AHIMS registrations) within the Elizabeth Drive upgrade study area. Site locations are shown in Figure 6. The archaeological value and significance of these deposits varied depending on the extent of disturbance and the nature/complexity of the site and its contents. Scientific significance assessment was undertaken based on site integrity/intactness, rarity, representativeness and archaeological research potential. It was determined that five sites displayed moderate significance, with the remaining six sites considered to display low significance. Impact assessment considered that all sites within the project study area were likely to be impacted by construction of the proposal, resulting in a partial impact to three sites and a total impact at eight sites. It was recommended that Transport seek an AHIP for the proposal, with further assessment under Stage 3 of the PACHCI to include a process of Aboriginal community consultation and preparation of a CHAR (this document).

5 Aboriginal Community Consultation

5.1 Stakeholder identification and registration of interest

Transport is committed to effective consultation with Aboriginal communities regarding Transport activities and their potential for impact on Aboriginal cultural heritage. The Transport PACHCI was developed to provide a consistent means of effective consultation with Aboriginal communities regarding activities which may impact on Aboriginal cultural heritage and a consistent assessment process for Transport activities across NSW.

The aim of consultation is to integrate cultural and archaeological knowledge and ensure registered Aboriginal parties have information to make decisions on Aboriginal cultural heritage. For the preparation of this CHAR, consultation with Aboriginal people has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH 2010b) and the requirements of Clause 60 of the *National Parks and Wildlife Regulation 2019*.

Transport advertised in local media (Appendix A) and contacted potential Aboriginal stakeholders identified from government agency notification responses. Transport invited Aboriginal people who hold knowledge relevant to determining the cultural heritage significance of Aboriginal objects and Aboriginal places in the area in which the proposed activity is to occur to register an interest in a process of community consultation. Investigations for the Elizabeth Drive project have included consultation with the 35 Aboriginal community groups and individuals as listed in Table 2 below.

Table 2. Registered Aboriginal parties

| Registered Aboriginal party | Representative and/or Contact Person |
|--|--------------------------------------|
| Deerubbin Local Aboriginal Land Council | CEO |
| Gandangara Local Aboriginal Land Council | CEO |
| Gunjeewong | Shayne Dickson |
| Koori Digs | Korri Currell |
| Yulay Cultural Services | Arika Jalomaki |
| Yurrandaali Cultural Services | Bo Field |
| Yurwang Gundana Cultural Heritage Services | Merekai Bell |
| A1 Indigenous Services Pty Ltd | Carolyn Hickey |
| Didge Ngunawal Clan | Lilly Carroll |
| Wailwan Aboriginal Group | Phil Boney |
| RAW Cultural Healing | Raymond Weatherall |
| Amanda Hickey Cultural Services | Amanda De Zwart |
| Ginninderra Aboriginal Corporation | Krystle Carroll-Elliott |
| Wattaka Pty Ltd | Des Hickey |
| Guntawang Aboriginal Resources Inc | Wendy Morgan |
| Gilay Consultants | Carolyn Slater |
| Aragung | Jamie Eastwood |
| Mundawari Heritage Consultants | Dean Delponte |
| Kamilaroi Yankuntjatjara Working Group | Phil Khan |
| Bariyan Cultural Connections | Kayelene Terry |
| Wori Woilywa | Daniel Chalker |
| Murra Bidgee Mullangari | Darleen Johnson |
| Muragadi | Jesse Johnson |
| Kelvin Boney | Kelvin Boney |

| Registered Aboriginal party | Representative and/or Contact Person |
|---|--|
| Butucarbin Aboriginal Corporation | Jennifer Beale |
| Gunya Aboriginal Cultural Heritage Services | Adam Gunther |
| Goobah | Basil Smith |
| Woronora Plateau Gundungara Elders Council | Kayla Williamson |
| Cubbitch Barta | Glenda Chalker |
| Wurrumay | Vicky Slater |
| BCS Group | Lee Field |
| Warrigal Cultural Services | Aaron Slater |
| Cacatua General Services | George Sampson |
| Registered Aboriginal stakeholder (details withheld)* | Registered Aboriginal stakeholder (details withheld) |
| Registered Aboriginal stakeholder (details withheld)* | Registered Aboriginal stakeholder (details withheld) |

*NB. Two stakeholders chose to withhold their contact details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*

The formal consultation process has included:

- advertising for registered Aboriginal parties (Appendix A);
- government agency notification letters;
- invitation to potential stakeholders to consult during the assessment;
- notification of closing date for registration;
- notification of registrant list to Heritage NSW and LALC;
- provision of proposed archaeological and CHAR assessment methodology (28 day review period ending 24/02/2023) outlining the methodology to undertake the test excavation;
- ongoing compilation of registrants list, through continuing to register individuals and groups for consultation on the project;
- provision of draft CHAR for review (a 28 day review period ending 04/07/2023);
- Aboriginal Focus Group (AFG) meeting held during review period to discuss investigation results and draft CHAR (minutes attached in Appendix B);
- ongoing consultation with the local Aboriginal community.

A consultation log is included in Appendix C.

5.2 Provision of proposed assessment methodology

Registered stakeholders were provided with a copy of the proposed assessment methodology as part of an information package from Transport on 27/01/2023. Stakeholders were requested to review the information and provide any comments or cultural information that may affect, inform or refine the methodology. The proposed assessment approach for both the CHAR and the archaeological test excavation program were included, with feedback sought from stakeholders during the review period. Responses were received from nine stakeholders: A1 Indigenous Services Pty Ltd (A1), Gilay Consultants (Gilay), Gunjeewong, Kamilaroi-Yankuntjatjara Working Group (KYWG), Mundawari Heritage Consultants (MHC), Wailwan Aboriginal Group (Wailwan), Warragil Cultural Services (Warragil), Yulay Cultural Services (Yulay) and one of the stakeholders who chose to withhold their details. Responses are attached in full in Appendix C.

A1 stated that they had reviewed the methodology and information provided, and supported the recommendations within the document including the proposed field program (email dated 12/02/2023). [NB the full text email response provided by A1 has been omitted from Appendix C at their request].

Gilay state that they had reviewed and agreed with the project information and proposed methodology for Elizabeth Drive (email dated 29/01/2023).

Gunjeewong stated they were happy with the methodology (email dated 31/01/2023).

KYWG agreed with the recommended approach in the methodology and provided some additional information on cultural values within the area (see Section 5.4 below) (email dated 09/02/2023).

MHC stated that they had reviewed and supported the proposed CHAR and test excavation methodologies (email dated 28/01/2023).

Wailwan agreed with the proposed assessment methodology for this project and the procedure of the proposed test excavation and provided some additional information (email dated 28/01/2023).

Warragil agreed with the proposed test excavation program for the study area (email dated 29/01/2023).

Yulay stated they had reviewed the assessment methodology and agreed with the proposed approach (email dated 14/02/2023).

The stakeholder who chose to withhold their details acknowledged receipt of the methodology but did not provide further comment (email dated 09/02/2023).

5.3 Review of draft CHAR

The draft CHAR and test excavation report were provided to registered Aboriginal stakeholders for review and comment. All registered Aboriginal stakeholders were provided a 28 day period for review, ending on 04/07/2023. Stakeholders were also invited to attend an AFG meeting during the review period to discuss the draft CHAR and the assessment findings. AFG minutes are attached in Appendix B, with written comments received from stakeholders summarised below and attached in full in Appendix C. Two stakeholders provided written comment on the draft CHAR.

Gandangara Local Aboriginal Land Council stated that they had reviewed the Stage 3 PACHCI assessment and agreed with the findings, significance assessment and recommendations that were made (email dated 05/07/2023).

Murra Bidgee Mullangari stated that they had reviewed the draft CHAR and text excavation findings and endorsed the recommendations made in the report (email dated 28/06/2023).

5.4 Aboriginal cultural heritage values

The study area has cultural value for the local Aboriginal community. The identified cultural value includes a feeling of attachment and responsibility for the land. These values become tangible when tied to identified Aboriginal objects found at archaeological sites. In this way, the Aboriginal objects can be seen as exhibiting both scientific information and cultural meaning, knowledge about the past tied with social values and belief systems. The presence of Aboriginal objects is not required for a site to hold value for the Aboriginal community. Aboriginal sites may have social, spiritual or landscape values which are not tangible. Some of the Aboriginal cultural heritage values expressed by stakeholders for the project footprint and wider region include:

- Responsibility to look after the land, including the heritage sites, plants and animals, creeks, rivers, and the land itself
- Artefact sites and landscape features
- Culturally modified trees
- Intangible sites of spiritual significance
- Connectivity of sites and pathways throughout the landscape
- Creek lines, particularly larger landscape features and waterways such as South Creek
- Indigenous plants and animals
- General concern for burials, as their locations are not always known, and they can be found anywhere.

KYWG expressed the high cultural significance of the local area, particularly noting that “there are major water ways nearby that are utilised by our people and have been for tens of thousands of years”. The diversity and abundance of natural resources in the area was also highlighted “there are resource rich ecosystems that allowed our people to thrive off their natural surroundings”. These features remain significant to Aboriginal people (email dated 09/02/2023).

Wailwan noted that previous excavation programs for other projects had recovered significant numbers of artefacts around the immediate area, and that these deposits displayed cultural significance (email dated 28/01/2023).

Specific cultural values for the identified archaeological sites within the study area have not been identified by stakeholders to date.

6 Summary and Analysis of Background Information

Analysis of the background information presented in Sections 2, 3, 4 and 5 allows an assessment of the Aboriginal cultural heritage values within the study area to be made. Combining data from historical/ethnographic sources, Aboriginal community consultation, landscape and environmental evaluation and archaeological context provides an insight into how the landscape around the study area was used and what sort of events took place in the past. This section draws together a variety of information to bring further understanding to the archaeological cultural landscape of the study area.

The study area and surrounding region are known to have been important to and extensively used by past Aboriginal people. Language group mapping places the study area within the traditional lands of the Darug language group. Interaction between groups was common as people frequently travelled across country for economic, social and ceremonial reasons. 'Borders' between clan and language groups could be fluid rather than static 'lines on a map', expanding and contracting over time to the movements of smaller family or clan groups. These boundaries ebbed and flowed through contact with neighbours, the seasons and periods of drought and abundance. Darug groups around the study area would have interacted with numerous other groups for initiation ceremonies, arrangement of marriages, corroborees, trade and exchange and the discussion and establishment of lore. The complex network of people's connections to and across Country forms a key part of the cultural landscape.

Early colonial interest in the area led to interactions between the British and the local Aboriginal people relatively soon after the arrival of Europeans to Australia. Aboriginal people's use of the wider Cumberland Plain is well-documented in historic accounts and the area has demonstrated cultural importance and value to the contemporary Aboriginal community. In particular, the cultural value of the multiple creek systems within the wider region has been identified. Cosgroves/Oaky Creek, Badgerys Creek and South Creek are specifically highlighted as significant landscape features with cultural value. Stakeholders expressed that they had a responsibility to look after the land, including the heritage sites, plants and animals, creeks and the land itself. Several stakeholders also indicated that they held additional cultural, spiritual, personal and familial connections to the area. Aboriginal community consultation undertaken for the current project has demonstrated that members of the contemporary Aboriginal community continue to experience connection with the area through cultural and familial associations.

Archaeological investigations have been undertaken in the region over several decades that have revealed physical traces of a range of Aboriginal land use activities which have survived in the form of Aboriginal archaeological sites. The Aboriginal archaeological sites identified in the region have been predominantly surface artefact scatters, isolated artefacts and subsurface archaeological deposits of varying artefact density and integrity, with modified trees and grinding grooves less common. Areas of PAD have also been recorded. Soil landscape, vegetation and land use practices have been identified as factors influencing the preservation of Aboriginal archaeological sites in the region. Soil landscapes subject to high levels of erosion or fluvial activity are unlikely to retain in situ Aboriginal objects while areas where sediment has been deposited often contain Aboriginal objects that are without spatial context. Stable, residual or alluvial soil landscapes with low levels of disturbance are most likely to contain intact subsurface deposits.

Previous archaeological investigations have shown that the distribution of Aboriginal archaeological sites in the region is also highly influenced by the reliability and permanence of fresh water sources in addition to underlying geology. Investigations in the region have found higher stone artefact density and site frequency along the margins of major watercourses including South Creek and its larger tributaries where elevated and stable micro-topographic landforms have suffered minimal disturbance. Elevated locations on hilltops and ridge crests further from major watercourses tend to display a different archaeological signature, chiefly a sparser artefact distribution and less evidence for 'everyday' or utilitarian activities, suggesting that these areas were often used differently.

