Appendix K Heritage Assessment

AECOM

Prepared for:

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Gloucester Coal Seam Gas Project Environmental Assessment: Heritage Gloucester to Hexham, NSW

Final

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Environment

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Gloucester Coal Seam Gas Project Environmental Assessment: Heritage
Gloucester to Hexham, NSW

15 September 2009

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Executive Summary

The following is a summary of the findings of this report:

- A review of the Aboriginal Heritage Information Management System (AHIMS) database administered by Department of Environment, Climate Change and Water (DECCW) suggest there are 13 previously recorded Aboriginal sites within the concept area and a 1,000 m wide pipeline buffer zone. However, only six sites occur within the study area – the field area and a 100 m wide pipeline corridor. Scrutiny of these records reveals that:
  - two sites (AHIMS #37-2-0336 and #37-2-0337) were erroneously identified as being in the study area near Clareval when they were, in fact, located in the Hunter Valley; they have since been destroyed under a s.90 permit;
  - two open campsites in the field area were not re-identified due to access restrictions (#38-1-0008 and #38-1-0031);
  - one, an isolated stone artefact at a reputed massacre site along the pipeline route was not re-identified during the survey; and
  - one, a Bora ground (#38-1-0006) was re-identified during the survey;
- three known but unrecorded Aboriginal sites, all isolated stone artefacts, occur in the field area, probably on Tiedman's Block;
- a total of nine previously unrecorded Aboriginal sites were identified during the field survey – two (possible) scarred trees, four low-density artefact scatters, and three isolated finds. Two are expected to be impacted by the proposal;
- a total of 14 potential archaeological deposits were identified during the survey. Five are expected to be impacted by the proposal;
- alternative routes were recommended to the proponent in order to minimise the potential for impacts to these sites;
- there are no indications at present that there are specific Aboriginal cultural (social) heritage values that would be affected by the development, except for the previously listed Bora ground (AHIMS #38-1-0006) and the reputed massacre site (#38-4-0010). However the pipeline alignment is not likely to physically impact these sites;
- there are no previously heritage-listed historic heritage items within the study area;
- there is one item that has been nominated for listing on the Register of the National Estate (RNE) – the Vale of Gloucester – but has not yet been formally registered. The field area component of the study area is located within a large tract of this item;
- a total of 11 items of potential historic heritage value were identified during the field survey. One of these is considered to be of local heritage significance and three exhibit features that may be of historic heritage value pending further research;
- on the basis of this assessment, it is considered the proposed development may encounter subsurface Aboriginal objects. It is recommended that the proponent prepare an Aboriginal Heritage Management Plan (AHMP) to manage the risk of impact to Aboriginal objects; and
- on the basis of this assessment, it is considered the proposed development is unlikely to encounter historic heritage relics.

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1.0 Introduction

1.1 Project Background

ENSR Australia Pty Ltd (trading as AECOM) and hereafter referred to as AECOM was commissioned by AGL to manage the planning approval process and pre-construction Environmental Management Plans (EMPs) for the proposed coalbed methane gas extraction and transport system between Gloucester and Hexham, NSW (hereafter referred to as 'the project'). As part of the process, AECOM was tasked to prepare an Aboriginal and historic heritage assessment of the proposed gas field and pipeline corridor to inform an Environmental Assessment (EA) being prepared by AECOM on behalf of AGL. The EA is being prepared under Part 3A of the *Environmental Planning and Assessment Act 1979*.

The Concept Plan involves the development of plant and infrastructure for the extraction of coal seam gas (CSG) from the Gloucester Basin and transport to markets in the Newcastle and Sydney Regions. The Concept Plan includes the development of well sites and associated infrastructure within the Field Area. Concept Approval is being sought for a staged Gas Field Development within the Field Area, including development of wells, gas and water gathering lines, and associated infrastructure and activities.

Project Approval is being sought for the following components of the project (**Figure 1.1** in **Volume 4** of the EA):

- proposed well site locations within the Stage 1 GFDA of the Field Area, access roads, gas and water gathering systems and other associated infrastructure;
- construction and operation of the Central Processing Facility (CPF) in the Stage 1 GFDA; and
- construction and operation of a 103.5 km pipeline within a 100 m wide corridor from Stratford to Hexham[1].

The heritage assessment involved the survey and inspection of lands directly impacted by the project with particular emphasis on areas where ground impacts are expected.

Relevant legislation, summarised further in **Section 9.0**, is the *Environmental Planning and Assessment Act 1979*, *Heritage Act 1977* and the *National Parks and Wildlife Act 1974*. Relevant guidelines include the *Aboriginal Cultural Heritage: Standards & Guidelines Kit* (NPWS 1997) and the *Burra Charter* (Australia ICOMOS 1999). The Aboriginal consultation process for this project followed the *Interim Community Consultation Requirements for Applicants* (DEC 2004).

[1] The final length of the pipeline is not yet known as it depends on the final location for the CPF. Two CPF locations are currently being considered: one near Stratford on a property known as Tiedmans Block, and one immediately south of the Gloucester Coal rail loop. The pipeline will be 103.5 km to Tiedmans Block or 95.2 km to the rail loop. This report assumes the furthest pipeline length, i.e. 103.5 km.

1.2 Aims

The overall aim of this assessment was to identify the Aboriginal and historic heritage values of the project lands, 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, and any historic sites or items, in the study area;
- to identify documented Aboriginal heritage sites/objects and/or historic heritage sites within the study area;
- to identify and record any previously unrecorded Aboriginal sites and objects, and any historic sites or items within the study area;
- to assess the cultural significance of Aboriginal sites and objects in the study area in consultation with Aboriginal stakeholders;
- to assess the cultural significance of historic heritage sites and items in the study area; and
- to prepare recommendations on the management of Aboriginal and historic heritage values within the study area, when compared with the proposed development footprint.

1.3 Study Area

The project land, hereafter referred to as the 'study area,' is located between Gloucester and Hexham, NSW. It comprises the Stage 1 GFDA and the 103.5 km pipeline corridor, to a width of 100 m, from a CPF located in the vicinity of Stratford to the Hexham Delivery Station near Newcastle. Initially, a 1,000 m wide buffer zone was established along the corridor route to allow for amendments to the pipeline route. The pipeline corridor follows existing service easements where possible. The study area consists of mainly pastoral grazing land, but includes parts of the Karuah River, Williams River, and the Hunter River and numerous creeks and water courses.

1.4 Project Team

The Project Team consists of archaeologists and other specialists from AECOM, and representatives of the local Aboriginal community. Ruth Baker (AECOM Principal Environmental Scientist) directed the EA project and provided QA for this report. Neville Baker (AECOM Principal Archaeologist) directed the heritage assessment project and provided technical review of this report. Rick Bullers (AECOM Senior Archaeologist) managed the heritage assessment project, conducted the fieldwork and was principal author of this report. Leigh Bate and Geordie Oakes (AECOM Archaeologists) assisted with the fieldwork and co-authored the report. Medard Boutry (AECOM Heritage Consultant) conducted background research. Lee-Anne Bishop and Tim Osborne provided administrative and drafting support. Stuart Galway (AGL, Land & Approvals Manager) 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** provides environmental and archaeological contextual information;
- **Section 3.0** describes the assessment methodology employed;
- **Section 4.0** describes the methodology and results of consultation with the Aboriginal community;
- **Section 5.0** lists the Aboriginal sites and objects identified in the study area, and discusses the results of the field survey;
- **Section 6.0** lists the historic heritage sites and items identified in the study area, and discusses the results of the field survey;
- **Section 7.0** discusses the significance values within the study area;
- **Section 8.0** discusses the potential impacts associated with the development;
- **Section 9.0** describes legislation guiding Aboriginal and historic heritage management; and
- **Section 10.0** provides succinct management recommendations regarding the Aboriginal and historic heritage values of the study area.

1.6 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 **Appendix B**. 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 9.0**. 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 Existing Environment

2.1 Environmental Context

An analysis of the natural resources available in a region are used to aid investigations of Aboriginal heritage to gain an understanding of the environmental conditions faced by hunter-gather societies, and consequently, the range of cultural remains that may be expected. Natural resources include the flora and fauna that may have provided food and material resources, and are linked to the hydrology, geology and soil types in a region.

Water availability is a major influence on the intensity of Aboriginal occupation and 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 here in order to delineate their nature and impact on the survival and location of archaeological material.

A detailed description of archaeological and historical evidence is also presented below to further analyse and interpret the spatial distribution and likelihood of archaeological material occurring within the study area.

Information on the geology, soil landscapes and topography in the region 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.

2.1.1 Climate

The climate between the Gloucester and Hexham region is variable, with temperatures ranging from 0-15°C in the winter months to 25-42°C during summer. The region is prone to protracted periods of dry weather, particularly in summer. Rainfall, particularly in the southern regions around Hexham, is variable and largely affected by coastal patterns. Rainfall in the northern regions around Gloucester is influenced by the mountainous terrain. The average rainfall in the Barrington Tops area is 2,500 mm, with the average in the southern areas being 900-1,000 mm (Bureau of Meteorology 2008). In the mountains far north of the area the climate is at times sub-alpine with snow not uncommon during the winter months.

2.1.2 Geology and Soils

The soils of the NSW North Coast region reflect the geology on which they lie and the local topography. Generally the soils are sandy in areas of sedimentary and quartz rich geology and highly fertile loams occur over basalts.

The soil types that are most common along the pipeline route are typically yellow podzolic, erosional and colluvial with alluvial plains (Floodplains/Terraces and Coastal Alluvial Plains). The topsoil textures range from loamy sand through to clay loam (Gay 2000: 9). The depth of the A-horizon ranges from 0.2 metres on the slopes and ridges to 0.5 meters in the alluvium (Stratford Coal EIS 1994: 2-3).

The NSW North Coast region principally consists of Devonian and Permian age bedrock that is a part of the New England Fold Belt. The bedrock of this region has been closely faulted as it was thrust over the northern margin of the Sydney Basin. The Great Escarpment was created by erosion from rivers and steams formed around 80-100 million years ago. The chief rock types that encompass the NSW North Coast geology are slates, shales, phyllite, quartzites, carboniferous mudstones, claystones and sandstones lithic to quartz (AHMS 2008: 163).

The study area lies on the Permian Craven Coal measures which surrounds the Hunter Valley lowlands. These form part of the Stroud-Gloucester Syncline consisting of conglomerate, sandstone, mudstone, arkose and coal (Newcastle 1:250,000 Geological Series S1-56-2).

2.1.3 Topography and Hydrology

The study area traverses a range of major river valleys from the Avon River valley at the northern end, through the Wards River, Karuah River, Williams River and Hunter River valleys, to Hexham in the south. Many ephemeral, semi-permanent or permanent watercourses flow through the study area. The major watercourses have headwaters in the hills and mountains to the east and west of the valley lowlands. The major rivers that the proposed pipeline crosses are the Karuah, Williams and Hunter Rivers, with a range of first- through to fourth-order watercourses along the route.

Watercourses in the study area were assessed using the Strahler system of stream order classification. In the Strahler system a watercourse segment with no tributaries is designated a first-order segment. A second-order segment is formed by the joining of two first-order segments, a third-order segment is formed by the joining of two second-order segments and so on. With the Strahler system, there is no increase in stream order when a segment of one order is joined by another of a lower order. A first-order creek, being ephemeral and little more than a drainage line, increases to a fourth-order creek, which carries a larger amount of water.

One of the major watercourses that flow along the western boundary of the field area is Dog Trap Creek. A second major watercourse is Waukivory Creek, which runs from the eastern boundary of the field area across to the western boundary. Both creeks drain into the Avon River, which also runs the length of the field area's western boundary.

Black Camp Creek is a major creek line that follows large portion of the pipeline route. It commences as a series of first-order streams west of Stroud in the north and flows southwards becoming progressively larger before flowing into to the Williams River near Glen Martin as a fourth-order plus stream.

There are several major inland landscape features of the NSW North Coast which include low foothills and ridges and valleys that run into the steep slopes and gorges of the Great Escarpment. The fault lines in the area control the structural patterning of these features. The foothills of the Great Escarpment have steep slopes with relief up to 750 m, where as the narrow alluvial plains have relief of up to 250 m (AHMS 2008: 162).

2.1.4 Vegetation

The study area consists of a combination of cleared land for grazing, agriculture, and currently consists of thick layers of grassland communities. The area is undergoing a rapid and continual change from its former rural use to hobby farming and urban residential use. Uncleared bushland remains on steeper slopes and in isolated pockets, largely along water courses. The study area has a diverse range of plant species, which correspond to the different soil substrates, the topographic variation and the climatic differences encountered across the region.

Eucalypt forests grow on soils derived from granites. The dominant species include blackbutt (*Eucalyptus pilularis*), Sydney blue gum (*E. saligna*), spotted gum (*E. maculata*), grey gum (*E. punctata*), forest red gum (*Eucalyptus tereticornis*), red bloodwood (*Corymbia gummifera*), brush box (*Tristania conferta*) and white mahogany (*E. acmenoides*) (AHMS 2008: 165).

In areas of dry, open flats, the vegetation community consists of white gum, blackbutt (*E. pilularis*), forest red gum (*E. tereticornis*) and grey box. In the hills of valleys and ranges, dry sclerophyll forests and woodlands of spotted gum, grey gum, blackbutt, red bloodwood and white mahogany (AHMS 2008: 165).

2.1.5 Fauna

The Atlas of NSW Wildlife lists 479 faunal species located within the Local Government Areas of Gloucester, Dungog and Maitland. Species recorded includes 45 species of amphibians, 58 species of reptiles, 93 species of mammal and 283 species of birds, although 10 bird species, 15 mammal species and one reptile species are introduced and were not an available food resource for pre-Colonial hunter-gatherers.

Common species include swamp wallaby (*Wallabia bicolor*), kangaroo (*Macropus* sp.), short-beaked echidna (*Tachyglossus aculeatus*), yellow-bellied glider (*Petauroides australis*), spotted-tail quoll (*Dasyurus maculatus.*), flying fox (*Pteropus sp.*), common ring-tailed possum (*P. peregrinus*), common brush-tailed possum (*Trichosurus vulpecula*), platypus (*Ornithorhynchus anatinus*), northern brown bandicoot *(Isoodon macrourus*), Gould's wattled bat (*Chalinolobus gouldii*), common wombats (*Vombatus ursinus.*), various marine mammals (whales, dolphins and seals), eastern water dragon (*Physignathus lesueurii*) and red-bellied black snake (*Pseudechis prophyriacus*).

The composition of marine and estuarine fish, crustacean and mollusc species is not known, but is presumed to have been fairly abundant, particularly in the Lower Hunter region, and available as a food source to the coastal people inhabiting the area prior to European settlement.

2.1.6 Summary of Environmental Conditions

Climatic conditions between the Gloucester and Hexham areas are generally mild. Within this area there are several climatic zones. The coast is generally sub-tropical consisting of hot summers, sub-humid on the slopes and a temperate with warm summers and no dry season in the uplands (AHMS 2008: 162). Rainfall is generally higher and more reliable in summer but, because soil moisture availability tends to remain high throughout the year, the area experiences good conditions for ground cover growth and a low risk of erosion from climatic causes.

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

The relatively abundant water resources and reliable rainfall also provided suitable conditions for European settlement. The area was settled fairly early in the Colony's history (**Section 2.2.2**) by the Australian Agricultural Company (AA Company), who recognised the region's potential for agricultural production.

2.2 Ethnohistoric Context

A discussion on the ethnographic context of the study area will provide a social context for understanding the heritage significance of Aboriginal and historic sites.

2.2.1 Aboriginal Occupation

Prior to European settlement, the study area was inhabited by people of three Aboriginal language groups (Aus Anthrop 2008):

1. The far northern section of the study area was occupied by people of the Birpai language group, also known in the various literature as Biribay, Biribi, Birippi, Birrapee, Birripai, Birripi, Bripi, Brippai and Waw-wyper. According to Tindale (1974: 192) this territory covered an area of some 7,300 square km, extending from the Manning River at Taree south to Cape Hawke (near Forster) on the coast, and inland to the dividing range around Gloucester in the south west and the head of the Hastings River in the northwest.
2. The majority of the study area was inhabited by people of the Worimi language group (Warrimee, Warramie, Gadang, Kattang (language name), Kutthung, Guttahn, Cottong, Wattung, Watthungk, Kutthack, Gingai, Gringai, Gooreenggai and Port Stephens tribe). This language group covered a relatively small area of some 3,900 square kilometres along the NSW coast which, according to Tindale (1974: map supplements), extended from Hunter River to Forster near Cape Hawke along coast; at Port Stephens; inland to near Gresford; about Glendon Brook, Dungog, head of Myall Creek and south to Maitland.
3. The far southern section of the study area was inhabited by people of the Awabakal language group (Awaba, Awabagal, Awabakal, Kuri Kuringgai, Lake Macquarie tribe, Minyowa (horde at Newcastle), Minyowie and Newcastle tribe). The Awabakal lands were relatively small (1,800 sq km), abutting the southern boundary of the Worimi and extended southwards to around Norah Head near Wyong (Tindale 1974).

