Appendix J

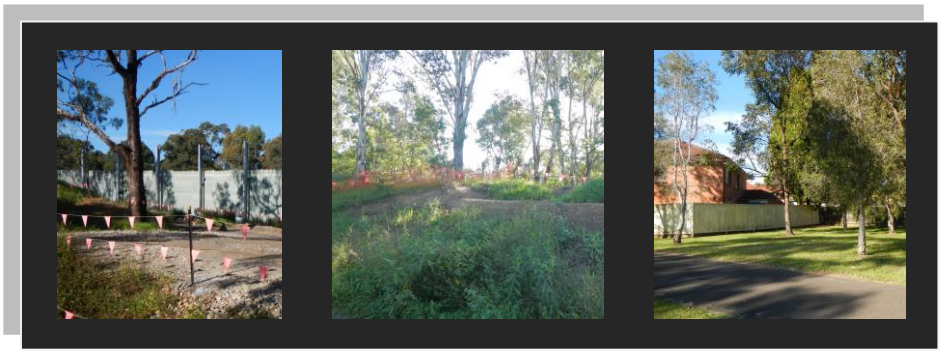
WestConnex - King Georges Road: M5 Interchange Upgrade. Environmental Impact Statement

Stage 2 PACHCI Archaeological Survey Report

Canterbury and Hurstville Local Government Area

Report to WestConnex Delivery Authority

8 July 2014



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Executive summary

WestConnex Delivery Authority (WDA) are preparing an Environmental Impact Statement for the King Georges Road: M5 Interchange Upgrade. The project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills. To the west of King Georges Road, work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project, and tie in with the completed M5 South West Motorway widening project respectively.

Artefact Heritage was engaged by WDA to conduct an Aboriginal archaeological survey and assessment for the proposal in accordance with Stage 2 of the Roads and Maritime Services (Roads and Maritime) *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI). The project will be approved under Part 5.1 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) and is classified as 'State Significant Infrastructure'. Approval from the Minister for Planning and Environment is required and will be based on the assessment of an Environmental Impact Statement (EIS) for the project. This assessment has been prepared to support the EIS.

The study area comprises land situated on and adjacent to the M5 South West and M5 East Motorways at the King Georges Road Interchange in Beverly Hills (Parish: St George; County: Cumberland), approximately 17 kilometres south-west of Sydney CBD. The study area falls within both the Canterbury and Hurstville Local Government Areas (LGA).

The study area is situated within the Cumberland sub-bioregion of the greater Sydney Basin Bioregion within the Georges River Catchment (the study area being 3.9 kilometres north of Georges River and 1.6 kilometres east of Salt Pan Creek). The underlying geology comprises Wianamatta Group Shales, and soil landscapes present are the residual Blacktown (bt) and fluvial Birrong (bg) soils.

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 12 June 2014 for recorded Aboriginal sites (AHIMS search # 137818). An area covering approximately five kilometres radius from the study area's boundaries was searched in order to gain information on the archaeological context of the area, and to ascertain whether any previously recorded Aboriginal sites are present within the study area. No Aboriginal sites are present within the study area.

Predictive Statements

The results of the desktop review were used to generate general predictive statements in regards to the potential of the study area to contain Aboriginal cultural heritage.

Predictive statements are as follows:

- The underlying geology of the study area comprises Wianamatta Group Shales and therefore is unlikely to contain site types associated with sandstone outcrops, such as shelters, grinding grooves or art;
- If the study area has not been previously cleared, during initial construction of the M5 Corridor, it is possible that scarred trees may exist as aerial images indicate the presence of vegetation adjacent to the Motorway (Figures 4 and 6).
- Stone artefact scatters or isolated finds are the most likely Aboriginal site type to be identified within the study area. Stone artefact sites within close proximity to fresh permanent creek and rivers (<50m) are more likely to be densely clustered, larger and complex.
- The study area is not situated within close proximity to any permanent sources of water (the closest sources are more than 1km away) therefore, any stone artefacts present within the study area are likely to represent isolated or low density highly dispersed scatters, indicative of casual use and discard.

Archaeological survey

An archaeological survey of the study area was undertaken in accordance with relevant OEH standards and guidelines, as part of Stage 2 of the Roads and Maritime PACHCI.

All native vegetation was inspected for the presence of any cultural scarring. No trees bearing cultural scarring were identified. Ground surface visibility was extremely low throughout the study area, except for areas of disturbance, some eroded areas and those areas surrounding footpaths and tracks. No Aboriginal cultural heritage or objects were identified within the study area. No landforms within the study area are considered to have potential to contain Aboriginal cultural heritage.

Overall the study area features high levels of ground disturbance. The majority of the study corridor has been disturbed through the construction and maintenance of the M5 Corridor. Further disturbances are evidenced by construction of infrastructure such as: parklands, walking paths, concrete drainage channels, high pressure gas mains and noise walls.

Recommendations

The following recommendations were based on consideration of:

- Stage 2 of the Roads and Maritime PACHCI.
- The SEAR under Section 115Y of the *Environmental Planning and Assessment Act 1979*;
- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, July 2005);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010);
- The results of the background research, site survey and assessment;
- The interests of the GLALC and MLALC; and
- The likely impacts of the proposed development.

It was found that:

- No Aboriginal sites or places were previously recorded within the study area.
- No new sites or areas of archaeological potential were located within the study area.
- The study area has been subject to high levels of disturbance.

It is therefore recommended that:

- The proposed works are able to proceed without the need for further archaeological and/or Aboriginal heritage assessment.
- If the project design is changed and areas not surveyed are to be impacted, further archaeological assessment would be required.
- If Aboriginal objects or suspected human remains are located during works the Roads and Maritime Unexpected Finds Procedures must be followed.

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1.0 Introduction and Background

1.1 Introduction

WestConnex Delivery Authority (WDA) are preparing an Environmental Impact Statement for the King Georges Road: M5 Interchange Upgrade. The project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills. To the west of King Georges Road, work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project, and tie in with the completed M5 South West Motorway widening project respectively.

This Archaeological Survey Report (ASR) complies with Stage 2 of the PACHCI; the Secretary's Environmental Assessment Requirements (SEAR) -Section 115Y of the *Environmental Planning and Assessment Act 1979*; *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, July 2005); and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).

1.2 Study Area Location

The study area comprises land situated on and adjacent to the M5 South West and M5 East Motorways at the King Georges Road Interchange in Beverly Hills (Parish: St George; County: Cumberland), approximately 17 kilometres south-west of Sydney CBD (Figure 1). The study area falls within both the Canterbury and Hurstville Local Government Areas (LGA).

1.3 Scope of Works

The project would tie into the completed M5 South West Motorway Widening project in the west. Minor treatment would be required to the existing M5 dual carriageways to retain two through lanes in each direction and accommodate the possible future construction of WestConnex M5. The eastern end of the project would tie into the existing M5 East Motorway, near Kooemba Road, Beverly Hills.

To the west of King Georges Road, work would be required to the eastbound off-ramp and the westbound on-ramp to make provision for the possible future construction of the WestConnex M5 project and tie in with the completed M5 South West Motorway widening project respectively.

To the east of King Georges Road the eastbound on-ramp would be extended by shifting the merge further to the east and a new bridge span would be constructed to the north of Cooloongatta Road overbridge. Similarly the westbound off-ramp diverge would be shifted further to the east and a new bridge span would be constructed to the south of Cooloongatta Road overbridge.

The project description presented in this EIS is based on the WestConnex Delivery Authority (WDA) concept design. That design would be refined during detailed design. It may also be modified in response to any submissions received following the exhibition of the environmental impact statement or to minimise environmental impacts. The final design of the project that is built could therefore vary from its description in this chapter.

The M5 Motorway was constructed in three stages, M5 South West in 1992 and 1996 and the M5 East in 2001. The parameters utilised in developing the design for the project were guided by the criteria applied for development of the existing motorway. The concept design for the project has been developed to:

- Utilise the space within the motorway corridor provided as a result of the original design.
- Deliver a design that meets the project objectives.
- Consider community and environmental constraints.

The project has been designed generally in accordance with Australian Standards, Austroads Design Standards, Guides and Codes and the Roads and Maritime supplements. Other parameters applied to the design include:

- Existing roads and structures would not be modified to meet current standards.
- The design speed for the main carriageways is generally 100 km/h.
- Lane widths, shoulder widths and crossfall would be variable.