Stone tool production and maintenance took place when people spent time in these areas as well as on an ad hoc basis in response to current needs while people moved throughout the landscape. The dominance of silcrete in local assemblages is related to the ubiquity of this raw material throughout large areas of the Cumberland Plain. Landscape features such as waterways would have provided a focus for access to varied raw materials via water-transported and deposited cobbles and pebbles, as well as riparian resources and fresh water. The preservation of archaeological deposit which provides evidence for Aboriginal activities is dependent on several factors, the most important of which affecting the current study area are flooding and modern landuse practices including road construction and adjacent development. While Aboriginal objects may exist in any location within the landscape, areas of low disturbance retain the archaeological and cultural context that gives these objects meaning.

The PACHCI Stage 3 assessment identified a total of 11 extant Aboriginal archaeological sites (incorporating 15 AHIMS registrations) at least partially within the study area. Site locations are shown in Figure 6 with site descriptions given below.

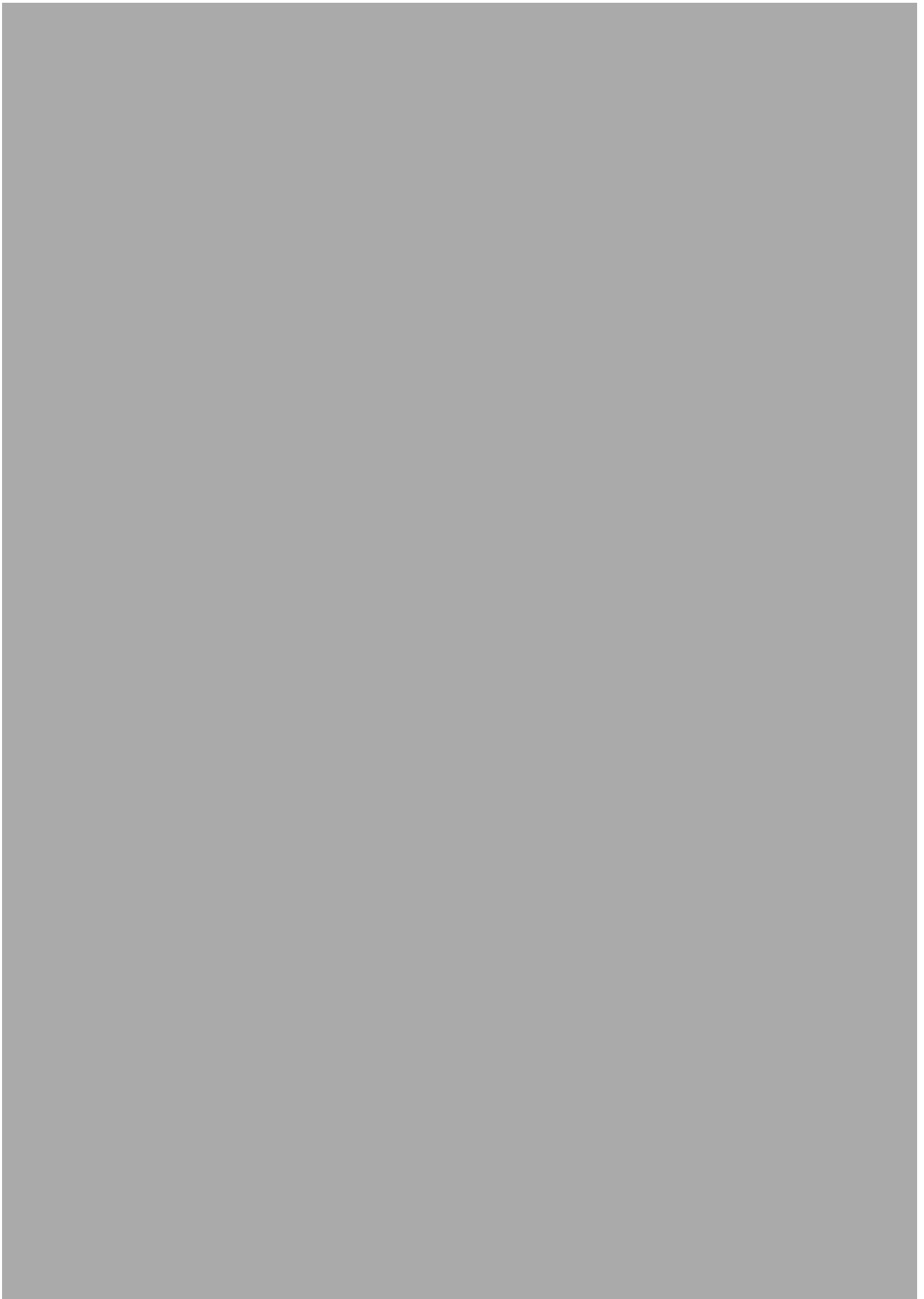


Figure 6. Identified Aboriginal archaeological sites within the study area

6.1 Summary of identified Aboriginal archaeological sites / PADs within the study area

Review of background information, Aboriginal community consultation, and archaeological assessment has resulted in the identification of 11 extant Aboriginal archaeological sites within the study area. These sites represent areas of Aboriginal cultural heritage value and are listed in Table 3 below.

Table 3. Identified Aboriginal archaeological features within the study area

| Name | AHIMS | Site Feature |
|--|--------------------------------------|--------------------------------------|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Artefact (surface and subsurface) |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Artefact (surface and subsurface) |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Artefact (isolated subsurface) |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Artefact (surface) |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Artefact (surface and subsurface) |
| EDU South Creek AFT 1 | 45-5-5734 | Artefact (surface and subsurface) |
| PAD 2001-6 | 45-5-3999 | Artefact (isolated subsurface) |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Artefact (surface and subsurface) |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Artefact (surface) |
| KC/ED2 | 45-5-2310 | Artefact (surface) |
| CP AS 1 / P-CP9 | 45-5-4374 / 45-5-2307 | Artefact (surface) |

Site Name: Elizabeth Drive/Adams Road AFT 1

AHIMS ID: 45-5-5105

Elizabeth Drive/Adams Road AFT 1 was an archaeological site complex that consisted of several surface artefacts and associated areas of potential subsurface archaeological deposit that encompassed the elevated areas adjacent to the confluence of Cosgroves Creek and Oaky Creek.

The site complex was initially recorded as an area of potential subsurface archaeological deposit during Brayshaw's 1995 assessment and again by Navin Officer in 2018. A subsequent archaeological survey by KNC identified two surface artefacts within the recorded extent of the PAD. Test excavation undertaken for the current project established the presence of subsurface archaeological deposit which varied in density and integrity across the landform. The highest intensity of Aboriginal occupation was encountered on the eastern side of Oaky Creek, with backed artefacts and a diversity of raw materials located in intact soil deposits. Two distinct areas of moderate density deposit including backed tools and cores were recorded on the western side of Oaky Creek, while the south-western portion of this area had a diffuse low-density artefact deposit. Low to moderate artefact density on the eastern side of Cosgroves Creek, as well as the presence of cortical artefacts and a variety of raw materials, indicates that the landforms just south of the creek confluence formed a focus of Aboriginal occupation, with different activities carried out in different part of the site.

Site Name: Badgerys West B (BWB) / Elizabeth Drive AFT 2

AHIMS ID: 45-5-5298 / 45-5-5240

Badgerys Creek West B (BWB) was a subsurface archaeological deposit situated on a gentle slope overlooking the junction of Badgerys Creek and an unnamed north east flowing tributary creek.

The site was initially identified by predictive modelling as an area of PAD during an archaeological assessment for the proposed M12 Motorway and was subsequently tested.

Fourteen test squares were excavated on a single east-west transect, from a slope down to alluvial floodplain and across an entrenched 3rd order tributary of Badgerys Creek. A total of 72 artefacts were retrieved, including flakes, flake fragments, two cores, one backed artefact and one core tool. The majority of the test squares contained two artefacts each, giving a low overall

density; however, one test square with a higher density contained 24 artefacts. Several pieces of unworked silcrete gravel were also noted. The spatial distribution of artefacts within the tested area was characterised by a low artefact density across the site with moderate artefact density at the eastern and western ends of the transect and further subsurface was considered likely.

The site was then subject to salvage excavation within the approved M12 project area. Over 120m² was excavated within the impacted portion of BWB during the salvage program, comprising both dispersed Phase 1 sampling and four focused open areas. Over 4,000 artefacts were recovered, indicating a moderate-high density deposit across the landforms associated with Badgerys Creek and its tributary running from the west on the northern side of the road. The portion of site BWB within the M12 approval area has now been destroyed. Part of the remaining site extent overlaps the current study area. Any works for the current project within the existing SSI-9364 approval area would be required to comply with the conditions of that approval. It is considered that the part of the site within the current study area is likely to contain similar deposit to that identified during previous salvage programs on these landforms.

Site Name: EDU Badgerys Creek IF 1
AHIMS ID: 45-5-5733

This site comprised an isolated subsurface artefact recovered during test excavation of EDU PAD 1 for the current PACHCI Stage 3 assessment program. The area was originally identified as a PAD immediately south of previously identified site BC/ED1 recorded by Brayshaw in 1995, and is on the opposite side of the creek from the significant archaeological deposits identified as part of site BWB. Landform comprises an elevated flat terrace extending to the east, with an adjacent slope and floodplain above Badgerys Creek to the west.

One medial flake fragment of silcrete was recovered from the upper 10cm of a test square excavated on the terrace crest. While the area was likely used by Aboriginal people, preservation conditions for intact subsurface deposits on this side of the creek were found to be poor, with soils on the more elevated ground affected by land use activities and those on the floodplain disturbed from flood events. The isolated artefact was typical of background scatter of lost/discarded cultural material from the general area and was not considered to be in situ. The remainder of the area displayed very low archaeological potential.

Site Name: Elizabeth Precinct Artefact Scatter 05 (EP AS 05)
AHIMS ID: 45-5-5660

The low density surface artefact scatter site was recorded by Artefact Heritage during site inspections for the Elizabeth Enterprise Precinct. [REDACTED]

[REDACTED]. One quartz flake and one silcrete flake were identified in a highly disturbed context within the road reserve, between the edge of the pavement and the adjacent property boundary fence. Landform was a modified slope. The artefacts were approximately 25 metres apart within disturbed exposures next to the road. The artefacts are not in situ and the site is not considered to display any archaeological potential for intact deposits.

Site Name: Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01)
AHIMS ID: 45-5-5259 / 45-5-5330 / 45-5-5236

This archaeological site complex is located north of Elizabeth Drive and west of South Creek and is partially located within the current study area. The site complex incorporates Brayshaw's PAD 2, artefact scatter site Elizabeth Drive AFT 1 recorded by KNC during PACHCI Stage 2 survey and several recordings made by Artefact Heritage for the Elizabeth Enterprise Precinct including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03, Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05. Subsequent archaeological investigation for the Sydney Water Advanced Water Recycling Centre (AWRC) project (KNC 2021) confirmed that the site complex that extended across the eastern slope and elevated flat adjacent to the western bank of South Creek. The site complex was assessed as having potential for subsurface archaeological deposit. The AWRC project received approval as CSSI (SSI-8609189) in November 2022. Any works for the current project within the existing SSI-8609189 approval area which crosses the site would be required to comply with the conditions of that approval.

Components of the site complex within the current Elizabeth Drive upgrade study area (outside of AWRC approval area) include Elizabeth Drive AFT 1 (45-5-5259), Elizabeth Precinct Isolated Find 04 (45-5-5330) and Elizabeth Precinct PAD 01 (45-5-5236). Testing across three defined crest landforms within the site extent was undertaken by KNC for the current PACHCI Stage 3 assessment program. Testing revealed a low to moderately high density subsurface deposit with clear spatial patterning related to distance from the creekline. Soil profiles in all excavated areas were relatively intact and well-structured. The highest density was revealed at the crest closest (<60m) to South Creek and the small drainage depression, containing a total of 63 artefacts including cores and backed artefacts and tools. Low-moderate artefact density was encountered on the central crest located 200 to 150m from South Creek, with no artefacts identified in the westernmost crest more than 200m from the creek. The test results confirmed that areas adjacent to South Creek not subject to contemporary land use disturbances or affected by natural processes such as flooding and erosion, contain high potential for further high or moderate density subsurface archaeological deposits.

Site Name: EDU South Creek AFT 1
AHIMS ID: 45-5-5734

This site comprised a subsurface archaeological deposit identified during the current PACHCI Stage 3 test excavation program at PAD area identified during initial PACHCI Stage 2 assessment (KNC-PAD4-18). The PAD was identified across an extensive alluvial flat on the eastern side of South Creek, north of Elizabeth Drive dissected by several small drainage lines. Artefact density across the tested area was generally low (mean 5.1/m²), however the majority of squares contained artefacts and four test squares spread across the site area contained more moderate densities of 12 artefacts/m². Artefacts included silcrete, IMT and FGSdebitage with one backed artefact and one usewear flake present.