Traditional Aboriginal groups were self sufficient, highly mobile bands of hunter gatherers (Mulvaney & Kamminga 1999: 79). The degree of mobility depended on the environment, seasonality and ceremonial movement. It was generally in areas where resources were scarce that groups moved around more frequently and broadly. Conversely, areas of abundance generated less frequent movement, within narrower corridors.

Both Tindale (1974) and Elkin (1932: 359) agree that the Hunter River formed the natural boundary for the Worimi and the neighbouring Awabakal to the south. However Enright (1932: 75) believed that the Worimi lands extended south to Norah Head (covering the Awabakal lands), which highlights the inherent difficulties on defining pre-European distribution of Aboriginal people using ethnographic data alone.

A limited amount of contemporary ethnographic material was collected on the traditional life of the Birpai, Worimi and Awabakal people. Details of the social structure of the Birpai, Worimi and Awabakal are rather ambiguous, as many of these systems had broken down by the time they were recorded (Brayshaw 1987: 36). Each of the groups formed separate closed social networks, differentiated by dialect and totemic beliefs (Ramsland 2001: 16). The economy of the Birpai, Worimi and Awabakal was similar to other coastal and hinterland groups in New South Wales, with a reliance on a staple food source while exploiting other seasonal resources.

Each group consisted of a number of self-governing territorial units known as 'hordes', of about 50 members from several families (Ramsland 2001: 16; Brayshaw 1987: 36; Sokoloff 1980: 3). Elkin (1932) lists four local Worimi groups, Garuagal, Maiangal, Gamipingal, and Burai-gal, the last-named probably being the same as Bahree. Some of the horde-like names listed by Mathews (1897, in Tindale 1974), including Bahree, probably belong to this and adjoining tribes.

Spiritual authority for the Aboriginal peoples of south-eastern Australia was vested in a large number of supernatural beings, but there was a common belief in an All-Father sky deity who held various names. To people of much of inland NSW he was *Baayama* or *Biame* ('The Great Shaper,' 'Thunder-God' or 'Great One'), who formed the world by shaping the cosmos from a pre-existing primeval void (O'Rourke 1997: 173). To the peoples of the Central Coast, he was *Daramalan* or *Goin*. These deities were said to be able to return to earth to punish transgressors of marriage rules, and could also return during certain initiation rituals (Berndt 1947: 334-336).

Plate 1: A lithograph of Chief Boomerang of Dungog, NSW, c.1848
National Library of Australia, nla.pic-an8152989

Ceremonial customs differed from one Aboriginal nation to the next. However Bora[2] ceremonies were generally associated with Biame, and involved ritual practice including law, dance, scarification and other bodily modification (AHMS 2008: 48; Attenbrow 2003: 126-128) (**Plate 2**). Bora grounds are typically either a single circle constructed of mounded earth, or two circles joined by a smoothed pathway (Brayshaw 1987: 86). It has been noted of the Birpai that at some Bora ceremonies any hostility or animosity between hordes would cease for the duration of the ceremony (Ramsland 2001: 16).

Plate 2: Oil Painting by Joseph Lycett of a Corroboree at Newcastle, c.1815-1825
National Library of Australia, enhancement of image DG 228

Burials were the main method of disposing of the dead, although some cremations have been found on Worimi land. In the case of burials the cadaver was placed into a pit in the ground, covered in bark, and then covered in soil, so the location of the grave is not clearly visible on the surface (Brayshaw 1987: 86).

According to Sokoloff (1980: 30) accounts of shelters built by the Worimi indicate the local people built a variety of structures, depending on the availability of material and the period of residence and could be either simple shelters of a few sheets of bark leaning on a pole against a tree or fallen log, or slightly more elaborate using forked sticks, tied together, and covered in bark sheets (**Plate 3**).

[2] Bora is the name given to both a male initiation ceremony and the site on which it was performed.

Plate 3: Watercolour of an Aboriginal camp near Port Stephens, dated 1826
National Library of Australia, nla.pic-an2818328

The equipment used by the Birpai, Worimi and Awabakal was often light weight and portable and made from stone, wood, shell, bone and skin (Kuskie 2004). These included stone tools and hatchets, clubs, spears, boomerangs, drinking vessels, net bags, nullas, yam sticks, canoes, fishing lines, nets, shell hooks and Gunyahs, which were small huts made from bark and tree branches (Ramsland 2001: 17; Kuskie 2004; Brayshaw 1987: 76). To exploit the marine resources, and to cross rivers, the Worimi built canoes from a single sheet of carefully selected stringybark (*Eucalyptus obliqua*), tied together at the ends and daubed with clay to make it watertight (Sokoloff 1980: 31-32).

The population of the region at the time of contact is not known, but it would be fair to surmise a relatively dense population, as there are numerous reports of large gatherings of Aborigines, including a Birpai bora ceremony with over 500 attendees (Ramsland 2001: 16). This intense level of occupation appears to date only to the last 4,000 years, following the stabilisation of coastline, but colonisation may extend back to 30 – 40,000 years BP (Kuskie and Kamminga 2000 in Kuskie 2004: 19). There is however, few landscape contexts that exist in which archaeological evidence of older occupation would be conserved.

Brayshaw (1987: 74-82) presented an extensive list of subsistence resources used by the Worimi, many of which would most likely have been exploited by the Birpai and Awabakal. These include *Zamia spiralis* seeds once they had been soaked for several weeks in a creek, then pounded and roasted, grasses, roots and tubers, giant lily (*Doryanthus excelsa*), ferns, macropods, possum, bandicoot, eels and fish, echidnas, emus and other avifauna, goanna, snakes and honey (Brayshaw 1987).

Movement around each territory may have been influenced by the seasonal availability of certain resources (Kuskie and Kamminga 2000 in Kuskie 2004: 19). Men were responsible for catching larger game, sometimes using large groups to corner macropods before killing them, or even using a narcotic made from Acacia bark to poison waterholes to catch fish (Brayshaw 1987: 79; Sokoloff 1980: 10). Women were responsible for catching smaller game and collecting plant resources (Sokoloff 1980: 8).

By 1818 European settlement extended as far north as the Hunter Valley and brought a period of decline in Aboriginal population numbers, largely due to the smallpox pandemic that caused an unknown number of deaths between 1830 and 1832. Due to the cumulative affect of interference, disease, displacement and conflict, Aboriginal populations all over NSW began to diminish noticeably around this time. The traditional life of the Awabakal and Worimi were also affected by the creation of the port of Newcastle on the Hunter River in the late 18th century, while the Biripai were affected more by the arrival of the cedar cutters and farmers in the early 19th century (Ramsland 2001: 25).

2.3 European Occupation

Europeans first settled the Newcastle region in 1804 when a convict settlement was established. By 1819 Newcastle had outlived its usefulness as a convict prison and Governor Lachlan Macquarie decided to find a suitable location to move the prison. An influx of free settlers into the Newcastle area and the prison being deemed to be too close to Sydney were the main reasons that the prison was moved to an alternate location (AHMS 2008: 65). However the greater Hunter Valley was still closed to free settlement up until 1825 because of its close proximity to the Newcastle penal colony.

The Australian Agricultural (AA) Company was incorporated in London in 1824 following negotiations with the British Government for a grant of 1 million acres of land in New South Wales on the condition that certain sums of money should be expended in the development and improvement of the land so granted (Sands 1925). In 1826 the Chief Agent for the AA Company, Robert Dawson, explored the Karuah River valley, naming places as he travelled.

Dawson continued to follow the valley north, arriving where Gloucester now stands in November 1826. As the land appeared ideal for grazing and agriculture early settlement was encouraged. An outpost at Stroud was settled by the AA Company in 1827. By 1832 Stroud had become a self-contained village and as early as 1836, the company's storehouses and much of the convict labour force were located there. By 1850, it had become the company's headquarters.

By the end of the 19th century the AA Company began to sell off land. A development company, Gloucester Estate Limited, purchased land in the Gloucester area for twelve shillings and sixpence per acre. Subdivision and good promotion by Gloucester Estate Limited resulted in rapid growth with land selling between twenty shillings and five pounds an acre by the end of 1903.

Hexham was first settled during the 1820s. Originally Hexham was sited in the Ironbark Creek area where the Church of England was built in 1849, but the village was moved to the north with the opening of the railway which shipped coal from the Minmi mines (Suters Architects 1997 in AHMS 2008: 40). It was named after the town of Hexham in England, as its nexus with Newcastle and the Hunter River mirrored the link between the city of Newcastle-on-Tyne and its historic neighbour, Hexham.

Maitland itself was not established until 1833, but by this time Europeans had been in the region for more than a decade. Their impacts on the land and on Aboriginal populations were pervasive and long-lasting, with the introduction of new animals, crops, commodities, customs and diseases. Change saw the displacement of Aboriginal populations and landscapes totally altered to accommodate European farming and industrial practices. It is only through the writings of L.E. Threlkeld (Gunson 1974) that Aboriginal society at European contact has been recorded and known to us today. Threlkeld was a missionary residing in the lake Macquarie area who made detailed and careful observations on Aboriginal customs, language, lifestyles, and social boundaries of the Lower Hunter and Newcastle regions (ENSR 2008).

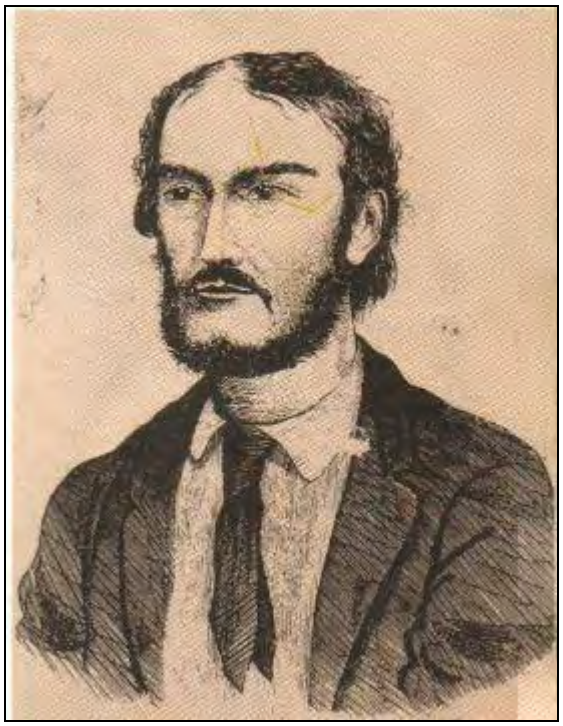

Plate 4: Image of Fred Ward, aka Captain Thunderbolt, artist/date unknown
http://dreamsis29.tripod.com/AboutThunderbolt.htm

There were two notorious figures in the history of the Upper Hunter Valley from the mid 1850s, a bushranger named Captain Thunderbolt (real name Fred Ward) and his partner Maitland Aborigine Mary Ann Bugg. The famed horse thief and bushranger was on the run for almost 20 years, operating in the Hunter Valley, Liverpool Plains and central NSW (Blyton et al 2004: 36-41). In 1866 he held up a hotel in Gunnedah and for the next year conducted a series of robberies of stations and mail coaches in the Barraba-Manilla districts. Thunderbolt was shot dead by Constable Alexander Walker during a highway robbery at Uralla on 25 May 1870. Captain Thunderbolt was acknowledged as the most successful and the last of the 'professional' bushrangers' (Openheimer, 1992: 92-107). Historic places relating to Captain Thunderbolt can be found throughout the region, including the study area.

2.4 Archaeological Background

The archaeological background section outlines the known Aboriginal sites in the region and provides a review of previous studies undertaken in the area. This section will provide a synthesis, which has been used in subsequent site prediction methods.

2.4.1 Regional Context

There have been relatively few archaeological surveys carried out in the lowlands of the Gloucester – Stroud region. Surveys include lands along Bucketts Way between Gloucester and Stratford (Griffith 1992), the Wards River area (Brayshaw 1981), and the Karuah River at Stroud (Appleton 1993). No Aboriginal sites were identified during these surveys.

Brayshaw (1984) conducted a survey of lands between Craven and Dog Trap Creek prior to the development of the Stratford Mine. Two sites – a low density artefact scatter and an isolated find – were located on footslopes 500 m south east of the end of Parkers Road. The artefact scatter was located on the edge of an ephemeral water course and was assessed as having low scientific/archaeological significance. Another three sites were located in the region during a survey as part of the Stratford Mine EIS (Brayshaw & Byrne 1994). Again, these were low density artefact scatters or isolated finds located in association with first order ephemeral creeks. Another site was located by Gay (2000) adjacent to an ephemeral water course 400 m east of Avondale Creek on the Stratford Mine lease area. This site was an isolated find of a single stone artefact.

From these studies, it is apparent that the most common Aboriginal site type to be found in the region are low density open sites consisting of stone artefact scatters or isolated finds, most likely in association with ephemeral or permanent water sources. The small number of surveys in the region reflect the minimal development that has occurred in the Gloucester region, and the low number of objects located is probably related to the generally low ground surface visibility due to good pasture growth in reliable rainfall areas.

Further south, the higher density development in the Lower Hunter Valley has seen a much broader level of archaeological research. Artefact scatters and isolated finds have been the most frequently recorded site types (Kuskie 2004: 23). To a lesser degree axe-grinding grooves, middens, bora/ceremonial sites, burials, scarred trees, stone arrangements, rock shelters with art, fish traps and places of historic or traditional Aboriginal significance have been located in the lower Hunter Valley.

Kuskie (2004) believes that most sites within the lower Hunter are typically artefact scatters, containing less than ten artefacts, occurring at a low density and situated within close proximity to drainage lines. Past investigations also demonstrate that occupation was also focused along the margins of the wetlands.

A test excavation program undertaken by Silcox and Ruig (1995: 36) around the margins of the Hexham Wetlands demonstrated that archaeological material was widespread and occurred in silcrete concentrations of varying sizes and density, separated by stretches of ground where much lower artefact numbers were present. This shows the possibility of higher densities of artefacts sharing an association with the location of specific activity areas. But this does not mean that areas of low artefact numbers were not on the perimeter of high density areas. It is more than likely, however, that when a continuous series of test pits have been dug and a low density is consistent, this is taken as a sign that the distribution pattern does not consist of widely spaced discrete concentrations.

Therefore, research indicates that stone artefact scatters are the predominant archaeological site type in this region, typically buried within the upper soil horizon, manufactured mostly from silcrete or mudstone. Smaller proportions of stone artefact assemblages are of quartz, petrified wood and other igneous material.

2.4.2 Local Context

A search of the Department of Environment, Climate Change and Water's (DECCW) Aboriginal Heritage Information Management System (AHIMS) database suggest that there are 13 registered Aboriginal sites within the 331 km² search area of the pipeline corridor and concept area (**Table 1** and **Figures 19.1** to **19.16** in **Volume 4** of the EA). These sites were plotted onto a map of the study area, revealing that out of the 13 registered sites, there were six sites of interest: four within a 100 m wide buffer corridor of the pipeline (i.e. potentially within the path of the proposed construction) and two in the field area.

One of the sites within the pipeline buffer zone (AHIMS #37-2-0336) and another site (AHIMS #37-2-0337) have erroneous positions recorded in AHIMS. These sites were recorded within the Mt Arthur Coal Mine Lease Area in the Hunter Valley; they are not within this study area. They have since been destroyed during a previous development pursuant to a Section 90 consent to destroy under the *National Parks and Wildlife Act 1974*.

Of the remaining sites within the pipeline corridor (AHIMS #38-1-0006) was re-identified during the survey, although an error in coordinate recording shows the site to be further south than it actually is (**Figures 19.1** to **19.16** in **Volume 4** of the EA). Further south, an isolated stone artefact site (AHIMS #38-4-0010) is recorded on the banks of Little Black Camp Creek. This site is recorded in AHIMS as where a massacre took place. It was formerly recorded as an "Aboriginal Place", but this reference was removed on 6 November 1997 because the site is not a formally declared Aboriginal Place. This site was not re-identified during the survey, except for the general locality.

The sites within the field area (AHIMS #38-1-0008 and 38-1-0031) were not re-identified during this survey due to access restrictions on the Stratford Coal Mine Lease.

