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15 April 2010

AECOM

M2 Upgrade Project

Preliminary Aboriginal Heritage Assessment



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Glossary of Terms

Alluvial	Pertaining to sediment mass deposited from transport by channelled stream flow or over-bank stream flow.
Archaeological Potential	The likelihood of the presence of archaeological evidence ascertained through physical evaluation (survey, test excavations) and historical research.
Artefact Scatter	A collection of artefacts usually distributed across the surface of the ground.
Aboriginal Object	<i>‘...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 (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains’</i> (s.5 NPW Act)
Aboriginal Place	Any place declared to be an Aboriginal place under s.84 of the <i>National Parks and Wildlife Act 1974</i> (NPW Act) because the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal objects.
Aboriginal Rockshelter	A covered area, usually in the form of a rock overhang, with evidence of Aboriginal activity including one or more Aboriginal stone artefacts, evidence of rock art or evidence of Aboriginal grinding grooves.
Aboriginal Scarred Tree	A tree that bears a scar or scars which are wounds formed from the deliberate removal of bark or wood by Aboriginal people. Aboriginal scarred trees are often an indicator of an activity area.
Aboriginal Site	In this study, the term is used to define the present physical extent of visible Aboriginal archaeological material.
Artefact	Any object that is physically modified by humans.
Assemblage	A collection of artefacts associated by a particular place or time and assumed generated by a single group of people. An assemblage can comprise different artefact types.
Attribute	A well defined feature of an artefact that cannot be further subdivided. Archaeologists identify types of attributes, including form, style and technology, in order to classify and interpret artefacts.
Axe	A stone-headed axe characteristically containing two ground surfaces which meet at a bevel.
Backed Artefact	A stone tool where one margin of a flake is retouched at a steep angle and that margin is opposite a sharp edge.
Background Scatter	A term sometimes used to describe a low density scatter of isolated finds that are distributed through the landscape without any obvious focal point.
Burra Charter	The Burra Charter provides guidance for the conservation and management of places of cultural significance Australia. It sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. Australia ICOMOS (the Australian National Committee of ICOMOS) adopted the most recent version of the Burra Charter on 26 November 1999.
Chert	A crypto-crystalline sedimentary siliceous rock commonly used in the manufacture of stone implements.
Conservation	As defined in The Burra Charter, conservation means all the processes of looking after a place so as to retain its cultural significance.
Conservation Management Plan	A document that outlines the cultural heritage significance of an object or area and policies, guidelines, maintenance and strategies for the conservation of the object or area.
Contact Site	A site that displays an interaction between early colonists and Aboriginal Australians.

Core	A piece of flaked stone which has one or more negative flake scars but no positive flake scars.
Country	A term used by Aboriginal people to refer to the land to which they belong.
Cultural significance	Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations (Australia ICOMOS Burra Charter Article 1.2).
Desktop Survey	A study that does not involve any field-based activity and only involves background research and reporting.
Effective Coverage	A quantifiable estimate of the area in which archaeological materials are “detectable”, i.e. exposed ground surface area.
Excavation	An archaeological field method that involves the disturbance of the earth to reveal previously buried archaeological materials.
Exposure	An area of land surface where the ground surface is visible, usually as the result of thinner vegetation cover, erosive forces or human-caused disturbance. In archaeological surveys, the percentage of ground surface that is visible is recorded. These percentages of exposure are then used to calculate effective coverage.
Feature	An artefact that cannot be normally removed from a site, e.g. foundations.
Flake	Any piece of stone struck off a core. It has a series of characteristics showing that it has been struck off. The most indicative of these features are ring cracks, showing where the hammer hit the core. Also the ventral surface may be deformed in characteristic fashion.
Flaked Piece/Waste Flake	An unmodified and unused flake, usually the by product of tool manufacture or core preparation.
Grinding Groove	A depression formed in rock from the sharpening of a stone hatchet head or use of a muller (topstone).
Ground Visibility	A term used to describe the area of the ground’s surface that is visible during archaeological field surveys.
Hammerstone	A stone that has been used to strike a core to remove a flake, often causing pitting or other wear on the stone’s surface.
Heritage	The word ‘heritage’ is commonly used to refer to our inheritance from the past. Heritage can be used to cover natural environment as well, for example the Natural Heritage Charter. In this document, cultural heritage refers to all Indigenous places and objects, and associated values, traditions, knowledge and cultures.
Holocene	The geological period covering the last 10,000 years.
Indurated Mudstone	Indurated mudstone (sometimes referred to as “tuff”) is a general term that encompasses sedimentary rocks from very fine mud-sized particles that are invisible to the naked eye. The term may also encompass siltstones and claystones.
In Situ	In the natural or original position. Applied to a rock, soil, or fossil when occurring in the situation in which it was originally formed or deposited.
In situ conservation	Strategies and initiatives designed for the preservation and conservation of historical archaeological materials without the need to collect or excavate materials from their archaeological context.
Isolated Find	A single artefact not located with any other.
Landform Element	A small area of the landscape, within an area of 30 m, with particular geomorphic attributes.
Lithics	Of, or pertaining to, stone.
Manuport	An object that is unmodified but has been transported to its location by humans.
Midden	A deposit of occupation debris, rubbish, or other by-products of human activity.
Natural Transformation	Change in the archaeological record as a result of natural processes.
Object	See Aboriginal object.

Place	See Aboriginal place.
Pleistocene	The geological period equivalent to the last ice age and preceding the Holocene from about 2 million years to 10,000 years ago. The Late Pleistocene generally refers to the period of time from 40,000 – 10,000 years ago.
Post-depositional	After deposition. A term commonly used with reference to factors affecting the preservation of artefacts and archaeological features.
Potential Archaeological Deposit	An area of the landscape that is believed to contain subsurface archaeological deposit.
Quartz	A hard transparent mineral commonly used in the manufacture of stone artefacts.
Quartzite	A metamorphic siliceous rock commonly used in the manufacture of stone artefacts.
Retouched Flake	A flake that has been flaked again in a manner that modifies an edge, commonly for the purpose of resharpening that edge.
Rockshelter	A covered area, usually in the form of a rock overhang, that may have been occupied by Aboriginal people in antiquity. No material evidence of occupation, c.f. Aboriginal rockshelter .
Scarred Tree	A tree that bears a scar or scars, which are wounds formed from a range of natural, accidental or deliberate impacts that cause damage to living plant tissue on a trunk or limb. See also <i>Aboriginal Scarred Tree</i> .
Settlement Pattern	Distribution of human settlement on the landscape.
Significance	A term typically used to define the level of importance of a heritage site or place.
Silcrete	A siliceous rock commonly used in the manufacture of stone artefacts.
Site	An area where archaeological evidence is observed.
Surface Site	A site where artefacts are found on the ground surface.
Survey Coverage	The area of a study area surveyed, usually expressed as a percentage. See also Effective Coverage.
Test Excavation	Excavation of small sections of an area to determine the archaeological remains and significance.
Tuff	Solidified volcanic ash. Used by some archaeologists to refer to indurated mudstone.
Usewear	The wear displayed on an artefact as a result of its use.

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Abbreviations and Acronyms

AFT	Artefact. Used in the AHIMS database to refer to an Aboriginal site feature/s comprising stone artefacts.
ACHMP	Aboriginal Cultural Heritage Management Plan.
AHIMS	Aboriginal Heritage Information Management System. Database of recorded Aboriginal sites across NSW managed by DECCW.
DECCW	Department of Environment, Climate Change and Water.
DoP	Department of Planning.
GDG	Grinding Groove. Used in the AHIMS database to refer to an Aboriginal site feature/s comprising stone artefacts.
ICOMOS	International Council on Monuments and Sites.
LEP	Local Environmental Plan.
LGA	Local Government Area.
MGA	Map Grid of Australia.
NHL	National Heritage List
NNTT	National native Title Tribunal.
PAD	Potential Archaeological Deposit.
TRE	Scarred/Carved Tree. Used in the AHIMS database to refer to an Aboriginal site feature/s comprising Aboriginal scarred or carved trees.

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Executive Summary

Aboriginal Cultural Heritage

Director-General's Requirements

The Environmental Assessment must include 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).

AECOM Australia Pty Ltd (AECOM) was commissioned by Leighton Contractors Pty Limited to prepare a preliminary Aboriginal heritage assessment of the proposed M2 Upgrade Project. The M2 Motorway is located in the north western suburbs of Sydney between North Ryde and Baulkham Hills. The project proposes to upgrade the existing M2 infrastructure by establishing a third lane to both eastbound and westbound carriageways (including Norfolk Tunnel) between Lane Cove Road and Windsor Road, provide new on-off ramps at Windsor Road and Herring Road and upgrade the motorway's Intelligent Transport Systems.

The preliminary heritage assessment involved the preliminary inspection of lands directly impacted by the project with particular emphasis on lands where ground impacts are expected, together with inspections of all known Aboriginal sites in the study area. Lands outside the current motorway lease boundary were not assessed.

The assessment was conducted in accordance with the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005), and the *RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RTA n.d.). The inspections conducted in March April 2009 were conducted in consultation with the Metropolitan Local Aboriginal Land Council. The inspections in December 2009 were conducted in consultation with the Aboriginal community in accordance with Department of Environment, Climate Change and Water's *Interim Community Consultation Requirements for Applicants* (DEC2004).

Existing environment

The environmental conditions of the study area can be summarised as an area of temperate climate with rugged, rolling to very steep hills, hillcrests and ridges on Hawkesbury Sandstone, and medium density drainage net of waterways. Soils are generally prone to erosion and in some instances water-logging. Large areas of the study area have been impacted by urban development, however, relatively undisturbed landscapes and vegetation occur in nature reserves and some steeper sections of the study area. This remaining vegetation supports a diverse range of fauna.

The study area lies in predominantly sandstone country with valleys and gullies with sandstone margins. The predominant archaeological sensitivity of these areas lies in their suitability for the formation of sandstone-based sites such as rockshelters, grinding-grooves and, to a lesser extent, art sites (including both pigment and engravings). Areas that contain extant native vegetation, such as in the major creeklines and reserves, may also contain culturally modified (scarred) trees.

The generally rocky conditions within the landscape are less suitable for open camp sites compared to the flatter and low undulating country of the Cumberland Plain further west. Furthermore, the soils in the study area are generally shallow and skeletal. These soils have little potential for the formation of subsurface archaeological deposit due to the highly erodible nature of the soils.

Urban development, including the development of the M2 itself, has also reduced the archaeological sensitivity of the study area. However whilst some areas have been extensively disturbed, others have not. Areas of steep-sided valleys and gullies have not been developed due to their unsuitable geography, and still retain a large portion of their original vegetation. Many of these areas have also been set aside as reserves and are exempt from development. It is these areas that are considered to hold the greatest archaeological sensitivity. Such areas include the Lane Cove Recreation Area; Berriwerri Reserve; Chilworth Recreation Reserve; Darling Mills State Forest; and Bidjigal Reserve.

A total of 15 registered or known Aboriginal sites occur within 100 m of the M2 Motorway. All sites were inspected during field inspections conducted during March/April 2009 and December 2009, with the exception of one site which was found to have erroneous coordinates recorded in AHIMS and is well south of the M2. Areas identified in 1989-1992 archaeological reports as being of potential archaeological constraint were also inspected, as were areas of construction impact in the vicinity of known Aboriginal sites.

Impact assessment

Sites that are considered to have potential to be impacted are:

- AHIMS 45-5-1005 is an isolated artefact that lies in very close proximity to the Beecroft Road bus off-ramp. The current proposal to remove the off-ramp is likely to disturb the ground where the artefact is said to occur. However, the artefact is not considered to be in situ, is completely out of archaeological context and consequently is considered to hold low significance.
- Site M2A1, a set of grinding grooves that were identified during the Phase 1 field inspections and occur directly beneath the Terrys Creek bridges. Whilst all construction work is intended to occur on the northern side of the M2, the current construction plan proposes to provide vehicle access from the southern side. Consequently, there is potential for indirect impact to the site through sedimentation and/or physical impacts through earthworks.
- In addition, Aboriginal stakeholders consider there is potential for indirect impact to one rockshelter (CF3; AHIMS 45-5-2161) through vibration impacts. Although previous monitoring suggests that such impacts are unlikely, it is recommended that technical advice from an expert in noise and vibration. Aboriginal stakeholders request that monitoring take place during construction works in the vicinity.

It is considered that there will be no direct impacts and unlikely to be indirect impacts to the other sites resulting from the upgrade works. However, it is considered prudent to erect some form of protective fencing at rockshelters within 50 m of M2 construction works to minimise the potential for indirect impacts resulting from access by construction workers. The sites considered to be within 50 m of construction works are: AHIMS 45-6-2097, 45-6-2160, 45-6-2161, 45-6-2162, 45-6-2163, 45-6-2543, 45-6-2544 and DC1.