West facing ramps

In the west the project would tie into the completed M5 South West Widening three lane dual carriageway. In addition to tie-in with the M5 South West Widening project, work to the west facing ramps to / from King Georges Road are required to integrate the project with any future WestConnex M5 configuration.

The diverge for the eastbound off-ramp to King Georges Road would be lengthened. This would require widening of the eastbound carriageway from above 300 m west of Penshurst Road. The nearside eastbound lane of the motorway would exit to King Georges Road and two lanes would continue eastbound under King Georges Road. The layout of the eastbound off-ramp would be reconfigured to improve vehicle storage

The M5 South West Widening project provides for three lanes in each direction. The westbound motorway carriageway is two lanes in each direction under King Georges Road and the westbound on-ramp from King Georges Road would become the third motorway lane.

Any design configuration for WestConnex M5 would require an increase in the number of lanes passing underneath King Georges Road from two to three. Work to the westbound off-ramp and widening of the

bridge over Penshurst Road is proposed as part of this project in order to accommodate all future WestConnex M5 configurations.

East facing ramps

In the east, work to the east facing ramps to / from King Georges Road are required to meet the project objectives and to integrate the project with any future WestConnex M5 configuration.

The eastbound on-ramp from King Georges Road would be extended by moving the merge about 160 m further to the east. The on-ramp would be realigned and widened, merging to a single lane prior to passing below Cooloongatta Road overbridge via a new bridge span at its northern end.

The length of the westbound off-ramp to King Georges Road would be increased by moving the diverge of the off-ramp with the motorway about 190 m further to the east. The off-ramp would be realigned passing below Cooloongatta Road overbridge via a new bridge span at its southern end.

Road Surface

At opening the project would tie into the existing M5 East Motorway two lane dual carriageway. Work to widen the motorway would include the provision of motorway 'stubs' that would accommodate any design configuration for WestConnex M5 at the eastern extent of the project. Where road widening is required, new road surface would be constructed to match the M5 South West and M5 East motorway surfaces.

Within the project extent, the motorway would need to be re-surfaced. This work may include milling and re-sheeting or just re-sheeting of the full length and width of the road surface prior to line marking. The finished surface would be consistent across all project elements, including for the motorway carriageways and the on- and off-ramps. The road surface material is subject to further investigation and detailed design, however it is likely that an open grade asphalt would be used.

Bridges

Work to the west facing ramps (eastbound off-ramp and westbound on-ramp) would extend west of Penshurst Road, and therefore require work to the bridge over Penshurst Road. Widening of the existing structure would be required to its north and south.

Additional bridge spans would be required on both the northern and southern ends of the Cooloongatta Road overbridge to accommodate the east facing ramp configurations.

Structures

The alignment of the west facing ramps would require the introduction of new cut retaining walls on the outside of the ramps to provide maintenance bay access to infrastructure such as Variable Speed Limit Signs (VSLS) that would be required by WestConnex M5.

Fill retaining walls would be required to support the widened motorway east and west of the bridge over Penshurst Road.

New cut retaining walls would be required to support the existing and / or realigned shared path and noise walls above motorway ramp level to the north and south of the motorway.\

Noise attenuation

Existing noise walls on both sides of the motorway may require adjustment, relocation and/or extension. The indicative heights and extents of noise walls would be reviewed during the detailed design process, however it is proposed that:

- Existing noise walls to the north and south of the motorway would be replaced immediately east and west of the bridge over Penshurst Road to suit the widened bridge and motorway.
- The existing noise mound south of the motorway between Kooemba Road and Cooloongatta Road requires removal and may be replaced with a noise wall or a combined noise mound / noise wall.
- The existing noise walls between Kirrang Street and Cooloongatta Road on the north side of the motorway require realignment to accommodate the proposed retaining wall and eastbound on-ramp alignment.
- The existing noise walls between King Georges Road and Cooloongatta Road, north and south of the motorway, may require upgrade to meet noise design guidelines.

Drainage Work

Some adjustments and extensions to motorway cross drainage would be required to accommodate the project. New surface and subsurface drainage and / or improvements to the existing system would be required in areas where the motorway would be widened.

Pedestrian and Cyclist Facilitates

Cyclists can currently use the M5 Motorway for travel in both directions west of Bexley Road. Shared paths are also available north and south of the motorway east of King Georges Road. Construction and operation of the project would not allow cyclists to use the motorway shoulder east of King Georges Road. This permanent change would be implemented at the start of construction.

Eastbound cyclists would use the shoulder on the upgraded eastbound off-ramp and signalised crossing facilities at the King Georges Road intersection to access the shared path facility located to the east of King Georges Road. Westbound cyclists would not be allowed to access the motorway at Bexley Road and would be required to use the existing shared path and would be able to access the motorway at King Georges Road via the westbound on-ramp.

Some realignment of the existing shared path network would be required between Cooloongatta Road and Beverly Park to accommodate the motorway widening work. Minor work may also be required between Bexley Road and King Georges Road, and is subject to further investigation.

Operational Management Control Systems

The M5 East Motorway currently has Operational Management Control Systems to support management of the motorway. The existing system would be upgraded to make provision for the future WestConnex M5 configuration including relocation of Variable Speed Limit Signs (VSLS) and Variable Message Signs (VMS).

Emergency facilities

While moving slightly to accommodate widening of the motorway, breakdown bays between King Georges Road and Cooloongatta Road would be retained generally in their current location. The break down bays opposite Kooemba Street would not be affected by the work.

In addition to the breakdown bays referenced above, maintenance bays that will be introduced to provide access to additional operational management control infrastructure can also be utilised as breakdown bays.

There are no emergency vehicle crossovers within the project area.

Road furniture, street lighting and signage

Existing kerbs, barriers and fencing would be upgraded where required to accommodate any future WestConnex M5 configuration. Existing static signage would be relocated to accommodate the project footprint and would also be positioned to make provision for WestConnex M5.

Lighting at the interchange, including on- and off-ramps currently extends from Penshurst Road to Kirrang Street and at other selected locations along the motorway corridor. Any new lighting or modifications to existing lighting would be designed in accordance with *AS4282-1997 Control of the Obtrusive Effects of Outdoor Lighting*.

Other Infrastructure

Provision for tolling infrastructure as part of WestConnex M5 (ie footings and base plates) forms part of this project, however the installation of toll gantries or collection of tolls from road users does not form part of this project.

Utility adjustments and protection

Telecommunications, gas and sewer lines cross the M5 Motorway within the project area. Utility modifications and/or protection would be required as part of the project..

Ancillary facilities

Temporary work areas such as construction site compounds, stockpiles and storage areas would be established at locations inside and outside the existing motorway corridor.

1.4 Objectives of the study

This report outlines the results of background research and field survey conducted within the study area in fulfilment of: Stage 2 of the PACHCI; the SEARs under Section 115Y of the *Environmental Planning and Assessment Act 1979*; *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, July 2005); and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).

The requirements of the SEAR for Aboriginal heritage included, but were not limited to:

Table 1 - Summary of the fulfilment of the Secretary's Requirements.

SEARs for the assessment of Aboriginal Cultural Heritage within the study area	Fulfilment of requirements
An assessment of the potential Aboriginal cultural heritage impacts of the project, including an assessment of objects, places of significance, natural and landscape values of the corridor and surrounding area, taking into account the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, July 2005); and	Section 2.0 Section 3.0 Section 4.0 Section 7.0 Section 8.0
Demonstration of effective consultation with Aboriginal communities in determining and assessing impacts and developing and selecting options and mitigation measures.	Section 1.6 Section 5.0 Section 7.3

In order to fulfil the requirements of the Stage 2 PACHCI, DEC 2005 guidelines and DECCW 2010 Code of Practice, the objectives of this study also include:

- A description of the proposal and the extent of the study area.
- A description of Aboriginal community involvement and Aboriginal consultation.
- Discussion of the environmental context of the study area.
- Discussion of the Aboriginal historical context of the study area.
- A summary of the archaeological context of the study area including a discussion of previous archaeological work in the area.
- Development of an archaeological predictive model.
- Description and analysis of archaeological field survey conducted within the proposal area.
- Description of identified Aboriginal sites and PAD within the proposal area requiring further archaeological investigation.
- Development of a significance assessment for these sites.
- Development of management and mitigation measures.

- Recommendations for whether further archaeological investigation is necessary, including preparation of Stage 3 PACHCI documents.

1.5 Investigator and contributions

Stacey Kennedy, Archaeologist and Senior Heritage Consultant at Artefact Heritage, prepared this report. Principal Archaeologist Dr Sandra Wallace reviewed this report and provided management input.