Table 1: AHIMS Registered Sites within the Search Area

Site No.	Site name	MGA Easting*	MGA Northing*	Site type
37-2-0336*	MAN 31; Mt Arthur North	398805	6422089	Open Camp Site
37-2-0337*	MAN 32; Mt Arthur North	398805	6421989	Open Camp Site
37-1-0003	Gloucester	402159	6457785	Open Camp Site
38-1-0006*	Washpool Bridge	397765**	6417239**	Bora Ring Site
38-1-0008#	Craven; Parkers Road	402995	6442779	Bora/Ceremonial
38-1-0010*	Little Black Camp Creek	391085	6404939	Aboriginal Place – removed 6 Nov 1997
38-1-0027	Honey Scarred Tree	401305	6425989	Open Camp Site, Scarred Tree
38-1-0031#	Isolated find No.1	402505	6446814	None (not defined)
38-1-0033	Honey Tree (002)	401265	6426489	None (not defined)
38-4-0148	Kanwarry	377455	6379769	Isolated Find: Aboriginal Place – removed 6 Nov 1997
38-4-0151	Green rocks	377475	6378159	Midden
38-4-0325	Tarro	375005	6368939	Isolated Find
38-4-1027	LimeBurner Creek Rd	387284	6394519	Isolated Find

* AHIMS registered sites within the 100 m wide the pipeline corridor.

** Corrected MGA coordinates. The coordinates in AHIMS (397660E 6417050N) are erroneous.

AHIMS registered sites within the field area.

In addition to the sites registered in AHIMS, there are several other known sites in the study area. In 2007 the Forster Local Aboriginal Land Council was requested to carry out an Aboriginal heritage assessment, in association with archaeologist Allan Lance, of a parcel of land near Stratford for the Stratford Pilot Project (FLALC 2007). During the survey three stone artefacts – each an isolated find – were identified. A small stone artefact, found 150 m from a watercourse, and another stone artefact, found on a ridgeline, suggests that the ridgeline was used as a walking track (FLALC 2007: 6). These sites have not yet been recorded in AHIMS. The FLALC report does not provide a specific location for any of the sites they found; however, it appears that the sites were found in the vicinity of Dog Trap Creek, probably on the property known as Tiedman's block, where gas wells have already been established under the pilot project.

2.4.3 Predictive Model of Site Location

Material evidence of Aboriginal occupation is one of the main indicators of the significance of an area to the Aboriginal community. Such physical evidence is the basis upon which archaeology operates. Physical signs of Aboriginal occupation vary in type, location and extent. However, from current knowledge of the Aboriginal occupation in the Gloucester to Hexham region, it is possible to draw predictions regarding the likelihood of finding sites in the study area. The predictive modelling in this project used a combination of desktop reviews of previous surveys in the region with existing Aboriginal site data. This was followed by a physical inspection of the study area to verify those sites and to locate and record any new sites.

There are several factors that can affect or constrain where Aboriginal people are most likely to have been, where they have left evidence of their activities and/or the degree to which that evidence might be observable in the present material record. Such constraints for Aboriginal people are largely environmental factors such as availability of permanent or ephemeral water, availability of food resources, availability of material resources (e.g. suitable rock sources) and shelter from sun, wind or rain. However, appropriate geomorphological attributes also contribute to site preservation. The interplay of these factors allows certain types of material culture evidence to be retained in the environment.

The potential for finding Aboriginal sites in the study area can be summarised as follows:

1 ***Stone artefacts***: stone artefact sites may occur as either single artefacts (or 'isolated finds') or as 'artefact scatters,' which are generally defined as two or more artefacts within 50 m of each other, or a concentration of artefacts at a higher density than the surrounding 'background scatter.'

   Artefact scatters can represent evidence of camp sites, hunting or gathering events, event sites (such as stone tool manufacture) or as transitory movement through the landscape. An artefact scatter may consist only of material on the ground surface, which has been exposed by erosion forces, or it may be indicative of a sub-surface deposit.

   However surface evidence (or the lack of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material. Extensive excavations have shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces.

   Stone artefacts, whether isolated finds or artefact scatters, are likely to occur in the study area along gentle to very gentle gradient spurs, along the ridge crests or along the simple slopes that characterise much of the study area. It is predicted that higher densities of stone artefacts are likely to occur within close proximity to drainage lines running east to west through the study area.

2 ***Scarred Trees***: scarred trees are commonly found in NSW and many are recorded in the Lower Hunter region. Scarred trees can be either culturally, naturally or accidentally produced. Cultural scars can be either Aboriginal or European in origin. Scars may be formed accidentally by passage of farm machinery or some other form of impact. Scars can also occur naturally as a result of trauma, storm activity (e.g. lightning strikes), fire, fauna activity (e.g. insects, termites, birds and stock), impact and abrasion, ring-barking and other farmland or woodland management activities.

Aboriginal scarred trees occur in many environmental contexts and their presence or absence cannot be reliably predicted. While only a low proportion of mature trees (older than 220 years) bear scars that can reliably be identified as Aboriginal in origin, the actual proportion has not been quantified and cannot be accurately predicted.

The study area appears to have been heavily logged in the past century and there is a lack of mature trees in the area. This means that scarred tree occurrence is highly unlikely, although it is possible that mature trees do still occur in some parts of the study area, particularly along the margins of watercourses (third-order creeks or larger).

3 ***Quarry Sites***: a lithic quarry is the location where a source of raw stone material is exploited (Hiscock and Mitchell 1993: 32). Quarry sites will only occur where there are exposures of a stone type suitable for manufacture of stone implements.

Lithic quarries are only likely to exist in the study area where outcrops of a suitable raw material exist. Considering the underlying geology of the region, the potential for lithic quarry sites to occur in the study area is considered to be low, except in the area east of Seaham, where Hanson Quarries is currently quarrying silcrete.

4 ***Grinding Grooves/Engraving Sites***: Grinding grooves are elongated narrow depressions, usually formed in soft sedimentary rocks, and generally associated with water courses. Grinding grooves are usually formed by the shaping and sharpening of ground-edge axes.

Occurrence of these types of sites relies on the presence of outcrops of sedimentary bedrock. The underlying bedrock, consisting of large expanses of sandstone, suggests that there is a moderate potential for such sites to occur in the study area.

5 ***Stone Arrangements***: These sites include mounds, circles, lines or other patterns of stone arranged by Aboriginal people for cultural purposes. Some were associated with ceremonial sites and others were associated with mythological or sacred sites. Hill tops, ridge crests and valley flats that contain outcrops of stone or surface stone, and have been subjected minimal impacts from recent land-use practices, are potential locations for this type of site.

6 ***Bora Grounds***: These sites are generally large circles of raised earth of varying diameters used for ceremonial purposes. The soil was scraped to form a ring. Typically, the Bora ground consisted of a pair of earth circles, the large circle being associated with a smaller circle situated perhaps 300 m away. The two circles were joined by a pathway. The smaller circle sometimes contained an inner circle formed from trees stood upside down with their roots intact. The earth circles were often accompanied by carved trees and/or ground carvings.

There is one previously-recorded Bora site within the study area. Bora grounds are very rare. Consequently, the study area is considered to have a low potential for further such sites.

7 ***Mythological/Traditional Sites***: mythological sites may occur anywhere in the landscape, although such sites are often located at natural landscape features. Other sites of contemporary significance include massacre sites (locations of violent clashes between early settlers and Aboriginal people), traditional camp sites and contact sites. Consultation with the local Aboriginal community is required to identify these types of site.

8 ***Burials***: Aboriginal people tended to place human remains in hollow trees, caves or sand deposits. Burials are usually only detected when eroding out of creek banks or sand deposits or when disturbed by development. The likelihood of detecting burial sites during archaeological survey is very low.

Although the potential for burial sites to occur in the study area is considered to be low, their presence cannot be discounted.

Gay's (2000) survey of the proposed Bowens Road North Project at Stratford identified one isolated find (a broken flake manufactured from a fine-grained siliceous material) which was located in a dam wall on the creek flats south of Wenham Cox Road (AHIMS #38-1-0031). This find, although being of low significance, provides one of the only available platforms on which to predict what site types may occur within the field area. Gay considered that there was low potential for archaeological deposits to occur within her study area, with the exception of flats within 100 m of Dog Trap Creek where she considered the potential to be moderate. Thus for the immediate area around Gloucester isolated finds of stone artefacts are considered to be the main site type likely to be found and, for the purposes of prediction, are most likely to occur within 100 m of larger creeks with reliable water.

For the Dungog-Stroud area the common site type is the 'open camp site' consisting of an artefact scatter. With the exception of an isolated 'Bora ceremonial site' in the Stroud area, there are no other known sites along the pipeline route from Stroud to Hexham, although many sites have been found in the lower Hunter Valley generally. This suggests that there may be a higher possibility of locating open camp sites south of Stroud along the pipeline route. The low number of recorded sites to date is probably a function of the lack of development in those regions.

Aboriginal sites can be found in any landform context, but a predictive model seeks to identify landforms that provide the most likely locations where Aboriginal artefacts may be found. Although there is very limited information on which to base predictive modelling for the northern end of the study area, there are generally accepted patterns of site location that may be used to base a targeted survey. These include:

- the banks of major rivers;
- the banks and floodplains of major and minor creeks;
- areas of lower, mid and upper foot slopes;
- the crests of low ridges in close proximity to water courses; and
- areas adjacent to natural water bodies (e.g. swamps, billabongs, water holes).

3.0 Methodology

3.1 Aboriginal Heritage Survey

A strategic approach was considered the most practicable and efficient means of identifying and assessing key Aboriginal heritage issues within a study area that has a linear length of some 103 km and includes a field area encompassing some 50 km^2.

This approach also conforms to the Director-General's Requirements (DGRs), which state:

> *Indigenous and Non-Indigenous Heritage – the EA must include a justified and tiered assessment of impacts to indigenous and non-indigenous heritage, including:*
>
> - sufficient information to demonstrate the likely impacts of the proposal on indigenous heritage values (archaeological and cultural), consistent with Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (DEC, July 2005) including measures to avoid, minimise, manage and/or offset impacts. The EA must demonstrate effective consultation with indigenous stakeholders in determining impacts and developing mitigation options; and
> - sufficient information to demonstrate the likely impacts of the proposal on non-indigenous heritage values (including heritage vistas) consistent with the guidelines in the NSW heritage Manual. Where impacts to State or local non-indigenous heritage items are proposed, a statement of heritage significance must be included and measures identified to mitigate and manage impacts.

3.1.1 Survey Areas and Sample Areas

The approach used for the Aboriginal heritage survey consisted of identifying known Aboriginal sites, places, issues and values, together with a predictive model (**Section 2.3.3**) to define target sample areas for intensive survey.

In order to effectively sample the proposed route of the pipeline, the entire length of the easement was divided into Survey Areas (SA). The SAs were delineated by major geographical boundaries and thus were not uniform in length/area. Within each survey area targeted sampling areas were selected for intensive pedestrian survey

Table 2: Survey Areas used for Identifying Targeted Sampling Areas

Survey Area	Location
Avon River Valley SA	Survey area consists of the portion of the study area within the geographic context of the Avon River. This area includes the entire field area and the section of the delivery pipeline from Stratford in the north to Craven in the south.
Wards River SA	Survey area consists of the portion of the study area within the geographic context of Wards River. This area includes the section of the delivery pipeline from Craven in the north to the Wiesmantels locale in the south.
Karuah River SA	Survey area consists of the portion of the study area within the geographic context of the Karuah River. This area includes the section of the delivery pipeline from the Wiesmantels locale in the north to Stroud Road in the south.

Survey Area	Location
Black Camp Creek SA	Survey area consists of the portion of the study area within the geographic context of the Black Camp Creek. This area includes the section of the delivery pipeline from Stroud Road in the north to Glen Martin in the south.
Williams River SA	Survey area consists of the portion of the study area within the geographic context of the Williams River. This area includes the section of the delivery pipeline from Glen Martin in the north to Brandy Hill in the south.
Hunter River SA	Survey area consists of the portion of the study area within the geographic context of the Hunter River. This area includes the section of the delivery pipeline from Brandy Hill in the north to Hexham in the south.

The predictive model suggested that Aboriginal sites in the study area would most likely be found in proximity to one of the rivers and/or major creek lines that cross the proposed pipeline route, particularly on or near the crest of the low ridges that also cross the easement. Several minor tributaries also cross the study area and, although these were considered to have less potential than the major creeks, the possibility of Aboriginal sites occurring could not be completely discounted. Therefore, the physical inspection of the study area used all these areas as a basis for targeted surveys for Aboriginal sites and objects (**Figures 19.1** to **19.16** in **Volume 4** of the EA). A variety of different contexts – of both potentially high and low archaeological sensitivity – were chosen, including the following:

- the banks of major rivers;
- the banks and floodplains of major and minor creeks;
- areas of lower, mid and upper foot slopes;
- the crests of low ridges in close proximity to water courses;
- areas adjacent to natural water bodies (e.g. swamps, billabongs, water holes);
- areas that had been completely cleared or cultivated; and
- areas that have been partially cleared, but still retain small stands of timber.

It should be noted, however, that the concept of Aboriginal heritage is not confined to material evidence, i.e. archaeological sites. 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 method adopted to explore this issue was to consult the local Aboriginal community using DECCW's *Interim Community Consultation Requirements for Applicants* (see **Section 4.0**).

In light of the limited response from Aboriginal stakeholders regarding this project (**Section 4.0**), there was limited information regarding the values of the study area to the Aboriginal community. Therefore the investigation focused on the identification of Aboriginal heritage values relating to archaeological sites. Field survey methods were adopted to verify existing Aboriginal site records, investigate and record new archaeological sites, ensure their accurate recording and provide sufficient background information to provide an assessment of cultural significance to the extent that surface survey allows.

3.2 Historic Heritage Survey

The methodology used for identifying the historic heritage values of the study area comprised a desktop review of previous heritage reports associated with the study area in conjunction with a review of relevant heritage databases to identify heritage sites currently listed in and around the study area.

Databases searched included the NSW Heritage Office's (DoP) Heritage Database for the Gloucester, Great Lakes, Dungog, Port Stephens, Maitland and Newcastle Local Government Areas (LGAs), including the State Heritage Register (SHR), relevant government agency section 170 registers and relevant Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs). Searches were also made of the Australian Heritage Database encompassing the Register of the National Estate (RNE), the National Heritage List (NHL), the Commonwealth Heritage List (CHL) and World Heritage List (WHL).

Field survey for historic sites was conducted in conjunction with the Aboriginal heritage survey.

3.3 Specific Actions

The methodology comprised:

- a search of the DECCW AHIMS database for records of existing Aboriginal heritage sites within the study area;
- a search of relevant historic heritage databases for records of existing historic heritage items within the study area;
- a review of relevant archaeological reports lodged in DECCW's archaeological reports library at Hurstville;
- consultation with Aboriginal community groups following DECCW's interim guidelines (discussed further in **Section 4.0**);
- field survey by an AECOM archaeologists and representatives of the local Aboriginal communities where available, following transects that sought to investigate targeted areas of the study area that were considered most likely to contain Aboriginal sites and/or historic heritage sites. This approach is consistent with the DGRs. A 100% coverage of the entire study area was not considered feasible and the locations targeted included 200 m either side of all major rivers and creeks and tributaries crossing the study area, as well as adjacent ridgelines and low hill tops;
- transects were generally conducted in an 'out-and-back' fashion from various access points along the pipeline, plus random walks. This allowed greater coverage of the study area by using the line's centre line as a reference point. The outward leg followed one side of the pipeline and the return leg followed the other side. In this fashion a 100 m-wide corridor was traversed in each transect;
- inspection of all ground exposures for evidence of artefacts;
- inspection of all mature trees within 50 m either side of the proposed route of the pipeline for evidence of scars; and
- photographing the study area and noting environmental and archaeological aspects.

3.4 Fieldwork Dates

Fieldwork was carried out in two phases:

3.4.1 Fieldwork – Phase 1

Phase 1 of the fieldwork was carried out over 10 days between 6 and 17 October 2008. The entire GFDA and pipeline route was surveyed during this period.

3.4.2 Fieldwork – Phase 2

Following the inclusion of additional lands within the GFDA (at the southern and eastern ends of the GFDA) and the rerouting of several small sections of the pipeline, additional fieldwork was carried out to survey these areas. The survey was carried out over four days between 15 and 18 June 2009.

4.0 Aboriginal Community Consultation

Aboriginal community consultation was undertaken in accordance with the DEC (2004) *Interim Community Consultation Requirements for Applicants* (ICCRs) and the DEC (2005) Draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*. These guidelines 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**.

4.1 Stage 1 – Notification and Registration of Interest

Specifically, consultation consisted of the following:

- advertisement of the project in local newspapers, inviting Aboriginal groups to register interest (this task was coordinated by the proponent);
- 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 24 July 2008):
  - Department of Environment, Climate Change and Water (DECCW);
  - Forster Local Aboriginal Land Council (FLALC);
  - Karuah Local Aboriginal Land Council (KLALC);
  - Worimi Local Aboriginal Land Council (WLALC);
  - Awabakal Local Aboriginal Land Council (ALALC);
  - Mindaribba Local Aboriginal Land Council (MLALC);
  - Native Title Tribunal for a search of claims affecting the study area;
  - Office of Registrar for Aboriginal Land Claims;
  - Gloucester Shire Council;
  - Great Lakes Shire Council;
  - Dungog Shire Council;
  - Port Stephens Council;
  - Maitland City Council;
  - Newcastle City Council; and
- known Aboriginal organisations around the study area were contacted, as a result of advice received from the above organisations (refer **Appendix B**).