Mitigation measures

The following recommendations are made in light of the initial findings of the preliminary Aboriginal heritage assessment:

1. should Aboriginal objects be identified during the course of construction, work should cease in that part of the study area and DECCW, MLALC and DLALC should be notified immediately;
2. should Aboriginal skeletal material be identified during construction, work should cease immediately and Police, DECCW and the relevant LALC should be notified immediately;
3. the proponent should prepare an Aboriginal Heritage Management Plan (AHMP) for the 15 known sites within the study area. The AHMP should provide guidance on the management of the sites both during the construction phase of the M2 Upgrade Project, and during the subsequent operational phase of the M2 Motorway. The AHMP will provide more detailed guidance than outlined in this report (e.g. detailed location mapping, fencing specifications, etc). The AHMP should include, but not be limited to, the following protective measures:
 - a) the proponent should erect temporary protective fencing at Aboriginal rockshelters within 50 m of the M2 construction works to minimise the potential for inadvertent damage by construction workers. The sites include: AHIMS 45-6-2097, 45-6-2160, 45-6-2161, 45-6-2162, 45-6-2163, 45-6-2543, 45-6-2544 and DC1;
 - b) the proponent should erect temporary sedimentation barriers and fencing along the banks of Terrys Creek, on the southern side of the bridges to minimise potential for indirect impacts to site M2A1 through sedimentation and/or personnel access during construction;
 - c) Aboriginal stakeholders have requested that monitoring take place at sites during construction works. However, this assessment considers that further impacts to, or identification of, Aboriginal objects is unlikely. Therefore further monitoring is not considered necessary;

- d) the Aboriginal community have requested that an exclusion zone be placed around site M2A1 on the southern side of the M2 bridge and the proponent should take steps to avoid any construction activity on that side of the bridge. If possible, access to the areas should be afforded from the northern side of the M2. If this is not possible, and access is required on the southern side (passing under the bridge) then access should be made as close as possible to the concrete abutment;
 - e) the proponent should ensure that regular toolbox talks are conducted with emphasis on Aboriginal cultural heritage and the potential for impacts to the sites.
4. AHIMS 45-5-1005 is not considered to hold cultural heritage significance, and the absence of the single artefact suggests that it has been lost from the area, and therefore the site has already been effectively destroyed. The impact from the M2 is therefore impact on a destroyed site. The AHIMS register should be amended to reflect this status.

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1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by Leighton Contractors Pty Limited (LeiCon) to prepare an Environmental Assessment (EA) of the proposed M2 Upgrade Project, one component of which was a preliminary Aboriginal heritage assessment. The M2 Motorway is located in the north western suburbs of Sydney between North Ryde and Baulkham Hills (**Figure F1: Regional Context**

). The project proposes to upgrade the existing M2 infrastructure by establishing a third lane to both eastbound and westbound carriageways (including Norfolk Tunnel), provide new on-off ramps at Windsor Road and Herring Road and upgrade the Motorway's Intelligent Transport Systems (**Figure F2: Project Proposal**

).

The preliminary heritage assessment involved the preliminary inspection and impact assessment of lands directly impacted by the project, with particular emphasis on lands where ground impacts are expected. Lands outside the current Motorway lease boundary were not assessed (see **Section 2.0**).

The preliminary Aboriginal heritage assessment was prepared in accordance with relevant guidelines including the *Aboriginal Cultural Heritage: Standards & Guidelines Kit* (NPWS 1997), draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005), the *RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RTA 2008) and the *Burra Charter* (Australia ICOMOS 1999). The Aboriginal consultation process for this project followed the Department of Environment, Climate Change and Water's (DECCW) *Interim Community Consultation Requirements for Applicants* (DEC 2004). Legislation regarding management of the Aboriginal heritage values of the study area, summarised further in **Section 8.0**, is the *National Parks and Wildlife Act 1974*.

1.1 Project Background

The Department of Main Roads publication *Roads 2000* (1987) identified the M2 Motorway as a priority section of Sydney's Orbital network, providing a key role in linking Sydney's north west to the lower north shore and Sydney's CBD. The M2 Motorway opened in 1997. Since then, land use density has increased within the motorway catchment particularly in Sydney's north west. The current proposal to upgrade the motorway seeks to relieve current congestion, thereby facilitating more efficient movement of people and goods and would also be consistent with potential future development of an M2 or F3 connection.

Owner / operator of the motorway, Transurban, initially presented the current M2 Upgrade proposal to the RTA in July 2007. Following collaborative scope refinements, between Hills M2 and the RTA, the project application report was submitted to the Department of Planning in February 2009 and consultation with the community commenced.

As part of the overall EA process, AECOM commenced a program of Aboriginal heritage assessment. This report documents the findings of that assessment.

Director General's Requirements (DGRs) were issued by the Department of Planning (DoP) on 6 April 2009. The DGRs identified Aboriginal Cultural Heritage as a key issue and stated that:

The Environmental Assessment must include 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).

As part of the agency submissions for the DGRs, DECCW requires:

An assessment of impacts on Aboriginal cultural heritage in consultation with relevant Aboriginal communities, and the protection measures to be adopted during construction of the facility.

1.2 Aims

The overall aim of this assessment was to identify the Aboriginal heritage values of the project land, identify potential development impacts on those values and provide suitable management recommendations. To achieve these aims the following objectives were established:

- to consult with the relevant local Aboriginal community groups regarding the specific social value of land in the study area;
- to understand the regional research context of any Aboriginal sites or objects in the study area;
- to identify and inspect documented Aboriginal heritage sites/objects within the study area;
- to identify and record any unrecorded Aboriginal sites and objects within the study area;
- to assess the cultural significance of Aboriginal sites and objects in the study area in consultation with the Aboriginal stakeholders; and
- to prepare recommendations on the management of Aboriginal heritage values within the study area, when compared with the proposed development footprint.

1.3 Study Area

The study area consists of the M2 Motorway within the M2 lease boundary, specifically between Windsor Road at Baulkham Hills and Lane Cove Road at North Ryde. Furthermore, the study area only encompasses those areas where construction impacts will occur or where known Aboriginal sites occur within 100 m of the M2 Motorway.

1.4 Project Team

The Project Team consists of archaeologists and other specialists from AECOM, and representatives of the local Aboriginal community. Rick Bullers (Professional Archaeologist) managed the project, participated in the second round of field inspections and co-wrote this report. Neville Baker (Associate Director Archaeologist) participated in the first round of field inspections and provided technical and QA review of this report. Geordie Oakes (Archaeologist) conducted background research, participated in the first preliminary field investigation and co-wrote this report. Tessa Corkill (Archaeologist) participated in the second field inspection program and provided advice on the previous archaeological investigations. Lee-Anne Bishop and Tim Osborne provided administrative and drafting support. Craig Niles (Associate Director Planning and Design) managed the overall EA project. John Fisher was the client's representative.

1.5 Report Structure

The report structure relates to the sections of the report and their contribution to the study.

- **Section 2.0** describes the assessment methodology employed including the methodology and results of consultation with the Aboriginal community;
- **Section 3.0** provides the environmental context of the study area;
- **Section 4.0** provides ethno-historical and archaeological contextual information;
- **Section 5.0** discusses the results of the desktop survey including database searches;
- **Section 6.0** discusses the results of the field inspection;
- **Section 7.0** discusses the impacts to Aboriginal heritage values in the study area;
- **Section 8.0** describes legislation guiding Aboriginal heritage management; and
- **Section 9.0** provides succinct management recommendations regarding the Aboriginal heritage values of the study area.

1.6 Acknowledgements

The project team are indebted to Tessa Corkill who gave freely of her time, advice and an extensive range of her reports regarding the Aboriginal archaeological survey of the study area in the early 1990s. Many of her reports were not available from other sources.

1.7 Limitations

Predictions have been made about the probability of subsurface archaeological materials occurring within the study area. It is possible that materials may occur in any landscape context, and the assessment of subsurface materials refers to the likelihood of occurrence based on surface indications and environmental context.

AECOM has undertaken a search of the Aboriginal Heritage Information Management System (AHIMS) held by Department of Environment, Climate Change and Water (DECCW). The search results are provided in **Section 5.4**, although Grid References have been omitted from the Public Exhibition copy for security reasons. Register searches are constrained by the amount of data in the register and the quality of that data (for example grid references can be inaccurate). Large areas of NSW may not have been systematically searched and may contain Aboriginal objects and other heritage values not recorded on AHIMS.

Additionally, the AHIMS reports database can only be searched by the title of the report, which may not indicate the geographical location of the area covered. This means that it is possible that some known sites and some reports may have been omitted from this study. Sites and reports are regularly added and removed from AHIMS and therefore the accuracy of information provided from AHIMS is only valid on the day the register is searched.

A summary of the statutory requirements regarding Aboriginal and historic heritage is provided in **Section 8.0**. This is provided based on experience with the heritage system in NSW and does not purport to be legal advice. It should be noted that legislation, regulations and guidelines change over time, and users of the report should satisfy themselves that the statutory requirements have not changed since the report was written.

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2.0 Assessment Methodology

AECOM undertook the assessment of the study area in accordance with the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005), the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) and the *RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RTA 2008), which consists of a staged process:

- 1) a preliminary assessment (desktop assessment) and field inspection; and
- 2) if heritage constraints are identified, a full heritage assessment.

This report documents the findings of the initial investigation (preliminary Aboriginal heritage assessment).

The assessment was conducted in accordance with appropriate State legislation, namely the *NSW National Parks and Wildlife Act 1974* and *Environmental Planning and Assessment Act 1979*, and additional guidelines, specifically the *Aboriginal Cultural Heritage Standards and Guidelines Kit* and (NPWS 1997) and the *Interim Community Consultation Requirements for Applicants* (DEC 2004) (ICCRs).

2.1 Preliminary Assessment

The methodology used in the preliminary assessment consisted of a desktop assessment to identify whether any Aboriginal heritage values are associated with the study area followed by a series of field inspections to ground-truth the desktop assessment.

The following tasks were undertaken by AECOM during the preliminary assessment:

- a desktop assessment to identify whether there were any initial constraints, including:
 - an Aboriginal site and report keyword search of DECCW's AHIMS database to identify registered Aboriginal sites within 1,000 m either side of the M2 corridor (**Figure F3: M2 Motorway Alignment and AHIMS Site Locations**);
 - a review of existing Aboriginal heritage reports and documents for the study area and nearby area to provide a regional and local picture on the heritage issues likely to occur in this area (**Section 5.1**); and
 - preparation of a heritage constraints map (**Figure F4: Motorway Aboriginal Heritage Preliminary Heritage Constraints Mapping – Western Section** to **Figure F6: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section**);
- consultation with relevant Aboriginal stakeholders in accordance with the *Interim Community Consultation Requirement for Applicants* (DEC 2004) (**Section 2.3**); and
- field inspection in conjunction with the Aboriginal community to:
 - ground-truth existing AHIMS-registered sites;
 - inspect lands in proximity to known Aboriginal sites, or on landforms that suggest archaeological potential, where direct impacts are expected (construction of sediment ponds, culverts, site compounds, temporary vegetation clearance); and
 - inspect lands within the study area previously identified as having potential archaeological value.

Where constraints are identified during the preliminary assessment, a full heritage assessment is normally conducted in accordance with the DEC (2005) Part 3A guidelines. Although there are two sites that have potential to be impacted by the project (see **Section 7.1.1**), a full heritage assessment is not considered warranted for the following reasons:

- the study area has been extensively surveyed previously during the lead up to the initial M2 construction;
- the preliminary assessment was conducted in full consultation and involving full participation of the Aboriginal community; and
- areas of direct ground impact were inspected during the preliminary assessment and the impact assessment did not identify any impacts to Aboriginal heritage other than those outlined above.

It should also be noted that one of the aims of this assessment was to identify *archaeological* issues for the study area (i.e. archaeological 'sites' or material evidence such as rockshelters, stone tools, grinding grooves, or other tangible evidence of Aboriginal occupation). However, the concept of Aboriginal heritage is not confined to material evidence. Instead, it is much broader in scope, encompassing such factors as language, stories and ritual. To investigate Aboriginal heritage values *not* related to archaeological sites relies on contact with the local Aboriginal community for advice. The usual avenue for this is to follow DECCW's guideline on Aboriginal community consultation for Part 6 approvals – *Interim Community Consultation Requirements for Applicants* (ICCRs) (DEC 2004). Details of the consultation process undertaken as part of this preliminary assessment are provided in **Section 2.3**.

2.2 Field Inspection Methodology

The method used for the field inspection was based on the results of an initial constraints mapping program (**Section 5.6**). Effort was made to inspect all AHIMS-registered sites within close proximity of the M2 corridor (within 100 m of the motorway) to assess their location in relation to the M2 and specifically in relation to the footprint of the proposed upgrade works.

The majority of the existing sites are located in steep and/or heavily vegetated terrain and access to the sites was by foot only. Geographic coordinates for each site were extracted from AHIMS and used to re-identify the sites using Differential Global Positioning System (DGPS)¹. Where the AHIMS coordinates were found to be in error, the corrected MGA coordinates were noted.

Areas of potential constraint, as determined from analysis of landform and from previous archaeological surveys of the M2 corridor, were traversed on foot to identify any previously unrecorded sites. The inspection was limited to targeted areas that included known registered Aboriginal sites and their surroundings, situated on landforms that are considered to have a higher archaeological potential (e.g. ridgelines, creek banks, etc) and in close proximity of the M2 corridor (i.e. no inspections were carried out more 100 m from the corridor). Inspection emphasis was placed on the footprint of the proposed upgrade works. These surveys concentrated on areas of sandstone outcrop suitable for the formation of rockshelters and overhangs that may have been used by Aboriginal people, as well as suitable areas where open camp sites might be expected, such as elevated areas in close proximity to creeks. The surveys also inspected areas of sandstone bedrock in and around creeklines that may have been used to form axe grinding grooves and mature trees for evidence of cultural scarring.