1.6 Aboriginal community involvement

Aboriginal consultation has been conducted in accordance with Stage 2 of the Roads and Maritime PACHCI. The study area is within the boundaries of the Ganadangara and the Metropolitan Local Aboriginal Land Councils (GLALC & MLALC). The Roads and Maritime Service Aboriginal cultural heritage advisor (ACHA) conducted consultation with the GLALC & MLALC. The consultation involved the inclusion of one Aboriginal site officer from both the GLALC & MLALC on the day of the survey. The representative from GLALC present during the survey was Abbi Whitlock. The representative for the MLALC was Adam Madden.

Figure 1 - The study area

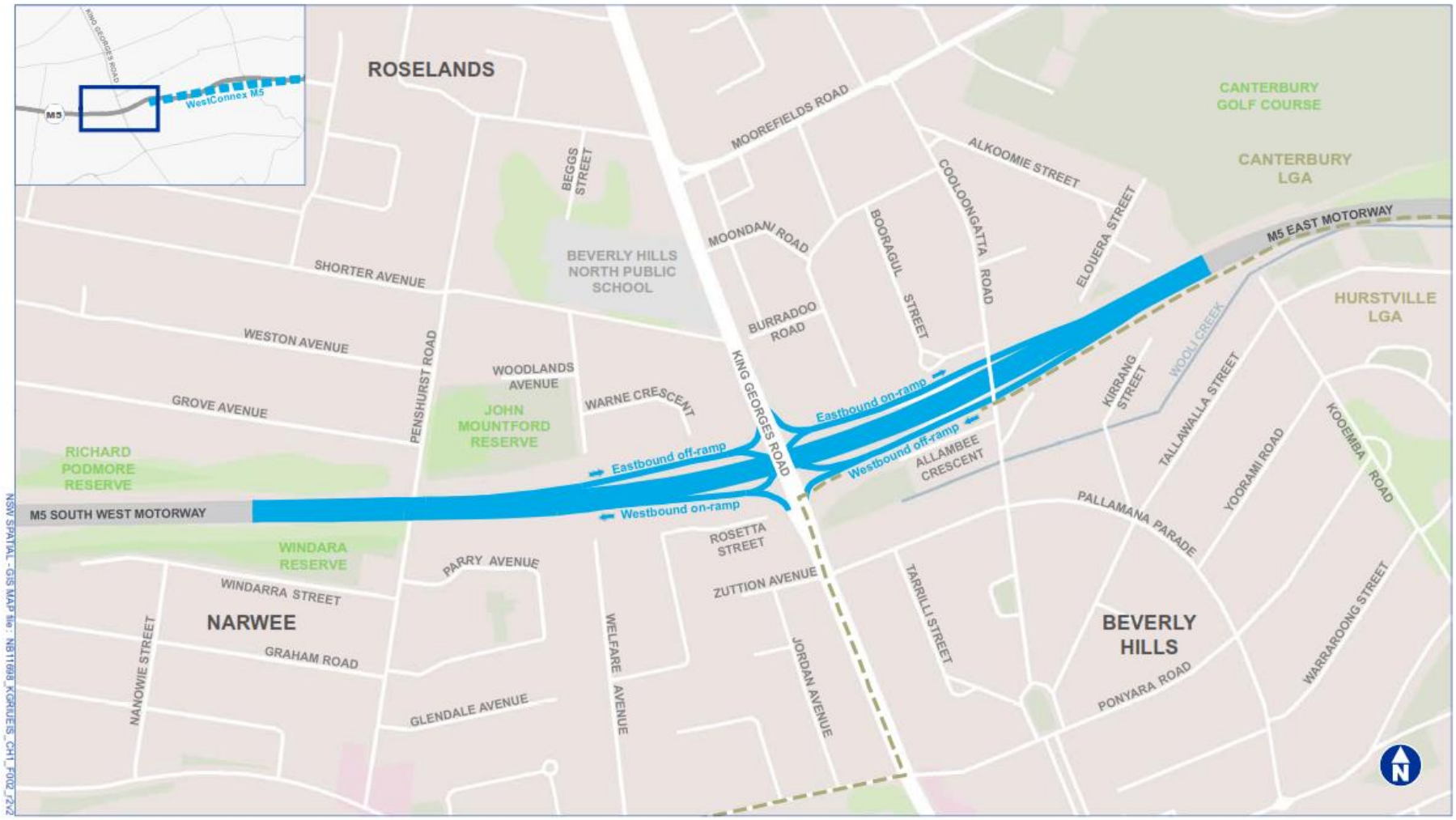


Figure 2 - : The proposal

2.0 Statutory Context

2.1 NSW Legislation Requirements

There are several items of State legislation and Guidelines that are relevant to the current study. A summary of these Acts and the implications for the proposed development follow.

National Parks & Wildlife Act (1974)

The *National Parks & Wildlife Act 1974* (the NP&W Act) provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) under Section 90 of the Act, and for 'Aboriginal Places' (areas of cultural significance to the Aboriginal community) under Section 90. Aboriginal objects are afforded automatic statutory protection in NSW whereby it is an offence to:

'*damage, deface or destroy Aboriginal sites without the prior consent of the Director-General of the National Parks and Wildlife Service* (now the OEH)'.

The Act defines an Aboriginal 'object' as:

'*any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal European extraction, and includes Aboriginal remains*'.

The Act was recently amended (2010), with the legislative structure for seeking permission to impact on heritage items modified. A s90 permit is now the only Aboriginal Heritage Impact Permit (AHIP) available and may only be granted by OEH if the conditions of the 'due diligence guidelines', and/or an 'archaeological investigation' have been met. The penalties and fines for damaging or defacing an Aboriginal object have also increased.

The Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (the EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits.

The proposal will be assessed under Part 5.1 of the EP&A Act, which establishes an assessment and approval regime for State Significant Infrastructure (SSI). Part 5.1 applies to development that is declared to be SSI by a State Environmental Planning Policy (SEPP). Section 115ZG of the EP&A Act specifies that approvals or permits under section 90 of the NPW Act 1974 are not required for approved SSI. However, approval from the Minister of Planning and Infrastructure is required and an EIS must

be submitted. The EIS must address the impact of the proposal on Aboriginal sites and Aboriginal places, through the framework of existing heritage legislation including the NPW Act and the 2005 DEC (now OEH) draft Aboriginal cultural heritage impact assessment guidelines and the 2004 DEC interim Aboriginal community consultation guidelines.

Aboriginal Land Rights Act (1983)

The Aboriginal Land Rights Act 1983 is administered by the NSW Department of Human Services - Aboriginal Affairs. This Act established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the Act to; (a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and (b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

Native Title Act (1994)

The Native Title Act 1994 was introduced to work in conjunction with the Commonwealth Native Title Act. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act.

3.0 Environmental Context

The study area is situated within the Cumberland sub-bioregion of the greater Sydney Basin Bioregion and features distinctive geology, geomorphology, soil types, landforms and vegetation communities. Review of these landform characteristics provides a means of determining the ecological systems which may have been present and utilised by Aboriginal people in the past, as well as facilitate the generation of archaeological site prediction models.

3.1 Geology and Soils

The Cumberland sub-bioregion is characterised by Triassic Wianamatta group shales and sandstones with a down warped block on the coastal side of the Lapstone Monocline. The area is intruded by a small number of volcanic vents and partially covered by Tertiary river gravels and sands. Quaternary alluvium is present along main streams and rivers (Morgan 2001).

Soil landscapes present in the study area comprise the residual Blacktown (bt) and fluvial Birrong (bg) soils (Figure 3). Blacktown soils are described as red and brown podzolic soils present on crests, upper slopes and well drained areas and are usually shallow to moderately deep (<100cm). Lower slopes and areas of poor drainage contain yellow podzolic soils (Morgan 2001). Blacktown soils occur throughout the Cumberland Lowlands from the Georges and Paramatta Rivers. The soil materials are described as friable brownish-black loam (A1 horizon topsoil); hardsetting brown clay loam (A2 horizon) and strongly pedal, mottled brown light clay (B horizon) (Morgan 2001).