DECCW did not respond to the request. The Native Title Tribunal responded on 2 September 2008 informing that the study area was not overlapped by any claim of determination.

The Office of Registrar for Aboriginal Land Claims responded on 30 July 2008 advising of Aboriginal owners for the Worimi Conservation Lands at Stockton, near Newcastle. The Worimi Conservation lands are located to the southeast of the study area and are not affected by the project.

The Newcastle City Council responded on 8 August 2008 with a list of four relevant Aboriginal stakeholder groups within the Newcastle LGA. The Gloucester, Great Lakes, Dungog, Port Stephens and Maitland Councils did not respond.

As a result of this process, and after the 10-day response period required under the ICCRs, two Aboriginal groups – Karuah LALAC and Mindaribba LALC – registered their interest in being consulted. There was no response from Forster, Worimi and Awabakal LALCs, but these organisations were automatically registered anyway, giving a total of five registered groups after Stage 1 of the consultation process.

4.2 Stage 2 – Briefing and Methodology Advice

Briefing letters were sent to the Aboriginal groups that initially registered their interest (Stage 1), as well as other groups known to AECOM, on 25 August 2008 advising the proposed methodology for the survey.

Mindaribba LALC replied by fax on 27 August 2008 agreeing with the methodology as put forward. In addition a further three Aboriginal stakeholder groups formally registered their interest:

- Awabakal LALC responded on 8 September 2008 registering their interest, but provided no comment on the proposed methodology. (This organisation had already been automatically registered.)
- Awabakal Traditional Owners Aboriginal Corporation (ATOAC) and Awabakal Descendents Traditional Owners Aboriginal Corporation (ADTOAC) registered their interest on 15 September 2008, agreeing with the proposed methodology.

There was no response from Forster LALC, Karuah LALC or Worimi LALC.

As a result of Stage 2 of the consultation process, and after the 21-day response period required by the ICCRs, at total of seven Aboriginal community groups were registered as stakeholders in the project. A list of all registered stakeholders is provided in **Table 3**.

Table 3: Aboriginal Stakeholders identified for this Project

Organisation	Contact Name
Forster Local Aboriginal Land Council	Tim Kelly
Karuah Local Aboriginal Land Council	Margaret Wright-Wilson; Dave Feeley
Worimi Local Aboriginal Land Council	Andrew Smith
Mindaribba Local Aboriginal Land Council	Rick Griffiths
Awabakal Local Aboriginal Land Council	Cheryl Kitchener
Awabakal Traditional Owners Aboriginal Corporation	Kerrie Brauer
Awabakal Descendents Traditional Owners Aboriginal Corporation	Shane Frost

4.3 Stage 3 – Fieldwork (Phase 1)

Letters were initially sent to the five registered LALCs on 22 September 2008 offering positions in the fieldwork team and, at the same time, requesting feedback on any known cultural heritage issues for the study area. A detailed fieldwork schedule was attached to the letters of offer.

Three groups – Karuah LALC, Worimi LALC and Mindaribba LALC – accepted the offer for participation in the fieldwork. There was no response from either Awabakal LALC or Forster LALC, despite follow up phone calls. Consequently there were no representatives of Forster LALC or Awabakal LALC involved in the field survey. Since there was no response from Awabakal LALC, offers of employment were sent to ATOAC and ADTOAC to participate in fieldwork for areas south of the Hunter River.

As a result of this process, three of these groups took part in the fieldwork. Fieldwork participants included:

- Wayne Ping (Karuah LALC) participated in the survey of lands within Karuah LALC boundaries, specifically from Wards River in the north, to the Williams River at Clarence Town in the south;
- Paul Robinson (Worimi LALC) participated in the survey of lands within Worimi LALC boundaries, specifically from the Williams River at Clarence Town in the north, to the next Williams River crossing near Seaham in the south; and
- Shane Frost (ADTOAC) participated in the survey of lands south of the Hunter River, which is considered Awabakal country, but is encompassed by both Awabakal LALC and Mindaribba LALC.

Mindaribba LALC accepted the offer of fieldwork, agreeing to the schedule of activities. However, during a subsequent follow-up telephone call to confirm their availability on the scheduled day, Mindaribba LALC indicated that a representative was not available that week (and was possibly available the following week). With a very limited window of opportunity to conduct the fieldwork, the only available time for conducting the fieldwork within Mindaribba's boundaries was as set out in the schedule as originally provided and agreed to. Consequently representatives of Mindaribba LALC were not involved in Phase 1 of the field survey.

4.4 Stage 4 – Circulation of Draft Report

Following Phase 1 of the field survey, a draft report was circulated to the seven Aboriginal stakeholder groups on 17 December 2008. As no response had been received, a follow-up letter was sent on 24 March 2009 inviting comment on the draft document. As a result AECOM received responses from ADTOAC and ATOAC. Both stakeholder groups considered the report to be "reasonably comprehensive" but raised the following concerns as outlined below. No responses were received from the remaining five groups.

4.4.1 Comments: Awabakal Descendants Traditional Owners Aboriginal Corporation

Awabakal Descendants Traditional Owners Aboriginal Corporation made the following comments:

- agreed that PAD19 should be monitored during construction work (a subsequent realignment of the pipeline to circuit the eastern extent of the Woodbury Ridge means that this PAD will not be affected by the project);
- requested that they be consulted during the development of the Aboriginal Heritage Management Plan;

- requested the Management Requirements include a clause requiring cessation of works should Aboriginal artefacts be uncovered, and DECCW and stakeholders notified; and
- noted the Hexham area holds cultural and spiritual significance to the Aboriginal stakeholders.

4.4.2 Comments: Awabakal Traditional Owners Aboriginal Corporation

Awabakal Traditional Owners Aboriginal Corporation made the following comments:

- pointed out that limited survey was unlikely to locate all Aboriginal artefacts in the impact area;
- requested that references to “Aboriginal Community” be changed to “Aboriginal Stakeholders” as a more appropriate label;
- requested monitoring be carried out for the pipeline works to mitigate damage to potential sites; and
- noted that the Hexham area holds cultural and spiritual significance to the Aboriginal stakeholders.

The above comments have been addressed in this report.

4.5 Stage 5 – Additional Fieldwork (Phase 2)

Subsequent to the distribution of the draft report, an additional lands were incorporated into the field area and several changes were made to the route of the pipeline. Consequently additional fieldwork was carried out to survey the additional field area and amended pipeline route. Field survey was limited to amended areas only. The additional field area occurred within the Forster LALC area and this organisation was invited to take part in fieldwork. The amendments to the pipeline route occurred within the Karuah and Mindaribba LALC areas, and both these organisations participated in the field survey.

As a result of this process, two of these organisations took part in the fieldwork. Fieldwork participants included:

- Ron Tisdell, Vanessa Saunders and Martin Feeney (Karuah LALC) participated in the survey of the amended pipeline route within Karuah LALC boundaries, specifically from around Clareval in the north to the northern section of Black Camp Road in the south; and
- Roberta Campbell (Mindaribba LALC) participated in the survey of the amended pipeline route within Mindaribba LALC boundaries, specifically from the Williams River at Seaham in the north, to the Hunter River at Hexam in the south.

Forster LALC initially indicated an interest in participating in the fieldwork. However, subsequent attempts to advise fieldwork dates and confirm their availability on the scheduled day, received no response. Consequently representatives of Forster LALC were not involved in Phase 2 of the field survey.

4.6 Stage 6 – Circulation of Amended Draft Report

A copy of the draft of this report, with amendments following the Phase 2 fieldwork, was circulated to the registered Aboriginal stakeholder groups on 18 August 2009.

As a result AECOM received a response from ADTOAC on 1 September 2009, who wished to clarify comments made in the previous comments phase (see **Section 4.6.1** below). A response was also received from ATOAC (letter dated 31 August 2009). No responses were received from the remaining six groups.

4.6.1 Comments: Awabakal Descendants Traditional Owners Aboriginal Corporation

Awabakal Descendants Traditional Owners Aboriginal Corporation made the following comments regarding the amended draft report:

- "we would only be interested in being involved in the Aboriginal Heritage Management Plan in regard to the section of the gas project which concerns the proposed development area within the Awabakal Traditional Tribal Country"; and
- "we would like the above statement added into the draft so as to clarify our position".

This clarification was added to the management commitments in **Section 10.2**.

4.6.2 Comments: Awabakal Traditional Owners Aboriginal Corporation

Awabakal Traditional Owners Aboriginal Corporation made the following comments regarding the amended draft report:

- suggested that the writings of Rev. L. Threkeld offer a more complete overview of the Awabakal people. Further ATOAC pointed out that anthropologists do not have the capability to adjudicate on the spirituality of any particular locality or site; this is the exclusive right of traditional owners;
- recommended that the value of 'place' be considered within the "Heritage and Cultural weighting" so as to ensure "the protection and conservation of Places and Objects which impact significantly on the spirituality, cultural, historic and general legacy needs of Aboriginal people to address inequalities in social and community well being";
- requested clarification in **Section 7.2.3** regarding the lack of information provided by Aboriginal stakeholders on cultural (social) heritage values. ATOAC had previously expressed reluctance to share their cultural heritage with others in respect to aspects of cultural significance that connects them to their country;
- believe that all the relevant Aboriginal stakeholders should be consulted during the proposed AHMP where it is appropriate to their cultural area of association;
- recommend that monitoring is necessary to examine the possible survival and integrity of any Aboriginal sites that may be present within the Proposed Pipeline Project area;
- suggested that further analytical research is needed concerning the region. Recommend that AGL consider the advantages of implementing a Research Excavation Methodology Design for the AHMP to address research questions which are common to the Hunter region. The research design would "pioneer active principles to unravel the geological history of the regions [sic] layers to encompass and create a data collective of the regions ethos"; and

- believe that caution is recommended because the draft report does not address the impact on the environment surrounding the proposed pipeline. ATOAC are concerned with the extent of potential damage that the excavation itself will create on Aboriginal sites, including access roads for trucks as well as the supporting equipment that is needed.

The above comments have been addressed in this report.

A detailed consultation log and Aboriginal community comments are presented in **Appendix B**. In addition, specific comments regarding the cultural significance of the study area (and any associated "sites") and report recommendations will be incorporated into **Sections 7.0** and **10.0** respectively.

5.0 Aboriginal Heritage Results

This section provides the results of the background research and fieldwork components of the assessment.

A total of nine new Aboriginal cultural heritage sites and 14 potential archaeological deposits were identified during the field survey.

5.1 Fieldwork Constraints and Opportunities

In addition to the constraints identified in **Section 2.4.3**, further constraints for archaeologists include the extent to which Aboriginal activity is represented by preserved evidence, the degree to which post-depositional processes have affected the archaeological record, the extent to which land-use (e.g. cultivation or development) has altered the archaeological landscape, the time of year and the conditions under which a survey is conducted.

The study area, for the more than half its length (approx 55%), was located within various cleared easements for roads, transmission lines and pipelines, that had undergone various levels of disturbance by previous land management practices. These easements are covered with a thick cover of low pasture grass, bracken, sedge and various low weed species to a height of less than 100 mm. The majority of sampling areas (transects) offered very poor surface visibility of 0% (**Plate P1**). Some areas offered slightly higher visibility, although still less than 10% of the ground surface (**Plate P2**).

Small ground surface exposures (1 m^2 to 10 m^2) occur sporadically throughout the study area, although several larger exposures occur (**Plate P3**), particularly as stream-bank erosion. These exposures are most prevalent along the banks of creeks and rivers and occur as the result of flood-scouring. Such flood-scouring, although offering one of the best areas of surface visibility, is also a source of sediment loss, and therefore a source of potential impacts on in situ archaeological deposits. In the majority of sample areas, there was little surface lithic material evident, even in bare-earth exposures.

5.1.1 Effective Survey Coverage

To calculate effective survey coverage, the ground surface visibility along the route needs to be quantified. This information was recorded for sites and for the sample areas. Effective survey coverage is calculated on the basis of the total area surveyed, exposure and ground surface visibility. Because of the nature of the survey (total pedestrian) and the proposed development (a linear excavation), and because a representative sample of landscape units were recorded, an analysis of the 58 sample areas (transects) provides the basis for assessing effective survey coverage along the route.

Details of ground surface visibility and effective survey coverage for each transect are provided in **Table T1** at the back of this report.

Effective survey coverage is a function of the amount of ground surface available for detecting surface artefacts. The amount of ground surface visibility is determined by the amount of ground cover (vegetative cover) over the entire transect, the number and total area of exposures in the transect, and the amount (area) of those exposures with bare soil visible. As can be seen from **Table 4** below, ground surface visibility (and therefore the area of each transect available for detecting artefacts, was extremely low. A total of 52 transects (90%) had a ground surface visibility of less than 10%. Impediments to ground surface visibility in this survey included grass, leaf litter, very thick regrowth (e.g. *Melaleuca spp.* or *Eucalyptus spp.* woodland regrowth) and/or woody weed growth (e.g. *Lantana camara*). Good recent rainfalls throughout the study area have ensured that ground layer species throughout the study area had grown to provide luxurious pasture with near 100% ground coverage. Heavy rainfall hampered survey in the area around McClement Swamp, near Brandy Hill, where the ground surface became totally inundated.

Table 4: Ground Surface Visibility Classes

Exposure Area	No. of Transects	Percentage
< 0.01%	7	12
0.01 – 1.0%	25	43
1.01 – 10.0%	20	34
10.01 – 50.0	1	2
50.01 – 100.0%	5	9
Total	**58**	**100**

As a result of the low level of ground surface visibility, effective survey coverage was generally very low, with nearly three-quarters of sample areas (42 transects) having an effective coverage of 1.0% or less. In all 54 transects (93%) had an effective coverage of 10 percent or less (**Table 5**). This result could be extrapolated to the entire study area; in other words the effective coverage in 96% of the study area was less than 10%.

Table 5: Effective Cover Classes

Effective Cover Class	No. of Transects	Percentage
< 0.01%	6	10
0.01 – 1.0%	36	62
1.01 – 10.0%	12	20
10.01 – 50.0	2	4
50.01 – 100.0%	2	4
Total	**58**	**100**

5.2 Findings

A total of nine Aboriginal sites with artefactual evidence were located in the field area or along the 103.5 km of the pipeline route. These are predominantly low density artefact scatters (n=4), followed by isolated finds (n=3) and scarred trees (n=2), and (**Table 6**). A Bora ring (AHIMS #31-1-0006) is recorded adjacent to the pipeline route (**Figures 19.1** to **19.16** in **Volume 4** of the EA), and was reidentified during the Phase 2 of the field survey. In addition, a further 14 potential archaeological deposits (PADs) were also identified.

Table 6: New Site Types Identified within the Study Area

Site Type	Number	Percentage
Isolated Find	3	13
Artefact Scatter	4	17.4
Scarred Tree	2	8.7
PAD	14	60.9
Total	**23**	**100**

For ease of reference, the results are presented according to the relevant LALC boundaries. Detailed descriptions of all sites can be found in **Section 5.4** and **TableT2** at the end of this report. **Table 7** shows the number of transects conducted in each LALC area.

All sites identified in the survey were assigned a unique ID. Aboriginal sites were prefixed “LEA” and Historic sites were prefixed “LEH”. PADs were simply prefixed “PAD”.

Table 7: Transects Conducted in Each LALC Area

LALC	No. of Transects	Length of Transects (km)	Length of Pipeline (km)	Percentage (%)
Field Area				
Forster (GFDA)	12	16.77	-	-
Forster (CPF)	1	0.50	-	-
Sub-Total	**13**	**17.27**		
Pipeline				
Forster (Pipeline)	7	4.20	21	20.0
Karuah	24	14.74	46	32.0
Worimi	10	1.92	26	7.4
Mindaribba	4	5.69	10	56.9
Awabakal	0	0	0.5	0
Sub-Total	**45**	**26.42**	**103.5**	**25.5**
Total Transects	**58**	**43.69**	**103.5**	**42.2**

Results within Forster LALC Boundaries

The proposed development has two components within this LALC boundary:

- the field area, consisting of 147 grid squares (each measuring 600 x 600 m) between, and eastwards of, Gloucester and Stratford. The development proposal calls for a total of 110 gas wells to be developed in the field area. In total, the field area measures approximately 50.3 km^2; and
- a total of 21 km of the proposed pipeline (20.2% of the total), between Stratford in the north and Wards River in the south.

A total of 20 transects were conducted (**Table 7**), constituting some 4.2 km (20%) of the total linear length of the proposed pipeline within this LALC boundary, 16.77 km of transects within the field area and 15.5 ha for the proposed CPF location.

A total of five Aboriginal sites and five PADs were identified in this LALC area (**Table 8**). The Aboriginal sites consist of three isolated finds, a single low-density artefact scatter and a possible scarred tree (see **Sections 5.4** and **5.5** and **TableT2** for site descriptions).