Notes on site type, condition and proximity to the M2 corridor were recorded. Records consisted of descriptive notes, DGPS positions (MGA format), and photographs. Where rockshelters were re-identified, the physical attributes were compared to those identified in the AHIMS site cards.

A methodology/briefing letter was presented to registered Aboriginal stakeholder groups during a Focus Group Meeting (further detail provided in **Section 2.3**).

¹ Trimble GEO-XM, employing GPS Pathfinder Office software.

2.3 Aboriginal Consultation

The Aboriginal heritage assessment was conducted in accordance with DECCW's Draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005). Furthermore, the RTA has its own comprehensive guidelines: *RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RTA 2008). Both these documents stipulate a two-part Aboriginal heritage assessment process and recommend that Aboriginal community consultation be undertaken in accordance with DECCW's *Interim Community Consultation Requirements for Applicants* (ICCRs) the DEC (2004), a process that was followed in this investigation.

The ICCRs outline a process of inviting Aboriginal groups to register their interest in being party to consultation (including local newspaper advertising), seeking responses on proposed assessment methodology, and seeking comment on proposed assessments and recommendations. The guidelines require proponents to allow ten working days for Aboriginal groups to respond to invitations to register, and then 21 days for registered Aboriginal parties to respond to a proposed assessment methodology.

An Aboriginal community consultation log is attached at **Appendix B**.

2.3.1 Preliminary Assessment

The desktop assessment identified areas of potential archaeological value based on the results of the AHIMS search and areas of archaeological potential identified in previous archaeological assessments of the M2 corridor. Consequently, a map of existing Aboriginal sites and areas of archaeological potential was produced (**Figure F4: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Western Section** to **Figure F6: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section**). A field inspection was deemed necessary to ground-truth the sites and areas of archaeological potential.

Metropolitan Local Aboriginal Land Council (MLALC) was contacted by telephone on 18 March 2009 and advised of the project, and the need for a field inspection. Mr Alan Madden was identified by MLALC as their representative for the project. A subsequent telephone conversation with Mr Madden on 23 March 2009 established that due to previous commitments he would be unable to attend site induction and the field inspection. Mr Madden advised AECOM that the field inspection should proceed without him, and advise him if any items of significance were found or any other issues were identified.

A field inspection was carried out within all areas of potential constraint on 30-31 March and 6-8 April 2009. No Aboriginal heritage items or areas of constraint were identified within areas to be impacted within the M2 corridor during that inspection. However, subsequent alterations to aspects of the project design warrants further inspection to ensure that no cultural heritage values are compromised. Aboriginal consultation following the ICCR process will also be conducted.

2.3.2 Full Consultation

Under the DECCW Part 3A guidelines (DECC 2005) and RTA Aboriginal heritage assessment guidelines (RTA 2008) consultation with the Aboriginal community is also a staged process. Where no constraints are identified in the preliminary assessment, there is no further requirement for consultation and assessment. However it is intended to allow the wider Aboriginal community to provide information on the socio-cultural values of the study area. A program of full Aboriginal consultation was instigated in late October 2009 to seek wider Aboriginal community input into the project.

The purpose of the full Aboriginal consultation is to seek information on the cultural (social) heritage values of the study area.

The following subsections outline a staged process of consultation in accordance with the ICCRs and the RTA guidelines.

Notification and Registration of Interest

Appropriate organisations were notified of the project with requests for information on suitable Aboriginal stakeholders to be consulted. Specifically, notification consisted of the following:

- advertisement of the project in the following newspapers, inviting Aboriginal groups to register interest:
 - *Northern District Times* newspaper on Wednesday 28 October 2009;
 - *Hills News* newspaper on Tuesday 3 November 2009;
 - *The Koori Mail* on Wednesday 4 November 2009; and
 - *The National Indigenous Times* on Thursday 29 October 2009.
- letters were sent to the following organisations requesting advice on Aboriginal stakeholders to consult and any known heritage issues to be taken into consideration (mailed or faxed 3 November 2009):
 - Department of Environment, Climate Change and Water (DECCW);
 - Department of Aboriginal Affairs;
 - Metropolitan Local Aboriginal Land Council (MLALC);
 - Deerubbin Local Aboriginal Land Council (DLALC);
 - NSW Aboriginal Land Council;
 - NTSCORP (formerly Native Title Services);
 - National Native Title Tribunal;
 - Registrar of Aboriginal Owners
 - Ryde City Council;
 - Baulkham Hills City Council; and
- known Aboriginal organisations and individuals around the study area were contacted, as a result of advice received from the above organisations (refer **Table 1**).

The National Native Title Tribunal responded on 4 November 2009 advising that they were unable to narrow down the search results for the M2 expansion area. They provided search results for the Baulkham Hills, Parramatta, Ryde and Hornsby local government areas. The results identify Native Title Claim No. NC97/8 over several parcels of land in the Greater Sydney Basin. Several small parcels occur in the vicinity of the M2 corridor, but are not within the M2 lease area.

The study area traverses two Local Aboriginal Land Council (LALC) areas, the boundary of which passes along Darling Mills Creek. Deerubbin LALC occupies the area west of Darling Mills Creek, and Metropolitan LALC occupies the area east of Darling Mills Creek (i.e. the majority of the study area). The Deerubbin Local Aboriginal Land Council responded on 4 November formally registering their interest in consultation. They did not provide any further information on potential Aboriginal stakeholders. The Metropolitan Local Aboriginal Land Council did not formally respond to the invitation to register, but were registered as a stakeholder anyway.

The Baulkham Hills Shire Council responded on 9 November 2009 recommending six Aboriginal individuals from four organisations for consultation, including DTAC and DLALC who had already registered. Notification letters were sent to the other two organisations on 10 November 2009.

The Office of the Registrar of Aboriginal Owners responded belatedly on 9 December (received 18 December) noting that there were no Registered Aboriginal Owners in the study area.

As a result of this process, and after the 10-day response period required under the ICCRs, a total of five Aboriginal groups registered their interest in being consulted.

Table 1: Aboriginal Stakeholders Identified for this Project

Organisation	Contact Name
Metropolitan Local Aboriginal Land Council (MLALC)	Alan Madden
Deerubbin Local Aboriginal Land Council (DLALC)	Steve Randall
Darug Tribal Aboriginal Corporation (DTAC)	Sandra Lee
Yarrawalk Enterprises (Yarrawalk)	Scott Franks
Darug Custodian Aboriginal Corporation (DCAC)	Leanne Watson
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Celestine Everingham/Gordon Morton
Darug Land Observations (DLO)	Gordon Workman

Briefing Letter/Methodology Advice and Focus Group Meeting

Briefing letters were sent to all registered Aboriginal stakeholders on advising the proposed methodology for the assessment (example in **Appendix B**) on 26 November 2009. The letters advised that the assessment will be conducted in stages as per the relevant guidelines for RTA and Part 3A projects. The briefing letters advised that field inspections had previously been conducted in March 2009 in consultation with MLALC, and no heritage constraints were identified. Stakeholders were also asked to provide any information they could on the Aboriginal socio-cultural heritage values of the study area.

The briefing letter also described the methodology used to conduct the field inspection including the use of a targeted sampling regime that investigates areas of potential heritage constraint as identified during the desktop assessment. These included areas of archaeological potential including creeklines, ridgetops, and sandstone outcropped slopes within 100 m of the M2 corridor.

An Aboriginal Focus Group meeting was held on Friday 11 December 2009 and all registered Aboriginal stakeholder groups were invited to take part. During the meeting a PowerPoint presentation of the initial results of the preliminary assessment (i.e. the desktop assessment and Phase 1 field inspections) was given (copy in **Appendix B**). All Aboriginal stakeholders were requested to comment on the results.

The briefing letter also included a response form that stakeholders could use to respond to the methodology. The response form provided space for stakeholders to endorse the methodology or to provide feedback on alternative methods, and to provide any information on the cultural (social) values.

Table 2 below lists the Aboriginal stakeholders that took part in the Focus Group meeting.

Table 2: Aboriginal Stakeholders Represented at the Aboriginal Focus Group Meeting on 11 December 2009

Organisation	Contact Name
Metropolitan Local Aboriginal Land Council (MLALC)	Alan Madden
Yarrawalk Enterprises (Yarrawalk)	Scott Franks
Darug Custodian Aboriginal Corporation (DCAC)	Leanne Watson
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Gordon Morton
Darug Land Observations (DLO)	Gordon Workman

DLALC and DTAC were unable to take part in the Focus Group meeting. Two main issues were raised at the meeting by Aboriginal stakeholders:

- During the briefing, it was mentioned that the Aboriginal sites in close proximity to the M2 Motorway had been monitored (for physical impacts) for a period of 10 years since the construction of the motorway in 1997. Aboriginal groups stated that they were unaware of any monitoring taking place and expressed dissatisfaction that no Aboriginal groups appear to have been involved in the monitoring process. Leanne Watson of DCAC advised that a Care Management Agreement was in place with Baulkham Hills Council that required Aboriginal participation in a program of monitoring (see **Section 5.1** and **Appendix C**)
- Objection was raised that field inspections had been conducted during the first round of fieldwork without Aboriginal community involvement. Despite explanations that the field inspections were conducted in consultation with MLALC and were done in accordance with the DEC (2005) and RTA (PACHCI) guidelines, Aboriginal groups stated that the inspections could only comment on archaeological values, not socio-cultural values. A second round of field inspections had already been planned, but it was agreed that previously inspected sites would be re-inspected during the second field inspection so that Aboriginal stakeholders had the opportunity to familiarise themselves with the previously inspected sites.

Fieldwork

Field inspections were conducted in two stages:

- 1) The first round of field inspections was conducted by AECOM archaeologists Neville Baker and Georgie Oakes in March and April 2009. MLALC were invited to take part but declined the invitation and suggested the inspection be undertaken without MLALC (Alan Madden) and to advise them if anything significant was found.
- 2) The second round of field inspections was conducted from 15 to 17 December 2009 by AECOM archaeologists Rick Bullers and Tessa Corkill, in conjunction with registered Aboriginal stakeholders. **Table 3** below identifies the stakeholders and their representatives that took part in the field inspections.

Table 3: Aboriginal Stakeholders that took part in the Field Inspections 15 December to 17 December 2009

Organisation	Contact Name	Day/Dates		
		Tues 15 Dec	Wed 16 Dec	Thurs 17 Dec
DLALC	Steve Randall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DTAC	John Reilly	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Yarrawalk	Scott Franks	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Danny Franks			<input checked="" type="checkbox"/>
DCAC	Leanne Watson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Jessica Wright	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DACHA	Gordon Morton	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Tim Wells	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DLO	Gordon Workman	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Ron Workman	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Six of the seven registered stakeholder organisations took part in the field inspections. MLALC elected not to take part in the second round of field inspections.

Aboriginal Stakeholder Field Survey Reports

In accordance with the RTA's PACHCI guidelines (RTA 2008), all Aboriginal stakeholder organisations that participated in the field inspections were requested to provide a written field survey report using PACHCI template No 3. A copy of the reports provided by the Aboriginal stakeholders are provided in full in **Appendix D**, and the recommendations have been incorporated into the final draft of this report. **Table 4** below provides a summary of stakeholder recommendations. Aboriginal stakeholders were requested to have their reports submitted by 12 January 2010. Follow up telephone calls and/or emails were made/sent on 19 January 2010 asking stakeholders to submit their reports.

Table 4: Summary of Aboriginal Stakeholder Recommendations

Organisation	Date	Recommendations	Comments
YW	21 Dec 09	Terrys Creek not be disturbed and a 100 to 200 m exclusion zone be placed around M2A1; Monitoring should occur if further development is considered in areas other than those in the current construction plan; The proponent should consider an offset in regard to any destruction; and The proponent should agree to a Heritage Management Plan and strategy.	Subsequent discussions with Yarrawalk agreed that any exclusion around M2A1 should occur on the southern side of the Terrys Creek bridge (where the site is) and the exclusion zone will not extend to the northern side of the bridge where works are to occur.
DLO	22 Dec 09	Works will not impact upon site M2A1, but DLO wants to be involved in any works in that area; Indirect impacts to CF3 (AHIMS 45-6-2161) may occur through vibration during construction. Periodic monitoring should occur.	
DTAC	19 Jan 2010	All sites identified in the study area must be monitored whilst construction occurs in the vicinity.	
DACHA			Did not submit field survey report.
DCAC			Did not submit field survey report.
DLALC			Did not submit field survey report.

Circulation of Draft Report

A complete draft copy of the preliminary Aboriginal heritage assessment report was circulated to the registered Aboriginal stakeholder groups on 5 February 2010 seeking comments on the results of the preliminary assessment, as well as to seek information to inform a socio-cultural heritage significance assessment.

Aboriginal stakeholders were requested to make written comment on the draft report by 5.00 pm on 19 February 2010. A follow up email (or fax) was sent to all registered Aboriginal stakeholders on 15 February 2010 as a reminder of the closing date for comment.

Written responses were received from three of the registered Aboriginal stakeholder groups. A summary of responses is provided in **Table 5**. Recommendations made by the Aboriginal stakeholders were incorporated in to the final management commitments where relevant.