Birrong soils are described as yellow podzolic soils and yellow solodic soils on older alluvial terraces and are quite deep (>250cm). Solodic soils and yellow solonetz soils are found on current floodplain. Birrong soils occur along the floodplains of watercourses draining the Wianamatta Group shales throughout the Cumberland Lowlands. The soil materials are described as dark brown pedal silty clay loam topsoil (A1 horizon), bleached hardsetting clay loam (A2 horizon), orange mottled silty clay (B horizon and brown mottled clay occurring as a deep subsoil (B horizon) (Morgan 2001).

3.2 Landform and Hydrology

The study area is situated within the greater Georges River catchment which covers a total area of 960 km² and comprises one of the most urbanised river catchments within Australia. The study area is situated approximately 3.9 kilometres north of Georges River and 1.6 kilometres east of Salt Pan Creek, one of its tributaries. The Georges River would have provided Aboriginal people with a permanent source of fresh water, abundant resources and may have been utilised as a transport route.

European settlers came to the area in the early 1800's and the river become important as a transport route. Areas surrounding the river banks were cleared for farmlands and housing but as the banks themselves are quite steep they remain relatively intact (HCC 2014). The study area is also situated approximately 4.2 kilometres to the south-west of Wolli Creek, which is part of the greater Cooks River catchment.

3.3 Natural resources

Before extensive clearing, the Blacktown soil landscape would have supported tall open-forest (wet sclerophyll forest) and open-woodland (dry sclerophyll forest). Drier areas would have been dominated by the following tree species: red gum (E. *tereticornis*), narrow leaved ironbark (E. *crebra*) and grey box (E. *moluccana*). The Birrong soil landscape would have supported ironbark (E. *paniculata*) stands, turpentine *Syncarpia glomulifera*, and Sydney blue gum E. *saligna* forest and woodlands. However, these ecological vegetation communities have been subject to extensive clearing.

3.4 Land use history

As described above, European settlers started to arrive and establish themselves within the vicinity of the study area and the greater Canterbury and Hurstville LGAs during the early 1800's. With the arrival of the settlers came dramatic changes to the local environment. Extensive clearing and timber getting took place to provide material for firewood, building of houses, horse drawn carts and other types of infrastructure such as wharves (HCC 2014). In time, subdivision opened up the area to suburban settlement and with it even greater impacts to the local environment and land as residential development and the need for infrastructure to support this development grew.

Aerial photographs from the 1940's demonstrate that the study area at this time has been significantly cleared (Figure 4). The Illawarra railway line has been established and residential subdivision is greatest to the north and south of the railway corridor. The M5 motorway has not been constructed (construction on the motorway began in the late 1980's) and the area now covered by the motorway comprises cleared land most likely used for agricultural purposes. To the east and west of Penshurst Road and south of the current position of the M5 motorway it appears that the vegetation has not been as extensively cleared, therefore it is possible that this portion of the study area may retain remnant native vegetation.

Since the late 1980's the study area has suffered significant ground disturbances due to the construction of the M5 motorway and other associated infrastructure. The area has also been subject to more intensive residential development as indicated by Figures 4 and 6.

Figure 3 – Soil landscapes of the study area and immediate surrounds

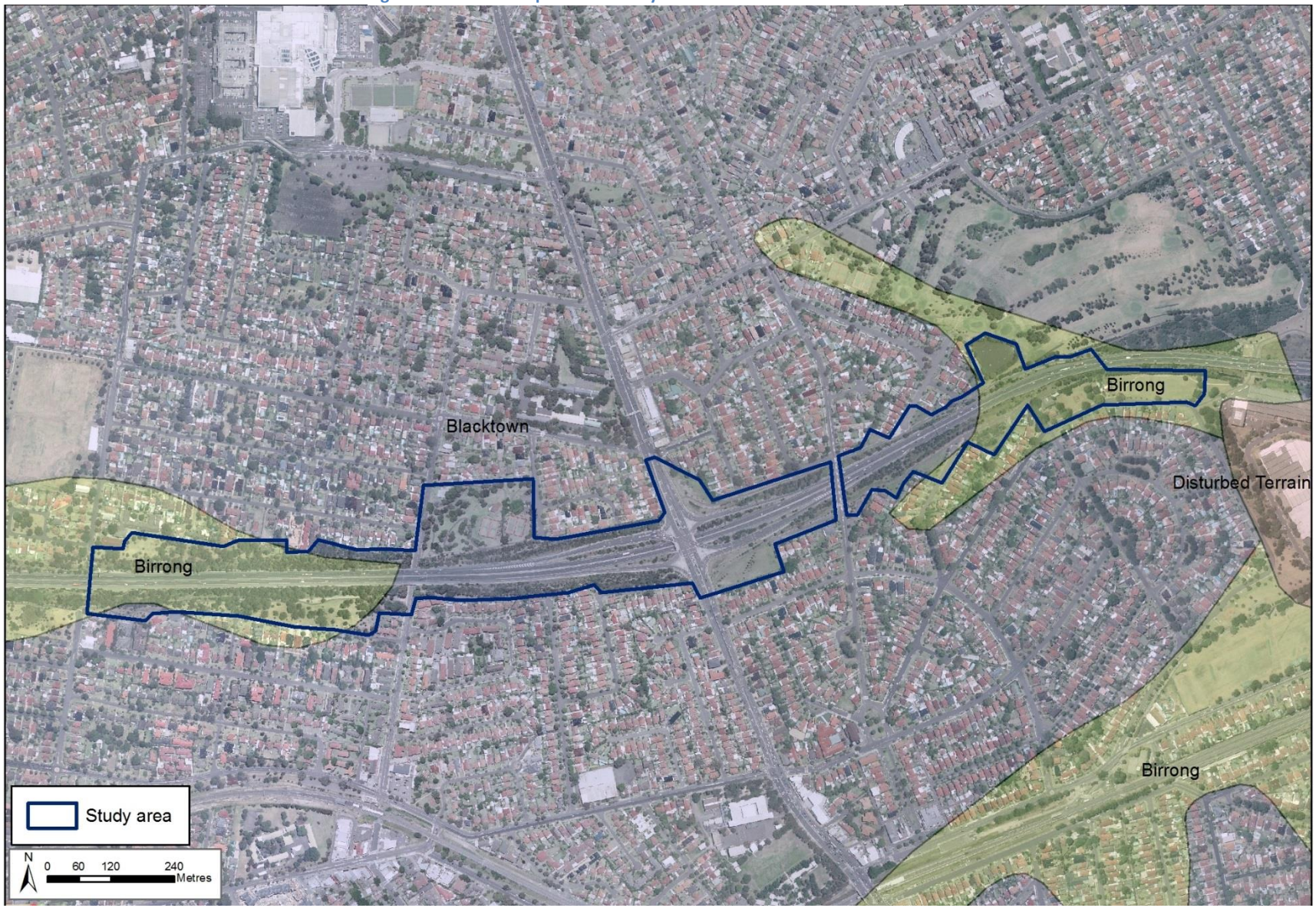


Figure 4 – 1943 aerial of the study area and immediate surrounds

4.0 Aboriginal Historical and Archaeological Context

4.1 Aboriginal material culture

The archaeological material record for Aboriginal occupation of the Sydney Basin Bioregion and greater NSW demonstrates long term occupation dating from the Pleistocene. The oldest dated sites for Aboriginal occupation in the Sydney Basin Bioregion are late Pleistocene in age, with securely dated sites situated at the base of the Blue Mountains (14,700 years before present (yBP)), and two coastal sites south of Wollongong at Bass Point and Burrill Lake in the Shoalhaven both dated to around 20,000 yBP (Lampert 1971; Nanson *et al* 1987). Evidence of earlier Aboriginal occupation has also been found within greater NSW at Lake Mungo (50-60,000 yBP) (Bowler *et al* 2003).

The existing archaeological record is limited to certain materials and objects that are able to withstand degradation and decay. As a result, the most common type of Aboriginal objects remaining in the archaeological record are stone artefacts. Archaeological analyses of these artefacts in their contexts have provided the basis for the interpretation of change in material culture over time. Technologies used for making tools changed, along with preference of raw material. Different types of tools appeared at certain times, for example ground stone hatchets are first observed in the archaeological record around 4,000 yBP in the Sydney region (Attenbrow 2010: 102). It is argued that these changes in material culture were an indication of changes in social organisation and behaviour.