Table 8: Sites Identified in Forster LALC Boundaries

Site ID	Site Type
LEA1	Scarred tree
LEA2	Isolated find
LEA3	Artefact scatter
LEA4	Isolated find
LEA5	Isolated find
PAD1	PAD
PAD2	PAD
PAD3	PAD
PAD4	PAD
PAD5	PAD

Results within Karuah LALC Boundaries

A total of 46 km of the proposed pipeline (44.4% of the total pipeline) occurs in this LALC area, from Wards River in the north to the Williams River at Clarence Town in the south. A total of 24 transects were conducted, constituting some 14.7 km (31.9%) of the total linear length of the proposed pipeline within this LALC boundary.

A total of two new Aboriginal sites and six PADs were identified in this LALC area (**Table 9**). These sites consist of a single isolated find and a single low-density artefact scatter. In addition one existing AHIMS-registered site, a Bora ring, was relocated on Black Camp Road (see **Sections 5.4** and **5.5** and **TableT2** for site descriptions).

Table 9: Sites Identified in Karuah LALC Boundaries

Site ID	Site Type
LEA6	Isolated Find
LEA7	Artefact Scatter
AHIMS #38-1-0006	Bora ground
PAD6	PAD
PAD7	PAD
PAD8	PAD
PAD9	PAD
PAD10	PAD
PAD11	PAD

Results within Worimi LALC Boundaries

A total of 26 km of pipeline (25.1% of the total length) passes through the Worimi LALC area, from the Williams River at Clarence Town in the north to the Williams River near Seaham in the south. A total of ten transects were conducted, constituting some 1.9 km (7.4%) of the total linear length of the proposed pipeline within this LALC boundary.

No Aboriginal sites were identified in this LALC area. However, two PADs were identified (**Table 10**). One PAD (PAD 13) is located where an outcrop of silcrete raw material is located on a slope overlooking the Williams River. Silcrete is a material favoured by Aboriginal people for the manufacture of stone tools.

Table 10: Sites Identified in Worimi LALC Boundaries

Site ID	Site Type
PAD12	PAD
PAD13	PAD: raw material outcrop

Results within Mindaribba LALC Boundaries

A total of 10km of pipeline (9.7% of the total length) passes through the Mindaribba LALC area, from the Williams River near Seaham in the north to the Hexham Bridge in the south. A total of 10 transects were conducted, constituting some 5.7 km (57%) of the total linear length of the proposed pipeline within this LALC boundary.

There were two new Aboriginal sites and one PAD identified within the corridor of the pipeline in this LALC boundary (**Table 11**). The two Aboriginal sites are both low-density artefact scatters located along the west bank of Deadmans Creek, approximately 130 m apart. It is considered that there is likely to be a sub-surface archaeological deposit associated with and between both these sites, although any deposit is also likely to be of low density.

Table 11: Sites Identified in Worimi LALC Boundaries

Site ID	Site Type
LEA8	Artefact scatter
LEA9	Artefact scatter
PAD14	PAD

Results within Awabakal LALC Boundaries

A total of 0.5 km of pipeline (0.5% of the total length)passes through the Awabakal LALC area at Hexam, at the pipeline's terminus immediately after crossing the Hunter River. Due to the very short stretch of pipeline within this LALC boundary, and the highly disturbed nature of the landscape, there were no transects conducted in this LALC area.

There were no Aboriginal sites or PADs identified in this area.

5.3 Summary

Of the total of 103.5 km[1] of proposed pipeline, a total of 26.4 km (25.5%) was surveyed to a width of 100 m along the corridor. In addition, a total of 17.2 km of transects were conducted within the field area, including the proposed CPF sites.

5.4 Identified Aboriginal Cultural Heritage Sites

The following section describes Aboriginal cultural heritage sites identified during the field survey. A total of nine new Aboriginal sites and 14 PADs were identified within the field area and along the proposed pipeline route.

Site LEA1 (MGA Coordinates: 0402611E 6452503N)

Site LEA1 is located on Mitchell's property on the western bank of the Avon River, approximately 400 m west of its confluence with Waukivory Creek (**Figures 19.1** to **19.16** in **Volume 4** of the EA). (Approximately 300 m north east of the Fairbairn Road bridge over the Avon.)

Site LEA1 is a dead eucalypt (species unknown) with a large scar on the western side (**Plate P4**). The scar is approximately 400 mm wide at its widest point, and tapers to a uniform point at the top and extends to a flat bottom, 400 mm from the ground. It is approximately 2.2 m long. The scar is in extremely poor condition with the surface completely decayed and the tree hollowed out within. The scar is not uniform in shape (ovoid at the top but straight horizontal at the base). Identification of this scar as an Aboriginal cultural site is not conclusive due to the poor condition of the scar, however based on the balance of probability the site is considered to be an Aboriginal site.

[1] At present there are two options for the location of the CPF being considered: one near Stratford on Tiedman's Block and one immediately south of the Gloucester Coal rail loop. The length of the pipeline quoted here includes the extended pipeline to the Tiedmans Block CPF option. Should the Gloucester Coal rail loop location be chosen, the pipeline length will be 95.2 km (8.1 km shorter).

Site LEA2 (MGA Coordinates: 0402011E 6449027N)

Site LEA2 is located on the eastern side of Dog Trap Creek on Tiedman's Block (owned by Lucas Energy), approximately 200 m south east of its confluence with the Avon River (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate P5**).

Site LEA2 is small artefact scatter consisting of two mudstone (grey) flakes (**Plate P6**) that lies approximately 10 m east of the creek bank in a small, dry tributary that comes off the eastern side of the creek and then turns south east. The site is located in a very short eroded section out of the tributary's northern bank.

Site LEA3 (MGA Coordinates: 0402096E 6449859N)

Site LEA3 is situated on the eastern side of the Avon River on Tiedman's Block (owned by AGL). The site is located approx 200 m NE of the ford over the Avon River (just north of its confluence with Dog Trap Creek). It lies within a small re-entrant in the low ridge that runs along the eastern bank of the Avon River at this point (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate P7**). The site is an isolated find consisting of a single, small, silcrete multi-platform, unifacial core measuring 24 mm long by 7 mm wide (**Plate P8**). The site is approximately 100 m east of the river bank. Other lithic material in the exposures consists mainly of ironstone gravel.

Within the re-entrant there is an extensive "L-shaped" contour bank that has been excavated around the eastern and northern sides. Running parallel to, and on the northern side of the contour bank, is an extensive exposure (~5 m wide by 30 m long) where the fill for the bank has been excavated. There is also a small exposure 2 m south and 4 m west of the NE corner of the bank. This is where the artefact is located. The total area of disturbance caused by these features is estimated to be 200 m^2. Vegetation cover is estimated at 60% in the exposures, 100% elsewhere. Stock tracks and cattle pads provide some ground surface visibility along the creek dams. No other artefacts were located in these areas despite thorough investigation.

Site LEA4 (MGA Coordinates: 0398996E 6442117N)

Site LEA4 is located on the southern side of Woods Road, Craven, at the front of Yates' property (1DP1003762). The single artefact is situated on the road verge next to the western-most fence post next to a timber stock gate at the front of the property (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate** P9). The site is an isolated find of a core, measuring 32 mm long by 23 mm wide by 10 mm thick (**Plate P10**). The platform shows a minor amount of cortex, there is a negative flake scar with two scar ridges, a bulb of percussion, and possible usewear on one of the lateral margins. The artefact is formed from a coarse-grained siliceous material that may be silcrete, although it is of a darker, greyish-red than the material seen elsewhere in the Gloucester region.

There is very little exposure here except around the fence posts. However, there is extensive ground surface exposure around the shed behind the gate and extending some 20-30 m southwards to where the property's driveway comes close to the eastern boundary fence. It is estimated that the total exposure in this area 50 m^2. Ground surface visibility is estimated to be about 60% in the exposure but 0% elsewhere due to thick pasture cover.

During a subsequent visit to this site two days after first recording, the artefact could not be found.

Site LEA5 (MGA Coordinates: 0398904E 6440693N)

Site LEA5 is located on the rising gentle slope approximately 200 m north of Coal Creek on Bosma's property (2DP1003762) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site is located on an exposure on the northern side of a large tree stump that has been left on a pedestal of eroded soil (**Plate P11**), 2 m west of the property's eastern boundary fence (adjacent to a large wooded block to the east) and 30 m south of an east-west fence and gate. The tree stump is sitting 0.5 m above current ground level, which shows the amount of sheet erosion that has occurred in this area.

The site is an isolated find consisting of a single single-platform, multi-facial core, measuring 34 mm long by 26 mm wide by 7 mm thick (**Plate P12**). There is a single negative flake scar and a possible bulb of percussion. Other scars do not show diagnostic features.

The site is located on a 4 x 3.5 m (14 m^2) exposure that has a total surface lithic density of approximately 5 lithics/m^2. Other nearby exposures have 20+ lithics/m^2. Ground surface visibility in the exposures is estimated to be about 80%, and only 10% elsewhere due to thick pasture ground cover.

Site LEA6 Isolated Find (MGA Coordinates: 0394945E 6410460N)

Site LEA6 is located on James and Hull's property, on the western side of Black Camp Road (122DP526671). It is situated on the northern side of a first-order drainage line that runs westwards about 100 m away into Black Camp Creek, and about 200 m north of the house (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate P13**). It lies on a large exposure formed by sheet erosion caused by vehicles, about 3 m from the eastern boundary fence, next to the road verge.

The site is an artefact scatter consisting of two stone artefacts: a thin mudstone core, measuring 44 mm long by 32 mm wide by 10 mm thick (**Plate P14**), and an indurated mudstone flake, measuring 24 mm long by 17 mm wide by 8 mm thick.

Both artefacts lie on an exposure measuring 10 x 2 m (20 m^2) and there is a fairly dense scatter of surface lithics (50-100/m^2) within the exposure, but no other artefacts were found. The artefacts lie about 15 m apart.

Site LEA7 Scarred Tree (MGA Coordinates: 0394770E 6410201N)

Site LE7 is located on Bottle Corner Gully, a second order creek that crosses Black Camp Road running east to west, and draining into Black Camp Creek (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It lies about 30 m west of the creek crossing and about 2 m from the northern creek bank. It is located on James and Hull's property (122DP526671).

The site is a scarred tree that *may* be of Aboriginal cultural origin (**Plate P15**). The scar is elliptical or diamond-shaped and non-uniform in shape, and measures 650 mm long by 280 mm wide by 70 mm deep, and the base 480 mm above the ground surface. The surface of the scar is fairly rough and is deteriorating; however it is till intact and there is what appears to be an axe cut near the apex. The scar is on the southern side of a large smooth-barked eucalypt.

The unusual shape of this scar lends some doubt as to its identification as an Aboriginal scarred tree. The shape of the scar could indicate impact damage rather than cultural scarring, and on the balance of probabilities, it is considered that the scar is not cultural in origin.

There are also a number of very new oblong bark removal scars up the bole of the tree that are flush with the bark surface. There is no edge build up/repair indicating very recent formation. The bole is densely marked with claw marks and several goannas were observed climbing trees in the area. It is possible that the newer scars were formed by these animals' activities.

Site LEA8 (MGA Coordinates: 0378005E 6384593N)

Site LEA8 is located on the western side of Deadmans Creek (approximately 1 km south east of the Brandy Hill Quarry complex on land owned by Hanson Quarries), off Clarence Town Road, approximately 140 m north of the road about 4 m back from the bank edge (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate P16**).

The site is small artefact scatter consisting of two stone artefacts (**Plate P17**): a white silcrete medial flake, measuring 36 mm long by 14 mm wide by 9 mm thick, and red silcrete flaked piece, measuring 12 mm long by 12 mm wide by 6 mm thick. The only diagnostic features on these objects are flake scar ridges, offering some doubt as to the identification of these objects as artefacts. Both artefacts lie on an exposure measuring 1 x 2 m (2 m2). No other lithic material was observed. The artefacts lie about 0.5 m apart. The site is considered to be part of a continuous subsurface deposit incorporating LEA9 (130 m south east).

Site LEA9 (MGA Coordinates: 0378093E 6384498N)

Site LEA9 is located on the western side of Deadmans Creek (approximately 1 km south east of the Brandy Hill Quarry complex on land owned by Hanson Quarries), off Clarence Town Road, about 10 m north of the road about 4 m back from the bank edge (**Figures 19.1** to **19.16** in **Volume 4** of the EA and **Plate P18**).

The site is a small artefact scatter consisting of two white silcrete broken flakes (**Plate P19**), measuring 13 x 21 x 6 mm and 18 x 15 x 3 mm respectively. The only diagnostic features on these objects are flake scar ridges, offering some doubt as to the indentification of these objects as artefacts. Both artefacts lie on an exposure measuring 6 x 4 m (24 m^2) about 4 m north of the roadside fence. Visibility within the exposure is about 70-80%. The artefacts lie about 0.2 m apart. The site is considered to be part of a continuous subsurface deposit incorporating LEA8 (130 m north west).

5.5 Identified Potential Archaeological Deposits

In addition to the identified Aboriginal cultural heritage sites listed above, a total of 14 potential archaeological deposits (PADs) were identified. PADs are areas that may have subsurface deposits identified primarily by the types of landforms that are considered most likely to contain subsurface artefacts rather than any surface indication of material evidence. The PADS are identified where the proposed route of the pipeline passes either along the banks of a watercourse, along lower foot slopes in close proximity to a watercourse, or on a low ridge or hill crest in close proximity to a watercourse (see original predictive model **Section 2.4.3** and ground-truthed site location model **Section 5.7.3**).

PAD 1 (MGA Coordinates: 0404041E 6450702N)

PAD 1 is located on Cole's property; northern side of Waukivory Creek, approx 150 m east of the house and sheds (**Figures 19.1** to **19.16** in **Volume 4** of the EA). This PAD is located on a small spur off the low ridge overlooking a billabong and creek flats, within 100 m of Waukivory Creek. The PAD is considered to by 30 m x 20 m. This site is within the general route of a proposed gas spine line.

PAD 2 (MGA Coordinates: between 0399018E 6439629N and 398768E 6439872N)

PAD 2 is located on the southern side of Spring Creek on Harris' property (417DP753173). The PAD is considered to be a 20 x 20 m area on the southern side of the creek on the low rise to the road (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

PAD 3 (MGA Coordinates: 0339052E 6439271N)

PAD 3 is located approximately 110 m SSW of the house on Burnet's property (2DP874695) on the southern side of Spring Creek (Berrico) Road (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site lies at the crest of a spur that leads down towards Spring Creek and is situated in a copse at the top of the hill.

The area covered by the PAD is estimated to be about 30 m north to south by 30 m east to west, centred over the position above. The ground surface visibility on this slope was 0% due to a very thick layer of pasture grass/fireweed. There were no exposures in this area.

PAD 4 (MGA Coordinates: between 0399575E 6436300N and 0398971E 6436391N)

PAD 4 is located on the southern side of Bull Creek on a small terrace above the creek channel (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It is considered to follow the creek channel to a width of 100 m wide to a depth of up to 50 m from the creek bank.

PAD 5 (MGA Coordinates: between 0399540E 6434799N and 0399371E 6434689N)

PAD 5 is located on a low rise on the northern side of Chainy Flat Creek on Chapman's property (6DP1107984). It follows a north westerly direction, and is considered to be 100 x 20 m (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

PAD 6 (MGA Coordinates: between 0397686E 6417213N and 0397206E 6417273N)

PAD 6 is situated on Osborn's property on Black Camp Road (9DP95639 and 681DP95674). It is located in the vicinity of site AHIMS #8-1-6 where Black Camp Creek Road heads south, then does a sharp right-angle turn to the west. It is considered to have two parts (**Figures 19.1** to **19.16** in **Volume 4** of the EA):

1. a 200 x 50 m section along the gentle foot slope where the road is oriented N-S; and
2. a 400 x 50 m section along the north side of the road where the road is oriented E-W, and includes a long narrow, shallow spur that runs NNE.

This PAD is associated with a registered Bora ceremony site (AHIMS 38-1-0006).

PAD 7 (MGA Coordinates: 0396931E 6417094N)

PAD 7 is situated on Osborn's property on Black Camp Road (676DP1114165) on a long, gentle NW facing spur (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The PAD straddles both sides of the road. It is estimated to be approximately 300 m long by about 30 m wide (9000 m^2). It is truncated by the road easement which has been heavily disturbed. It is recommended that the gas pipeline remains within the road easement.

PAD 8 (MGA Coordinates: between 0394950E 6410465N and 0394794E 6410318N)

PAD 8 is situated on James and Hull's property, on the western side of Black Camp Road (122DP526671) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It consists of a 180 x 40 m (7200 m^2) strip encompassing the east-west drainage line north of the house (see Site LEA6) from the boundary fence 60 m west to Black Camp Creek, thence south along the gentle slope fronting black Camp Creek to the vehicle ford 120 m south.