Table 5: Summary of Aboriginal Stakeholder comments regarding the Draft Preliminary Aboriginal Heritage Assessment Report

Organisation	Representative	Date Received	Comments
DLO	Gordon Workman	15 Feb 2010	Agrees with report recommendations but requests monitoring of construction activities in vicinity of CF3, and wants to be involved in any works carried out on this job site.
DACHA	Gordon Morton	19 Feb 2010	Generally agrees with the report recommendations except for recommendation 3 (iii) - DACHA requests monitoring at all known sites within 50 m of the M2 and ensure that fencing is erected. Requests special care and appropriate controls developed around M2A1 due to potential impacts.
DCAC	Leanne Watson	19Feb 2010	Generally agrees with report findings and is happy with consultation process. DCAC is unhappy with previous survey and management of sites in the M2 buffer (but not with this project), relating to the lack of a holistic approach to site assessment and lack of consultation in subsequent site monitoring. DCAC wants site 45-6-2543 AHIMS recording to be extended to include the adjacent rockshelter and is unhappy with the condition of 45-6-0977.
YW			Did not provide comment on the draft report.
DTAC			Did not provide comment on the draft report.
DLALC			Did not provide comment on the draft report.
MLALC			Did not provide comment on the draft report.

3.0 Environmental Context

Investigations of the distribution of Aboriginal objects and places include an analysis of information on the natural resources available in a region to gain an understanding of the range of cultural remains that can be expected. Resources are linked to the hydrology, geology and soil types in a region.

Water availability is a major influence on the intensity of Aboriginal occupation. Evidence, usually in the form of flaked stone artefacts, is often associated with permanent or semi-permanent water sources.

Soil types are influential as accumulating sediments can cover cultural remains while areas of sediment removal through erosion can either uncover buried archaeological material or transport small items away from the original depositional context. Soil analysis has important ramifications for archaeological research through the potential impact of different soils on human activity (such as agricultural exploitation) and the impact of the soils on archaeological evidence (such as post-depositional movement). The soils known to occur throughout the study area are identified in order to delineate their nature and impact on the survival and location of archaeological material.

A detailed section on the ethno-historical and archaeological context of the study area is also presented below in **Section 4.0** to provide context for this assessment.

Information on the geology and soil landscapes and topography in the region of the study area is presented below. This data was used in the development of the fieldwork methodology and discussion on the results of the field inspection at the end of this report.

3.1.1 Climate

The study area has a temperate climate consisting of warm to hot summers and cool to mild winters. The warmest month is January, with an average temperature range between 18.6-25.8°C. The coolest winter month is July, with average temperatures between 8-16°C. However, daily temperatures can reach considerably higher or lower than these ranges. The average annual rainfall for this area is 1132.6mm (Bureau of Meteorology 2009).

3.1.2 Topography and Hydrology

The study area passes through several topographic environments as it winds its way across a number of Sydney's north-western suburbs. From the western extent of the M2 in the suburb of Baulkham Hills to the eastern end near Lane Cove the study area passes through the physiographic regions known as the Hornsby Plateau and the Harbour Foreshores. These regions are part of the greater Sydney Basin an area of Triassic sediments that dip gently from the east and north to a central lowland area south-west of Parramatta. The topography of these regions can be generally characterised as rugged, rolling to very steep hills, hillcrests and ridges on Hawkesbury Sandstone (Chapman and Murphy 1990). Local relief ranges from 20-120m with slopes of 5-25%.

Due to the study area's physical extent, a number of watercourses intersect with and/or run adjacent to it. A small un-named water course, running in a north to south direction, is located approximately 1 km east of Windsor Road. Further east, a complex of connected watercourses includes Morinda Creek to the west, Darling Mills Creek in the centre and Blue Gum Creek at the eastern edge drains southwards into the Parramatta River. Devlins Creek occurs about 1 km east of Pennant Hills Road and crosses the study area at several points. Terrys Creek crosses the M2 about 1.5 km east of Beecroft Road and runs generally parallel to the M2 as it meets Lane Cove River to the north of the M2. Further east Mars Creek and Shrimptons Creek also cross the M2 and drain northwards into Lane Cove River (**Figure F3: M2 Motorway Alignment and AHIMS Site Locations**); the banks of these two creeks has been heavily modified by the Macquarie Park developments.

Drainage lines are found on exposed bedrock and often contain deposits of up to 100 cm of gravel, loose quartz sand or other transported sedimentary material (Chapman and Murphy 1990).

3.1.3 Geology and Soils

The broad geology of the Sydney region is dominated by the Triassic Narrabeen Group which outcrops in the Erina Hills along the coast north of Narrabeen and the Middle Triassic Hawkesbury Sandstone that outcrops extensively on the Hornsby Plateau and the McDonald ranges. The Triassic Narrabeen Group consists of interbedded laminate, shale, quartz sandstone and lithic sandstone. The Middle Triassic Hawkesbury Sandstone overlies the Narrabeen Group and consists of medium to coarse-grained quartz sandstone with minor shale and laminate lenses (Chapman and Murphy 1990: 2).

Chapman and Murphy's (1990) studies of soil landscapes in the Sydney region indicate the study area crosses numerous types of soil environments. These include GyMEA (gy), Blacktown (bt), Glenorie (gn), Hawkesbury (ha), Lane Cove (lc) and Luddenham (lu). These are summarised below:

- GyMEA (gy) soils occur extensively throughout the Hornsby Plateau. They consist of shallow to moderately deep (30-100 cm) yellow earths and earthy sands on crests and inside of benches; shallow (<20 cm) siliceous sands on leading edges of benches; localised gleyed podzolic soils and yellow podzolic soils on shale lenses; shallow to moderately deep (<100 cm) siliceous sands and leached sands along drainage lines. These present a high erosion hazard (Chapman and Murphy 1990: 64);
- Blacktown (bt) soils occur extensively on the Cumberland Lowlands and occupy small parts of the western boundary of the study area near Baulkham Hills. They consist of shallow to moderately deep (<100 cm) red and brown podzolic soils on crests, upper slopes and well drained areas; deep (150-300 cm) yellow podzolic soils and solonchaks on lower slopes and in areas of poor drainage (Chapman and Murphy 1990: 30);
- Glenorie (gn) soils occur north of the Parramatta River on the Hornsby Plateau in Baulkham Hills, Hornsby, Kuring-Gai, and Ryde local government areas. They consist of shallow to moderately deep (<100 cm) red podzolic soils on crests; moderately deep (70-150cm) red and brown podzolic soils on upper slopes; deep (>200 cm) yellow podzolic soils on lower slopes and humic gleys, yellow podzolic soils and gleyed podzolic soils along drainage lines. These soils are a high erosion hazard (Chapman and Murphy 1990: 68);
- Hawkesbury (ha) soils occur on the steep, rugged, Hawkesbury Sandstone slopes and ridges of the McDonald Ranges, Hornsby Plateau and Hawkesbury Valleys. These consist of shallow (>50 cm), discontinuous lithosols/siliceous sands associated with rock outcrop; earthy sands, yellow earths and some yellow podzolic soils on the inside of benches and along joints and fractures; localised yellow and red podzolic soils associated with shale lenses; siliceous sands and secondary yellow earths along drainage lines. These soils are subject to erosion (Chapman and Murphy 1990: 44);
- Lane Cove (lc) soils occur on the floodplain of the Lane Cove River and its tributaries which includes parts of North Ryde, West Killara, West Chatswood and Lane Cove West, and only account for a minor part of the study area. These consist of deep (>200 cm) alluvial loams and various buried alluvial and marine soils. These areas are subject to flooding and present a high soil erosion hazard and seasonal water logging (Chapman and Murphy 1990: 86); and
- Luddenham (lu) soils occur primarily towards the south and the west in the Cumberland Lowlands. These consist of shallow (<100 cm) dark podzolic soils or massive earthy clays on crests; moderately deep (70-150cm) red podzolic soils on upper slopes; moderately deep (<150 cm) yellow podzolic soils and prairie soils on lower slopes and drainage lines. These soils are subject to high soil erosion, (Chapman and Murphy 1990: 63).

3.1.4 Flora and Fauna

Much of the study area's original natural vegetation has been extensively cleared for agriculture and urban development. Originally wet and dry sclerophyll woodland and open-forest dominated the study area but this vegetation is now largely confined to ridges and upper slopes. However, areas of Lane Cove and west of Baulkham Hills still retain tracts of wet sclerophyll forest or woodland. Common species include red bloodwood (*Eucalyptus gummifera*), yellow bloodwood (*E. eximia*), scribbly gum (*E. haemastoma*), brown stringybark (*E. caprellata*), old man banksia (*Banksia serrata*), Sydney blue gum (*E. saligna*) and blackbutt (*E. pilularis*).

A search of the Atlas of NSW Wildlife lists 515 faunal species located in the general region of the study area. Species recorded include 30 amphibian species, 329 bird species, two gastropod species, three insect species, 96 mammal species and 54 reptile species.

Common species include the common eastern froglet (*Crinia signifera*), red-browed finch (*Neochmia temporalis*), silvereye (*Zosterops lateralis*), bush rat (*Rattus fuscipes*), common brushtail possum (*Trichosurus vulpecular*) and the grey-headed flying-fox (*Pteropus poliocephalus*).

Although the current flora and fauna inhabiting the study area are not necessarily representative of the range and quantity present prior to non-Indigenous settlement, the composition of flora and fauna species present are indicative that there were probably sufficient resources to support a population of hunter-gatherers.

3.1.5 Past Land Use

Much of the study area has been heavily impacted by past agricultural land use and urban development, including the construction of the current M2 Motorway. As a result, considerable areas of natural vegetation and topography have been cleared and/or considerably altered. Today, areas running adjacent to the northern and southern edges of the M2 Motorway consist of low to high density residential housing and/or light to heavy industrial complexes.

However, some areas have undergone a lesser degree of alteration, and still retain their original geography. These tend to be steeper sections of the landscape which are often used for recreational purposes and in many cases have substantial remnant vegetation. Such areas include the Lane Cove Recreation Area; Berriwerri Reserve; Chilworth Recreation Reserve; Darling Mills State Forest; and Bidjigal Reserve.

3.1.6 Implications for Aboriginal Archaeology

The environmental conditions of the study area can be summarised as an area of temperate climate with rugged, rolling to very steep hills, hillcrests and ridges on Hawkesbury Sandstone, and a medium density drainage net of waterways. Soils are generally prone to erosion and in some instances water-logging. Large areas of the study area have been impacted by urban development, however, relatively undisturbed landscapes and vegetation occur in nature reserves and some steeper sections of the study area. This remaining vegetation supports a diverse range of fauna.

The study area lies in predominantly sandstone country with valleys and gullies with sandstone margins. The predominant archaeological sensitivity of these areas lies in their suitability for the formation of sandstone-based sites such as rockshelters, grinding-grooves and, to a lesser extent, art sites (including both pigment and engravings). Areas that contain extant native vegetation, such as in the major creeklines and reserves, may also contain culturally modified (scarred) trees.

The generally rocky conditions within the landscape are less suitable for open camp sites compared to the flatter and low undulating country of the Cumberland Plain further west. Furthermore, the soils in the study area are generally shallow and skeletal. These soils have little potential for the formation of subsurface archaeological deposit due to the highly erodible nature of the soils.

Urban development, including the development of the M2 itself, has highly impacted the study area. However whilst some areas have been extensively disturbed, others have not. Areas of steep-sided valleys and gullies have not been developed due to their unsuitable geography, and still retain a large portion of their original vegetation. Many of these areas have also been set aside as reserves and are exempt from development. It is these areas that were targeted for closer inspection during this investigation.

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4.0 Ethno-Historical and Archaeological Context

4.1 Ethno-history

Much of what is known about the Aboriginal inhabitants of an area comes from ethno-historical accounts. However, ethno-historical records of the Aboriginal people of the Sydney region are relatively sparse and often open to debate. The first written descriptions of the Aboriginal people in the Sydney region come from the writings of early explorers, such as Cook, Banks and Sydney Parkinson. There were few subsequent observations until the lack of fertile soils in the Port Jackson area led Governor Phillips to explore large areas of the Sydney region in the hope of locating arable land.

The expansion of European settlement in the Sydney region introduced a period of rapid decline in Aboriginal population numbers through introduced disease, conflict and dispossession of land and few attempts had been made to record the customs and languages of 'tribes' in the Sydney region (AECOM 2007: 14). Consequently, observations of Aboriginal life in south western Sydney were made largely after the massive social disruption following near population collapse and very little is known about the Aboriginal occupants of the Cumberland Plains at the time of first contact (Haglund 1982; Ross 1988).

Language and Territory

According to Attenbrow (2002: 22-35) Aboriginal groups in the Sydney region can be divided into five distinct language groups, each broken into smaller clans (local descent groups) and bands. The people occupying the study area belonged to the Darug language group (Attenbrow 2002: 23), which occupied the Sydney peninsula (Darug *Coastal*) and much of the central Cumberland Plain west of Parramatta (Darug *Hinterland*).

The boundaries of the language group lands are not always precise lines and many cultural customs relating to land use and responsibilities for Country mean boundaries are 'blurred' zones and can change over time (Sutton 1995, cited in Attenbrow 2002: 29). However, the people inhabiting the study area were well within the area generally accepted as being Darug.

Population

Early colonial records suggest that Aboriginal population densities west of Parramatta were lower than along the coast (Hunter 1793, cited in Attenbrow 2002: 17). Kohen (1995: 81) estimates the inland population density at about 0.5 persons/ sq. km, and the total population in the greater Sydney region (including the lower Blue Mountains) as between 4-5,000 and 8,000. The 1789 smallpox epidemic killed many Aboriginal people even before Phillip's 1791 expedition crossed the Cumberland Plain. By the 1820s Reverend William Walker listed nine 'tribes' in the Sydney region, but only three as "numerous".