The Eastern Regional Sequence was first developed by McCarthy in 1948 to explain the typological differences he was seeing in stone tool technology in different stratigraphic levels during excavations such as Lapstone Creek near the foot of the Blue Mountains (McCarthy *et al* 1948). The sequence had three phases that corresponded to different technologies and tool types (the Capertian, Bondaian and Eloueran). The categories have been refined through the interpretation of further excavation data and radiocarbon dates (Hiscock & Attenbrow 2005; JMcD CHM 2005). It is now thought that prior to 8,500 yBP tool technology remained fairly static with a preference for silicified tuff, quartz and some unheated silcrete. Bipolar flaking was rare with unifacial flaking predominant. No backed artefacts have been found of this antiquity. After 8,500 yBP silcrete became dominant as a raw material source, and bifacial flaking was the most common technique for tool manufacture. From about 4,000 yBP to 1,000 yBP backed artefacts appear more frequently. Tool manufacture techniques become more complex and bipolar flaking increases (JMcD CHM 2006). It has been argued that from 1,400 to 1,000 years before contact there is evidence of a decline in tool manufacture. This reduction may be the result of decreased tool making, an increase in the use of organic materials, changes in the way tools were made, or changes in what types of tools were preferred (Attenbrow 2010: 102). The reduction is evidenced by the reduction in frequency of backed blades as a percentage of the assemblage.

4.2 Aboriginal Ethno-Historic Context

The locations and boundaries of traditional Aboriginal language groups within the greater Sydney region is based on observations by Europeans since the early 1700's and therefore may sometimes be

inaccurate or incomplete. It is currently acknowledged that the greater Sydney region was occupied by five different language groups, each made up of smaller tribes or clans (Attenbrow 2010: 17). The two language groups relevant to the study area are: the Darug & Gameygal whose clans were present within the general vicinity of Botany Bay.

The Darug occupied the area from Broken Bay to the northern and western area of Botany Bay, the north shore of the Georges River stretching westward to Appin in the south, and along the Nepean/Hawkesbury catchment to the north (Attenbrow 2010: 22-36). The Darug were further split into hinterland and coastal clans. The coastal clans of the Darug may have included the study area within their traditional boundaries. The Gameyjal clan is believed to have resided in the St George area, south of the study area (Attenbrow 2010: 22-36).

Early ethno-historic records note the Aboriginal people of the Botany Bay region fishing from canoes, diving for oysters, collecting shellfish and trapping fish (Cook 3rd May 1770; Umwelt Australia 2001). Lieutenant Captain Cook recorded that upon one venture ashore in Botany Bay his party found several small huts made of the bark of trees (Cook 29th April 1770).

The introduction of European disease, particularly smallpox, decimated the Aboriginal population. As settlement of the Sydney region expanded loss of land and resources frequently led to conflict, and more generally to a decline in aboriginal social structures way of life (Attenbrow 2010). Numerous camps were established, one of which was located across Botany Bay at La Perouse.

4.3 Registered Aboriginal sites in the study area – AHIMS search

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 12 June 2014 for recorded Aboriginal sites (AHIMS search # 137818). An area covering approximately five kilometre radius from the study area's boundaries was searched in order to gain information on the archaeological context of the area, and to ascertain whether any previously recorded Aboriginal sites are present within the study area.

Table 2 – AHIMS search details

Buffer	Start (Lat/Long)	End (Lat/Long)
50 metres	-33.9793 151.0029	-33.8908 151.1433

No previously recorded Aboriginal sites are situated within the study area. The distribution of recorded sites within the AHIMS search area is shown on Figure 5. The location of Aboriginal sites is considered culturally sensitive information. It is advised that this information be removed from this report if it is to enter the public domain.

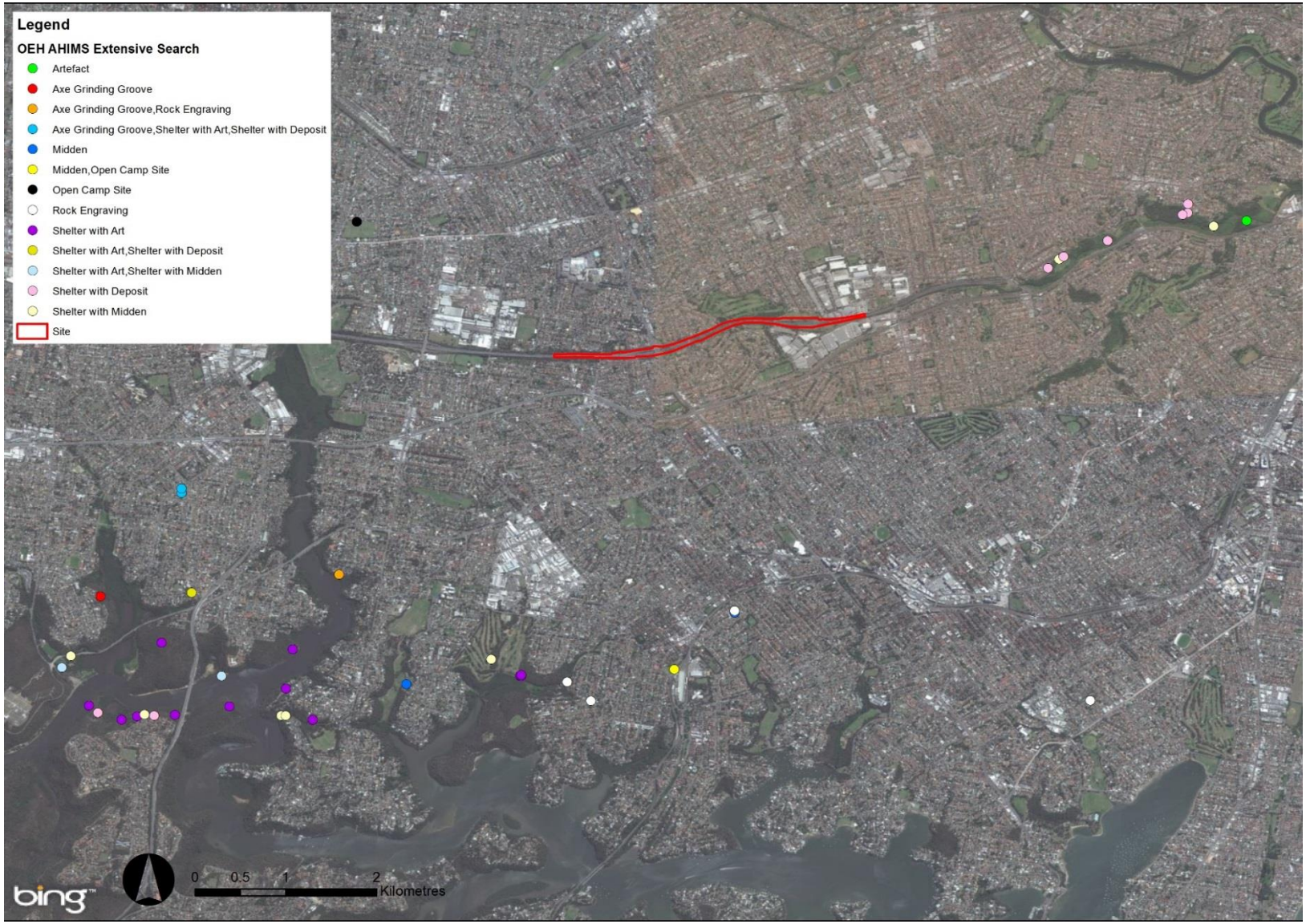
The frequency of recorded site types is summarised in Table 3 below.

Table 3 - Frequency of site features from AHIMS data, within 5km of study area

Site Feature	Frequency	Percentage
Axe grinding groove	1	2
Axe grinding groove/rock engraving	1	2
Axe grinding groove/shelter with art/shelter with deposit	2	4
Midden	2	4
Midden open camp site	1	2
Open camp site	1	2
Rock engraving	4	9
Shelter with art	12	28
Shelter with art/shelter with deposit	1	2
Shelter with art/shelter with midden	3	7
Shelter with deposit	8	18
Shelter with midden	9	20
Total	45	100

The majority of previously recorded sites on the AHIMS register, situated within five kilometeres of the study area, comprise shelter sites within close proximity to Georges River and Wolli Creek. Shelters with art are the most common, followed by shelters with middens and shelters with deposits. There are also a higher number of rock engravings (9%) when compared to grinding grooves and open camp sites (<2-4%).

Figure 5 – Location of previously registered Aboriginal sites on AHIMS near the study area



4.4 Previous archaeological investigations

A number of regional and local archaeological investigations have been conducted across the Cumberland sub-bioregion. Those relevant to the study area are provided below (Kohen 1986; Haglund 1984; NHS 1991; KAS 2010).