PAD 9 (MGA Coordinates: between 0394949E 6410417N and 0393137E 6409065N)

PAD 9 is located on a low spur on the south side of Cedar Tree Creek on the northern side of Black Camp Creek Road, on Muddle's property (14DP95008) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The PAD is considered to be approximately 150 m long by 40 m wide oriented to the spur.

PAD 10 (MGA Coordinates: between 0391213E 6407650N and 0391052E 6407688N)

PAD 10 is located on low north westerly spur on the southern side of Black Camp Creek on the western side of (Old) Black Camp Creek Road (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It is considered to cover an area of 150 x 80 m oriented with the spur.

PAD 11 (MGA Coordinates: between 0389067E 6395054N and 0389126E 6394908N)

PAD 11 is located on the eastern side of Boatfall Creek on a low ridge that follows the course of the creek. It is located on Allen's property (10DP1040379). It is considered to be at least 100 m long by 20 m wide, oriented along the ridge (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

PAD 12 (MGA Coordinates: between 0382530E 6389641N and 0382439E 6389658N)

PAD 12 is situated at the northern end of James' property (100DP1039833). The landform consists of a low E-W ridge along the northern property boundary (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It is considered to run the extent of the ridge before it rises sharply on to high hills to the east.

PAD 13 (MGA Coordinates: 0382073E 6388896N)

PAD 13 is located on O'Keefe's property (151DP1067987), off Holmwood Road (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It is located on the northern side of a west-facing spur line, approximately 30 m west of the eastern boundary fence in a relatively cleared corridor through the woodland. This location is a source of raw material (red silcrete) that is commonly used in the manufacture of stone tools. The area consists of a 5 x 5 m surface scatter of silcrete cobbles and at least one large rock that is mostly buried (**Plate P2**), indicating the material is *in situ* and suggests that a seam runs through this location. As such there is the potential that sub-surface indications exist of Aboriginal usage. Due to the cleared corridor, this area was considered by the proponent as an alternative route for the pipeline. However, the original alignment has been retained, thus avoiding this PAD.

PAD 14 (MGA Coordinates: between 0380274E 6386745N and 0380097E 6386726N)

PAD 14 is located on the southern side of Carmichaels Creek, which drains into the Williams River (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It consists of a very low ridge on the southern side of creek flats; the property is currently used as horse agistment. It is considered to be 100 x 10 m, oriented with the ridge.

5.6 Discussion

A total of nine previously unidentified Aboriginal sites and 14 PADs were identified within the field area and along the 103.5 km of the pipeline route covered by this report (**TableT2** and **TableT3**). The Aboriginal sites were predominantly open camp sites (n=7) with the remainder being possible scarred trees (n=2).

In order to discuss the distribution of sites found along the route, a number of analyses were undertaken to explore the factors affecting site location. Ground visibility, existing land-use impacts, taphonomic factors, stream order and distance to water were analysed in terms of site type and the size of artefact scatters. These analyses were based on the data derived from the site and sample area recordings (**Table T1**, **TableT2** and **TableT3**). The results of these analyses are summarised as follows:

- all the sites (n=9) were found relatively close to a reliable water source with more than half (n=5; 55%) associated with stream order ranking of 4 or higher (**Table 12**);
- four sites (44%) were located in the vicinity of an ephemeral water course (i.e. stream orders with a ranking of 3 or lower) (**Table 12**). By far the majority of sites and PADs are associated with higher order streams of 4 and above (**Table 13**);
- the majority of sites consisting of a single stone artefact (isolated finds) were associated with ephemeral, low order water courses. Most artefact scatter sites and both scarred trees were associated with higher stream orders of 4 and above (**Table 13**);
- of the "open sites" identified in the survey, a higher proportion were artefact scatters (n=4; 44%) compared to "isolated finds" (n=3; 33%) (**Table 13**). However, in all four cases the "artefact scatters" consisted only of a maximum of two artefacts, suggesting that artefact densities in the study area are generally low;
- in relation to distance from a water source, nearly three-quarters of the sites (n=7; 77%) were found within 50 m of a water source. The remainder (n=2; 22%) were found up to 200 m from the nearest water source (**Table 14**);
- scarred trees appear to be almost exclusively found within 10 m of a larger water source (**Table 13** and **Table 14**), although this is more likely be a result of extensive vegetation clearance rather than a predisposition by Aboriginal people to select trees close to water;

Table 12: Aboriginal Sites in Relation to Named Water Courses and Stream Order

Name of Water Course	Stream Order	No. of Sites*
N/A	N/A	1
Avon River	4+	2
Dog Trap Creek	4	1
Coal Creek	2	1
Black Camp Creek	4	1
Bottle Corner Gully	4	1
Deadmans Creek	3	2
Total		**9**

* does not include potential archaeological deposits

Table 13: Number of Aboriginal Sites Showing Stream Order and Site Type

Stream Order	Isolated Find	Artefact Scatter	Scarred Tree	PAD	Total
N/A				1	1
1	1				1
2	1			2	3
3		2		2	4
4	1	2	2	8	13
Billabong				1	1
Total	**4**	**4**	**2**	**14**	**23**

Table 14: Number of Aboriginal Site Types Identified at Increasing Distances to Water Sources

Distance to Water Source (m)	Isolated Find	Artefact Scatter	Scarred Tree	Total
0 – 10 m		3	2	5
11 - 20				0
21 - 30	1			1
31 - 40				0
41 - 50		1		1
51-100	1			1
101-200	1			1
Total	**3**	**4**	**2**	**9**

Table 15: Ground Visibility Ranking and Artefact Locations

Visibility	Isolated Find	Artefact Scatter	Total
< 0.01%	-	-	-
0.01 – 1.0%	-	-	-
1.01 – 10.0%	-	-	-
10.01 – 50.0	-	-	-
50.01 – 100.0%	2	5	7
Total	**2**	**5**	**7**

- all the stone artefact sites (n=7; 77%) were found in areas where visibility was good (> 50%). These sites were usually found in bare earth exposures amongst thick pasture. There were no sites found where visibility was less than 50% (**Table 15**);
- visibility throughout the study area caused a general limitation on the potential for site discovery. The sample area data, being based on a random selection of landscape contexts, provides the best indications for overall visibility along the route (**Table 4**). From this, it is clear that visibility along the route was generally very poor, with 96% of transects having less than 10% visibility;
- no part of the proposed route could be described as 'undisturbed.' Levels of disturbance along the route varied, but most sites were located in fairly lightly disturbed contexts, which were only associated with vegetation clearance and minor pastoral/agricultural infrastructure works.

In areas where the soil is bare but not heavily eroded, surface evidence (or lack thereof) can sometimes be an unreliable guide to subsurface archaeological content. The lack of surface lithic material evident in the many surface exposures of the study area does not necessarily mean that there are no sub-surface artefacts. The assessed potential for subsurface deposits in the landforms of each transect are provided in **Table T1** at the back of this report.

5.7 Aboriginal Site Potential in Unsurveyed Areas

As discussed in **Section 3.1** the field survey used a targeted sampling approach to identify Aboriginal sites within the pipeline corridor and field area, and areas where potential archaeological deposits may occur. This section provides a general Aboriginal site location model covering areas of the study area that were not surveyed. Although the survey identified a relatively low number of Aboriginal sites, some general predictions may be made on the results.

5.7.1 Unsurveyed Areas

A number of sections of the proposed pipeline easement could not be included in the heritage assessment either because landowners had not granted the proponent permission to gain access either generally or for the cultural heritage survey specifically. These were designated 'No-Go" areas.

Of the original areas targeted for survey, the following 'No-Go' areas were identified in the study area:

- creek lines in the lower foothills of the range east of Gloucester; several owners – no access granted; field area altered to avoid properties, therefore access deemed unwarranted;
- Glen Martin Road: Broadbent's properties – 21280 892DP262981 and 21290 893DP262981 – owner unavailable for contact; access deemed unwarranted due to visual inspection of the landforms; and
- East Seaham Road: Rushworth's property – 21580 185DP1114256 – no access granted; access deemed unwarranted due to visual inspection of the landforms.

5.7.2 Aboriginal Site Patterning

From the results in **Section 5.6** it can be seen that open sites are the main Aboriginal site type likely to be encountered in the study area. They appear to be found in two contexts:

1. in areas of greatest water reliability, particularly in association with higher order water courses (≥ stream order 4); and
2. on lower to mid foot slopes that overlook a water source, but are slightly elevated to avoid periodic flooding.

There were no open sites found on ridge tops during the survey; indicating that sites on ridge tops in the study area are rare. However, such sites are commonly found on this type of landform elsewhere, particularly where low ridges are in close proximity to reliable water, and the paucity of sites in the study area is probably due to poor ground surface visibility during the survey.

The second Aboriginal site type identified in the study area was scarred trees. Upper stratum vegetation has been largely cleared within the study area, leaving only remnant patches within the margins of watercourses, along some road margins or as isolated copses surrounded by cleared pasture. Therefore, the occurrence of scarred trees will only be associated with these areas. Additionally, much of the vegetation observed during the survey was regrowth; there were few mature trees observed that are old enough to carry cultural scars. It should also be noted that the two sites identified in the field survey –LEA1 and LEA6 – are only identified as "possible" scarred trees; the diagnostic features of each site were not sufficient to identify them definitively (Long 2005).

5.7.3 Aboriginal Site Predictions

The patterning of Aboriginal site locations allows the development of a general Aboriginal site location model covering areas of the study area that were not surveyed. While it is accepted that Aboriginal people lived in all areas of the environment and left evidence in all parts of the landscape, this discussion focuses on landscape areas where past repeated Aboriginal activity left the most obvious and enduring archaeological signature, suitable for interpretation and heritage management.

Open sites, comprising stone artefacts on the open ground, or as subsurface deposits, are likely to occur within 50 m of a high order creek or river, although they may be found up to 200 m from a water source. Open sites are less likely to be found adjacent to ephemeral low order streams. These sites are likely to occur on largely undisturbed ground that has not been disturbed by building, road or dam construction or landscaped areas.

Although, there were no ridge-top open sites found during the survey, it is likely that such sites will occur on low ridges, especially if such ridges are located within 100 m of a reliable water course.

It should be noted that the pipeline corridor traverses longitudinally (i.e. southerly) along the valleys of several major creeks and rivers (**Section 3.1.1**). There are many water courses that drain off the bordering hills and ranges and drain eastwards (or westwards) into the main streams, and are consequently crossed by the pipeline.

The 14 PADs identified during the survey were determined on the predictive model stated above and were located where the pipeline corridor is currently aligned. Although the alignment of the pipeline route has avoided the majority of the PADs identified in this survey, it is considered that five PADs will be impacted. It is considered that realignment of the pipeline will not avoid these PADs because Aboriginal open sites could occur along any part of the associated watercourses. Therefore, the heritage management commitments in **Section 10.0** have been based on that assumption.

With little evidence of stone artefacts located during the survey, and with few sites previously located and recorded, actual artefact densities within the study area cannot be made with any accuracy. All studies to date, including this study, indicate that artefact densities are likely to be very low (probably $<1/m^2$).

6.0 Historic Heritage Results

AECOM undertook a search of the NSW Heritage Branch (DoP) Heritage Database on 14 August 2008 for the Gloucester, Great Lakes, Dungog, Port Stephens, Maitland and Newcastle local government areas (LGAs). The search identified a total of 1,474 historic heritage sites listed within those LGAs (**Table 16**). The majority of listed items are located within the urban areas of towns in the region, e.g. Gloucester, Stroud, etc.

Table 16: Historic Heritage Items Listed in the LGAs traversed by the Study Area

LGA	No. of Historic Heritage Items Listed			
	SHR	s.170	LEP/Gaz	Total
Gloucester	1	1	64/11	77
Great Lakes	4	1	60/0	65
Dungog	19	0	0/138	157
Port Stephens	7	3	32/0	42
Maitland	35	24	234/1	294
Newcastle	37	100	703/0	840
Total	**103**	**129**	**1,243**	**1,475**

Only one item listed on a heritage instrument was identified within the pipeline corridor (i.e. within 100 m of the proposed gas pipeline route) or within the field area (**Table 17**). This item – the Vale of Gloucester – though listed, is a nomination for the RNE and is not formally registered.

Table 17: Items within the Study Area listed on Heritage Instruments

Item	Location	List
Vale of Gloucester	Approximately 25,000 ha, comprising generally the upper Avon River catchment south of Gloucester and part of the Gloucester River catchment between Faulkland and Gloucester.	RNE (Indicative Place)

6.1 Listed Historic Heritage Items in the Study Area

The following listed item is located in the study area:

Vale Gloucester

The Vale of Gloucester was nominated for listing on the RNE. The nominated area consists of approximately 25,000ha, comprising generally the upper Avon River catchment south of Gloucester and part of the Gloucester River catchment between Faulkland and Gloucester (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

The Vale includes the headwaters of the Avon River. The northern section of the Vale is overshadowed by the Bucketts Range to the west and the Mograni Range to the north-east. The ranges are predominantly granite and volcanic in origin, contrasting markedly with the shale derived low hills and undulating topography of the valley. The ranges are heavily timbered in contrast to the largely cleared grazing land of the valley floor. The vale in which the township of Gloucester is situated, is surrounded by heavily forested ranges which serve as a spectacular backdrop to the rural lands of the slopes and valley floor.

The Vale was nominated for listing on the RNE for the following reasons:

> *Scenic value: the town of Gloucester is surrounded by a series of low hill ranges which dominate the valley floor and provide a spectacular backdrop to the agricultural activity that takes place in the valley. Historical: the vale of Gloucester was discovered in 1826 by the chief agent of the Australian agricultural company, Mr Robert Dawson. During development of the vale for sheep raising and later for cattle, the homestead was built.*

The assessment panel recommended the item be included, but the Commission deferred it. Its current status is 'Indicative Place,' meaning that it is not yet registered but is currently undergoing assessment.

6.2 Historic Sites Identified in the Field Survey

A total of 11 historic places, which are not currently listed on a heritage instrument, were identified and recorded during the field survey. Furthermore, all are built-structures, compared to the heritage-listed site – the Vale of Gloucester (**Section 6.1**) – which is a cultural landscape.

The heritage survey was undertaken at the same time as the Aboriginal survey. The survey was designed to incorporate the locations of known historical places. Historic sites frequently occur in similar areas to Aboriginal sites as both are looking for similar characteristics – flat land on which to camp/build and ready access to water.

NB. Although all places identified in the field survey are listed here, the significance assessment (**Section 7.3**) shows that not all items are considered to be 'heritage' items. This section provides a brief description of each place.

Site LEH1 Cobb and Co Hut (MGA Coordinates: 0398142E 6429351N)

This site is located at the old 'Weismantles Inn' at the Monkerai Road turnoff from the Bucketts Way, to the north of Maddens property, at 1655 The Bucketts Way, Weismantels. It is situated on the eastern side of Buckets Way, approximately 150 m off the side of the road and approximately 180 east of the pipeline route (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

Since this item is not in the path of the proposed pipeline, it was not inspected.

Site LEH2 European Scarred Tree (MGA Coordinates: 0397480E 6427560N)

This site is located on Wielgosinkski's property, Buckett's Way, near Stroud Road (31DP828026). It is situated on the eastern side of Bucketts Way, approx 100 m south of Groom Creek (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

The site consists of a single box-type eucalypt tree that was said to have been emblazoned with the initials of Fred Ward (aka Captain Thunderbolt) (**Plate P20**). Although the tree was not seen close up, discussions with the owner indicate that the story is an urban myth and the tree is, in fact, relatively recent regrowth. The size of the bole tends to support that theory.

Another local tale is that Groom Creek is so-named because it is where Thunderbolt is said to have groomed his horse. There is no corroborating evidence for this.

Site LEH3 Hut and Stockyards (MGA Coordinates: 0396564E 6416168N)

This site is located on Gorton's property, off the western side of Black Camp Road, west of Stroud (3DP744888). It is situated about 20 m from the road edge (**Figures 19.1** to **19.16** in **Volume 4** of the EA).

The hut is an end-gabled, rectangular timber hut (**Plate P21**). The walls are framed with round-log corner posts with top and bottom beams. They are clad with vertical timber slabs (most are missing off the front and side walls, but mostly intact on the rear wall). The roof is clad with corrugated iron and the gables are also clad with several small sheets of corrugated iron. The roof appears to be newer than the rest of the hut since it is framed with sawn timber joists and rafters. There is a single door and window at the front. There is no glass in the window but there is a leaf hinge attached to the frame indicating a timber shutter. There are also the remains of a very small galvanised-iron water tank and stand at the southern end.

About 20 m south of the hut is an old stockyard with newer extensions that may still be in use. Several sections of old timber fence lie around the hut consisting of timber posts with rebates for two rails. A small refuse scatter is located about 5 m south of the hut.