Economy, Resource Use and Material Culture

Aboriginal people generally moved regularly across the land in small family groups subsisting predominantly on plant foods such as yams from the river plains and other plant foods such as the flowers of Banksias and pounded roots of ferns. Kangaroos, wallabies, possums, koalas, bandicoots, dingos, wombats, echidnas, fruit bats and other smaller mammals such as rats and mice, were among the wide range of animals that were available to Aboriginal hunters (Attenbrow 2002: 70). These animals are generally non-migratory and seasonal abundance did not vary markedly, with the exception of possums, which are most easily caught from tree hollows in winter when they are less active. The method of hunting involved building a fire at its hollow base to smoke the possum out, which would be clubbed on emergence. A regular part of the men's toolkit observed at contact was the stone headed hatchet slung from a string belt which was particularly useful in chopping footholds in trees for this purpose. Complex traps were built to hunt birds and large nets were used for hunting kangaroos.

Trade in various goods is well documented in parts of south eastern Australia. Items such as axe heads, wooden implements, coastal shell goods, hair string and lumps of resin or beeswax for hafting were typical trade items. In some parts of Australia craft specialisations were developed in the manufacture of stone tools from particular sources. Stone knives and spear points from certain quarries in the Northern Territory were traded as far as Victoria.

4.2 Regional Archaeology

The study of Aboriginal archaeological sites did not commence in the Sydney region until the late 19th century (Attenbrow 2002: 5). Since then, over 4,000 archaeological sites have been recorded across the region, and hundreds have been excavated (Attenbrow 2002: 48). These sites commonly contain midden material, stone artefacts and engraved or pigmented images. They occur as open artefact scatters, isolated artefacts, or in and around rockshelters. Plant materials rarely survive in Sydney region sites aside from small amounts of hafting material, such as resin, small fragments of twine, and some paperbark fragments (Attenbrow 2002: 97).

Present archaeological evidence suggests that human occupation of Australia began between 60,000 and 40,000 years BP, however these dates have not been universally accepted (Attenbrow 2002: 152). Radiocarbon determinations of over 100 sites in the region have revealed that occupation begins in the early Pleistocene with archaeologically visible occupation beginning in the early Holocene (c.10,000 BP) (McDonald 2008: 36). Rockshelter SF2 (AHIMS 45-6-2097) at Darling Mills Creek was occupied around 10,000 years and Attenbrow (2002: 154) conjectures that occupation there was a result of Aboriginal people beginning to move to higher ground as sea levels rose. This site is the only site listed on the AHIMS register within a 1 km radius of the study area that has been subject to dating analysis, but it is likely the other sites in the surrounding area, including the rockshelters in the study area, have similar dates to SF2.

Stone tool manufacture underwent a change from the largely Pleistocene-Holocene sequence of core tool and scraper tradition to the small tool tradition prevalent during the mid to late Holocene. Artefacts found at Darling Mills Creek site SF2 dated to c.10,000 BP show that the larger stone tool types prevalent during the Pleistocene continued to be used in the Early Pleistocene, but in greater numbers. In addition, new stone 'backed' asymmetrical implements (such as Bondi points) began to appear. From the Late Holocene (commencing approximately 5,000 BP), backed implements became the characteristic tool type. These implements, such as Bondi points, geometric microliths, Elouera and other retouched flakes, became much smaller than previously manufactured and formed the 'Small Tool Tradition'.

5.0 Heritage Search Results

5.1 Native Title

In 1994 a Native Title claim was lodged with the National Native Title Tribunal (NNTT) by Ian (Bundeluk) John Watson on behalf of the descendents of the Darug people (claim number NC94/6). Claim No. NC94/6 covers an area of land and waters in the Baulkham Hills Shire LGA and the Sydney Metropolitan area (see map in NNTT Search Results in **Appendix B**). The application area includes Excelsior Park and the land comprising the remainder of the Darling Mills State Forest (now known as "Bidjigal Reserve") adjacent to the M2 Motorway at the western end of the M2 Motorway corridor.

At a meeting on 15 September 2001, persons identifying as Darug descendents unanimously resolved to support the Bidjigal Reserve Agreement and to authorise Ian (Bundeluk) John Watson and Colin Gale to represent all Darug descendents (Colin Gale subsequently withdrew his representation of Darug descendents in August 2002).

In 2003 Deed of Agreement for Bidjigal Reserve was entered into between the Native Title Claimants and the NSW government to identify lands within the Bidjigal Reserve, to establish a Reserve Trust and to provide for the withdrawal of Native Title Application NC94/6 (**Appendix C**).

5.2 Previous Archaeological Studies

In order to develop a predictive model of the distribution, density and site types that occur in the study area it is necessary to review archaeological work previously undertaken in that environment. A number of surveys and excavations have been carried out in the vicinity of the study area. The majority of these assessments and excavations have been undertaken in support of the development of the M2 Motorway (formerly known as the F2 or Castlereagh Freeway).

The most relevant of these assessments are summarised below.

Haglund (1989) undertook a preliminary survey for Aboriginal sites along the F2 (Castlereagh Freeway) and Pennant Hills Road to Lane Cove River for the then Department of Main Roads (RTA), NSW. One previously recorded site (AHIMS 45-6-977) was re-identified and six new sites were found, including two rockshelters with middens, two rockshelters with potential occupation deposits and two engraving sites. A further 19 areas were identified for further investigation.

Haglund (1991) undertook an assessment of Aboriginal heritage for the RTA. The study area covered part of the F2 from Pennant Hills Road at Beecroft to Pittwater Road at Ryde. Four archaeological sites were identified (LC/1, LC/2) during the survey and one previously recorded site was re-identified (AHIMS 45-6-977). These were all rockshelter sites: two rockshelter complexes with art and stone artefacts, two rockshelters with stone artefacts and one rockshelter with artefacts and possible art. Seven rockshelters with potential archaeological deposits (PAD) and three rockshelters with habitation potential were also identified.

Corkill (1991) undertook *A Survey of the CSIRO Site in North Ryde, NSW* for the Rice Daubney Group. The intention of the survey was to locate any Aboriginal archaeological sites with the CSIRO site at Delhi Road, North Ryde. The survey relocated CSIRO Site (AHIMS 45-6-1854) and recorded it in greater detail. In addition, a rockshelter with PAD was found and recorded and several sandstone exposures were identified as possible venues for rock engravings.

Corkill (1992) undertook a *Darling Mills Creek Stormwater Management Strategy Preliminary Survey for Aboriginal Archaeological Sites* for the Upper Parramatta River Catchment Trust. The fieldwork resulted in the identification of two and possibly three new archaeological sites in addition to the relocation of two previously known sites in the Darling Mills Creek area. Twelve new and six previously known PAD sites were found. A total of 25 potential habitation rockshelters were also flagged. Of the new archaeological sites, two were rockshelters with deposits and one was a rockshelter in which two possible Aboriginal stencils were found.

Attenbrow (1992) undertook an archaeological excavation of a rockshelter (AHIMS 45-6-2097) of considerable significance located at the western end of the study area. Several thousand stone artefacts were recovered, plus a large component of faunal remains. The raw materials of the artefacts recovered include silcrete, chert, indurated mudstone, quartz, quartzite and basalt. Artefact types included were flakes, flaked pieces, cores and bipolar pieces. The lower floor levels of the deposit were dated to 6,700 BP and possibly over 10,000 BP (Attenbrow 1992, 1993), although there may be some discrepancy in the dating (T. Corkill, pers. comm, 2009).

Corkill (1993) excavated five rockshelters in the Darling Mills Creek Valley area, including two rockshelters with deposit (DMC 1, AHIMS 45-6-2548; DMC 6, AHIMS 45-6-2542) and three rockshelters with PAD (PAD 3, PAD 5 and PAD 6). The excavations confirmed two of the PADs as sites: PAD 5 was redesignated DMC 7 (AHIMS 45-6-2543) and PAD 6 was redesignated DMC 8 (AHIMS 45-6-2544). The test excavations only yielded a total of 40 artefacts, of which 16 are suspect, and more still may be fragments of the same tool. No sign of habitation was found in PAD 3. Corkill concluded that the sites have been disturbed to various levels by flooding, roof-fall and public visitation. The sites were assessed as having low significance.

Corkill (1994) undertook a survey for archaeological sites at Toongabbie Creek to fulfil an earlier recommendation (Corkill 1990b) that Toongabbie Creek should be surveyed once the final route of the M2 was identified. The survey found one Aboriginal site: TC1 (AHIMS 45-5-0970), consisting of eight stone artefacts on the creek bank. Subsequent test excavations at the site by Edgar (1994) yielded a total of 117 stone artefacts. Edgar concluded that the site was highly disturbed and there was little that remained in context. He recommended that a Consent to Destroy be issued.

Corkill (1995a) assessed a series of rock piles that were alleged to be Aboriginal burials in the path of the M2 at Devlins Creek. The investigation concluded that they were European in origin, most likely relics of WWII army training that had occurred in that area. The only definite Aboriginal site assessed was the rockshelter DC1 previously assessed and excavated by Haglund (1995).

Corkill (1995b) conducted a final Aboriginal heritage assessment of the western end of the M2 Motorway corridor between Toongabbie Creek and Windsor Road following rerouting as a result of previous recommendations (Corkill 1990; Haglund 1990). The survey identified two artefact scatters (WH1 and WH2) approximately 1 and 1.8 km east of Old Windsor Road respectively. The sites were in disturbed contexts with low significance, and Corkill recommended Consents to Destroy be issued for the two sites. Neither site appears in the AHIMS register (see **Section 5.4**). Erosion from a site located uphill from this site has been attributed to their occurrence.

Corkill (1995c) conducted test excavations at a possible Aboriginal rockshelter site that had been identified as a PAD previously. The excavations confirmed the site (redesignated CF6) as an Aboriginal rockshelter. A total of 137 Aboriginal stone artefacts were recovered during the excavation. The dominant raw material of recovered artefacts was quartz (91) and followed by silcrete (40), chert (5) and basalt (1). The site was highly disturbed and a variety of 20th century European material was recovered from the surface and excavated material, including fibro, lino, masonite, plastic, nails, (copper and iron), glass, ceramics, bottle tops, metal strips, filter tips, brick fragments and part of a perfume bottle. Excavations of the shallow floor deposits indicated an extremely disturbed stratigraphy and Corkill concluded that the rockshelter was of "minimal" scientific significance. Corkill recommended a Consent to Destroy be issued.

Crew (1995) undertook an *Archaeological Survey for Aboriginal Sites Delhi Road – Main Road No 191, Northern Suburbs Crematorium to River Avenue, Lane Cove, NSW* for the NSW Roads and Traffic Authority. The survey resulted in the identification of one potential habitation shelter in the eastern end of the survey area.

Haglund (1995) undertook *The Proposed M2 Motorway: Investigation of Aboriginal Heritage Significance Test Excavation of Rock Shelter PAD1/DC1 on Devlins Creek, Pennant Hills – Beecroft* for the NSW Roads and Traffic Authority. The excavation of the rockshelter site (AHIMS number unknown) resulted in the recovery of approximately 602 artefacts from two 50 x 50 cm test pits. The base of the excavation was dated to c.1,400BP. The majority of the artefacts were quartz and silcrete.

Guider (1995) undertook an *Aboriginal Site Survey – M2 Tollway, Terrys Creek, NSW* for local residents. Three rockshelters were found within the immediate vicinity of the M2 and all were classified as having Potential Archaeological Deposits within them. No sites were found to be disturbed by the M2 Tollway.

Guider (1995) undertook an *Aboriginal Site Survey – M2 Tollway, Darling Mills Creek, NSW* for local residents. Ten rockshelters were found within the vicinity of the Darling Mills Creek. One rockshelter site contain 11 artefacts and a white hand stencil. The remaining nine sites were classified as having Potential Archaeological Deposits. The survey also identified several trees as potentially being Aboriginal scarred trees. One previously excavated site was identified.

Corkill (1996) set up a monitoring program for sites DMC 7 (AHIMS 45-6-2543), DMC 8 (AHIMS 45-6-2544) and PAD 8, to assess the affects of periodic flooding resulting from the construction of a flood retarding basin in the Darling Mills Valley. The first two sites were low in the valley and were likely to experience periodic flooding, whilst the third rockshelter was higher and out of the flood zone and could act as a control site. The report recommended analysis of data after five years (i.e. 2001).

Corkill and Edgar (1996) undertook an *Aboriginal Archaeology of M2 Motorway Salvage Excavation of Rockshelter Site CF6 Darling Mills State Forest Carlingford, NSW* for the NSW Roads and Traffic Authority. A total of 895 Aboriginal stone artefacts were salvaged from rockshelter CF 6 (AHIMS #45-6-2472). The dominant raw material of recovered artefacts was quartz (471) followed by silcrete (344), Chert (41), quartzite (22), basalt (9), mudstone (6), and lastly fine grained siliceous (2).

Corkill (1997a) conducted an assessment of the handstencils at two sites: CF3 (AHIMS 45-6-2161) and CF4 (AHIMS 45-6-2162) adjacent to the M2 corridor. In 2007, during the subsequent monitoring program for sites adjacent to the motorway, Corkill observed that a second modern hand stencil had appeared at CF4.