Archaeological material was mostly located between 10 and 20cm depth however artefacts >30cm depth were recovered from relatively intact deep alluvial deposits within 150 metres of South Creek. Some disturbance was evident in the upper 20cm from contemporary land use. It was considered likely that further archaeological deposits are located within elevated, raised flat areas across the site, particularly adjacent to South Creek.

Site Name: PAD 2001-6
AHIMS ID: 45-5-3999

PAD 2001-6 comprises an isolated subsurface artefact recovered during the test excavation program for the current PACHCI Stage 3 investigation. The site was originally recorded as an area of archaeological potential during a survey in 2010 across a low gradient landform on the south western corner of Elizabeth Drive and Devonshire Road. The site card notes the area was assessed only from the property boundary and it was subsequently registered on AHIMS.

The test program revealed localised disturbances across the PAD area, including truncated topsoils to the east and buried asbestos-containing materials (ACM) to the south. More intact profiles were found in the north west with one medial flake fragment of IMT recovered from a single test square in this area. The isolated artefact was typical of background scatter of lost/discarded cultural material from the general area. The remainder of the area displayed very low archaeological potential and is not a PAD.

Site Name: EDU Kemps Creek AFT 1
AHIMS ID: 45-5-5735

This site comprises a subsurface artefact deposit identified during testing for the current PACHCI Stage 3 investigation. Testing was undertaken across the area previously identified by Brayshaw (1995) as PAD 4, across the landforms immediately adjacent to Kemps Creek north of Elizabeth Drive. Three distinct landform elements within the PAD were subject to test excavations: the alluvial flat to the east of Kemps Creek, and the floodplain and raised flat to the west of Kemps Creek. The alluvial flat was found to be heavily disturbed, both by flooding and contemporary land use which has truncated and disturbed soils. Shallow soils affected by waterlogging were encountered within the floodplain west of Kemps Creek. No cultural material was recovered from testing of these landforms.

An extensive area of sheet erosion with at least 30 surface artefacts was identified [REDACTED] during the test program. Artefacts included silcrete, IMT, petrified wood and quartz flakes, flaked fragments and cores. Test excavation was completed in areas south of this surface scatter in order to determine if intact soils with associated archaeological deposits were present. Two further surface artefacts were identified in the vicinity of the test squares. All excavated squares on the raised flat contained subsurface cultural material, with a mean density of 8.6 artefacts/m² from this part of the test area and a peak density of 28/m² at one test square. Soils were relatively intact with some surface disturbance and historical rubbish mixed into the upper profile, with artefacts occurring up to 30cm deep. The assemblage included cortical silcrete and IMT, two backed blades (broken) and a retouched flake. The confirmed presence of both surface and subsurface cultural material indicates that the artefact bearing deposits (despite some levels of previous disturbance) are likely to extend across the rest of elevated flat landform along the western side of the creek.

Site Name: Mamre Road Kemps Creek AFT 1
AHIMS ID: 45-5-5478

Mamre Road Kemps Creek AFT 1 comprised a very low density surface scatter of two artefacts identified during a survey in 2022. The site is partially located within the current study area along the western side of Mamre Road, approximately [REDACTED]. One silcrete core and one proximal flake fragment were identified on exposures [REDACTED]. Minor tributaries of Kemps Creek were located to the north and south of the gentle upper slopes of the hilltop containing the site. The majority of the site was truncated and disturbed by property driveways, parking areas, vehicle tracks and above ground and underground services. Potential for intact subsurface archaeological deposit to remain in the road verge at the site location was low.

Site Name: KC/ED2
AHIMS ID: 45-5-2310

This site was identified during Brayshaw's Elizabeth Drive EIS survey in 1995, on the southern edge of the Elizabeth Drive road easement east of Mamre Road. The site comprised an open artefact scatter of five artefacts in a disturbed area along a vehicle track west of the transmission line. It was considered that the artefacts had been exposed during the laying of a telecommunications line and the artefacts showed some damage from bulldozing along the track. Artefacts were dispersed, recorded along a 70-80 metre length of track in an area approximately 30 metres across. The area had little to no topsoil remaining and was considered to be disturbed. Artefacts included a mudstone backed blade with a broken tip, and debitage of silcrete, quartz and mudstone (IMT). Archaeological potential was assessed as low due to the very low surface artefact density and high levels of disturbance. This site was revisited and reassessed during archaeological investigations for the M12 Motorway EIS (Jacobs 2019). No artefacts were relocated and disturbance of the area was noted.

Site Name: CP AS1 / P-CP9
AHIMS ID: 45-5-4374 / 45-5-2307

P-CP 9 was identified [REDACTED] during field survey for the Western Sydney Orbital (now M7 Motorway) in 1995. The site comprised two artefacts each of silcrete, mudstone and igneous and one quartz, recorded along an approximately 130 metres stretch of the same disturbed access track as KC/ED2 ([REDACTED]). Three artefacts were bipolar cores with the remainder being debitage. The site was positioned on the southern slope of a ridge crest cut by Elizabeth Drive. Potential for intact deposit was assessed as low due to high levels of disturbance.

CP AS1 was recorded during another survey in 2014 slightly further north west along the same disturbed vehicle/infrastructure route as PCP-9. Silcrete and one IMT artefacts were identified in disturbed exposures along approximately 45 metres of the track alignment, close to and partially overlapping the original recorded site extent of P-CP 9. The area was described as disturbed. The archaeological assessment for the M12 Motorway EIS considered PCP-9 and CP AS 1 (AHIMS 45-5-4374) to form part of the same site, given the very close proximity and shared site context of the original recordings. This assessment is supported by previous investigations and the PACHCI Stage 3, with archaeological potential assessed as low due to high levels of disturbance.

7 Cultural Heritage Values and Statement of Significance

7.1 Significance assessment criteria

One of the primary steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984, Pearson and Sullivan 1995:7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations, as the nature of what is conserved and why, also changes over time.

Significance assessments can generally be described under three broad headings (Pearson and Sullivan 1995:7):

- value to groups such as Aboriginal communities
- value to scientists and other information gatherers
- value to the general public in the context of regional, state and national heritage.

The assessment of significance is a key step in the process of impact assessment for a proposed activity as the significance or value of an object, site or place will be reflected in resultant recommendations for conservation, management or mitigation.

The *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a) requires significance assessment according to criteria established in the *Australia ICOMOS Burra Charter* (Australia ICOMOS 2013). The *Burra Charter* and its accompanying guidelines are considered best practice standard for cultural heritage management, specifically conservation, in Australia. Guidelines to the *Burra Charter* set out five criteria for the assessment of cultural significance:

- Aesthetic value - relates to the sense of the beauty of a place, object, site or item;
- Historic value - relates to the association of a place, object, site or item with historical events, people, activities or periods;
- Scientific value - scientific (or research) value relates to the importance of the data available for a place, object, site or item, based on its rarity, quality or representativeness, as well as on the degree to which the place (object, site or item) may contribute further substantial information; and
- Social value - relates to the qualities for which a place, object, site or item has become a focus of spiritual, political, national or other cultural sentiment to a group of people. In accordance with the *Heritage NSW Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*, the social or cultural value of a place (object, site or item) may be related to spiritual, traditional, historical or contemporary associations. "Social or cultural value can only be identified through consultation with Aboriginal people" (OEH 2011a:8).
- Spiritual value - refers to the intangible values and meanings embodied in or evoked by a place which make it important to the spiritual identity, traditional knowledge, art or practices of a cultural group. Spiritual value is strongly connected to social value.

Significance assessment for identified archaeological sites focusses on the social/spiritual, historic, scientific and aesthetic significance of Aboriginal heritage values as identified in *The Burra Charter* (Australia ICOMOS 2013). The identification of significance is developed in consultation with the registered Aboriginal stakeholders. Assessed values for the site within the study area are detailed below.

7.1.1 Cultural / social values

This area of assessment concerns the value/s of a place, feature or site to a particular community group, in this case the local Aboriginal community. Aspects of social significance are relevant to sites, objects and landscapes that are important or have become important to the local Aboriginal community. This importance involves both traditional links with specific areas as well as an overall concern by Aboriginal people for sites generally and their continued protection. Aboriginal cultural significance may include social, spiritual, historic and archaeological values and is determined by the Aboriginal community. It has been identified during the consultation process that the local area has cultural heritage value (social value) to the registered Aboriginal stakeholders and the wider Aboriginal community.

No specific cultural/social values for the archaeological sites identified within the study area were provided by RAPs following the draft CHAR review period.

7.1.2 *Historic values*

Community consultation and historical research have not identified any information regarding specific historical significance of identified Aboriginal archaeological sites in or near the study area. No specific historical values for the archaeological sites identified within the study area were provided by RAPs following the draft CHAR review period. Archaeologically, the study area does not contain these values in relation to Aboriginal heritage.

7.1.3 *Scientific / archaeological values*

For archaeologists, scientific significance refers to the potential of a site to contribute to current research questions. Alternately, a site may be an in situ repository of demonstrably important information, for example rare artefacts of unusually high antiquity.

Scientific significance is assessed using criteria to evaluate the contents of a site, state of preservation, integrity of deposits, representativeness of the site type, rarity/uniqueness and potential to answer research questions on past human behaviour. Heritage NSW's recommended criteria for assessing archaeological significance include:

- Archaeological Research Potential - significance may be based on the potential of a site or landscape to explain past human behaviour and can incorporate the intactness, stratigraphic integrity or state of preservation of a site, the association of the site to other sites in the region (connectivity), or a datable chronology.
- Representativeness - all sites are representative of those in their class (site type/subtype) however the issue here relates to whether particular sites should be conserved to ensure a representative sample of the archaeological record is retained. Representativeness is based on an understanding of the regional archaeological context in terms of site variability in and around the study area, the resources already conserved and the relationship of sites across the landscape.
- Rarity – which defines how distinctive a site may be, based on an understanding of what is unique in the archaeological record and consideration of key archaeological research questions (i.e., some sites are considered more important due to their ability to provide certain information). It may be assessed at local, regional, state and national levels.

High significance is usually attributed to sites which are so rare or unique that the loss of the site would affect our ability to understand an aspect of past Aboriginal use/occupation of an area. In some cases, a site may be considered highly significant because it is now rare due to destruction of the archaeological record through development.

Moderate (medium) significance is attributed to sites which provide information on an established research question. Sites with moderate significance are those that offer the potential to yield information that will contribute to the growing holistic understanding of the Aboriginal cultural landscape of the project area. Archaeological investigation of moderately significant sites will contribute knowledge regarding site type interrelationships, cultural use of landscape features and occupation patterns.

Low significance is attributed to sites which cannot contribute new information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents.

7.1.4 *Aesthetic values*

Aesthetic values are often closely related to the social values of a site or broader cultural landscape. Aspects may include scenic sights, smells and sounds, architectural fabric and creative aspects of a place. The study area displays a low level of aesthetic value in relation to Aboriginal heritage. European land use practices, drainage modifications and dams, construction and development, vegetation clearance and existing road construction have altered the natural landscape within and around the identified Aboriginal archaeological sites.

The more significant sites maintain something of a spatial relationship with adjacent waterways including Oaky/Cosgroves, Badgerys, South and Kemps Creeks, but the primary aesthetic connection of this landscape has been lost. No specific aesthetic values for the sites within the study area were provided by the RAPs following the review of the draft CHAR.

7.2 Statements of Significance

The project assessed 11 extant identified Aboriginal archaeological sites within the study area (incorporating 15 AHIMS registrations). The scientific significance of recorded Aboriginal archaeological sites ranges from low to moderate. This assessment is based on a consideration of the research potential, representativeness, intactness and rarity of the sites. Assessed significance is listed in Table 4.

Sites of low significance demonstrated few Aboriginal objects, low artefact densities and high levels of landscape disturbance. Recovered artefacts were typical of local assemblages in terms of raw material and artefact type and the sites did not demonstrate particular assemblage complexity or variety. At the low significance sites, artefacts were found at very low densities, dispersed across the site area, indicating that the objects represented a discontinuous 'background scatter' of objects across the landscape or former deposits dispersed by disturbance and/or erosion. In this regard these sites may be considered representative of their type, being surface and subsurface deposits representing Aboriginal activities across the South Creek valley and foothills to the east, however more intact and better examples of this site type are present both within the study area and wider region. The sites are not rare. Higher levels of landscape disturbance were also evident. While Aboriginal objects are present at the sites, they lack the archaeological context that gives them meaning beyond the information exhibited by the objects themselves. Research potential is low as the sites are unlikely to be able to contribute further to our understanding of Aboriginal landscape use in the region, beyond the information already exhibited by the objects themselves or recovered as a result of the test excavation program.