Site LEH4 Stockyard (MGA Coordinates: 0395584E 6411836N)

This site is located on Fearon and Nosworthy's property on Black Camp Road (103DP570275) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). It is a small stockyard measuring about 20 x 10 m with a stock ramp and chute at the southern end (**Plate P22**). It appears to have had three pens, but many of the fences have fallen down leaving gaps in the structure. It is constructed of 1.5 m high round-log posts (at ~3 m centres) with three split-log rails and a top-rail. All rails are wired to the posts. The stock ramp has a base of coarse rock that was probably covered in loose gravel that has since been washed away. The rock fill is between vertical round log sides.

Site LEH5 Brick Pile (MGA Coordinates: 0395201E 6411570N)

This site is on Farrell's property on the eastern side of Black Camp Road (35DP95407). It lies just north of the confluence of the road and the transmission line easement (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of a small pile of red-orange bricks and rocks (**Plate P23**). The bricks have a "V" notch on one surface and the remains of mortar is still attached. The bricks are stacked in a neat pile indicating that they are not in situ, but probably come from a former house/hut site nearby (location unknown).

Site LEH6 Hut (MGA Coordinates: 0394663E 6410184N)

This site is located on James and Hull's property, on the western side of Black Camp Road (122DP526671) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). This site consists of a hut that has been added to over many years (**Plate P24**). It is clad in various states of corrugated iron (walls and roof), has a skillion-form roof, and measures approximately 20 x 4 m. It has a small 'settler's hut' type chimney and a small water tank and stand at the SE end. It appears to have been added-to and now has what appears to be a vehicle bay at the NW end. The hut appears to be serviceable but is showing signs of marked deterioration. The roof cladding at the SE end is held down by the weight of several sawn timber beams lying on top. Several rusting farm implements lie along the rear wall.

Site LEH7 Stockyard (MGA Coordinates: 0394609E 6410020)

This site is located on James and Hull's property, on the western side of Black Camp Road (122DP526671) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of a stockyard that was originally constructed of round log posts with round log rails wired to the posts (**Plate P25**). Several sections appear to have been either repaired or extended using round log posts with sawn timber rails (also attached by wire). The interior of the yards have been reinforced by wire mesh; the yard appears to be in useable condition though modifications mean that it has only moderate integrity.

Site LEH8 Bridge (MGA Coordinates: 0393225E 6409125N)

This site is located on Black Camp Road on the Cedar Tree Creek crossing, adjacent to Muddle's property and 20 m SE of "Margaret's Folly" (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of a small vehicular bridge measuring 10 x 3.5 m, consisting of several longitudinal log spans side by side and covered in coarse rubble (**Plate P26**). There are two large mature eucalypt trees at each corner of the SW end. The base of the northernmost tree has grown over one of the side longitudinal spans suggesting the bridge has been in existence for many years. The bridge is similar to many existing farm-track bridges still evident in the Gloucester region.

Site LEH9 Bridge (MGA Coordinates: 0391638E 6408132N)

This site is located on the old section of Black Camp Road, on the road easement adjacent to Muddle's property (33DP95007) (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of a small vehicular bridge measuring 10 x 2.5 m, consisting of several longitudinal log spans side by side and covered in coarse rubble (**Plate P27**). The central log spans have collapsed making the bridge impassable. The bridge is similar to many existing farm-track bridges still evident in the Gloucester region, and is of the same construction style as site LEH8.

Site LEH10 Mound (MGA Coordinates: 0376589E 6371963N)

This site is located at Woodberry, Greenways Creek, approx 150 SE of the Hunter Water pipeline crossing over Greenways Creek (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of 3 x 3 m earth mound that appears to be the foundations of a former structure that has since been demolished (**Plate P28**). The mound has battered sides and rises 0.5 m above the surrounding flats. This site is possibly the foundations of a former pump house. No structural remains extant. The site is considered to have low heritage significance.

Site LEH11 Bridge (MGA Coordinates: 0376590E 6371984N)

This site is located at Woodberry, Greenways Creek, approx 150 SE of the Hunter Water pipeline crossing over Greenways Creek (**Figures 19.1** to **19.16** in **Volume 4** of the EA). The site consists of an old timber bridge over Greenways Creek, measuring 8 x 2 m (**Plate P29**). The bridge is constructed of timber sleepers over round-log longitudinal bearers (x5). The sleepers are fastened to the bearers by large-diameter iron spikes. Some sleepers are missing and most of those remaining are decayed to various degrees.

6.3 Discussion

As stated previously, the inclusion of these items does not imply that they are considered to be 'heritage' items, which implies a level of significance. Rather they are a list of items that were considered to be historic features in the landscape worthy of assessment of heritage significance. The heritage significance assessment (see **Section 7.3**) identified one item that is considered to have local heritage significance, and three items that were considered to have potential significance but further research is required.

7.0 Cultural Heritage Significance

This section provides an assessment of the Aboriginal heritage significance of the study area within a local, regional and national framework. This section can be divided into two distinct parts, a scientific assessment and an Aboriginal cultural assessment of social value. The former is undertaken by the archaeologist and investigates the scientific importance of the sites identified, while the latter is provided by discussions and input from the relevant Aboriginal stakeholders.

7.1 Principles of Assessment

Heritage sites, objects and places hold value for communities in many different ways. The nature of those heritage values is an important consideration when deciding how to manage a heritage site, object or place and balance competing land-use options. The many heritage values are summed up in an assessment of "Cultural Significance".

The primary guide to management of heritage places is the Australia ICOMOS Charter for Places of Cultural Significance (The Burra Charter) 1999. The Burra Charter defines cultural significance as follows:

> *Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations.*
>
> *Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.*
>
> *Places may have a range of values for different individuals or groups.*

This assessment has sought to identify heritage objects and sites within the study area and obtain enough information to allow the values of those objects and sites to be determined.

This significance assessment will be limited to an assessment of Aboriginal heritage significance only.

7.2 Aboriginal Cultural Heritage

The criteria for the assessment of the 'heritage significance' of Aboriginal sites are the site's scientific, educational significance and social/cultural value.

7.2.1 Scientific Value

Scientific value is assessed according to the research potential of a site. Rarity and representativeness are also related concepts taken into account. Research potential or demonstrated research importance is considered according to the contribution that a heritage site can make to present understanding of human society and the human past. Heritage sites, objects or places of high scientific significance are those that provide an uncommon opportunity to inform us about the specific age of people in an area, or provide a rare glimpse of artistic endeavour or provide a rare chronological record of changing life through deep archaeological stratigraphy.

The comparative rarity of a site is a consideration in assessing scientific significance. A certain site type may be "one of a kind" in one region, but very common in another. Artefacts of a particular type may be common in one region, but outside the known distribution in another.

The integrity of a site is also a consideration in determining scientific significance. While disturbance of a topsoil deposit with artefacts does not entirely diminish research value, it may limit the types of questions that may be addressed. A heavily cultivated paddock may be unsuited to addressing research questions of small-scale site structure, but it may still be suitable for answering more general questions of implement distribution in a region and raw material logistics.

The capacity of a site to address research questions is predicated on a definition of what the key research issues are for a region. In the region the key research issues revolve around the chronology of Aboriginal occupation and variability in stone artefact manufacturing technology. Sites with certain backed implements from the Holocene are very common, but sites with definite Pleistocene evidence are extremely rare, and hence of extremely high significance if found.

Sandra Bowdler and Anne Bickford suggest that the value of a place/object can be judged by answering the following questions:

> Can the site contribute knowledge which no other resource can?
>
> Is the knowledge relevant to general questions about human history or other substantive subjects?

To adequately assess significance, evidence is required which includes information about the presence of subsurface deposits, integrity of these deposits, nature of site contents and extent of the site. A review of information about previously recorded sites within the local area and region enables the rarity and representativeness of a site to be assessed (**Section 2.4**).

High significance is usually attributed to sites that are so rare or unique that the loss of the site would affect our ability to understand aspects of past Aboriginal use/occupation for an area. In some cases a site may be considered highly significant because its type is now rare due to destruction of the archaeological record through development. Moderate significance can be attributed to sites which provide information on an established research question. Low significance is attributed to sites which cannot contribute information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents.

7.2.2 Educational Value

The educational value of a site or a suite of sites is their potential to be used by members of the wider community for on-site lectures, tour and displays.

7.2.3 Cultural (Social) Value

Aspects of social significance are applicable to sites, objects and landscapes that are important to the local Aboriginal community. The importance involves both traditional links with specific areas as well as an overall concern by Aboriginal people for sites generally and their continued protection.

Aboriginal sites with archaeological evidence are all of value to the Aboriginal community because they represent a tangible connection with pre-European Aboriginal life. For this reason, we often report what we perceive to be the social value of a site to the Aboriginal community based on their comments and advice.

In acknowledgement that the Aboriginal community themselves are in the best position to identify levels of cultural significance a copy of this draft report was distributed to the Aboriginal stakeholders involved in the project and their comments on values, both social and cultural, were incorporated into the assessment prior to its finalisation.

Local Aboriginal community groups were consulted regarding the methodology used in this assessment and, where possible, involved in the field survey. Prior to the field survey, all registered Aboriginal stakeholders were requested to provide information on the cultural heritage values of the study area. There was very little response to that request, with the exception of ATOAC, who expressed reluctance to share their cultural heritage with others "in respect to aspects of the cultural significance that connects them to their country (ATOAC, letter dated 6 April 2009, **Appendix B**). However this is at odds with a later statement made (ATOAC, letter dated 31 August 2009, **Appendix B**) which stated that only traditional owners have the right to comment on cultural values (spirituality) of any particular location or site. ATOAC are, in effect, say that only they can comment on the cultural (social) values of the study area, but they are not going to.

Therefore it is difficult to draw any conclusions regarding those values.

7.2.4 Assessment

Table 18 below gives the significance assessment of the Aboriginal sites identified during the heritage investigations.

Table 18: Significance Assessment of Aboriginal Sites Identified During the Field Survey

Site ID	Site Type	Scientific Assessment	Educational Assessment	Social/Cultural Assessment	Significance
LEA1	Scarred Tree	The poor condition of the tree provides some doubt as to whether the scar is culturally formed: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA2	Artefact Scatter	Two stone artefacts of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA3	Isolated Find	Single stone artefact of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA4	Isolated Find	Single stone artefact that exhibited very few diagnostic features: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA5	Isolated Find	Single stone artefact of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA6	Artefact Scatter	Two stone artefacts of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*

Site ID	Site Type	Scientific Assessment	Educational Assessment	Social/Cultural Assessment	Significance
LEA7	Scarred Tree	The shape of the scar on this tree is unusual and makes identification as a cultural scar doubtful: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA8	Artefact Scatter	Two stone artefacts of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*
LEA9	Artefact Scatter	Two stone artefacts of similar style to artefacts found elsewhere: *Low*	Of limited educational value: *Low*	Not given	*Low*
AHIMS #38-1-0006	Bora ground	Re-identified during survey, and is probably of *high* scientific value.	Unsuitable for educational use: *Low*	Not given	*High*

Scientific Significance Assessment

The sites found during the heritage assessment of the Coal Seam Gas Project were either single stone artefacts, very low density stone artefact scatters, or scarred trees that were either too damaged or of such unusual shape as to render their identification as cultural scars doubtful.

These sites offer little potential for advancing scientific knowledge of the Aboriginal occupation of the study area. On that basis the sites found in the study area are considered to offer no scientific value. The Bora Ground is considered to be of high scientific value.

Educational Significance Assessment

The isolated nature of these sites, together with their lack of scientific value, is considered to render very little value in providing an educational source for the wider community. On that basis the sites found in the study area are considered to have little educational value, with the exception of the bora ground on Black Camp Road.

Social/Cultural Significance Assessment

During the initial consultation process there were no views expressed by the Aboriginal community on the cultural value of the study area. A copy of the draft of this report was circulated to registered Aboriginal stakeholders after the Phase 1 fieldwork to seek their input. Comments from that draft were incorporated into this report, although no site-specific comments were received.

Following completion of Phase 2 fieldwork, as a result of amendments to the pipeline route and additions to the field area, a revised copy of this draft report was circulated to registered Aboriginal stakeholders for comment.

All comments from the Aboriginal community were included in the text of the final report where appropriate and written comments were attached in **Appendix B**.

7.2.5 Overall Aboriginal Heritage Significance

This section presents the overall Aboriginal heritage significance of the study area. This significance assessment can be considered a combination of the scientific, educational and cultural values, or an overview of the importance of a particular area through Aboriginal heritage sites and places. The subsequent retention or manipulation of these values will be the rationale behind the management strategy presented in **Section 9.2.**

Subject to feedback from the relevant Aboriginal communities regarding the cultural value of these sites, the overall heritage significance of these sites is considered to be low.

7.3 Historic Heritage

An assessment of significance for historic items is undertaken to explain why a particular site is important and to enable the appropriate site management strategies to be determined. Cultural significance is defined in the *Australian ICOMOS Charter for the Conservation of Places of Cultural Significance* (the *Burra Charter*) as 'aesthetic, historic, scientific or social value for past, present or future generations' (Article 1.1). Cultural significance may be derived from the fabric of a place, association with a place, or the research potential of a place. The significance of a place is not fixed for all time, and what is of significance to us now may change as similar items are located, more historical research is undertaken and community tastes change.

The process of linking this assessment with a site's historical context has been developed through the Department of Planning (DoP) and the NSW Heritage Management System and is outlined in the Heritage Assessment Guidelines of the *NSW Heritage Manual*. The Heritage Assessment Guidelines establish seven evaluation criteria, reflecting significance categories and representativeness, by which a place can be evaluated in the context of State or local historical themes.

7.3.1 Assessment Criteria

The heritage significance criteria are:

Criterion (a) – an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (b) – an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

Criterion (d) – an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.

Criterion (e) – an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (f) – an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (g) – an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments.

Different components of a place may make a different relative contribution to its heritage value. Loss of integrity or poor condition may diminish significance. In some cases it may be useful to specify the relative contribution of an item's elements. While it is useful to refer to Table 19 when assessing this aspect of significance, it may need to be modified to suit its application to each specific item.

Table 19: Grades Used to Determine Heritage Value

Grading	Justification	Status
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness. Item can be interpreted relatively easily.	Fulfils criteria for local or State listing
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfils criteria for local or State listing.
Moderate	Altered or modified elements. Elements with little heritage value but which contribute to the overall significance of the item.	Fulfils criteria for local or State listing.
Little	Alterations detract from significance. Difficult to interpret.	Does not fulfil criteria for local or State listing.
Intrusive	Damaging to the item's heritage significance.	Does not fulfil criteria for local or State listing.

Following Kerr (2000) the cultural significance of a precinct or element within a precinct can be expressed in three broad ways (these encompass the significance criteria above) through:

- the ability to demonstrate an aspect of the precinct's significance. For example the fabric on the site could demonstrate how a site was used;
- the association of the precinct with an important event or a particular person. The association may not require physical evidence of the event; and
- the ability of archaeological remains in a precinct to answer relevant research questions.

These three ways of expressing significance apply as much to archaeological remains as they do to the built environment or the landscape. It is conceivable that archaeological remains may not have any research potential but have strong historical associations or a high ability to demonstrate an aspect of history.

The relationship between an item and its historical context underlies this assessment process. Historical themes provide a context within which the heritage assessment criteria are applied, especially if historical values are critical to an understanding of an item's heritage significance.

7.3.2 Significance Assessment of Unlisted Historic Items

This section assesses the significance of the buildings and structures identified in the fieldwork. It assesses them as a group as they share many common elements. The evaluation criteria outlined in the NSW Heritage Branch guideline *Assessing Heritage Significance* have been used to undertake the assessment of the following heritage items. **Table 20** provides a succinct assessment of each item's significance and **Figures 19.1** to **19.16** in **Volume 4** of the EA details each site plotted within the study area boundary and its level of significance.

Table 20: Significance Assessment of Unlisted Non-Indigenous Places Identified in the Field Survey

Site ID	Name	Significance Criteria	Significance Assessment	Significance
LEH1	Cobb and Co Hut	-	Further research and inspection required.	*Deferred assessment*
LEH2	Unnamed Tree	-	Further evidence required.	*Deferred assessment*
LEH3	Hut and Stockyard	g	An interesting pastoral hut dating from the late 19th century, that retains many relics of former pastoral life.	*Local*
LEH4	Stockyard	-	This stockyard is similar to any one of hundreds of similar items still extant.	*None*
LEH5	Brick Pile	-	This site does not display any evidence of historic heritage value.	*None*
LEH6	Hut	-	An interesting hut that exhibits some features of early construction but is largely obscured by subsequent additions. Further research required.	*Deferred assessment*
LEH7	Stockyard	-	This stockyard is similar to any one of hundreds of similar items still extant.	*None*
LEH8	Bridge	-	The bridge is similar to many existing farm-track bridges still evident in the Gloucester region.	*None*
LEH9	Bridge	-	The bridge is similar to many existing farm-track bridges still evident in the Gloucester region.	*None*
LEH10	Mound	-	This site is not considered to have any heritage value.	*None*
LEH11	Bridge	-	This site is not considered to have any heritage value.	*None*

To summarise:

- One item – Vale of Gloucester – is already listed on a heritage instrument and was not reassessed here.
- One unlisted place located during the survey – LEH3 – was assessed as having local heritage significance.
- Three unlisted places – LEH1, LEH2 and LEH6 – appear to exhibit features that may have local heritage value, but further research is required. Assessment was deferred pending further research.
- The remaining seven places identified during the survey are considered to have no heritage value.