Corkill (1997b) undertook a *Test Excavation of Rockshelter, CSIRO PAD 1, Site 2 Riverside Corporate Park, North Ryde, NSW* for Australia Pacific Projects. Ten pits were excavated to bedrock. Fourteen small silcrete, chert and indurated mudstone artefacts were recovered. Along with the Aboriginal artefacts, 19th and 20th century European material was also present, mainly in the form of glass from brandy bottles (Corkill 1997:3). The European material was present both on the surface and in excavated surface units in almost all sample squares. Little evidence remains at this site to be able to determine past usage. From the interpretation of the stratigraphic and cultural components of the rockshelter, there may have been an original upper layer that has been removed from the rockshelter and its immediate surrounds. The low number of artefacts recovered from the excavation and lack of art means that this site is probably of low significance and was not frequently used.

Corkill and Haglund (1998-2008) undertook monitoring of Aboriginal archaeological sites identified as part of the M2 Motorway project. Monitoring occurred from July 1998 till May 2008 and was aimed at determining whether known rockshelter sites were being adversely affected by runoff or vibrations from the M2 Motorway. Two rounds of monitoring were performed each year. The program found that none of the sites being monitored were being significantly impacted as a result of the M2 Motorway. Erosional issues related to natural water seepage and the accumulation of rubbish were two issues reported.

Corkill (2000) conducted an analysis of the artefactual assemblage excavated by Attenbrow (1992) at the rockshelter site DMSF2 (AHIMS 45-6-2097). The rockshelter, measuring 22 x 5.5 x 3 m on a low cliffline, was excavated 1992 and radio carbon dating of two pits was 2,500 and 10,000 years BP. A total of 2,079 artefacts of mostly quartz material with lower percentages of silcrete and volcanic material was found.

Irish (2004) undertook an *Aboriginal Archeological Monitoring Report Lane Cove Tunnel Project: Mowbray Park Worksite, Lane Cove, NSW* for Theiss John Holland. It was determined by both the Consultant Archaeologist and the MLALC that there were no archaeological constraints to the sub-surface works.

Corkill (2008) provided a final (31st) monitoring report of rockshelter sites along the M2 Motorway. The rockshelters consist of seven sites (CF1, AHIMS 45-6-2160; CF2, AHIMS 45-6-2097; CF3, AHIMS 45-6-2161; CF4, AHIMS 45-6-2162; DMC 7, AHIMS 45-6-2543 and DMC8, AHIMS 45-6- 2544) in close proximity to the M2 corridor. Monitoring was instigated to determine any ongoing detrimental effects to the rockshelters attributable to the M2. None were identified.

5.3 Summary of Regional and Local Archaeology

Previous regional and local archaeological studies in the study region indicate that the predominant site type for the area is rockshelters associated with water courses and containing archaeological deposits. As the Sydney Basin is one of the richest archaeological provinces in Australia, with more than 3,000 rockshelters containing cultural deposits or art, these results are not surprising (Mulvaney and Kamminga 1999:376). Many of these sites have been dated to less than 5,000 years old. Artefactual material for this period and region generally consists of stone tools including backed implements and associated manufacturing by-products.

5.4 Registered Aboriginal Sites

A search of the DECCW AHIMS register identified 53 sites within 1 km of the M2 Motorway (**Figure F3: M2 Motorway Alignment and AHIMS Site Locations**). However another site, Aboriginal rockshelter DC1, did not appear in the AHIMS search results despite the site being excavated by Haglund (1995) under a Section 87 permit (#653) issued by DEC in 1994 (Corkill, pers comm.). This site occurs under the Devlin Creek M2 bridge (it is not known why DC1 does not appear on the AHIMS database). Of the 54 known sites, two were identified as duplicates of other sites reducing the total of individual sites to 52 (45-5-0886 is a duplicate of 45-6-2548 and 45-6-2513 is a duplicate of 45-6-2472). **Table 6** shows the relative frequency of different site types in the AHIMS search area. **Appendix A** and **Figure F3** shows the entire list of sites within the AHIMS search area, their site type and their location in relation to the study area.

Table 6: Summary of archaeological site types within the study area

Site Type	Number of Sites	Percentage
Axe Grinding Grooves	3	6
Isolated Find	1	2
Open Camp Site	6	12
PAD	1	2
Rock Engravings	3	6
Shelter with Art	2	4
Shelter with Deposit	31	58
Shelter with Midden	2	4
Unknown*	3	6
Total	52**	100%

* Site card unavailable; site type unknown

** Sites include 53 AHIMS-registered sites and one additional known site (DC1) less the two duplicate site cards.

Three site cards (AHIMS 45-5-2892, 45-6-0981 and 45-6-1887) were missing from the DECCW library and as a result the site types are unknown, although the site name for AHIMS 45-6-1887 suggests that it is a grinding groove site and discussions with archaeologist Mary Dallas confirmed that AHIMS 45-5-2892 is a rockshelter.

Many sites consist of multiple site types, particularly rockshelters which often have associated sites such as art (either pigment or engraved), archaeological deposit, middens and/or axe grinding grooves. One open camp site, AHIMS site 45-5-0970, has an existing Section 90 AHIP over it. Rockshelter sites AHIMS 45-6-2472, 45-6-2097, 45-5-0886, 45-5-2542, 45-5-2543 and 45-5-2544 have been excavated as has one PAD site 45-6-2653.

Two additional Aboriginal sites occur in the general vicinity (but not within the study area). These sites are known to the Aboriginal community and were identified as a result of and abortive development proposal to construct an adventure playground facility within the Darling Mills Creek area. The sites consist of:

- scarred tree on Excelsior Creek north of the M2; and
- rockshelter with deposit, also several hundred meters north of the M2

These sites are not currently recorded within the AHIMS database (L. Watson, DTAC, pers. comm).

5.4.1 Registered Sites within the Study Area (100 m Buffer)

The sites identified in the AHIMS search were plotted on a map (**Figure F4: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Western Section** to **Figure F6: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section**) and sites within the study area (i.e. within 100 m of the M2 Motorway) were identified. Site DC1 (see above) also occurs within the study area. However, two registered sites (45-6-2472 and 45-6-2513) are separate recordings of the same site. Therefore there are a total of 15 known Aboriginal sites within the study area (**Table 7**).

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Table 7: Aboriginal Sites within the Study Area Identified in the AHIMS Search

AHIMS No.	Site Name	AHIMS Site Type	MGA Easting*	MGA Northing*	Description	Within 100 m of the Study Area?
45-5-1005	IFCH1;	Isolated Find			Corkill (1996a). Single stone artefact near Beecroft Road found in excavation trench. Artefact left in situ. Condition: very disturbed.	Yes
45-5-2892	PHGC 1 (Hills Golf Course)	Unknown			Site card not available. Rock shelter recorded by Mary Dallas in 1996 (Corkill, pers. com.).	Yes
45-6-0977	Epping; Lane Cove River; little bloodwood;	Shelter with Deposit			Taplin (1960s); Attenbrow & Cutmore (1989). Shelter above small freshwater creek, rubble deposit, artefacts recorded 1960s but none observed 1989.	Yes
45-6-1854	L C/2 Lanecove 2 Epping Road Bridge	Shelter with Midden			Haglund (1989); Attenbrow (1989), Lane Cove River. Shallow overhang 10 x 1 x 5 m. Shell material, orange pigment on back wall.	Yes
45-6-1855	L C/1 Lanecove 1	Shelter with Midden			Haglund (1989), Lane Cove River. Shelter with two parts, 2 m apart: 1) 8.3 x 2 x 3 m, shell material; 2) 6.5 x 1.6 x 3.5-4 m, sandy floor, no surface material.	Yes
45-6-1953	Pages Creek Cave;	Shelter with Deposit			Guider (1990), Pages Creek. Shelter, approx 24 x 3.3 x 4.5 m with large midden and stone artefacts and grinding grooves associated.	Yes
45-6-2097	Darling Mills S. F. 2 - CF2	Shelter with Deposit			Attenbrow & Edgar (1989); Corkill (2000, 2008), Darling Mills Creek. Shelter 22 x 5.5 x 3 m, low cliffline, deposit on floor, two surface artefacts. Site excavated 1992 (Attenbrow) and radio carbon dating of two pits was 2,500 and 10,000 years BP. A total of 2,079 artefacts of mostly quartz material with lower percentages of silcrete and volcanic material. Condition: disturbed - graffiti, campfires, frequent use by public. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway. Glass "tell-tales" inserted in wall cracks by M2 construction crew were all broken as a result of vandalism.	Yes
45-6-2160	CF1 a b; Cumberland S.F.;	Shelter with Deposit			Corkill (1990, 2008); two shelters, 3.5 m apart – 1) 14 x 4 x 2.1, no art, 4 silcrete artefacts; 2) 2 x 2.9 x 1.2 m; charcoal art on 18 x 53 cm area of back wall. Condition: fair to good. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway.	Yes

AHIMS No.	Site Name	AHIMS Site Type	MGA Easting*	MGA Northing*	Description	Within 100 m of the Study Area?
45-6-2161	CF3;Cumberland S. F.;	Shelter with Deposit			Corkill (1990, 1997, 2008); 30 m north of M2 corridor. Deep shelter 10 x 3.5 x 2 m, deposit with two surface artefacts at dripline. Charcoal on roof may be art. Very faint hand stencil recorded in 1997. Condition: disturbed: graffiti on roof; rubbish, frequently visited by locals. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway, 30 m to the south.	Yes
45-6-2162	CF4 a b;Cumberland S.F.;	Shelter with Deposit			Corkill (1990, 1997), Darling Mills Creek. Two shelters 14 m apart; 1) shelter 12 x 5 x 1.5 m, sandy deposit, two artefacts, hand stencil; 2) shelter 5 x 3 x 5 m, sandy, charcoal-rich deposit, very faint hand stencil covered in graffiti on back wall. Condition: disturbed, graffiti. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway, 40 m to the south. New white hand stencil observed in 2008.	Yes
45-6-2163	CF5;Cumberland S.F.;	Shelter with Deposit			Corkill (1990); Shelter with 8 x 1-2 m deposit. Wall too rough for art. One quartzite flake, three quartz pebbles	Yes
45-6-2472	CF6;	Shelter with Deposit			Corkill (1995c); Corkill and Edgar (1996), tributary/Darling Mills Creek. Shelter 10 x 3.5 x 1.5-1.7 m. loose sandy deposit. Test excavation indicates deposits disturbed and little stratigraphy, low scientific significance; S90 Consent to Destroy (#739) issued in 1995. Salvage excavation in 1996 retrieved a total of 895 artefacts with a similar assemblage to similar sites in the Sydney region.	Yes
45-6-2513	See 45-6-2472;				Same site as 45-6-2472 (Attenbrow)	-
45-6-2543	Darling Mills Creek 7;DMC 7; (formerly PAD 5)	Shelter with Deposit			Corkill (1993, 1996, 2008), Moorinda Creek/Darling Mills Creek. Rockshelter, 5 x 3 x 3 m, small area of deposit, subject to flooding. Test excavations in 1993 found about four artefacts of Bondaian age. Program set up in 1996 to monitor affects of flooding by Flood Retarding Basin. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway 20 m to the south.	Yes

AHIMS No.	Site Name	AHIMS Site Type	MGA Easting*	MGA Northing*	Description	Within 100 m of the Study Area?
45-6-2544	Darling Mills Creek 8; DMC 8; (formerly PAD 6)	Shelter with Deposit			Corkhill (1993, 1996, 2008), Moorinda Creek/Darling Mills Creek. Rockshelter, 10 x 5.5 x 1.8 m, sandy deposit, subject to flooding. Test excavations in 1993 found only one artefact. Program set up in 1996 to monitor affects of flooding by Flood Retarding Basin. Continued monitoring to 2008 identified no impacts associated with the M2 Motorway, 25 m to the south.	Yes
Unknown**	Devlin Creek 1; DC1	Shelter with Deposit			Haglund (1995), Devlins Creek, directly under the M2 bridges. Rockshelter. Test excavations in 1995 under permit #653; however site did not appear in AHIMS search results. Continued monitoring to 2008 found site to be periodically flooded; physical impacts to the shelter appear to be minimal, although the M2 structures may have resulted in greater visitation and graffiti (Haglund 2008).	Yes

* Location coordinates have been removed from the Public Exhibition version of this report for site security reasons.

** Site DC1 did not appear on the AHIMS search results despite the site having been excavated under a Section 87 permit. Leila Haglund was contacted for further information, but she was unable to remember the AHIMS number; she was away on extended fieldwork in Queensland and did not have access to files.

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5.5 Study Area Site Prediction

Based on the distribution of known Aboriginal sites provided by previous studies and an AHIMS register search, and the types of landform elements found in the study area, statements can be made about the likelihood of archaeological sites being present within the study area, and what they may constitute.

Large parts of the study area have been subjected to significant modification due to urban and infrastructure development, particularly at the eastern end of the M2 around Macquarie Park and North Ryde. Lower density development has occurred in the centre and western sections of the M2 and consists largely of residential development and recreational development (e.g. Pennant Hills Golf Course), occurring mostly on higher ridges and plateaux along the route. Areas of less disturbed landscape occur in relation to some of the waterways in the study area, notably Darling Mills Creek, Blue Gum Creek, Devlin Creek and Terrys Creek, although minor impacts have occurred such as drainage modification and track construction. Creeklines at the eastern end (e.g. Mars Creek and Shrimptons Creek) have been highly impacted by urban development.