Sites that display moderate significance demonstrate higher quality archaeological information, greater density of artefacts and/or less severe landscape disturbance. Archaeological integrity of moderate significance sites is higher than low significance sites, with generally intact soils. Given the nature of land use along the wider project corridor (agricultural, pastoral, infrastructure etc.) and the natural effects of flooding, erosion and soil movement, this increases the value of sites which retain archaeological context and integrity. Assemblages from moderate significance sites demonstrate higher levels of complexity of artefact types and raw materials and include a number of tools. The moderately significant sites are also located in spatially significant locations along the major creek corridors; representing good examples of the landform types considered most archaeologically sensitive for the Cumberland Plain region.

Based on the values assessment, the following levels of significance were attached to the Aboriginal archaeological sites within the study area, as summarised in Table 4 below.

Table 4. Summary of significance of archaeological features located in the study area

| Name | AHIMS | Site Feature | Assessed significance |
|--|-----------------------------------|--------------|-----------------------|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Artefact | Moderate |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Artefact | Moderate |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Artefact | Low |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Artefact | Low |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Artefact | Moderate |
| EDU South Creek AFT 1 | 45-5-5734 | Artefact | Moderate |
| PAD 2001-6 | 45-5-3999 | Artefact | Low |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Artefact | Moderate |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Artefact | Low |
| KC/ED2 | 45-5-2310 | Artefact | Low |
| CP AS1 / P-CP9 | 45-5-4374 / 45-5-2307 | Artefact | Low |

8 Impact Assessment

8.1 The proposed activity

The proposed Elizabeth Drive upgrade works will occur between The Northern Road at Luddenham and approximately 600m west of Cecil Road at Cecil Hills. The proposed works comprise an upgrade from a two-lane road, to a four-lane road (two lanes in each direction) with provision of a central median to allow for widening to six lanes in the future. The works are anticipated to be along the existing road reserve corridor however widening beyond the current corridor width will be required.

The main components of the proposed Elizabeth Drive Upgrade project include:

- Upgrade of about 11.4 kilometres of Elizabeth Drive from two lanes to four lanes between The Northern Road at Luddenham and about 600 metres east of Duff Road at Cecil Hills, including a central median (which would allow for potential future upgrade to six lanes)
- New bridges over Cosgroves Creek, Badgerys Creek, South Creek and Kemps Creek
- Upgrades to six road intersections on Elizabeth Drive at Luddenham Road; Martin Road; Western Road; Salisbury Avenue; Mamre Road; Range Road; and Duff Road
- Active transport provision along the full corridor with the inclusion of shared paths along both sides of the Elizabeth Drive corridor.

The study area also includes areas identified for use as construction compounds and other ancillary areas required to support construction of the project, including areas required for bridge work, access for construction vehicles and plant, drainage infrastructure, key utilities and services adjustments, temporary stockpiles, temporary property adjustments and temporary ancillary facilities. It is considered that the proposed activities would disturb the ground surface within the entirety of the study area.

8.2 Impact reduction/avoidance

Transport is committed to seeking project outcomes that protect and preserve Aboriginal heritage wherever possible. Early identification of Aboriginal heritage in the assessment process allows this to be considered during design where there is construction flexibility along the route. For the current project, the proposed route is largely constrained by topography/hydrology and the location of the existing Elizabeth Drive corridor and surrounding development including the Western Sydney Airport. A larger study area corridor was assessed for the initial PACHCI Stage 2 in order to ensure Aboriginal heritage values in the immediate vicinity were captured during the assessment process. Detailed review of other archaeological investigations undertaken in the immediate area has also allowed for a clear understanding of the archaeological landscape.

Locating the proposed infrastructure upgrade along the same corridor previously disturbed by road construction and various services reduces the overall environmental impact of the project, in comparison to the construction of a new road. This results in a partial level of impact to most of the moderate significance sites identified adjacent to these disturbed corridors. This reduces the overall impact to Aboriginal cultural heritage; however, some level of impact is unavoidable due to the position of the existing road and presence of Aboriginal objects within the disturbed easement.

NB. Several portions of the study area are overlapped by existing approvals for major infrastructure projects, including the M12 Motorway (SSI 9364), AWRC (SSI 8609189) and the Western Sydney Airport (Figure 7). These approvals are active/current where they intersect the current study area, and include conditions related to Aboriginal heritage considerations within their boundaries. These areas are therefore excluded from impact assessment for the current project, and Transport must ensure that any works for the current project undertaken within these existing approval areas comply with all relevant conditions.

8.3 Proposed impacts to Aboriginal archaeological sites

Background research and field assessment under Stages 2 and 3 of the PACHCI have identified 11 Aboriginal archaeological sites (comprising 15 AHIMS registrations) at least partially within the study area. Sites display a range of archaeological value and have been assessed as displaying scientific significance varying from moderate to low.

The impact assessment is shown in Figure 7. While conservation and avoidance are the best approach when considering Aboriginal heritage, some level of ground disturbance and impact to the identified archaeological sites is unfortunately unavoidable due to the construction requirements of the road upgrade and topographic context of the sites.

Proposed impacts to the Aboriginal archaeological sites within the study area (based on a corridor-wide assessment and excluding existing approval areas) are detailed in Table 5 and shown in Figure 7.

Table 5. Impact of proposed activities on Aboriginal archaeological sites within the study area

| Name | AHIMS | Nature/Extent of Impact | Significance of Impact | Consequence of Impact |
|--|-----------------------------------|-------------------------|------------------------|-----------------------|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Direct / Partial | Moderate | Partial loss of value |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Direct / Partial | Moderate | Partial loss of value |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Direct / Total | Low | Total loss of value |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Direct / Total | Low | Total loss of value |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Direct / Partial | Moderate | Partial loss of value |
| EDU South Creek AFT 1 | 45-5-5734 | Direct / Total | Moderate | Total loss of value |
| PAD 2001-6 | 45-5-3999 | Direct / Total | Low | Total loss of value |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Direct / Total | Moderate | Total loss of value |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Direct / Partial | Low | Partial loss of value |
| KC/ED2 | 45-5-2310 | Direct / Total | Low | Total loss of value |
| CP AS1 / P-CP9 | 45-5-4374 / 45-5-2307 | Direct / Total | Low | Total loss of value |

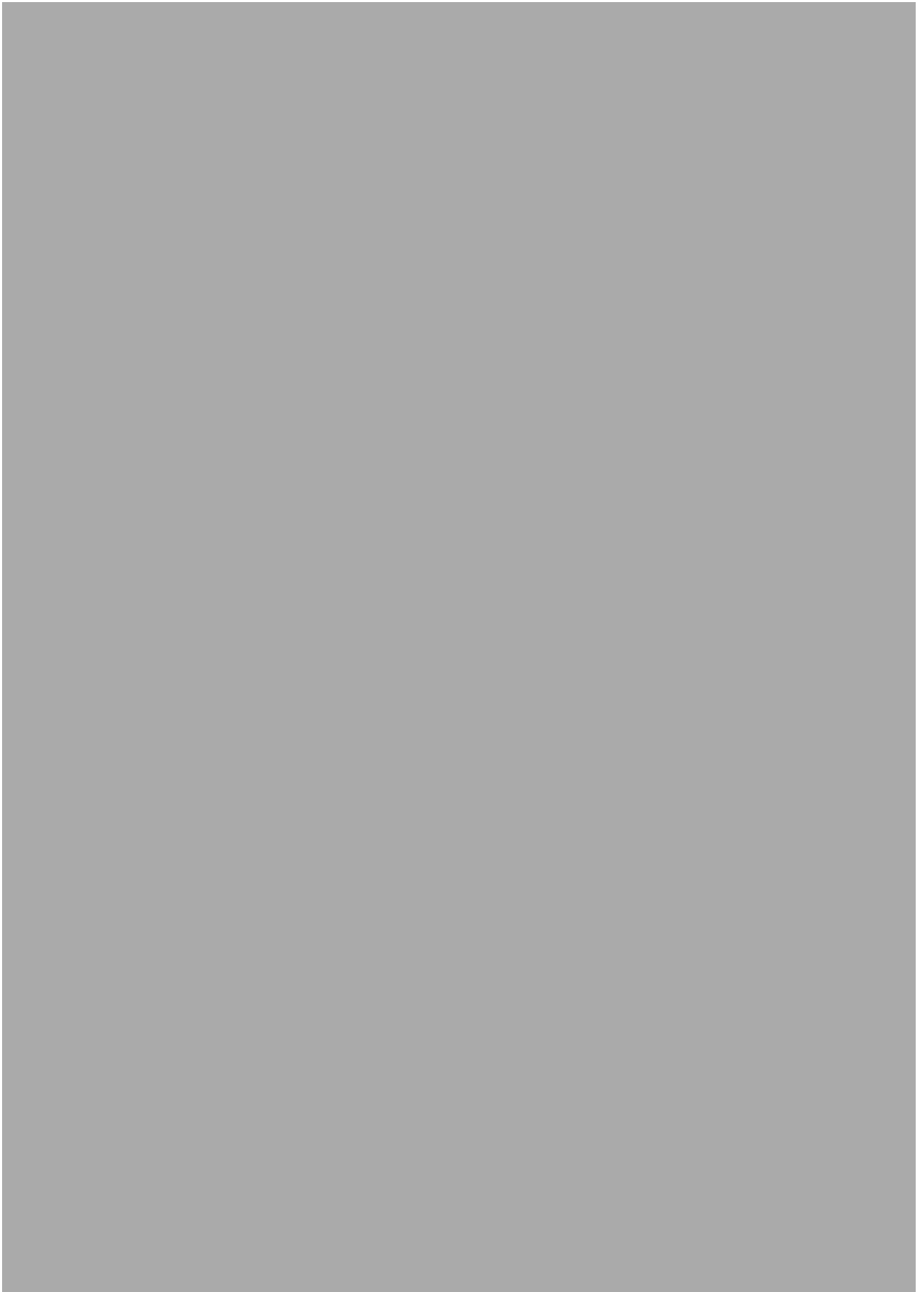


Figure 7. Study area (impact area) and Aboriginal heritage including existing approvals

9 Mitigating Harm

9.1 Ecologically Sustainable Development Principles

The CHAR has evaluated the potential harm of the project on Aboriginal archaeological heritage in terms of Ecologically Sustainable Development (ESD). The principles of ESD are defined in Section 6 of the NSW *Protection of the Environment Administration Act 1991*. The ESD principles relevant to Aboriginal cultural heritage within the proposal area are the Precautionary Principle and the Principle of Inter-Generational Equity. The application of these principles in relation to the current proposal is discussed below.

9.1.1 The Precautionary Principle

The Precautionary Principle states “that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.

The identified Aboriginal archaeological sites have been considered by Transport in relation to the proposed road upgrade construction and associated activities. A larger area was investigated as part of the initial PACHCI Stage 2 assessment in order to provide options for Aboriginal archaeological site avoidance where possible. Refinement of the original corridor as part of the long term project planning process has enabled avoidance of several sites. The subsequent updated PACHCI Stage 2 investigation included additional archaeological field survey and assessment, and PACHCI Stage 3 assessment further clarified the nature of existing recorded sites, and refined the areas identified as requiring further investigation. The subsequent Aboriginal archaeological test excavation program was designed to collect additional information within the proposed impact corridor, to provide a better understanding of potential site impacts without impacting unduly on adjacent areas which are being avoided.

Involvement of Aboriginal stakeholders in the assessment process including participation in fieldwork components (survey and test excavations) has also allowed for consideration of Aboriginal cultural values throughout the investigation process. While conservation is the best approach when considering Aboriginal heritage, the complete avoidance of all Aboriginal archaeological sites within the study area was not possible due to the requirements of the proposal and limited area in which it could occur.

The Aboriginal sites located within the proposed impact area have all been impacted to some degree by natural processes and by past landuse activities and would continue to be impacted by these factors regardless of impacts from the proposal. Scientific confidence regarding the condition, nature and extent of the sites has been achieved through archaeological investigations which have included both archaeological field survey, test excavation and detailed review of existing data available for previously recorded sites including excavation results from major projects such as the M12 Motorway and Western Sydney Airport. Aboriginal cultural heritage value confidence has been achieved through consultation with Aboriginal stakeholders. As detailed in Sections 6 and 7, it has been determined that the wider study area contains Aboriginal archaeological sites displaying from low to moderate assessed significance. The CHAR assessment provides a comprehensive understanding of the identified Aboriginal cultural heritage features and their significance, and enables a high level of confidence in the recommended management measures that follow.

9.1.2 The Principle of Inter-Generational Equity

The Principle of Inter-Generational Equity states “that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations”.

The archaeological sites located within the study area were evaluated in relation to intergenerational equity and in particular, the cumulative impact of the proposal on the Aboriginal heritage of the region. As discussed in Sections 4 and 6, previous archaeological investigations have identified the presence of Aboriginal archaeological sites in the local area and wider region that predominantly contain the same site features as the sites identified within the study area, being dominated by artefact sites (surface and subsurface) of varying densities and extents. These occur in landscape contexts similar to those investigated during the current study, with higher density sites located along suitable landforms in proximity to the larger creeks, and a sparser distribution on the slopes and crests dividing the creek catchments.