Western Cumberland Plain

Kohen's (1986) study undertook a regional analysis of the western Cumberland Plain in order to reconstruct the occupational patterns and land use of past Aboriginal people from the late Pleistocene to Holocene. Kohen's study was based on open surface archaeological sites analysed across five geological formations on which they were found: Wianamatta Group Shales, Hawkesbury Sandstone, Quaternary alluvium, Quaternary Aeolian and Tertiary alluvium. A series a sample units across Richmond, Blacktown and Penrith were surveyed (an area of 20 x 30km in total) and a total of 222 open archaeological sites identified. The number of sites identified on the Quaternary alluvium formation was greater than expected and emphasised a correlation between the proximity of permanent fresh water and the location of archaeological sites. It was found that over 65 per cent of open stone artefact scatter sites were situated within 100 metres of permanent fresh water sources while only 8 per cent of sites were found in locations over 500 metres in distance. Kohen considered that archaeological sites situated within close proximity to fresh permanent creek and rivers were more densely clustered, larger and complex. Silcrete and chert were favoured raw materials used in the manufacture of stone artefacts with quartz, basalt and quartzite utilised in comparatively smaller quantities (Kohen 1986: Attenbrow 2010: 7, 49-50; AHMS 2013: 33).

Freeway No. 5 Section between King Georges Road, Beverly Hills & Heathcote Road, Moorebank

Huglund and Associates (1984) undertook an archaeological survey of the M5 Motorway between King Georges Road, Beverly Hills and Heathcote Road, Moorebank, which included the study area. The survey identified three sparse and widely dispersed stone artefact scatters within the former Greenwood golf course. The site was recorded as Greenwood 1 AHIMS #45-5-0337 and was noted to be highly disturbed. No Aboriginal cultural heritage was identified within the study area (Hugland & Associates 1984; AHMS 2013: 34).

Archaeological Survey of the Toll Plaza Site for the F5 South Western Freeway near Liverpool

National Heritage Studies completed an archaeological survey of the then proposed toll plaza on the M5 Motorway between New Brighton Golf Course and the former Greenwood Golf Course. As a result of the survey three surface stone artefact scatters were identified: TPS1 (AHIMS #45-5-0837 (n=5)), TPS2 (n=10) and TPS (n=1). The artefacts were made from the following raw materials: silcrete (n=10), mudstone (n=5) and quartz (n=1). It was considered that TPS2 was actually a re-identification of Greenwood 1 (AHIMS #45-5-0337) which Haglund originally identified in 1984 (NHS 1991; AHMS 2013: 35).

The Georges River Estuary

Kayandel Archaeological Services undertook a Cultural Heritage Desktop Assessment for the Georges River in order to compliment and inform an Estuary Management Plan. The study area comprised the estuary of Georges River from Liverpool Weir to Botany Bay. A total of 112 Aboriginal sites were identified within the study area. Site types included: shell middens (57 per cent), pigment art (20 per cent) and stone artefact sites (15 per cent). Engraved art and grinding groove sites were rare (n=3) and this was considered to be linked to the local geological conditions. One burial site was noted, however, it is unclear whether this constitutes a modern burial of ancestral remains. Three scarred trees were also noted to be within the study area, although one of these has now been relocated to the Australian Museum.

The desktop assessment also reviews Aboriginal historic sites within the study area. Of particular note is the Salt Pan Creek Aboriginal Camp. The camp is described as existing before the 1910 and in use up until the 1940's. The camp was located where Salt Pan Creek meets the Georges River, north of One Tree Point and South of Henry Lawson Drive, approximately 3.5 kilometres south of the current study area. The camp included three weather board houses, sheds and tents (MDCA 2004: 88; KAS 2010: 16).

It was recommended that field inspections of previously recorded sites in the study area be undertaken to assess their current condition and whether further research would be appropriate. It was also recommended that any future work should be undertaken in collaboration with relevant Aboriginal communities (KAS 2010).

5.0 Predictions

5.1 Aboriginal land use

Assumptions about Aboriginal land use patterns are made on the basis of archaeological information gained from the local area, from observations made by Europeans after settlement of the area, and from information known about available natural resources.

As Aboriginal people were mobile hunter-gatherers, it would be likely that they moved across the landscape between resources. It would also be likely that movement was related to socio/cultural factors such as gatherings and ceremonial obligations. Campsites would have provided temporary residences such as bark structures. It is difficult to ascertain whether a campsite existed at a given location, but correlations between stone artefact density and campsites are often assumed. While it would be likely that knapping would have occurred at a campsite, it would also be likely that knapping would have occurred during movement across the landscape, as tools were prepared or repaired during hunting and gathering activities.

5.2 Predictive models

This predictive model comprises a series of statements about the nature and distribution of evidence of Aboriginal land use that is expected in the study area. These statements are based on:

- Landscape context and landform units;
- Ethno historical evidence of Aboriginal land use;
- Distribution of natural resources;
- Results of previous archaeological investigations in the vicinity of the study area; and
- Predictive models proposed in other archaeological investigations such as Kohen 1984.

Predictive statements are as follows:

- The underlying geology of the study area comprises Wianamatta Group shales and therefore is unlikely to contain site types associated with sandstone outcrops, such as shelters, grinding grooves or art;
- If the study area has not been previously cleared, during initial construction of the M5 Motorway, it is possible that scarred trees may exist as aerial images indicate the presence of vegetation adjacent to the Motorway (Figures 4 and 6).
- Stone artefact scatters or isolated finds are the most likely Aboriginal site type to be identified within the study area. Stone artefact sites within close proximity to fresh permanent creek and rivers (<50m) are more likely to be densely clustered, larger and complex.
- The study area is not situated within close proximity to any permanent sources of water (the closest source is more than one kilometre away) therefore, any stone artefacts present within the study area are likely to represent isolated or low density highly dispersed scatters, indicative of casual use and discard.

6.0 Field Methods

6.1 Site definition

An Aboriginal site is generally defined as an Aboriginal object or place. An Aboriginal object is the material evidence of Aboriginal land use, such as stone tools, scarred trees or rock art. Some sites, or Aboriginal places can also be intangible and although they might not be visible, these places have cultural significance to Aboriginal people.

OEH guidelines state in regard to site definition that one or more of the following criteria must be used when recording material traces of Aboriginal land use:

- The spatial extent of the visible objects, or direct evidence of their location.
- Obvious physical boundaries where present, e.g. mound site and middens (if visibility is good), a ceremonial ground.
- Identification by the Aboriginal community on the basis of cultural information.

For the purposes of this study an Aboriginal site was defined by recording the spatial extent of visible traces or the direct evidence of their location.

Potential Archaeological Deposits (PADs) are areas where sub-surface stone artefacts and/or other cultural materials are likely to occur (DECCW 2010: 38). These areas may be associated with recorded sites but are often greater in extent, taking in areas around the visible artefacts where there is a potential for further buried artefacts to exist. PADs may also be present where no visible artefacts are located. This may be the case when there is no ground surface visibility, but the area is seen to have a high likelihood of containing artefacts.