The following broad statements relating to site prediction can be made:

- rockshelters, or rock overhangs are naturally occurring rock formations and commonly occur in the study area, usually in association with creek valleys with sandstone bedrock outcrops. As indicated by previous research and AHIMS search results, these natural geological formations were often used by Aboriginal people for shelter and consequently often contain artefactual material. Monitoring studies of sites along the M2 between 1998 and 2008 have found that there has been no physical impacts to the sites from the development and operation of the M2;
- inland waterways are often a source of fresh water and home to a great variety marine life. Previous studies and known Aboriginal sites show that site distribution is dominated by the presence of waterways such as Darling Mills Creek, Blue Gum Creek, Devlins Creek, Terrys Creek, Mars Creek and Shrimptons Creek. As such, these waterways form likely areas of Aboriginal occupation; and,
- areas adjacent to the M2 Motorway that have been significantly disturbed by urban development reduce the likelihood of finding Aboriginal sites *in-situ*.

In light of the above statements, it can be concluded that the water courses in the study area occur as generally deeply cut valleys and gullies in Hawkesbury Sandstone geology, the erodible nature of which is conducive to the formation of rockshelters suitable for occupation as rockshelters. The number of rockshelters recorded during previous archaeological surveys shows that occupation of the valley sides occurred. Test excavations at several of the rockshelters suggests that artefacts are present where sufficient soil occurs in a habitable shelter. Open campsites are considered less likely to occur in these areas where there are abundant rockshelters and the lack of recorded sites supports this.

Other site features within the study area and the surrounding region include stone tools, shell middens and rock art. However, as many parts of the study area have been subjected to large-scale land disturbances associated with urban development the integrity of potential sites may have been compromised. In-situ archaeological remains are more likely to occur in areas of less landscape disturbance.

5.6 Preliminary Mapping of Archaeological Potential

A preliminary map of archaeological potential was produced (**Figure F4**: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Western Section to **Figure F6**: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section), to determine the likelihood of possible impacts to recorded sites in the study area. Of the 53 site records in the AHIMS search area, 15 were deemed to be of interest during analysis of constraints based on their proximity within 100 m to the M2 corridor (**Table 7**). One site has two separate recordings giving a total number of actual sites of 14. The remaining 38 registered sites within the AHIMS search area were deemed to be too far from the construction works to be of any further interest.

A review of the reports described in **Section 5.1** identified several areas along the M2 corridor that those authors considered warranted further investigation. Those areas included:

- areas around Devlins Creek (Mount King Ecological Surveys 1988; Haglund 1989, 1992);
- Devlins Creek north of Barombah Road (Haglund 1989, 1992);
- Devlins Creek at the west end of Somerset Street
- Devlins Creek at west end of Beecroft Road (Haglund 1992);
- Terry's Creek – east and west banks (Hagland 1989, 1992)
- Terry's Creek along Somerset Street (Hagland 1989);
- the slopes of Mars Creek (Hagland 1989);
- Shrimptons Creek west of Alma Road (Haglund 1989);
- Shrimptons Creek (Haglund 1992);
- Chilworth Reserve below Welham Street;
- between Woodvale Avenue and Somerset Street (Haglund 1992);
- west of Crimea Road (Haglund 1992); and
- west of Busaco Road, North of Talavera Road (Haglund 1992).

These areas, along with the existing AHIMS site records, were compiled into a preliminary map of archaeological potential that was used to inform the field inspection (**Figure F4: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Western Section** to **Figure F6: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section**). The areas were inspected, but only where they occurred within 100 m of the M2 Motorway.

6.0 Field Inspection Results

6.1 Registered Site Inspection

A site inspection program was conducted by AECOM in two distinct phases:

- a) Phase 1, conducted in March and April 2009; and
- b) Phase 2, conducted with Aboriginal stakeholders in December 2009.

6.1.1 Phase 1 Field Inspections

The first phase of field inspections were conducted by archaeologists Neville Baker and Geordie Oakes over five days on the 30-31 March and 6-8 April 2009 in consultation with MLALC. The inspections aimed at relocating previously recorded sites and confirming their location by use of DGPS. The inspections were not an archaeological survey for discovery purposes.

A total of nine previously recorded Aboriginal sites within the study area were visited during the first field inspection (**Table 8**). Seven sites were not inspected: AHIMS 45-5-1005, 45-5-2892, 45-6-1953, 45-6-2162, 45-6-2472(2513), 45-6-2544 and site DC1. These sites were not inspected due to difficulties in relocation, with the exception of:

- 45-6-1953 which clearly had incorrect coordinates registered in AHIMS and is well outside the study area. The registered site coordinates for AHIMS 45-6-1953 suggests that the site is approximately 50 m north of the M2. However, the site card clearly describes the site being well south of the M2 on Pages Creek. The area where the AHIMS coordinates place the site was inspected and no site was identified; and
- 45-6-2472 (2513) which was previously destroyed under an s90 permit.

6.1.2 Phase 2 Field Inspections

Following consultation with the Aboriginal community (see **Section 2.3.2**), a second site inspection program was conducted over three days from 15 to 17 December 2009.

The second phase of inspections aimed to re-identify sites that were missed during the first phase and involve the Aboriginal community in the field inspections. Tessa Corkill, the archaeologist that had previously identified the majority of rockshelters near the M2, was also engaged to provide background information on the sites and to assist with the inspections due to her extensive knowledge of the sites.

A total of nine registered sites were inspected during the second phase, including six of the sites that were not inspected during the first phase (**Table 8**). No physical impacts to the sites were observed as a result of the M2.

One previously unrecorded site was identified during the inspection:

Site M2A1, Terrys Creek

This site consists of an area of grinding grooves on a sandstone bedrock platform in the Terrys Creek channel. The site is located on the southern side of the M2 commencing directly beneath the southern edge of the westbound bridge. The site extends approximately 20 x 5 m, and consists of a series of grinding grooves and hollowed-out grinding dishes. Some grooves are angled perpendicular to the waterflow, whilst others (at the downstream end of the platform) run with the waterflow (**Plates 1 to 3**).

The site is possibly associated with rockshelter (AHIMS 45-6-0977) located approximately 90 m south east on the eastern side of the Terrys Creek gully.

Site M2A1 has been registered on AHIMS as (AHIMS 45-6-2949).

6.1.3 Areas of Previously Identified Site Potential

In addition to the previously registered Aboriginal sites, a series of areas with site potential were identified based on the findings of previous archaeological reports (**Section 5.6; Figure F4: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Western Section to Figure F6: M2 Motorway Aboriginal Heritage Preliminary Constraints Mapping – Eastern Section**). These areas are predominantly associated with Devlins Creek, Terrys Creek, Mars Creek and Shrimptons Creek.

These areas were traversed on foot to identify additional and unrecorded Aboriginal sites in close proximity to the M2 corridor. The areas were inspected to a maximum distance of 100 m from the M2 corridor. The areas were inspected during both phases of field inspections.

No additional Aboriginal sites were identified.

Table 8: Known Aboriginal Sites Inspected During the Field Inspections

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	AHIMS MGA Easting*	AHIMS MGA Northing*	Corrected MGA Easting*	Corrected MGA Northing*	Results Field Inspection 1	Results Field Inspection 2
45-5-1005	10 m west of bus off-ramp	Isolated Find					This site was not inspected.	Inspection of the area did not reveal any surface artefacts in the area. The creekline in this area has been extensively disturbed and in situ artefact deposits are not considered likely to occur (Plate 4).
45-5-2892	Unknown, >100 north of M2	Shelter with Deposit					This site was not inspected.	Site could not be re-identified. Searches of the area of golf course and Devlin Creek within 100 m of M2 did not relocate the site. Discussion with original recorder (Mary Dallas) suggests that the site may be further north than recorded in AHIMS (Plate 5).
46-6-0977	c. 60 m south of M2, east side of Terrys Creek	Shelter with Deposit					No artefacts observed. Rubbish.	Description of shelter conforms to site card description. Extensive rubbish. No artefacts. No physical impacts observed (Plate 6).
45-6-1854	c. 40 m north of M2	Shelter with Midden					Matches site card description. Midden shell observed. "Ochre" patch likely to be natural growth (Plate 7).	Not re-inspected; outside of study area.
45-6-1855	c. 60 m south of M2	Shelter with Midden					Matches site card description, except no midden observed. Signs of recent habitation.	Not re-inspected; outside of study area.

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	AHIMS MGA Easting*	AHIMS MGA Northing*	Corrected MGA Easting*	Corrected MGA Northing*	Results Field Inspection 1	Results Field Inspection 2
45-6-1953	Unknown, well south of M2	Shelter with Deposit					<i>Coordinates incorrect. Site card clearly describes a Pages Creek location south of Epping Road. More than 100m from M2.</i>	Not re-inspected; outside of study area.
45-6-2097	c. 30 m north of M2	Shelter with Deposit					Matches site card description. Very large box-like rockshelter, 20 m SSW of powerlines.	Matches site card description. High on gully side at same level as M2. No signs of any physical impact (Plate 8).
45-6-2160	c. 60 m north of M2	Shelter with Deposit					No evidence of artefacts. Site further east than mapped by Corkill. Corrected MGA coordinates are: 318018E 6262574 N.	Both shelter sections observed. No physical impacts observed. Two silcrete manuports and one quartz blade observed. No physical impacts to shelters observed (Plates 9 to 11).
45-6-2161	c. 40 m north of M2	Shelter with Deposit					Shelter description as per site card. No artefacts observed, but heavy leaf litter. Corrected MGA position is 317123E 6262357N. Hand stencil in shelter.	Shelter description as per site card. Some graffiti. No physical impacts observed, though traffic vibration noticeable through ground (Plate 12).
45-6-2162	c. 30 m north of M2	Shelter with Deposit					Site not inspected.	Shelter description as per site card. New hand stencil has chipped off considerably; original hand stencil still intact although some graffiti around it. No other physical impacts to site observed (Plates 13 to 14).

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	AHIMS MGA Easting*	AHIMS MGA Northing*	Corrected MGA Easting*	Corrected MGA Northing*	Results Field Inspection 1	Results Field Inspection 2
45-6-2163	c. 30 m north of M2	Shelter with Deposit					No artefacts observed.	Northern side of Blue Gum Creek. No artefacts observed. No physical impacts observed (Plates 15 to 16).
45-6-2472 (45-6-2513)	Unknown	Shelter with Deposit					Site not inspected. Site destroyed under S90 permit.	Site not inspected. Site destroyed under S90 permit.
45-6-2542	c. 120 m north of M2	Shelter with Deposit					No artefacts observed. Floor deposit disturbed by uprooted tree. Outline of old test pits evident. <i>More than 100 m from M2</i> . Identified set of axe grinding grooves in creek bed 20 m east of site (Plates 17 to 18).	Site not re-inspected.
45-6-2543	c. 20 m north of M2	Shelter with Deposit					No artefacts observed.	Site description as per site card. No artefacts observed. Shelter extends a further 20 m to the west of the recorded site (Plates 19 to 20).
45-6-2544	c. 30 m N of M2						Site not inspected.	Site description as per site card. One small quartz flaked piece identified. No physical impacts to site observed (Plate 21).

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	AHIMS MGA Easting*	AHIMS MGA Northing*	Corrected MGA Easting*	Corrected MGA Northing*	Results Field Inspection 1	Results Field Inspection 2
DC1	Directly beneath M2 bridge						Site not inspected.	Site description as per site card. Site located directly beneath the westbound M2 bridge near eastern abutment. Site occurs on the southern bank of Devlins Creek. Outlines of two former test pits visible; smoke blackened ceiling. No physical impacts to site observed despite proximity to M2.

* Location coordinates have been removed from the Public Exhibition version of this report for site security reasons.

7.0 Impact Assessment

This section provides a review of the environmental and archaeological contexts of the study area, together with the results of heritage searches, to provide an analysis of the archaeological potential of the study area and consequent heritage constraints (if any).

7.1 Project Description and Assessment of Impacts

The M2 Upgrade Project is designed to ease the current congestion along the M2 corridor resulting from an increase in urban density in Sydney's north west since the M2 opened in 1997.

The proposed upgrade would include the following components:

- widening and/or provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road and Lane Cove Road;
- provision of new on/off ramps at Windsor Road, Christie Road and Herring Road;
- widening and provision of a third lane eastbound and westbound in the Norfolk Tunnel;
- restoration of westbound breakdown lane from Beecroft Road to Lane Cove Road;
- removal of the Beecroft Road bus on/off ramp;
- improvement and widening of local arterial roads, Windsor Road and Talavera Road;
- widening of the Christie Road bridge and provision of new traffic control signals; and
- upgrades to the Motorway's Intelligent Transport Systems (ITS).

The proposed works will occur wholly within the current lease boundary for the M2 carriageway. The construction works with the highest potential for impacts to archaeological material are:

- the areas of temporary clearing: these areas will be stripped of all existing vegetation and the areas used for material stockpiling and the installation of temporary construction compounds. There will be no disturbance to the subsoils in these areas and, in the case of stockpiles, a geotextile membrane will be installed to separate the stockpiles from the natural soils. These stockpile areas will be subject to soil compaction;
- the construction of new, and extension of existing, sedimentation basins; and
- the construction of new culverts.

Assessment of impacts from these works will be completed following the second field inspection.