Many of the previously recorded Aboriginal archaeological sites have subsequently been impacted to some degree by residential, commercial/industrial development and infrastructure corridors; however, elevated landforms in close proximity to South Creek and its tributaries retain potential for archaeological deposits containing high archaeological significance and have been largely avoided by urban expansion, instead forming part of riparian corridors or open space. Taken together, the sites within the study area provide a cross-section of typical site types and locations across the South Creek valley. Moderately high levels of disturbance across the study area are also typical for an existing road corridor and adjacent lands in this part of south western Sydney, which has a long history of European settlement and alteration to the landscape.

Existing road corridors, buried infrastructure, vegetation clearance, drainage modifications and damming of creeklines, installation of vehicle tracks, erosion, colluvial movement and flooding have all affected the study area and its archaeology to some degree and would continue to do so regardless of whether the proposed upgrade is undertaken.

Ongoing development and provision of infrastructure within this part of south western Sydney is intensifying due to development of the Western Sydney Airport and surrounding aerotropolis precincts. The majority of the study area is located within the disturbed road corridor and easement of the existing Elizabeth Drive alignment. An upgrade to the existing road alignment rather than construction of a new route reduces the overall cumulative impact of the proposal on the surrounding environment and Aboriginal cultural landscape. It also provides for more efficient integration of the existing road with the major transport infrastructure projects (both completed and underway) in the surrounding area, including the M12 Motorway, Sydney Metro Western Sydney Airport, The Northern Road upgrade and the airport precinct itself. Use of existing approvals and areas of impact for other projects where possible also reduces the overall cumulative impact footprint of the Elizabeth Drive upgrade.

Management measures to ensure non-impacted portions of sites are avoided by the proposed activities will be also be implemented (protective fencing, identification in the CEMP, toolbox talks).

9.2 Mitigation measures

The proposal area contains 11 Aboriginal archaeological sites (comprising 15 AHIMS registrations). Recommendations for the mitigation of impacts to the identified Aboriginal archaeological sites have been developed based on the principles of Ecologically Sustainable Development (ESD), environmental context and condition, background research and consultation with registered Aboriginal stakeholders.

The impacted Aboriginal archaeological sites EDU Badgerys Creek IF 1, Elizabeth Precinct Artefact Scatter 05 (EP AS 05), PAD 2001-6, Mamre Road Kemps Creek AFT 1, KC/ED2, and CP AS1 / P-CP9 are considered to display low archaeological value and significance. The sites display higher levels of disturbance and a paucity of Aboriginal objects. They do not display potential for intact associated deposit and have low research potential. Archaeologically, the sites do not warrant further investigation. Archaeological significance of harm to these sites is considered to be low and does not warrant non-practicable avoidance or mitigation.

The impacted portions of sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), EDU South Creek AFT 1 and EDU Kemps Creek AFT 1 are considered to display moderate significance based on their scientific value and potential to inform on Aboriginal landscape use of South Creek and its tributaries. The significance of harm to the portions of the sites within the study area is moderate, given the sites' overall moderate archaeological significance.

The archaeological value of the sites is linked to the information that they contain. Recovery of this information through archaeological salvage excavation would help to mitigate the impact of the proposal and offer an opportunity to better understand the activities which were undertaken at these sites and the effect of land use disturbance and natural processes on subsurface archaeological deposits in the vicinity of South Creek. The loss of intrinsic Aboriginal cultural value of impacted sites cannot be offset or mitigated; however, the salvaged information will assist in a better understanding of and future management of archaeological sites in the region.

It is noted that registered Aboriginal stakeholders also place cultural value on the material objects (artefacts) identified through the archaeological investigations for this project. Community surface collection is therefore recommended for the sites where surface artefacts have previously been identified. Long-term storage and management of any collected objects would be determined in consultation with Aboriginal stakeholders.

Management measures should be implemented for Aboriginal objects and parts of archaeological sites situated outside the proposal area to ensure avoidance of objects not covered by an AHIP. Management measures to be implemented include protective fencing and identification of 'no-go zones' on maps within the Construction Environmental Management Plan.

An AHIP is required for impacts to land and identified sites/objects prior to the commencement of pre-construction or construction activities associated with the proposal that would affect the sites. Measures for mitigating harm to the sites are outlined in Table 6 below.

Table 6. Mitigation measures for impacted Aboriginal site

| Name | AHIMS | Significance of Impact | Mitigating Harm |
|--|-----------------------------------|------------------------|--|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Moderate | <ul style="list-style-type: none"> Archaeological salvage excavation of impacted portion of site. AHIP required prior to commencement of works affecting the site. Barrier fencing to be erected on the AHIP boundary to ensure that no construction impact extends into the portion of the site outside the proposal area. Portion of site outside of proposal area should be identified on the CEMP as environmentally sensitive no-go zone to ensure no impact. |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Moderate | <ul style="list-style-type: none"> Archaeological salvage excavation of impacted portion of site. AHIP required prior to commencement of works affecting the site. Barrier fencing to be erected on the AHIP boundary to ensure that no construction impact extends into the portion of the site outside the proposal area. Portion of site outside of proposal area should be identified on the CEMP as environmentally sensitive no-go zone to ensure no impact. |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Low | <ul style="list-style-type: none"> Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Low | <ul style="list-style-type: none"> Community collection of surface artefacts. Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Moderate | <ul style="list-style-type: none"> Archaeological salvage excavation of impacted portion of site. AHIP required prior to commencement of works affecting the site. Barrier fencing to be erected on the AHIP boundary to ensure that no construction impact extends into the portion of the site outside the proposal area. Portion of site outside of proposal area should be identified on the CEMP as environmentally sensitive no-go zone to ensure no impact. |
| EDU South Creek AFT 1 | 45-5-5734 | Moderate | <ul style="list-style-type: none"> Archaeological salvage excavation of impacted portion of site. AHIP required prior to commencement of works affecting the site. |
| PAD 2001-6 | 45-5-3999 | Low | <ul style="list-style-type: none"> Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Moderate | <ul style="list-style-type: none"> Archaeological salvage excavation of impacted portion of site. AHIP required prior to commencement of works affecting the site. |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Low | <ul style="list-style-type: none"> Community collection of surface artefacts. Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. Barrier fencing to be erected on the AHIP to ensure that no construction impact extends into the portion of the site outside the proposal area. Portion of site outside of proposal area should be identified on the CEMP as environmentally sensitive no-go zone to ensure no impact |
| KC/ED2 | 45-5-2310 | Low | <ul style="list-style-type: none"> Community collection of surface artefacts. Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. |
| CP AS1 / P-CP9 | 45-5-4374 / 45-5-2307 | Low | <ul style="list-style-type: none"> Community collection of surface artefacts. Archaeological mitigation not required. AHIP required prior to commencement of works affecting the site. |

10 Summary and Recommendations

Review of background information, Aboriginal community consultation, and archaeological assessment has resulted in the identification of 11 Aboriginal archaeological sites (comprising 15 AHIMS registrations) within the Elizabeth Drive Upgrade study area. An AHIP is being sought for Aboriginal objects within the boundaries of the proposal area, incorporating the Aboriginal archaeological sites listed in Table 7.

No known current or future AHIPs exist within the area which is the subject of this application. The proposed works overlap several areas which have been previously assessed for Aboriginal cultural heritage values and are covered under existing major infrastructure approvals (M12 Motorway, The Northern Road, Western Sydney Airport and AWRC, refer Figures 7 and 8). Any works related to the current proposal undertaken within existing approval areas will be required to comply with the existing approval conditions, including those related to Aboriginal heritage. These areas have been excluded from the AHIP application area.

Aboriginal Heritage Impact Permit

An application for an Aboriginal Heritage Impact Permit should be made under section 90A of the *National Parks and Wildlife Act 1974* for the land and associated objects within the boundaries of the Elizabeth Drive Upgrade study area, excluding the existing approval areas (Figure 8). The application should be prepared in accordance with the Heritage NSW *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants* (OEH 2011b). The AHIP should be sought for the specified Aboriginal sites and Aboriginal objects contained within the sites listed below in Table 7.

Table 7. Aboriginal archaeological sites and scope of AHIP

| Name | AHIMS | Scope of AHIP | Type of Harm |
|--|--------------------------------------|---------------|---|
| Elizabeth Drive/Adams Road AFT 1 | 45-5-5105 | Partial | Direct harm Salvage excavation Community collection |
| Badgerys West B (BWB) / Elizabeth Drive AFT 2 | 45-5-5298 / 45-5-5240 | Partial | Direct harm Salvage excavation Community collection |
| EDU Badgerys Creek IF 1 | 45-5-5733 | Whole | Direct harm |
| Elizabeth Precinct Artefact Scatter 05 (EP AS 05) | 45-5-5660 | Whole | Direct harm Community collection |
| Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) | 45-5-5259 / 45-5-5330 / 45-5-5236 | Partial | Direct harm Salvage excavation Community collection |
| EDU South Creek AFT 1 | 45-5-5734 | Whole | Direct harm Salvage excavation |
| PAD 2001-6 | 45-5-3999 | Whole | Direct harm |
| EDU Kemps Creek AFT 1 | 45-5-5735 | Whole | Direct harm Salvage excavation |
| Mamre Road Kemps Creek AFT 1 | 45-5-5478 | Partial | Direct harm Community collection |
| KC/ED2 | 45-5-2310 | Whole | Direct harm Community collection |
| CP AS1 / P-CP9 | 45-5-4374 / 45-5-2307 | Whole | Direct harm Community collection |

Salvage Excavation

The AHIP would include provision for impact mitigation through archaeological salvage excavation. Salvage excavation would be required within the impacted portions of sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), EDU South Creek AFT 1 and EDU Kemps Creek AFT 1.

Salvage excavation must be completed prior to any activities (including pre-construction activities) which may harm Aboriginal objects at these locations. Salvage excavation activities would be undertaken in accordance with the methodology attached as Appendix D.

Community Collection

The AHIP would include provision for community collection at sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Precinct Artefact Scatter 05 (EP AS 05), Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), Mamre Road Kemps Creek AFT 1, KC/ED2 and CP AS1 / P-CP9.

Community collection must be completed prior to any activities (including pre-construction activities) which may harm Aboriginal objects at these locations. Community collection activities would be undertaken in accordance with the methodology attached in Appendix D.

Site Protection

The boundary of the AHIP area adjacent to the non-impacted portion of sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) and Mamre Road Kemps Creek AFT 1 should be demarcated with protective fencing and listed in the CEMP. These areas should be identified as “no-go zones” on the CEMP maps and workers inducted as to appropriate protection measures and requirements to comply with conditions in the adjacent AHIP.

Collected/Salvaged Aboriginal Objects

The short term management of collected Aboriginal objects is as follows:

- Any Aboriginal objects that are removed from the land by actions authorised by an AHIP, must be moved as soon as practicable to the temporary storage location (see below) pending any agreement reached about the long term management of the Aboriginal objects.
- The temporary storage location would be: Kelleher Nightingale Consulting Pty Ltd, Suite 505-507, 155 King Street, Sydney NSW 2000.
- Any Aboriginal objects stored at the temporary storage location must not be further harmed, except in accordance with the conditions of the AHIP.

Long-term storage and management of any collected objects would be determined in consultation with Aboriginal stakeholders. Recovered objects may be held by the Aboriginal community under a Care Agreement or reburied. If reburial is to take place, registered Aboriginal stakeholders would be notified and given the opportunity to attend, and the reburial recorded on AHIMS.

Requirement 26 “Stone artefact deposition and storage” in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (24 September 2010, available online at: <http://www.environment.nsw.gov.au/resources/cultureheritage/10783FinalArchCoP.pdf>) must be complied with.

Procedure for Unexpected Archaeological Finds

The Transport for NSW *Unexpected Archaeological Finds Procedure* (2022) will be used in the event of uncovering an unexpected archaeological find during Transport activities.