6.2 Survey methodology

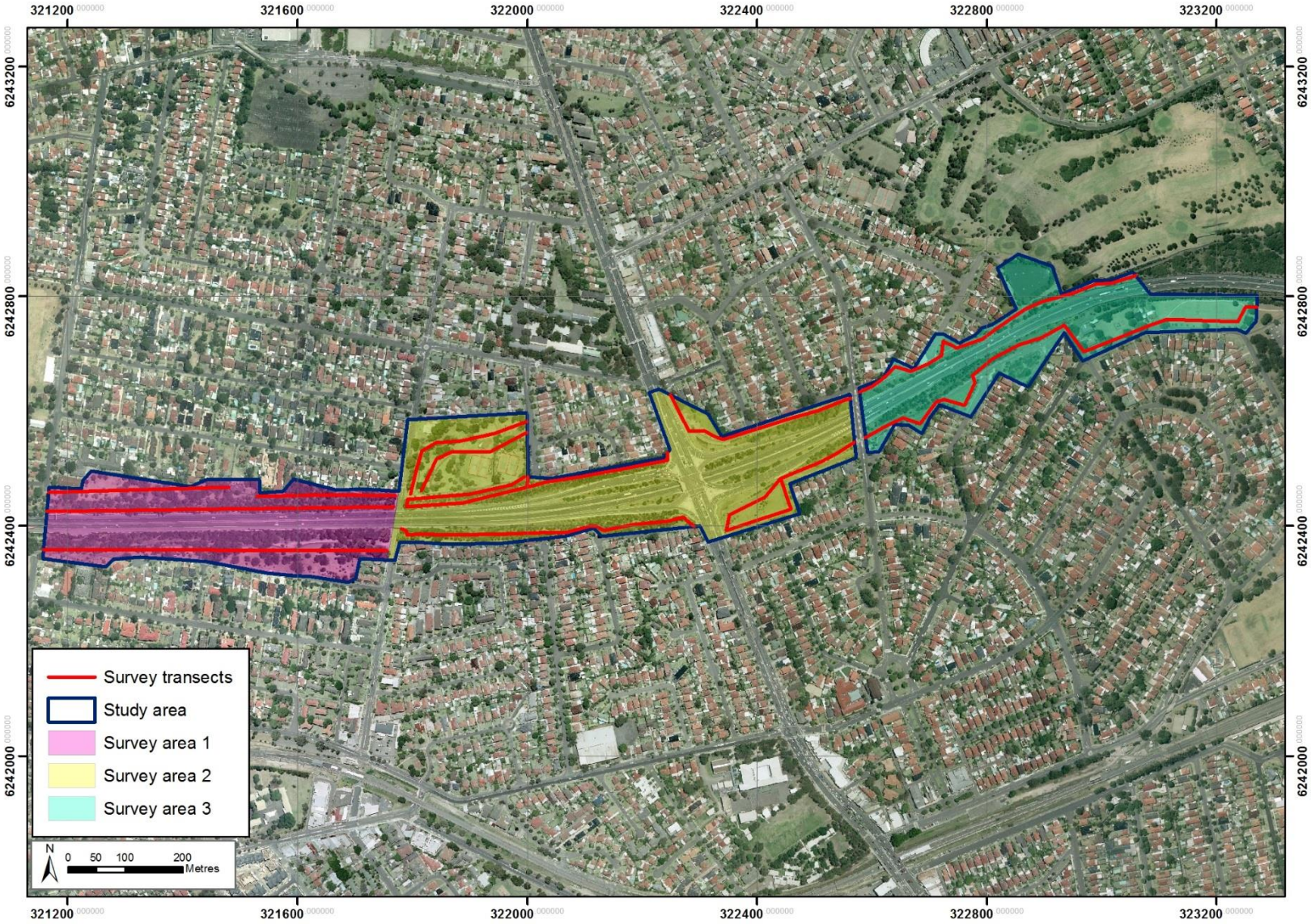
The survey was conducted on foot on the 19 June 2014. The survey was undertaken by Stacey Kennedy and Alexander Timms (Artefact Heritage). Abbi Whitlock represented GLAC during the survey and Adam Madden represented MLALC.

The survey was undertaken in accordance with relevant OEH standards and guidelines, as part of Stage 2 of the Roads and Maritime PACHCI. The survey area covered all proposed construction compound and/or laydown areas. A handheld Global Positioning System (GPS) was used to track the path of the surveyors, and to record the co-ordinates of sites, features and location of landform units within the study area. An aerial map of the study area was also carried by members of the survey team in the field.

All ground exposures were examined for stone artefacts, shell, or other traces of Aboriginal occupation. Old growth trees were examined for signs of cultural scarring or marking.

A photographic record was kept of all sections of the study area. Photographs were taken to record different aspects of the landform units within the study area, vegetation, levels of disturbance, Aboriginal sites and PADs. Scales were used for photographs where appropriate.

Figure 6 – Survey areas and transects



7.0 Results

7.1 Survey Observations

Survey Area 1

The study area was divided into three survey areas and covered all proposed construction compound and/or laydown areas. (Figure 6). The survey began in Survey Area 1 on the southern side of the M5 motorway which was traversed from west to east (Karne St to Penshurst St). The northern side was traversed in the same manner (Figure 6). The general composition of the study area in Survey Area 1 consists of: the M5 Motorway (30-40 metres), the Motorway reserve corridor (15-20 meters) and 20-30 metres of parkland reserve to either side of the motorway (north & south). The landscape of Survey Area 1 comprises level to gently undulating floodplain associated with the Wianamatta Group Shales (Birrong soil landscape).

The majority of Survey Area 1 has been subject to significant ground disturbance due to the construction of the M5 Motorway and other associated items of infrastructure such as noise walls, drainage channels and landscaping (Plate 1). It was also noted that utility installation, comprising high pressure gas mains, are also present within the immediate area (Plate 4). Some native vegetation is present within the Motorway reserve and parkland reserve, however, due to the extent of disturbance noted above this is considered to represent regrowth and not remnant native vegetation.

Although the native vegetation was considered to be regrowth all was inspected for the presence of any cultural scarring. No trees bearing cultural scarring were identified.

Ground surface visibility was extremely low throughout Survey Area 1, except for areas of disturbance, some eroded areas and those areas surrounding footpaths and tracks. Drainage channels within the study area were predominately artificial, being created as part of the construction and maintenance of the M5 Motorway.

No Aboriginal cultural heritage or objects were identified within Survey Area 1. No landforms within Survey Area 1 are considered to have potential to contain Aboriginal cultural heritage.

Table 4 – Survey Coverage: Survey area 1

Landform	Survey unit area (m^2)	Visibility (%)	Exposure (%)	Effective coverage area (m^2)	Effective coverage (%)
Undulating floodplain	87,037	10	10	8, 704	<10

Plate 1- Survey area 1 facing east across Motorway reserve and parkland reserve

Plate 2- Survey area 1 facing east across Motorway reserve and parkland reserve

Plate 3 - Survey area 1 facing north-west across Motorway reserve

Plate 4- Survey area 1 facing east. Shows high pressure gas main is located within the vicinity

Survey Area 2

Survey Area 2 was traversed west to east (Penshurst Rd to King Georges Rd), on both the southern and northern sides, and then from King Georges Rd to Cooloongatta Rd in the same manner (Figure 6). The general composition of the study area in Survey Area 2 consists of: the M5 Motorway (30-40 meters), the Motorway reserve corridor (15-20 meters) and 20-30 meters of parkland reserve to either side of the motorway (north & south). The landscape of Survey Area 2 comprises level to gently undulating plain associated with the Wianamatta Group Shales (Blacktown soil landscape).

The majority of Survey Area 2 has also been subject to significant ground disturbance due to the construction of the M5 Motorway and other associated items of infrastructure such as noise walls, drainage channels and landscaping (Plate 5). It was also noted that utility installation, comprising high pressure gas mains, are also present within the immediate area (Plate 6). Some native vegetation is present within the Motorway reserve and parkland reserve within this section but not to the same extent as is present in Survey Area 1. All native vegetation present in Survey Area 2 is considered to represent regrowth and not remnant native vegetation.

Although the native vegetation was considered to be regrowth all was inspected for the presence of any cultural scarring. No trees bearing cultural scarring were identified.

Ground surface visibility was extremely low throughout Survey Area 2, except for areas of disturbance, some eroded areas and those areas surrounding footpaths and tracks. Drainage channels within the study area were predominately artificial, being created as part of the construction and maintenance of the M5 Motorway.

No Aboriginal cultural heritage or objects were identified within Survey Area 2. No landforms within Survey Area 2 are considered to have potential to contain Aboriginal cultural heritage.

Table 5 – Survey coverage: Survey area 2

Landform	Survey unit area (m^2)	Visibility (%)	Exposure (%)	Effective coverage area (m^2)	Effective coverage (%)
Undulating plain	132, 913	10	10	13, 291	<10

Plate 5 – Survey Area 2 facing west across parkland reserve. Area has been subject to landscaping and drainage works

Plate 6– Survey Area 2 facing east across parkland reserve. High pressure gas mains are situated within the vicinity

Plate 7– Survey Area 2 facing east across Motorway reserve. Area has been highly modified by the construction of batters

Plate 8– Survey Area 2 facing east across M5 Motorway (Survey Area 3)

Survey Area 3

Survey Area 3 was traversed west to east (Cooloongatta Rd to Rosebank Av), on the northern side until the underpass was reached. The southern part was then accessed by going through the underpass and traversed from east to west (near Rosebank Ave to Cooloongatta Rd) (Figure 6). The general composition of the study area in Survey Area 3 consists of: the M5 Motorway (30-40 metres), the Motorway reserve corridor (15-20 metres) and 20-30 metres of parkland reserve to either side of the motorway (north & south). The landscape of Survey Area 3 comprises level to gently undulating plain associated with the Wianamatta Group Shales (Blacktown soil landscape).