7.1.1 Impacts to Known Aboriginal Sites

Table 9 below provides a summary of the assessed impacts to registered Aboriginal sites within the study area.

Table 9: Assessment of Impacts to Registered Aboriginal Sites within 100 m of the M2 Corridor Inspected

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	Direct Impact?	Indirect Impact?
45-5-1005	10 m west of bus off-ramp	Isolated Find	Yes	No
45-5-2892	Unknown, >100 north of M2	Shelter with Deposit	No	Unlikely
46-6-0977	c. 60 m south of M2	Shelter with Deposit	No	No
45-6-1854	c. 40 m north of M2	Shelter with Midden	No	No
45-6-1855	c. 60 m south of M2	Shelter with Midden	No	No
45-6-1953	Unknown, well south of M2	Shelter with Deposit	No	No
45-6-2097	c. 20 m north of M2	Shelter with Deposit	No	Unlikely
45-6-2513 (45-6-2472)	c. 20 north of M2	Shelter with Deposit	No (Destroyed)	No (Destroyed)

Site Surveyed	Proximity to M2 (m)	AHIMS Site Type	Direct Impact?	Indirect Impact?
45-6-2160	c. 60 m north of M2	Shelter with Deposit	No	No
45-6-2161	c. 40 m north of M2	Shelter with Deposit	No	No
45-6-2162	c. 30 m north of M2	Shelter with Deposit	No	Unlikely
45-6-2163	c. 50 m north of M2	Shelter with Deposit	No	No
45-6-2542	c. 120 m north of M2	Shelter with Deposit	No	No
45-6-2543	c. 20 m north of M2	Shelter with Deposit	No	Unlikely
45-6-2544	c. 30 m north of M2	Shelter with Deposit	No	Unlikely
DC1	Beneath M2 bridges	Shelter with Deposit	Unlikely	Unlikely
M2A1 (45-6-2949)	Beneath M2 bridges	Axe Grinding Grooves	Unlikely	Possible

The assessment of impacts used above is based on the following parameters”

Table 10: Impact Assessment Criteria

Criteria	Meaning
No impact	It is considered that there will be no impacts resulting from the development.
Unlikely	The site is in close proximity to the M2, but is well clear of the construction zone; therefore it is considered unlikely that there will be impacts. However, mitigation measures will be established to minimise the potential for impact.
Possible	There is a possibility that impacts to a site may occur, due to its proximity to the construction zone. Mitigation measures will be established to minimise the potential for impact.
Yes	There will be impact to the site as a result of the development.

An extensive program of monitoring occurred between 1998 to 2008 aimed at determining whether known Aboriginal rockshelter sites were being adversely affected by runoff or vibrations from the M2 Motorway (Corkill and Haglund 1998-2008). Two rounds of monitoring were performed each year and found that none of the sites being monitored were being physically impacted as a result of the M2 Motorway. Erosion issues were attributed to natural water seepage.

Sites that are considered to have potential to be impacted are:

- AHIMS 45-5-1005 is an isolated artefact that lies in very close proximity to the Beecroft Road bus off-ramp. The current proposal to remove the off-ramp is likely to disturb the ground where the artefact is said to occur. However, the artefact is not considered to be in situ, is completely out of archaeological context and consequently is considered to hold low significance.
- Site M2A1 (AHIMS 45-6-2949), a set of grinding grooves that were identified during the Phase 2 field inspections and occur directly beneath the Terrys Creek bridges. Whilst all construction work is intended to occur on the northern side of the M2, the current construction plan proposes to provide vehicle access from the southern side. Consequently, there is potential for indirect impact to the site through sedimentation and/or physical impacts through earthworks. However, this can be readily avoided by fencing (access) and sediment barriers.

It is considered that there will be no direct impacts and unlikely to be indirect impacts to the other sites resulting from the upgrade works. However, it is considered prudent to erect some form of protective fencing at rockshelters within 50 m of M2 construction works to minimise the potential for indirect impacts resulting from access by construction workers. The sites considered to be within 50 m of construction works are: AHIMS 45-6-2097, 45-6-2160, 45-6-2161, 45-6-2162, 45-6-2163, 45-6-2543, 45-6-2544 and DC1.

7.2 Summary

Given the extent of previous survey along the M2 Motorway corridor it is considered unlikely that further, un-recorded Aboriginal rockshelters will occur in the study area. Due to the nature of the landscape, it is considered unlikely that any further archaeological material (i.e. artefacts comprising open sites) will be encountered within the study area.

Previous monitoring, in conjunction with the inspections of registered sites during this project, indicates that there has been no physical impacts to the sites since the construction of the M2 and its subsequent operation. An assessment of areas of direct impact (i.e. construction of ramps, sediment ponds, site compounds, culverts and temporary vegetation clearance suggests that there is not likely to be any direct or indirect impacts to Aboriginal cultural heritage values.

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8.0 Legislative Framework

8.1 Commonwealth Legislation

8.1.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The purpose of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Heritage Protection Act) is the preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters that are of particular significance to Aboriginal people in accordance with Aboriginal tradition.

Under the Heritage Protection Act the responsible Minister can make temporary or long-term declarations to protect areas and objects of significance under threat of injury or desecration. The Act can, in certain circumstances, override state and territory provisions, or it can be implemented in circumstances where state or territory provisions are lacking or are not enforced. The Act must be invoked by or on behalf of an Aboriginal or Torres Strait Islander or organisation.

The Act is administered by the Department of the Environment, Water, Heritage and the Arts.

8.1.2 Environment Protection and Biodiversity Conservation Act

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the establishment of two heritage lists:

- The National Heritage List (NHL) is a list of places with outstanding heritage value to Australia, and includes places overseas.
- The Commonwealth Heritage List (CHL) is a list of places managed or owned by the Australian Government, and includes places, or groups of places in Commonwealth lands or waters, or under Commonwealth control, and are identified by the Minister as having Commonwealth heritage values.

There are no items in the study area listed on either of these lists.

8.2 New South Wales Legislation

The following New South Wales legislation protects aspects of cultural heritage and is relevant to development activities in the study area.

8.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) requires that consideration be given to environmental impacts as part of the land use planning process. In NSW environmental impacts are interpreted as including cultural heritage impact. Three parts of the EP&A Act are most relevant to Heritage. Part 3 relates to planning instruments, including those at local and regional levels; Part 4 controls development assessment processes; and Part 5 refers to approvals by determining authorities.

Part 3A provides an approvals regime applying to all major projects. Major projects are defined under *State Environmental Planning Policy (Major Projects) 2005* (SEPP 2005). It also applies to those projects which the Minister believes are required to deliver particular government plans or programs, known as critical infrastructure projects. Part 3A applies to all projects where the Minister has the approval role. Under Part 3A, the Minister can issue a project approval or a concept approval. Both maintain the requirement for consultation with the community and relevant State Government agencies, however the requirement for certain other permits and licences is removed under Part 3A.

Section 75B(2) of the EP&A Act makes provision for 'major projects' to be identified through various means, including by way of declaration as a listed project in SEPP 2005, or by notice in the Gazette.

This project is classified as a 'major project' under Part 3A.

8.2.2 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by DECCW, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. One of the objectives of the NPW Act is:

The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including but not limited to: (i) places, objects and significance to Aboriginal people... (Section 2A(1)(b))

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence if impacts are not authorised. An Aboriginal Heritage Impact Permit (AHIP) should be obtained if impacts on Aboriginal objects and places are anticipated. AHIPs can be issued under Sections 87 and 90 of the NPW Act.

Sections 86 and 87

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to:

- 1) disturb or excavate any land, or causes any land to be disturbed or excavated, for the purpose of discovering an Aboriginal object; or
- 2) disturb or move on any land an Aboriginal object that is the property of the Crown, other than an Aboriginal object that is in the custody or under the control of the Australian Museum Trust.

...except in accordance with the terms and conditions of an AHIP issued under Section 87 of the NPW Act.

Section 90

Under Section 90 of the NPW Act it is an offence to:

knowingly destroy, deface or damage, or knowingly cause or permit the destruction or defacement of or damage to, an Aboriginal object or Aboriginal place...

...unless under an AHIP issued by the Director-General under Section 90, subject to such conditions and restrictions as are specified in the AHIP. Therefore an AHIP issued under Section 90 should be obtained if impacts on Aboriginal objects and places are anticipated.

For the purposes of the Act:

- An Aboriginal object is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains).
- An Aboriginal place is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Under Section 75U of the EP&A Act, projects approved under Part 3A do not require a permit under s.87 or a consent under Section 90 of the NPW Act. However, for the preparation of an EA, the Director-General will issue environmental assessment requirements under Section 75F, in consultation with other relevant public authorities and have regard to the need for the requirement to assess any key issues raised by those public authorities. In practice this usually means that Part 3A still requires assessment of potential impacts to European and Indigenous heritage and such assessment is generally equivalent to the normal assessment process under the NPW Act and Heritage Act.

Consultation with the Aboriginal communities is required under DECCW policy when an application for an approval under Part 6 of the NPW Act, or Part 3A of the EP&A Act, is considered. The consultation process used in this study is outlined in more detail in **Section 2.3**.

8.3 Local Government

Under the provisions of the EP&A Act, Local Environmental Plans (LEP) and Regional Environmental Plans (REP) are prepared by a Local Government Council. An LEP defines some of the rules relating to the development of an area or a particular site. It contains information on the zoning of land and any special provisions relating to the development of the land. An LEP is enforceable after it is published in the Government Gazette (i.e. "gazetted") by the NSW Minister for Planning.

Typically, LEPs and REPs have provisions that protect items of environmental heritage.

9.0 Management Commitments

The findings of this preliminary Aboriginal heritage assessment are:

- a total of 14 previously recorded Aboriginal sites and one newly recorded Aboriginal site occurs within 100 m of the M2 Motorway (one site has been recorded twice);
- two phases of field inspection re-identified all but two of the recorded sites. Of these two sites, one (45-6-2472(2513) was previously destroyed and another (45-6-1953) occurs much further south than AHIMS suggests and is not within the study area;
- inspections of areas considered to have archaeological potential in previous archaeological reports suggest that there is unlikely to be any impact to Aboriginal cultural heritage;
- inspections were conducted of areas to be impacted by construction in the vicinity of known Aboriginal sites and it is considered that there is unlikely to be any direct or indirect physical impact to the sites, with the exception of 45-5-1005 and site M2A1;
- landforms, together with analysis of previous archaeological investigations in the region, suggest that there is a low potential for any unregistered open campsites to occur in the study area;
- extensive previous surveys, together with the results of this preliminary assessment, suggest there is a low potential for further sandstone-based Aboriginal sites (e.g. Aboriginal rockshelters, grinding grooves and art sites) to occur close to the M2;
- areas of developed land traversed by the M2 have been impacted to such an extent that archaeological evidence is likely to have been destroyed;
- on the basis of this assessment the proposed development is considered unlikely to encounter further Aboriginal objects, or impact known Aboriginal sites, with the exception of 45-5-1005 and site M2A1;
- 45-5-1005 is a single stone artefact located in a highly disturbed context. The object can no longer be located and it is not considered likely that it will be located; and
- it is considered unnecessary to proceed to a full heritage assessment.

The following recommendations are made in light of the initial findings of the preliminary Aboriginal heritage assessment:

1. should Aboriginal objects be identified during the course of construction, work should cease in that part of the study area and DECCW, MLALC and DLALC should be notified immediately;
2. should Aboriginal skeletal material be identified during construction, work should cease immediately and Police, DECCW and the relevant LALC should be notified immediately;
3. the proponent should prepare an Aboriginal Heritage Management Plan (AHMP) for the 15 known sites within the study area. The AHMP should provide guidance on the management of the sites both during the construction phase of the M2 Upgrade Project, and during the subsequent operational phase of the M2 Motorway. The AHMP will provide more detailed guidance than outlined in this report (e.g. detailed location mapping, fencing specifications, etc). The AHMP should include, but not be limited to, the following protective measures:
 - a) the proponent should erect temporary protective fencing at Aboriginal rockshelters within 50 m of the M2 construction works to minimise the potential for inadvertent damage by construction workers. The sites include: AHIMS 45-6-2097, 45-6-2160, 45-6-2161, 45-6-2162, 45-6-2163, 45-6-2543, 45-6-2544 and DC1;
 - b) the proponent should erect temporary sedimentation barriers and fencing along the banks of Terrys Creek, on the southern side of the bridges to minimise potential for indirect impacts to site M2A1 through sedimentation and/or personnel access during construction;
 - c) Aboriginal stakeholders have requested that monitoring take place at sites during construction works. However, this assessment considers that further impacts to, or identification of, Aboriginal objects is unlikely. Therefore further monitoring is not considered necessary;
 - d) the Aboriginal community have requested that an exclusion zone be placed around site M2A1 on the southern side of the M2 bridge and the proponent should take steps to avoid any construction activity on that side of the bridge. If possible, access to the areas should be afforded from the northern side of the M2. If this is not possible, and access is required on the southern side (passing under the bridge) then access should be made as close as possible to the concrete abutment;

- e) the proponent should ensure that regular toolbox talks are conducted with emphasis on Aboriginal cultural heritage and the potential for impacts to the sites; and
4. AHIMS 45-5-1005 is not considered to hold cultural heritage significance, and the absence of the single artefact suggests that it has been lost from the area, and therefore the site has already been effectively destroyed. The impact from the M2 is therefore impact on a destroyed site. The AHIMS register should be amended to reflect this status.

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