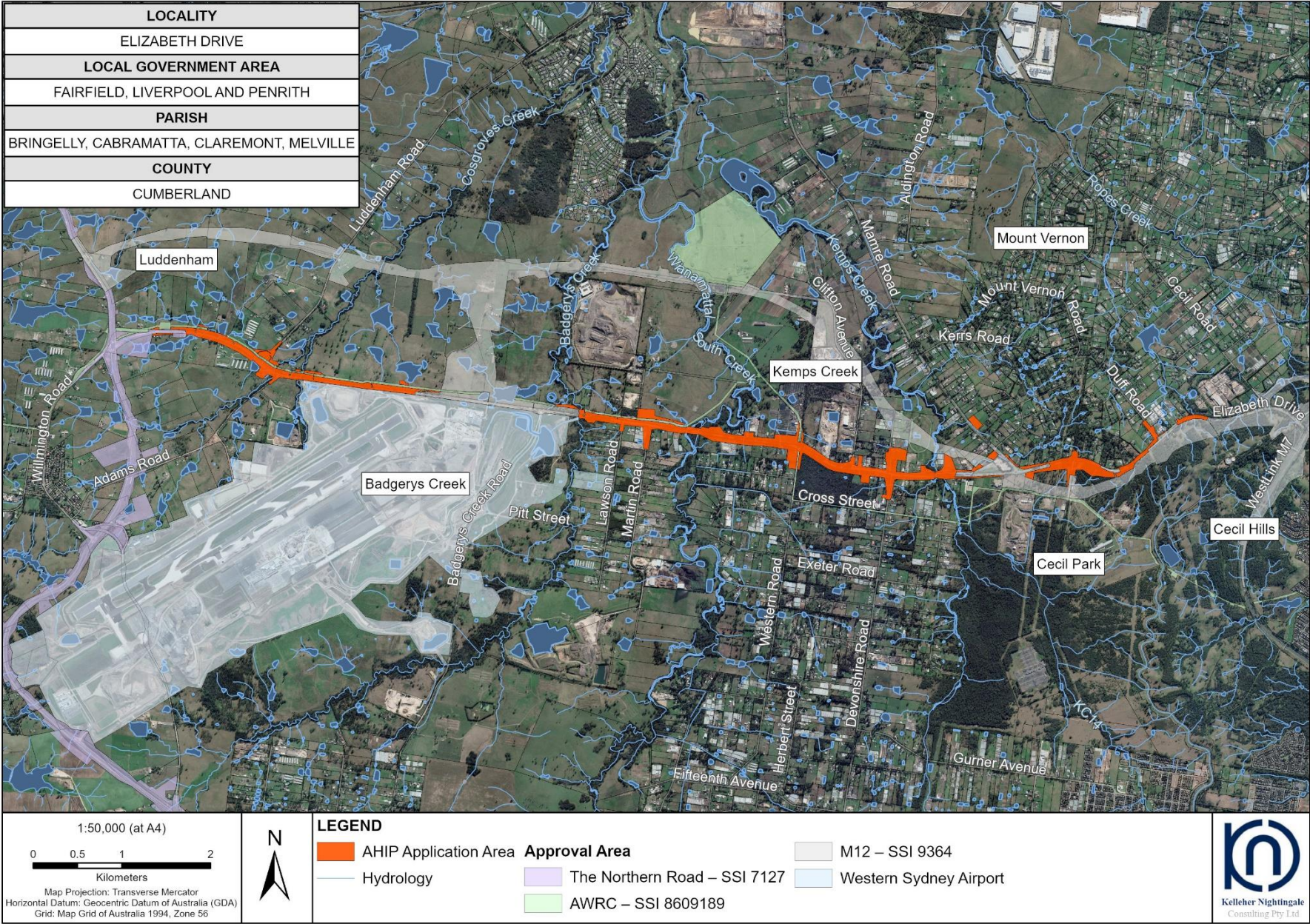



Figure 8. AHIP application area boundary

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Appendix A Advertisement for registration of interest




Aboriginal Heritage Elizabeth Drive Upgrade Project Site Investigations

Transport for NSW invites Aboriginal people and Aboriginal groups who hold cultural knowledge relevant to determining the significance of Aboriginal objects and places for the Elizabeth Drive upgrade Project site investigations to register to be consulted.

The NSW Government proposes to upgrade Elizabeth Drive between The Northern Road at Luddenham and about 600 metres east of Duff Road at Cecil Hills. As part of this work, Transport is planning to conduct investigations along Elizabeth Drive to inform further design and development.

Elizabeth Drive upgrade investigation area




The proposal may result in Transport for NSW:

- Applying for an Aboriginal Heritage Impact Permit (AHIP) under Part 6 of the *National Parks and Wildlife Act 1974*, and/or
- Undertaking investigations in accordance with the *Code of practice for archaeological investigations in NSW 2010*, and/or
- Undertaking an environmental impact assessment under the *Environmental Planning & Assessment Act 1979*.

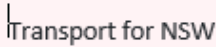

To register your interest, please contact:
 Noni Ross, Aboriginal Cultural Heritage Officer,
noni.ross@transport.nsw.gov.au
 0476 813 136

Registrations must be received by phone or in writing by Friday 16 December 2022.



Appeared in: *Koori Mail*, Wednesday 30/11/2022
Penrith Western Weekender, Friday 02/12/2022
The District Reporter, Friday 02/12/2022

Appendix B AFG Minutes

| | |
|---|--|
| <div>  </div> <div> 22 June 2023 10am – 12pm Workers Hubertus 205 Adams Road, Luddenham </div> <div>  </div> | |
| <div> <h1>Minutes</h1> <h2>Elizabeth Drive Upgrade – ACHAR</h2> </div> | |
| Chair | Noni Ross, Aboriginal Cultural Heritage Officer |
| Attendees | Noni Ross, TfNSW Terri Deunhower, TfNSW Mark Barrett, TfNSW Matthew Kelleher, KNC Vicky Slater, Wurrumay Brad Maybury, Guntawang Aboriginal Resources Inc. Krystle Elliot, Ginninderra Aboriginal Corp Paul Cummins, Woronora Plateau Gundungara Elders Council Mark Pietruszewski, Woronora Plateau Gundungara Elders Council Peter Delponte, Mundawari Heritage Consultants |
| Apologies | Raymond Weatherall, RAW Cultural Healing |
| Conflict of Interest Declarations | Nil |
| Acknowledgement to Country | Noni Ross |
| Items | |
| Item 1: Elizabeth Drive Project Overview | <ul style="list-style-type: none"> Summary of Project Overview – Mark Barrett, Senior Project Development Manager |
| Item 2: Draft Aboriginal Cultural Heritage Archaeological Assessment Report | <ul style="list-style-type: none"> Overview of ACHAR – Matthew Kelleher |
| Questions | <ul style="list-style-type: none"> Brad Maybury asked : where archaeological items were found, have they been registered as AHIMS sites. |
| 27- 31 Argyle Street, Parramatta NSW 2150 <div>1</div> | |

– Matthew Kelleher advised that this has not been done as yet.

Meeting Closed

2

Appendix C Aboriginal Community Consultation

ELIZABETH DRIVE UPGRADE: M7 MOTORWAY, CECIL HILLS TO THE NORTHERN ROAD, LUDDENHAM NSW AUGUST 2023

Record of Consultation and Consultation Log

Aboriginal cultural heritage consultation requirements for proponents 2010

Consultation for the project was undertaken directly by Transport for NSW in accordance with the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI)*

| Step | Task Requirement | Action | Outcome |
|-------|---|---|--|
| 4.1.1 | Identify if native title exists in relation to the project area. | Completed by Transport for NSW Letter sent to NNTT 17/11/2022 | Completed by Transport for NSW No relevant claims in or around the study area. |
| 4.1.2 | Ascertain, from reasonable sources of information, the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places. Compile a list of Aboriginal people who may have an interest for the proposed project area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places. | Completed by Transport for NSW Letters sent 17/11/2022 Deerubbin Local Aboriginal Land Council (DLALC); Gandangara Local Aboriginal Land Council (GLALC); DPE/Heritage NSW; NSW Aboriginal Land Council; Native Title Services Corporation (NTSCORP Limited); Office of The Registrar, <i>Aboriginal Land Rights Act 1983</i> (ORALRA) for a list of Aboriginal owners; The National Native Title Tribunal (NNTT) for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements; | Completed by Transport for NSW A list was compiled from responses of Aboriginal people who may have an interest in the study area and may hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places. |
| 4.1.3 | Written notification and advertisement: Write to the Aboriginal people whose names were obtained in step 4.1.2 and the relevant LALC(s) to notify them of the proposed project. Place a notice in the local newspaper circulating in the general location of the proposed project, explaining the project and its exact location. | Completed by Transport for NSW Wrote to the Aboriginal people whose names/groups were provided by parties listed above (letters/emails sent 30/11/2022) Advertisement placed in the following publications: <i>Koori Mail</i> , Wednesday 30/11/2022 <i>Penrith Western Weekender</i> , Friday 02/12/2022 <i>The District Reporter</i> , Friday 02/12/2022 | Completed by Transport for NSW The notification process resulted in the registration of 35 Aboriginal groups/individuals as stakeholders for the project: Deerubbin Local Aboriginal Land Council Gandangara Local Aboriginal Land Council Gunjeewong Koori Digs Yulay Cultural Services Yurrandaali Cultural Services Yurwang Gundana Cultural Heritage Services A1 Indigenous Services Pty Ltd |

| Step | Task Requirement | Action | Outcome |
|-----------------|--|--|--|
| 4.1.3 cont'd | <p>Notification by letter and newspaper must include:</p> <ul style="list-style-type: none"> (a) the name and contact details of the proponent (b) a brief overview of the proposed project that may be the subject of an application for an AHIP, including the location of the proposed project (c) a statement that the purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director-General of OEH in his or her consideration and determination of the application (d) an invitation for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation with the proposed applicant regarding the proposed activity (e) a closing date for the registration of interests. | The final closing date for registration of interest was the 16/12/2022. | <p>Didge Ngunawal Clan Wailwan Aboriginal Group RAW Cultural Healing Amanda Hickey Cultural Services Ginninderra Aboriginal Corporation Wattaka Pty Ltd Guntawang Aboriginal Resources Inc Gilay Consultants Aragung Mundawari Heritage Consultants Kamilaroi Yankuntjatjara Working Group Bariyan Cultural Connections Wori Woilywa Murra Bidjee Mullangari Muragadi Kelvin Boney Butucarbin Aboriginal Corporation Gunya Aboriginal Cultural Heritage Services Goobah Woronora Plateau Gundungara Elders Council Cubbitch Barta Wurrumay BCS Group Warrigal Cultural Services Cacatua General Services Registered Aboriginal stakeholder (details withheld) Registered Aboriginal stakeholder (details withheld)</p> |
| 4.1.4 | A minimum of 14 days from the date the letter was sent or notice published in the newspaper to register an interest. | <p>Completed by Transport for NSW</p> <p>Final closing date for registration of interest was at least 14 days from the date the letter was sent or publication of the advertisement. The final closing date for registration of interest was 16/12/2022</p> | <p>Completed by Transport for NSW</p> <p>Copy of newspaper notice attached to CHAR (Appendix A).</p> |

| Step | Task Requirement | Action | Outcome |
|-------------|--|--|---|
| 4.1.5 | Must advise Aboriginal people who are registering an interest that their details will be forwarded to Heritage NSW and the LALC unless they specify that they do not want their details released. | Completed by Transport for NSW Two Aboriginal stakeholders specified they did not want their details released. | Completed by Transport for NSW Two Aboriginal stakeholders specified they did not want their details released. |
| 4.1.6 | Make a record of the names of each Aboriginal person who registered an interest. Provide a copy of that record and copy of the notification from step 4.1.3 to Heritage NSW and LALC. | Completed by Transport for NSW List of registered stakeholders compiled. | Completed by Transport for NSW Record of registration for the project sent to LALC and Heritage NSW |
| 4.1.7 | LALCs holding cultural knowledge relevant to determining the significance of Aboriginal objects and places in the proposed project area who wish to register an interest to be involved in consultation must register their interest as an Aboriginal organisation rather than individuals. | Completed by Transport for NSW Local Aboriginal Land Councils who registered interest as an organisation. Provided contact details for the LALC. | Completed by Transport for NSW Local Aboriginal Land Councils who registered interest as an organisation. Provided contact details for the LALC. |
| 4.1.8 | Where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge has registered an interest, a contact person for that organisation must be nominated. Aboriginal cultural knowledge holders who have registered an interest may indicate they have appointed a representative to act on their behalf. Where this occurs, the registered Aboriginal party must provide written confirmation and contact details of those individuals to act on their behalf. | Completed by Transport for NSW Inform stakeholders registering their interest as an organisation that contact information and contact person must be nominated. | Completed by Transport for NSW Aboriginal stakeholders who have registered as an organisation name also provided contact details and names of representatives for each organisation. |
| 4.2 | Presentation of information about the proposed project | Completed by Transport for NSW Aboriginal stakeholders provided with specific information regarding the proposed project. | Completed by Transport for NSW |
| 4.3.1-4.3.2 | Notification of proposed assessment methodology | Completed by Transport for NSW Information regarding the proposed cultural heritage assessment methodology and proposed test excavation was sent to all registered stakeholders with an invitation to review and | Responses were received from nine stakeholders: A1 Indigenous Services Pty Ltd (A1), Gilay Consultants (Gilay), Gunjeewong, Kamilaroi-Yankuntjatjara Working Group (KYWG), Mundawari Heritage Consultants (MHC), Wailwan Aboriginal Group (Wailwan), Warragil |