The majority of Survey Area 3 has also been subject to significant ground disturbance due to the construction of the M5 Motorway and other associated items of infrastructure such as noise walls, drainage channels and landscaping (Plate 9). Some native vegetation is present within the Motorway reserve and parkland reserve within this section but not to the same extent as is present in Survey Area 1. All native vegetation present in Survey Area 3 is considered to represent regrowth and not remnant native vegetation.

Although the native vegetation was considered to be regrowth all was inspected for the presence of any cultural scarring. No trees bearing cultural scarring were identified.

Ground surface visibility was extremely low throughout Survey Area 3, except for areas of disturbance, some eroded areas and those areas surrounding footpaths and tracks. Drainage channels within the study area were predominately artificial, being created as part of the construction and maintenance of the M5 Motorway.

No Aboriginal cultural heritage or objects were identified within Survey Area 3. No landforms within Survey Area 3 are considered to have potential to contain Aboriginal cultural heritage.

Table 6 – Survey coverage: Survey area 2

Landform	Survey unit area (m^2)	Visibility (%)	Exposure (%)	Effective coverage area (m^2)	Effective coverage (%)
Undulating plain	75, 839	10	10	7, 584	<10

Plate 9 – Survey Area 3 facing west across parkland reserve. Note impact of concrete drainage channel

Plate 10– Survey Area 3 facing west across Motorway reserve and parkland reserve

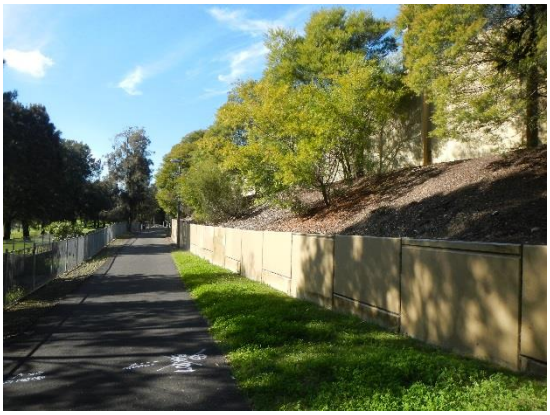


Plate 11– Survey Area 3 facing west across parkland reserve

Plate 12– Survey Area 3 facing west across Parkland reserve

8.0 Analysis and Discussion

8.1 Aboriginal cultural heritage

All native vegetation was inspected for the presence of any cultural scarring. No trees bearing cultural scarring were identified. Ground surface visibility was extremely low throughout the study area, except for areas of disturbance, some eroded areas and those areas surrounding footpaths and tracks. No Aboriginal cultural heritage or objects were identified within the study area. No landforms within the study area are considered to have potential to contain Aboriginal cultural heritage.

8.2 Areas of Disturbance

Overall the study area features high levels of ground disturbance. The majority of the study corridor has been disturbed through the construction and maintenance of the M5 Motorway. Further disturbances are evidenced by construction of infrastructure such as: parklands, walking paths, concrete drainage channels, high pressure gas mains and noise walls.

8.4 Archaeological potential

Archaeological potential is closely related to the levels of ground disturbance in the area. Other factors are also taken into account when assessing archaeological potential, such as whether artefacts were located on the surface, and whether the area has landforms considered to be sensitive for Aboriginal heritage according to the predictive statements for the area.

Archaeological potential refers to the likelihood of sub-surface deposits to be situated within *in situ* soil horizons. In order to effectively identify the archaeological potential of an area, landform and soil profile disturbances need to be assessed. In order to do this, general categories of disturbances have been specified.

- *Lightly Disturbed*—this is characterised by areas with natural landforms. Natural landforms are identified by an assessment of the study area, aerial photographs and archaeological and environmental backgrounds. It is possible that Aboriginal cultural material and / or objects will be present *in situ* within relatively undisturbed contexts. Disturbances within areas identified as lightly disturbed will generally include timber clearance, grazing, ploughing activities and occasional occurrences or erosion and soil runoff.

- *Moderately Disturbed*—this is characterised by areas with intact landform units but with disturbed soil profiles. Aboriginal cultural material and / or objects may be present within these soil profiles but may have been moved from their original locations. Disturbances within areas identified as moderately disturbed include areas which have been cultivated continuously, areas that have been utilised as vehicle tracks and / or area that have been subject to extensive erosional activities and soil deflation including areas that have been re-vegetated.

- *Heavily Disturbed*—this is characterised by areas of constructed landforms, buildings and modified ground surfaces. It is likely that, cultural material and / or objects in these areas have been destroyed or removed by the process of construction. If Aboriginal cultural material and / or objects are present, determining the origin and / or context would not be possible. Disturbances within areas identified as highly disturbed include areas that have been subject to construction, which include but are not limited to implementation of buildings, roadways and sub-surface infrastructure as well as areas subject to erosion and landscaping works and graded surfaces. Areas that have been completely eroded of natural soil profiles are likewise identified as being heavily disturbed.

The study area has been impacted due to construction of the M5 Motorway and is considered to be heavily disturbed. Further disturbances also include artificial embankments, construction of reserve areas, drainage work adjacent the current road alignment, and construction of various infrastructure. No intact landforms were identified across the study area. If any intact pockets of undisturbed landforms are present within the study area the characteristics and distance of the study area from permanent water sources suggest that those landforms would have very low potential to contain archaeological deposits.

9.0 Significance Assessment

9.1 Assessment criteria

Archaeological significance refers to the archaeological or scientific importance of a landscape, site or area. This is characterised using archaeological criteria such as archaeological research potential, representativeness and rarity of the archaeological resource and potential for educational values. These are outlined below:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?
- Education potential: does the subject area contain teaching sites or sites that might have teaching potential?

If a Stage 3 PACHCI assessment is required, cultural values and significance would be discussed by the Aboriginal groups during the ongoing consultation, details of which would be contained in the Cultural Heritage Assessment Report of the Roads and Maritime PACHCI.

9.2 Archaeological significance assessment

No Aboriginal sites were previously recorded within the study area. No new Aboriginal sites were identified during the current study. The study area was largely disturbed and modified. The study area was assessed as demonstrating low archaeological potential and low archaeological significance.

10.0 Impact Assessment

It has been identified that the proposed works will largely be contained within areas that are already highly disturbed and modified. Any undisturbed areas (if present) that may be impacted have low archaeological significance. No areas were identified as having archaeological potential within the study area.

The impact assessment has therefore found that there will be no impact to known Aboriginal sites and/or places or identified areas of potential under the proposed works.

11.0 Management and Mitigation Measures

Conservation of Aboriginal sites is best practice cultural heritage management. Retaining Aboriginal archaeological material within a natural landscape setting enables the continuation of past cultural associations with the landscape.

The nature of mitigation measures recommended is primarily based on an assessment of archaeological significance. The recommendations are also informed by cultural significance, which would be discussed by the GLALC and the MLALC.

11.1 Mitigation and Management Measures

In accordance with the Roads and Maritime Stage 2 PACHCI guidelines, the current assessment has established that the entire study area has low archaeological significance and no previously recorded Aboriginal sites and/or places are located within the boundaries of the study area. No areas of archaeological potential were identified during the assessment within the study area.

If unforseen Aboriginal objects or potential human remains are uncovered during development, work must cease in the vicinity of the find. Section 5.8 of the Roads and Maritime PACHCI identifies the requirements if unexpected finds are identified and would need to be addressed and adhered to. If Aboriginal objects were to be impacted Stage 3 of the PACHCI would need to be undertaken.

12.0 Recommendations

The following recommendations were based on consideration of:

- Stage 2 of the Roads and Maritime PACHCI.
- The SEAR under Section 115Y of the *Environmental Planning and Assessment Act 1979*;
- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, July 2005);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010);
- The results of the background research, site survey and assessment;
- The interests of the GLALC and MLALC; and
- The likely impacts of the proposed development.

It was found that:

- No Aboriginal sites or places were previously recorded within the study area.
- No new sites or areas of archaeological potential were located within the study area.
- The study area has been subject to high levels of disturbance.

It is therefore recommended that:

- The proposed works are able to proceed without the need for further archaeological and/or Aboriginal heritage assessment.
- If the project design is changed and areas not surveyed are to be impacted, further archaeological assessment would be required.
- If Aboriginal objects or suspected human remains are located during works the Roads and Maritime Unexpected Finds Procedures must be followed.

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