| Step | Task Requirement | Action | Outcome |
|---------------------------|---|--|--|
| 4.3.1- 4.3.2 Contd. | | <p>provide comment (letters dated 27/01/2023)</p> <p>Stakeholders were provided with a 28 day period for review closing on 24/02/2023.</p> <p>The proposed assessment approach for both the CHAR and the archaeological test excavation program were included, with feedback sought from stakeholders during the review period</p> | <p>Cultural Services (Warragil), Yulay Cultural Services (Yulay) and one of the stakeholders who chose to withhold their details. Responses are attached in full in CHAR Appendix C.</p> <p>A1 stated that they had reviewed the methodology and information provided, and supported the recommendations within the document including the proposed field program (email dated 12/02/2023). [NB the full text email response provided by A1 has been omitted from Appendix C at their request].</p> <p>Gilay state that they had reviewed and agreed with the project information and proposed methodology for Elizabeth Drive (email dated 29/01/2023).</p> <p>Gunjeewong stated they were happy with the methodology (email dated 31/01/2023).</p> <p>KYWG agreed with the recommended approach in the methodology and provided some additional information on cultural values within the area (see Section 5.4) (email dated 09/02/2023).</p> <p>MHC stated that they had reviewed and supported the proposed CHAR and test excavation methodologies (email dated 28/01/2023).</p> <p>Wailwan agreed with the proposed assessment methodology for this project and the procedure of the proposed test excavation and provided some additional information (email dated 28/01/2023).</p> <p>Warragil agreed with the proposed test excavation program for the study area (email dated 29/01/2023).</p> <p>Yulay stated they had reviewed the assessment methodology and agreed with the proposed approach (email dated 14/02/2023).</p> <p>The stakeholder who chose to withhold their details acknowledged receipt of the methodology but did not provide further comment (email dated 09/02/2023).</p> |
| 4.3.3 | Gathering information about cultural significance | Aboriginal stakeholders were invited to provide information about cultural significance of the | Many registered stakeholders have been previously involved with cultural heritage assessments within the region and a high level of knowledge |

| Step | Task Requirement | Action | Outcome |
|------|---|--|---|
| | | <p>area and identified Aboriginal archaeological sites.</p> <p>Aboriginal stakeholders invited to provide information on cultural significance at all stages of the assessment process.</p> | <p>existed with stakeholders. Cultural values have been provided throughout the consultation process.</p> |
| 4.4 | Review of draft cultural heritage assessment report | <p>The draft CHAR was provided to registered Aboriginal stakeholders for review and comment (letters dated 06/06/2023). All registered Aboriginal stakeholders were provided a 28 day period for review, ending on 04/07/2023.</p> <p>Stakeholders were also invited to attend an AFG meeting during the review period to discuss the draft CHAR and the assessment findings. Stakeholders invited to comment on cultural significance of study area and identified Aboriginal heritage.</p> | <p>Two stakeholders provided written comment on the draft CHAR.</p> <p>Gandangara Local Aboriginal Land Council stated that they had reviewed the Stage 3 PACHCI assessment and agreed with the findings, significance assessment and recommendations that were made (email dated 05/07/2023).</p> <p>Murra Bidgee Mullangari stated that they had reviewed the draft CHAR and text excavation findings and endorsed the recommendations made in the report (email dated 28/06/2023).</p> |

Comments on proposed assessment methodology (January 2023)**Zac Thomas**

From: carolyn slater [REDACTED]
Sent: Sunday, 29 January 2023 2:59 PM
To: Zac Thomas
Subject: Re: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - Gilay Consultants

Hi Zac

Gilay Consultants have reviewed and agree with the project information & Methodology draft for 2225 Elizabeth Drive Upgrade.

Kind regards

Carolyn Slater - Manager
Gilay Consultants
[REDACTED]

On Fri, 27 Jan 2023, 5:08 pm Zac Thomas, [REDACTED] wrote:

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

This email is to inform registered stakeholders about project information and the proposed assessment methodology in accordance with the Heritage NSW *Aboriginal cultural heritage consultation requirements for proponents 2010*.

Please see the attached project information and proposed assessment methodology.

Comments on the proposed assessment methodology, including relevant cultural information that might affect, refine or inform the proposed methodology, should be provided by **24 February 2023**, using the contact details on the attached letter.

Zac Thomas

From: Shayne Dickson [REDACTED]
Sent: Tuesday, 31 January 2023 2:50 PM
To: Zac Thomas
Subject: RE: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - Gunjeewong

Good afternoon Zac,

Gunjeewong is happy with the methodology provided.

Kind Regards
Ngunnawal, Dunghutti, Yuin
Shayne Dickson
[REDACTED]

First Nation
I pay respect to the Traditional Custodians of this Land past and present emerging

From: [Zac Thomas](#)
Sent: Friday, 27 January 2023 5:09 PM
To: [Shayne Dickson](#)
Subject: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - Gunjeewong

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

This email is to inform registered stakeholders about project information and the proposed assessment methodology in accordance with the Heritage NSW *Aboriginal cultural heritage consultation requirements for proponents 2010*.

Please see the attached project information and proposed assessment methodology.

Comments on the proposed assessment methodology, including relevant cultural information that might affect, refine or inform the proposed methodology, should be provided by **24 February 2023**, using the contact details on the attached letter.

Kind regards,

Zac Thomas
Heritage Administration Assistant
Kelleher Nightingale Consulting Pty Ltd
Suite 505-507, 155 King Street, Sydney NSW 2000
p 02 9232 5373

Zac Thomas

From: Phil Khan [REDACTED]
Sent: Thursday, 9 February 2023 11:03 AM
To: Zac Thomas
Subject: RE: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - KYWG

Follow Up Flag: Follow up
Flag Status: Flagged

Good Morning Zac,

Thank you for your methodology for Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW. The study area is known to us and is of significance to our people there are major water ways near by that are utilised by our people and have been for tens of thousands of years. There are resources rich ecosystems that allowed our people to thrive off their natural surroundings. For this reason we would like to agree to your methodology and we look forward to seeing your finding on this project. We look forward to furthering consultation on this project.

Kind Regards
 Kadibulla
 Office Manager
 [REDACTED]



From: [Zac Thomas](#)
Sent: Friday, 27 January 2023 5:09 PM
To: [REDACTED]
Subject: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - KYWG

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

Zac Thomas

From: Dean Delponte [REDACTED]
Sent: Saturday, 28 January 2023 7:43 AM
To: Zac Thomas
Subject: Re: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - MHC
Attachments: CONFIDENTIAL - MHC - Further Information.pdf; CONFIDENTIAL - MHC - COC - WORKERS INSURANCE.pdf; CONFIDENTIAL - MHC Liability Insurance CERTIFICATE 22-23.PDF

Dear Zac,

Thank you for providing us with the project information and proposed assessment methodologies.

After review we support the CHAR and test excavation methodologies for the Elizabeth Drive Upgrade project.

Further information is provided in the attachments. Please also note that all attachments are to remain **Confidential** (commercial in confidence) and are not to be included in reports.

Kind Regards

Dean Delponte

Director



As part of the business of the company, all documents are confidential. Please do not disclose to the public or to any other person, without the prior written consent of the company, any information contained in this document or any part of it.

On Fri, 27 Jan 2023 at 17:09, Zac Thomas [REDACTED] wrote:

Dear registered Aboriginal stakeholder,

Zac Thomas

From: Phillip Boney
Sent: Saturday, 28 January 2023 3:12 PM
To: Zac Thomas
Subject: Re: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - WAG

Hi Zac,

Phil Boney here. I agree with the proposed assessment methodology for this project and the procedure of the proposed test excavation methodology. I also believe there could possibly be cultural significance in this area due to past excavation projects in this area.

Regards, Phil Boney
Wailwan Aboriginal Group

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From: Zac Thomas
Sent: Friday, January 27, 2023 5:11:42 PM
To: Phillip Boney
Subject: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - WAG

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

This email is to inform registered stakeholders about project information and the proposed assessment methodology in accordance with the *Heritage NSW Aboriginal cultural heritage consultation requirements for proponents 2010*.

Please see the attached project information and proposed assessment methodology.

Comments on the proposed assessment methodology, including relevant cultural information that might affect, refine or inform the proposed methodology, should be provided by **24 February 2023**, using the contact details on the attached letter.

Kind regards,

Zac Thomas
Heritage Administration Assistant
Kelleher Nightingale Consulting Pty Ltd
Suite 505-507, 155 King Street, Sydney NSW 2000
p 02 9232 5373

Zac Thomas

From: Aaron Slater [redacted]
Sent: Sunday, 29 January 2023 3:49 PM
To: Zac Thomas
Subject: Re: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - WCS
Attachments: 4.2-4.3_WCS_270123.pdf

Hi Zac

Warragil cultural services agrees to the test excavations in place for the above mentioned project. Would also like to be apart of the upcoming field works.

Kind regards
Aaron Slater

Sent from my iPhone

On 27 Jan 2023, at 5:12 pm, Zac Thomas <[redacted]> wrote:

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

This email is to inform registered stakeholders about project information and the proposed assessment methodology in accordance with the *Heritage NSW Aboriginal cultural heritage consultation requirements for proponents 2010*.

Please see the attached project information and proposed assessment methodology.

Comments on the proposed assessment methodology, including relevant cultural information that might affect, refine or inform the proposed methodology, should be provided by **24 February 2023**, using the contact details on the attached letter.

Kind regards,

Zac Thomas
Heritage Administration Assistant
Kelleher Nightingale Consulting Pty Ltd
Suite 505-507, 155 King Street, Sydney NSW 2000
p 02 9232 5373

Zac Thomas

From: Arika J - [REDACTED]
Sent: Tuesday, 14 February 2023 8:54 PM
To: Zac Thomas
Subject: Re: Project Information & Methodology Letter - 2225 Elizabeth Drive Upgrade - YCS

Dear Zac,

On behalf of Yulay cultural service's I have reviewed and agree with the assessment methodology for this project.

Kind regards,

Arika Jalomaki
[REDACTED]

On Fri, 27 Jan 2023 at 5:13 pm, Zac Thomas <[REDACTED]> wrote:

Dear registered Aboriginal stakeholder,

Thank you for registering your interest to be involved in the Aboriginal cultural heritage consultation process for the proposed upgrade of Elizabeth Drive between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, NSW.

This email is to inform registered stakeholders about project information and the proposed assessment methodology in accordance with the *Heritage NSW Aboriginal cultural heritage consultation requirements for proponents 2010*.

Please see the attached project information and proposed assessment methodology.

Comments on the proposed assessment methodology, including relevant cultural information that might affect, refine or inform the proposed methodology, should be provided by **24 February 2023**, using the contact details on the attached letter.

Kind regards,

Zac Thomas

Heritage Administration Assistant

Kelleher Nightingale Consulting Pty Ltd

Comments on draft CHAR (June 2023)**Cristany Milicich**

Subject: FW: Elizabeth Drive Upgrade – Draft ACHAR



OFFICIAL

From: Bronwyn Partell <[REDACTED]>
Sent: Wednesday, 5 July 2023 12:33 PM
To: Noni Ross <[REDACTED]>
Subject: FW: Elizabeth Drive Upgrade – Draft ACHAR

GANDANGARA
Local Aboriginal Land Council

t email from [REDACTED]

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Dear Noni,

My apologies I could not get back to you by yesterday. I have reviewed the Stage 3 PACHCI that KNC completed, and agree with the findings, significance assessment and recommendations that have been made. I note that Gandangara would like to see an Aboriginal Cultural Heritage Assessment (including consultation) completed before an AHIP application is submitted.

Kind Regards,

Bronwyn Partell

Senior Archaeologist
Gandangara Local Aboriginal Land Council
64 Macquarie Street, Liverpool NSW 2170 | P.O Box 1038 Liverpool BC 1871
[REDACTED]

Gandangara Local Aboriginal Land Council acknowledges the Families of the Cabrogal Clan of the Darug Nation as the Traditional Custodians of the lands we span. GLALC pays respects to Elders past, present and emerging. Gandangara Local Aboriginal Land Council continues to value the generations of knowledge Aboriginal people embed within our organisation.

This email message and any attached files is confidential and intended solely for the use of the individual or entity to whom it is addressed and may contain information that is privileged, confidential and/or exempt from disclosure under applicable law. If you have received this email in error, delete all copies and notify the sender.

Zac Thomas

From: Darleen Johnson <[REDACTED]>
Sent: Wednesday, 28 June 2023 9:08 AM
To: Noni Ross; Zac Thomas
Subject: Re: Elizabeth Drive Upgrade – Draft ACHAR
Attachments: Elizabeth Drive Upgrade_Aboriginal Archaeological Assessment_draft v0.1 (003).pdf

Hi Noni and Zac,
I have read the project information draft ACHAR and test excavation program for the above project, I endorse the recommendations made.
Kind regards
Ryan Johnson

On Tuesday, 6 June 2023 at 02:27:11 pm AEST, Noni Ross <[REDACTED]> wrote:

Dear Darlene

The draft Aboriginal Cultural Heritage Assessment Report is out for review.

Transport for NSW engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare an Aboriginal archaeological assessment for Aboriginal heritage within the study area, including a test excavation program, under Stage 3 of the PACHCI.

This assessment has been prepared in accordance with the requirements of the PACHCI and the Heritage NSW [formerly Office of Environment and Heritage (OEH)] *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a).

This report presents the findings of the test excavation program and informs the accompanying Aboriginal Cultural Heritage Assessment Report (CHAR) prepared by KNC for the project.

Comments on the attached draft ACHAR are due by 4th July 2023.

An invite will be sent to you soon to attend an AFG.

We thank you for being a part of the community consultation. Please call me if you want to yarn about anything further.

Appendix D Archaeological Salvage Methodology

The impacted portions of sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), EDU South Creek AFT 1 and EDU Kemps Creek AFT 1 are considered to display moderate significance based on their scientific value and potential to inform on Aboriginal landscape use of South Creek and its tributaries. The significance of harm to the portions of the sites within the study area is moderate, given the sites' overall moderate archaeological significance.

The archaeological value of the sites is linked to the information that they contain. Recovery of this information through archaeological salvage excavation would help to mitigate the impact of the proposal and offer an opportunity to better understand the activities which were undertaken at these sites and the effect of land use disturbance and natural processes on subsurface archaeological deposits in the vicinity of South Creek.

Research Aims

The main aims of the proposed salvage excavation program are:

- ♦ To salvage a representative sample of the identified Aboriginal archaeological sites along the project corridor prior to construction impact
- ♦ To analyse the salvaged archaeological material to gain and conserve knowledge and understanding of the scientific and cultural information exhibited by the activities associated with the identified landforms across the broader South Creek valley
- ♦ To use the excavation results to gain insight into the subsurface archaeology of the adjacent areas and site extents not being impacted by the proposal. This would increase future educational opportunities and allow more informed management of Aboriginal heritage.

The further scientific aim of the salvage excavation program would be to determine the subsurface integrity, extent, spatial distribution and nature of the cultural deposit and the specific types of associated archaeological/cultural activities.

- ♦ Determining the integrity of the deposit involves assessing the degree of disturbance which is present.
- ♦ Determining the statistical extent of the site and/or activity areas involves identifying the boundaries associated with the identified archaeological deposit.
- ♦ Assessing the spatial distribution involves identifying the presence/absence of archaeological material across the identified archaeological site.
- ♦ The nature of the sites refers to the type of activities indicated by the artefactual material (e.g., primary production, domestic knapping, hunting camps). The goal would be to retrieve entire assemblages from specific activities if such activities were present.
- ♦ Retrieved assemblages would be compared with the results from other relevant archaeological projects in order to assess significance, particularly data from adjacent excavation programs including the M12 Motorway, Western Sydney Airport and Upper South Creek Advanced Water Recycling Centre.

Research Questions

The results of the proposed salvage excavation would increase our understanding of subsurface archaeology of the study area. The majority of the study area traverses undulating low crests and slopes intersected by north-running drainage of the South Creek catchment. Higher rolling hills and ridgelines at the eastern and western boundaries of the study area form the watersheds dividing South Creek from Hinchinbrook/Cabramatta Creeks (Georges River catchment) and Mulgoa Creek (Nepean River catchment) respectively. The long, linear nature of the study area therefore provides almost a full cross section of the broader South Creek valley. Research would focus on the archaeologically-identifiable cultural activities that took place across this topographical continuum.

The study area also has a long history of disturbance both from natural factors such as flooding and from European settlement. Understanding how environmental and modern land use processes have impacted archaeological deposits assists the planning process and potentially increases conservation outcomes. Understanding the relationship between archaeology and site soils will inform the interpretation of archaeological significance, as opposed to an assessment of the presence or absence of artefacts.

Question 1: What are the taphonomic features of the salvaged archaeological sites? What does this indicate about site integrity and artefact survivability for portions of the sites not impacted by the proposed works and for similar landforms within other areas adjacent to Elizabeth Drive?

Question 2: What is the effect of fluvial processes and modern land use practices on the preservation of Aboriginal archaeological sites associated with the primary creeklines, and does this have implications for our understanding of site taphonomy within the broader South Creek catchment?

Question 3: What cultural activities are archaeologically identifiable at the sites? How do they compare to each other (major vs minor creeks) and to other Aboriginal sites within the South Creek catchment? Relevant comparative data from neighbouring archaeological projects including the M12 Motorway, Western Sydney Airport and Upper South Creek Advanced Water Recycling Centre may be employed to provide a comprehensive picture of Aboriginal land use within the study area.

What can we expect?

It is anticipated that differences in stone tool assemblages may be related to different cultural activities (e.g., primary reduction vs maintenance flaking). The science of archaeology is paramount to any research question and it is important to stress that the goal for the salvage program for all excavated sites is straight forward: to retrieve a viable sample for comparative analysis using established techniques (see Field Methods below). In this regard interpretation would not precede data collection. The proposed archaeological program would systematically sample the relevant areas using standard techniques with the outcome being a viable, robust and comparable sample. Analysis of the sample would follow and interpretations would be made distinctly separate from the results.

Archaeological Salvage Areas

Salvage excavation would be undertaken within the identified portions of sites Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), EDU South Creek AFT 1 and EDU Kemps Creek AFT 1. Salvage excavation would focus on the extraction of collections of artefacts related to activity areas.

Conservation is a primary goal of all Aboriginal heritage management. All archaeological excavation undertaken during the proposed program would be restricted to the actual construction corridor and approved AHIP area associated with the impacted sites.

FIELD METHODS

Community Surface Collection

The AHIP should include provision for impact mitigation through community surface collection within the impacted portion of those sites within the AHIP area which have a surface artefact component, including Elizabeth Drive/Adams Road AFT 1, Badgerys West B (BWB) / Elizabeth Drive AFT 2, Elizabeth Precinct Artefact Scatter 05 (EP AS 05), Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01), Mamre Road Kemps Creek AFT 1, KC/ED2 and CP AS1 / P-CP9. Surface collection must be completed prior to any activities (including pre-construction activities) which may harm Aboriginal objects at these site locations. Surface collection would be undertaken in accordance with the methodology outlined below:

- Surface artefact collection would be restricted to the impacted site area and approved AHIP area.
- The collection of surface artefacts would be undertaken with Aboriginal site officers concurrent with the salvage excavation program.
- Surface collection would record the location information and context for collected objects.
- Collected objects would be documented as part of salvage reporting being undertaken for the project.

Excavation

The goal of the field excavation program is to recover significant assemblages of artefacts. In order to achieve the most robust and comparable result, KNC advocates an open area salvage excavation. The first phase in open area salvage is to establish the statistical boundaries of the previously identified archaeological deposit. In other words, recording the spread of activities across the site/landscape. This approach is designed to salvage the spatial properties of the site as shown in the lithic continuum.

Phase 1

A series of 1 m² squares are excavated on a transect grid at regular intervals overlain on site to mark the spread of lithics and related geomorphic activity.

GDA 94 coordinates would be recorded for each square to enable spatial modelling. Statistical salvage following this method is highly beneficial because it creates a robust inter-site sample, sufficiently random, critical for regional comparative analysis. No other method is as efficient or effective. A minimum of 5m² would be excavated within each site during Phase 1 to complement the existing test excavation results.

Individual excavation squares measuring 1 m² would be hand excavated in stratigraphic units (Unit A, Unit B, etc.). Squares would be excavated until the basal layer or culturally sterile deposit is reached (usually 25-35 cm). Previous excavation of the podzolic soils associated with the area indicates no archaeological stratigraphy within units. As such the A1 and A2 soil layers are culturally one layer (suffering from cyclical soil transfer resulting in a mixed cultural profile within the soil) and can be salvaged as one unit where possible. Where potential archaeological stratigraphy is encountered, units may be excavated stratigraphically or using standard spit intervals. All excavated deposit would be

sieved using nested 5.0 mm and 2.5 mm sieves. Where potential micro-debitage is recovered 1.0mm sieves will be utilised.

The location of each excavated square would be identified on a surveyed plan of the site. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit would be drawn and all squares would be photographed. Soil samples as well as thin section profiles (where feasible) would also be collected. The stratigraphy of all excavated areas would be fully documented and appropriate records archived.

Phase 2

Open area salvage of significant deposit follows the Phase 1 assessment. Additional 1 m² squares, constituting a contiguous open area, will be excavated around information bearing deposits along the excavation grid. Information bearing deposits are identified by triggers such as: significant quantities of artefacts, variations in raw material, unusual artefacts, chronological material and/or taphonomic indicators. In this context chronologic material is anything that can be used to date artefacts or deposit: charcoal or charcoal bearing deposit (e.g., hearth ash), sandy deposit, gravels (e.g., aluminium feldspar). Phase 2 open area investigation would expand to encompass entire activity areas. The location of Phase 2 open area investigation would be based on Phase 1 and existing test results. Suggested minimum Phase 2 totals for each site are as follows:

- Elizabeth Drive/Adams Road AFT 1 – 50m²
- Badgerys West B (BWB) / Elizabeth Drive AFT 2 - 50m²
- Elizabeth Drive AFT 1 (includes Elizabeth Precinct Isolated Find 04 & Elizabeth Precinct PAD 01) – 25m²
- EDU South Creek AFT 1 - 25m²
- EDU Kemps Creek AFT 1 - 25m²

Where possible, carbon samples will be collected and analysed for material relating to both the archaeology and geomorphology. Where appropriate, cosmogenic and radiometric dating of soils and rock surfaces will be applied (Nishiizumi et al. 1986, 1993). Chronologic dating is an important part of the salvage program as this information will assist in interpreting the wider South Creek catchment.

Analysis

Artefacts would be analysed on a comparable level with previous analyses of excavated assemblages. Information derived from this analysis; in particular the identification of specific artefact types and their distributions and associations; would be used to put together interpretations about how sites were used, where sites were located across the landscape, the age of sites and to assess cultural heritage values. By comparing different areas, it would be possible to determine whether there were differences in the kinds of activities carried out and if different activities were related to different landforms.

A range of stone artefacts may be present across the salvage area and the analysis would expand accordingly to account for artefact variability. All information would be recorded in database form (MS Excel). Various types of evidence would be used to determine the kinds of activities that were carried out. A short description of the proposed analysis is outlined below.

- ♦ Field analysis would record basic data, such as material type, number and any significant technological characteristics, such as backing or bipolar techniques; added to this would be any provenance data such as pit ID and spit number. The purpose of the field recording is twofold: 1) establish a basic recording of artefacts retrieved and 2) to allow on-going assessment of the excavation regime (e.g., whether higher stratigraphic resolution is required while digging).
- ♦ Detailed (laboratory) analysis would entail recording a larger number of characteristics for each individual artefact. These details would be recorded in matrices suitable for comparative analysis (e.g., multivariate and univariate) of the excavated assemblage on a local and regional basis.
- ♦ Lithic characteristics to be recorded cover a range of basic information but are not limited to these categories (see example below). For transparency, terms and category types would in large part be derived from Holdaway and Stern (2004).

| Sample Categories | | |
|-------------------|----------------|------------------------|
| Record Number | % Cortex | Flake Type |
| Pit ID | Length | Termination Type |
| Spit Number | Width | Core Type |
| Count | Thickness | Number of Scars (Core) |
| Raw Material | Weight | Scar Type (Core) |
| Colour | Modification | Shape of Flake |
| Quality | Reduction Type | Platform Type |

- ♦ A detailed explanation and glossary would be provided with the final excavation report.
- ♦ Minimum Number of Flake (MNF) calculations formulated by Hiscock (2000, 2002) would be undertaken where applicable (although past experience indicates MNF calculations would not be required for this excavation program).

The analysis of artefacts recovered during the excavation program would be undertaken in a transparent and replicable fashion so as to permit the comparison of the entire excavated assemblage with data from other areas. This would also allow for an interpretation of the study area's archaeological significance.

Field Team

KNC directors, Dr Matthew Kelleher and Alison Nightingale, would be responsible for the salvage excavation program. Dr Matthew Kelleher would direct the excavation component of the Aboriginal archaeological assessment. Matthew has extensive experience in managing archaeological excavations and research projects. Matthew would also be the principal contact for the overall Aboriginal archaeological assessment for the project. The salvage excavation will be undertaken in association with registered Aboriginal stakeholders.