8.0 Impact Assessment

This section provides an assessment of the impacts of the development on the cultural heritage values of the study area.

8.1 Project Construction Details

The project involves the reconstruction of:

- the installation of 110 wells in Stage 1 GDFA (the field area);
- the installation of approximately 38.1 km of gathering lines and 28.9 km of spine lines, totalling 67 km. Access tracks will also be constructed within the field area, but the footprint of this area was not available at the time of writing. For the purposes of this impact assessment the total length of access tracks is assumed to be 10 km;
- the construction of a central processing facility (CPF) within the field area. Two options are currently being considered for the location of the CPF:
  - "Facility 1" on Tiedman's Block, south of Gloucester; or
  - "Facility 7" immediately south of the Gloucester Coal Mine rail loop; and
- the installation of buried gas pipeline from the field area to the terminus at Hexham. The length of the pipeline will depend on the final location of the CPF:
  - the pipeline length if CPF "Facility 1" on Tiedman's Block is selected is approximately 103.5 km; or
  - the pipeline length if CPF "Facility 7" is selected is approximately 95.2 km.

The study area consists of a total area of 59.9 km^2 consisting of:

- approximately 50.33 km^2 (5033 ha) for the field area; and
- approximately 9.52 km^2 (952 ha) for the gas pipeline survey area.

The following subsections describe the specific construction detail.

8.1.1 The Field Area

The field area will be impacted by the construction of approximately 110 wells spaced at approximately 600 m intervals. The wells will have an initial impact area of 90 x 90 m (0.81 ha) during drilling (the hardstand for each well will be reduced to 15 x 15 m (0.0225 ha) during production, with the remaining land restored). A series of underground gathering lines and spine lines will be constructed to convey the gas from the well heads to the CPF.

The CPF will cover an area of approximately 7.18 ha for CPF "Facility 1" or 6.4 ha for CPF "Facility 7".

8.1.2 Gas Pipeline

The methane gas pipeline between the CPF at Stratford and the delivery point at Hexham will be approximately 103.5 km if "Facility 1" is chosen for the CPF or 95.2 km long if "Facility 7" is chosen for the CPF. Construction of the pipeline will consist of clearing and grading a temporary construction corridor up to 30 m wide along the entire route. This will involve vegetation clearance and impact to topsoil within this corridor. The survey sampled a corridor up to 100 m wide to allow for minor alterations to the intended route.

It is intended that, where possible, existing infrastructure corridors/easements such as transmission line easements or Telstra telephone cable corridors, will be used to site the pipeline. Many of these areas have already received a high level of disturbance, particularly those where cable burial has occurred.

Trenching

The gas pipeline will involve removal of topsoil along the route, which will be stockpiled for later site remediation. A trench (approximately 0.6 m wide by 1.2 m deep) will be excavated to lay the pipe. The trench will then be backfilled and the topsoil replaced. Access and maintenance tracks will also be established where required.

Major roads and railways will be bored to minimise construction impact.

River and Creek Crossings

Two methods are proposed for laying the pipe across rivers and creeks:

- major water courses, such as the Avon, Karuah, Williams and Hunter Rivers, as well as some high order creeks, will be installed by drilling a parabolic bore beneath the river channel. This method of crossing will have the least impact (in terms of archaeological sites) as the entry/exit point will be located some distance back from the banks; the distance will depend on the depth/distance of bore-hole required; and
- minor water courses, ephemeral streams and tributaries will be crossed by open cut trenching; the depth and width of the cutting will depend on the geology and hydrology of the particular creek. This method is likely to have the greatest impact on potential archaeological sites.

Restoration

At the completion of the installation process, the corridor will be restored as near as practicable to its original condition. Remedial works include backfilling using excavated material and replacement of topsoil.

8.2 Impacted Area

Table 21 below presents the area of the study area that will be impacted by the development. The table provides a calculation of impact for both CPF site options.

It is likely that approximately 7.2% to 7.5% of the study area will be directly affected by ground-breaking activities during the project (4.3 or 4.5 km^2 of an estimated 59.9 km^2 study area).

Table 21: Area Impacted by the Project (both CPF Options)

	CPF "Facility 1"	CPF "Facility 7"
Area of main pipeline impact	3.1 km^2 (103.5km long by 30 m wide)	2.9 km^2 (95.2 km long by 30 m wide)
Area of the CPF	0.064 km^2	0.072 km^2
Area of 110 well heads (90 x 90 m)	0.891 km^2	0.891 km^2
Area of gathering lines within Field Area	0.381 km^2 (38.1 km long by 10 m wide)	0.381 km^2 (38.1 km long by 10 m wide)
Area of access tracks within Field Area	0.025 km^2	0.025 km^2
Percentage of study area impacted by groundbreaking activity	6.62%	6.30%
Total area impacted	**4.461 km^2**	**4.269 km^2**

8.3 Discussion

Throughout the survey, archaeological sites and potential archaeological deposits were identified and their positions relative to the intended route of the pipeline recorded. On this basis, the nature of impacts of the proposed development on heritage sites has been assessed. Sample areas included a 100 m wide corridor to allow for flexibility in the placement of the final pipeline route, and to ensure that alignment changes and construction activity to could be managed to minimise inadvertent damage to heritage sites.

All identified sites within the KLALC, MLALC and WLALC boundaries were visited with members of the local Aboriginal community (see **Section 4.0**). During the Phase 1 fieldwork and first draft report period, a number of minor realignment recommendations were made to the proposed pipeline route, to avoid impact to identified sites. Management outcomes (**Section 10.0**) were made in consultation with representatives of these groups. Due to timing, MLALC did not participate in Phase 1 of the fieldwork, but a large area of their area (south of the Hunter River) was inspected by another member of the local Aboriginal community (ADTOAC). However MLALC representatives participated in the fieldwork under Phase 2. FLALC did not participate in either stage of the field work. Several attempts to contact FLALC by email, mail and telephone received no response (see **Section 4.0**). Consequently, the management recommendations for sites and PADs within the boundaries of those two groups are yet to be discussed and confirmed.

TableT2, **TableT3** and **Table T4** at the back of this report list all heritage sites, both Aboriginal, historic and PADs. The sites were recorded in relation to the proposed route at the time of the survey. A series of mitigation recommendations were provided to the proponent and these have subsequently been incorporated into the design of the pipeline.

Potential impacts to the sites identified are graphically represented in **Figures 19.1** to **19.16** in **Volume 4** of the EA. The locations of known Aboriginal sites, together with potential sites, are overlain on an aerial photo with the pipeline route shown. The figure provides a useful guide to where development activities, and the position of the easement, may impact on observed Aboriginal or historic heritage sites.

The results section shows that there are seven existing Aboriginal sites occurring in close proximity to the study area:

8.3.1 Scarred Trees

Two possible scarred trees are located in the study area. One (LEA1) is situated in the field area within 2 m of the Avon River. It is understood that no construction activity, particularly well heads, will be conducted so close to the river or major creeks (T. Laurie, pers. comm.) and therefore it is considered that there will be no impacts to this site.

The other scarred tree (LEA7) is located in close proximity (30-45 m) to the proposed pipeline route, on its northern side. Amendments were recommended to keep the proposed route in the road easement and avoid crossing the creek on private property. Trees in the road easement were checked for evidence of cultural scarring; none was evident. This recommendation was incorporated into the final route of the pipeline, and it is therefore considered that no impacts to this site will occur.

The threats to scarred trees (in general) lie in the need for the easement to be largely cleared to provide clear access to the pipeline. However, the majority of the pipeline route passes through pasturelands that have been largely cleared of mature vegetation capable of bearing cultural scars. For the majority of the study area, upper stratum vegetation only occur along the banks of water courses, some of which will require clearing to allow construction of the pipe trench. All prominent water sources were inspected during the survey; no evidence of cultural scarring was found. On that basis AECOM considers that the project will have no detrimental affect on these sites.

8.3.2 Open Sites

Sites with stone artefacts, either as isolated finds or artefact scatters, were the most frequently occurring site types, although very few were located during the survey. In addition to very few surface artefacts being located, the majority of sample areas exhibited very low numbers of surface stone material in general.

As discussed in **Section 5.0**, the archaeological assessment suggests that stone artefacts are very infrequent within the study area and, at best, occur at a very low density in the subsoil. With such a low relative footprint, the excavations associated with construction of the proposed infrastructure are not considered likely to constitute disturbance that diminishes the scientific value of Aboriginal heritage.

The development will retain large undeveloped areas (92.5% of the study area) that will preserve any subsurface Aboriginal heritage intact. The balance of any possible affect on subsurface Aboriginal heritage values is considered to be readily mitigated by the retention of the majority of the study area as undeveloped land.

There is potential impact to subsurface Aboriginal artefacts in the areas identified by surface artefacts at LEA8 and LEA9, as well as five identified PADs. Low density artefact scatters at LEA2, LEA3, LEA5 and LEA6 may also be indicative of subsurface deposits but these sites are unlikely to be impacted by the proposal. The area surrounding the stone artefact at LEH4 has been heavily disturbed by roadworks, fence and building development. The potential for disturbance to *in situ* archaeological deposits is considered to be low.

Of the existing AHIMS-registered sites, three open sites occur within the study area. AHIMS #38-1-0008 is located in the southeast corner of the field area adjacent to the eastern boundary and is not expected to be impacted by the proposal. AHIMS #38-1-0031 occurs in the field area on land occupied by Stratford Coal and is not expected to be impacted by this project.

Of the existing AHIMS sites, there is potential for impact to one site – AHIMS #38-4-0010. This site consists of an isolated stone artefact but, more importantly, is said to be the site of a massacre. The site is located off the western side of the road easement along the banks of Little Black Camp Creek. A recommendation that the pipeline remain within the disturbed road easement to avoid any impacts in this area has been incorporated into the final alignment.

There is also potential for impact to three known Aboriginal sites (not registered on AHIMS) on Tiedman's Block in the field area. These sites, recorded by FLALC as part of the Stratford Pilot Project (FLALC 2007), consist of three stone artefacts, one at each of three separate locations. The FLALC report does not provide a specific location for any of the sites they found; however, it appears that the sites were found in the vicinity of Dog Trap Creek, probably on the property known as Tiedman's block, where gas wells have already been established under the pilot project. It is recommended that, should the final site of the CPF occur on Tiedman's Block, then salvage of these artefacts be conducted under the provisions of an AHMP in consultation with FLALC.

As can be seen in **Section 5.6**, areas within 50 m of a major watercourse (stream order 4 and above) present the most likely areas of encountering Aboriginal artefacts in the study area. However, the surface indications found during this study indicate that artefact densities are likely to be very low.

Other Stone-based Sites

There were no other stone-based sites (e.g. engravings, grinding groves or rock shelters) identified in the study area. Since the survey took a targeted approach, it is possible that such sites do exist in the study area, particularly in the areas north of and including Black Camp Road. There were very few outcrops of suitable sedimentary rock material evident in any of the survey sample areas. On that basis it is considered that the potential for impacts to these types of sites is low.

The hills to the north west of Seaham has large deposits of silcrete raw material, a material favoured by Aboriginal people for the production of stone tools. Silcrete is currently quarried at Brandy Hill Quarries, a large quarry complex operated by Hanson Quarries to the west of Seaham. Surface scatters of silcrete raw material was observed along the transmission line easement (Transect 50).

Ceremonial/Mythological Sites

There was no archaeological evidence of any ceremonial sites identified in the survey, with the exception of a previously recorded Bora ground on Black Camp Creek Road (AHIMS #38-1-006). A recommendation that the pipeline remain within the disturbed road easement to avoid any impacts in this area has been incorporated into the final alignment. However, it is recommended that an archaeologist and a representative of the local Aboriginal community member be present while excavations occur in this area, to ensure that no impacts to the Bora ground occur.

There are no known mythological sites likely to be impacted by the development.

8.3.3 Historic Heritage

Items Identified During the Field Survey

A total of 11 historic sites were identified in the study area; of these only one is considered to have local heritage significance, whilst significance assessment of a further three sites was deferred pending further research. As with Aboriginal sites, where the proposed pipeline alignment passed within close proximity to an identified historic site (whether of heritage value or not), recommendations were provided to the proponent on possible realignments that would mitigate potential impact to the site. These recommendations were implemented, and the final pipeline alignment has been re-routed to avoid these sites.

Due the targeted nature of the field survey, not all areas of the pipeline route were assessed during the field survey. It is possible that places of historic heritage value may occur in the study area that were not identified, particularly in the case of historic archaeological deposits. However, for the majority of its route, the pipeline crosses relatively open pasturelands, where evidence of historic built heritage is likely to be either non-existent or, at best, easily visible. Therefore on the balance of probability, AECOM considers that the potential for impacts to unknown historic heritage is low.

Heritage-Listed Items

Of the 1,475 heritage listed items within the relevant LGAs (**Table 16**), only one is located within the study area (**Table 17**). The remainder are considered unlikely to be impacted by the proposed development. Below is an assessment of impacts on the tem in the study area that is currently heritage-listed.

Vale of Gloucester (Register of the National Estate)

The Vale of Gloucester was nominated for listing on the RNE due to the outstanding visual amenity afforded by the Avon Valley floor bordered by the spectacular ranges to the east and west. The nomination's current status as an Indicative Place indicates that the nomination has not yet been accepted by the Australian Heritage Council (the status simply means that it somewhere in the assessment process).

The listing provides the following note under condition and integrity:

> *Development should not detract from the essentially rural nature of the area, and be harmoniously sited in respect to the more outstanding features of the landscape.*

The nomination for inclusion on the RNE was based on two parts, its scenic amenity (which is not within the scope of this report) and its historic value. The nomination listed its historic value as being based on the fact that the Vale was discovered by the (then) chief agent of the Australian Agricultural Company, Robert Dawson, and that a homestead was built while the area was being developed for sheep-raising.

The Vale nomination covers a vast area (250 km^2) whilst the field area incorporates only about 16% of that area; the majority of the Vale (about 84%) will not be affected by the development. In addition, the development occurs almost wholly on the valley floor, well away from the "more outstanding features of the landscape" such as The Bucketts to the west and the ranges to the east. The majority of the development will be subsurface and is not considered to be detrimental to the rural nature of the area. Except in the immediate vicinity of the CPF, which is located adjacent to the existing rail loop to the Stratford Coal mine, all lands associated with the development will retain their existing (rural/agricultural) uses.

It is considered that there will be no detrimental impacts to the Vale on a historic heritage basis. As such, the effect of introducing another industry to the area is not considered to be a significant impact.

9.0 Applicable Policy and Legislation

9.1 Commonwealth Legislation

9.1.1 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.

9.2 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.

9.2.1 Environmental Planning and Assessment Act 1979

The 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.

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

- Under section 75U of the EP&A Act, projects approved under Part 3A do not require a permit under section 87 or a consent under section 90 of the NPW Act. Under the Part 3A provisions, the Minister for Planning is the consent authority and has ultimate responsibility for determining matters relating to Aboriginal heritage. However, for the preparation of an Environmental Assessment, the Director-General will issue environmental assessment requirements under s.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.

9.2.2 Heritage Act (1977)

The *Heritage Act 1977* was enacted to conserve the environmental heritage of New South Wales. Under section 32, places, buildings, works, relics, moveable objects or precincts of heritage significance are protected by means of either Interim Heritage Orders (IHO) or by listing on the State Heritage Register (SHR). Items that are assessed as having State heritage significance can be listed on the SHR by the Minister on the recommendation of the Heritage Council.

Archaeological relics (any relics that are buried) are protected as either SHR items or, when not SHR items, by the provisions of section 139. Under this provision it is illegal to disturb or excavate any land knowing or suspecting that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed. In such cases an excavation permit under section 140 is required. Note that no formal listing is required for archaeological relics; they are automatically protected.

Proposals to alter, damage, move, damage or destroy places, buildings, works, relics, moveable objects or precincts protected by an IHO or listed on the SHR require an approval under section 60. Demolition of whole buildings will not normally be approved except under certain conditions (section 63). Some of the sites listed on the SHR or on LEPs may either be 'relics' or have relics associated with them. In such cases, a section 60 approval is also required for any disturbance to relics *associated* with a listed item.

9.2.3 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…* (s.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 ss.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:

a) disturb or excavate any land, or causes any land to be disturbed or excavated, for the purpose of discovering an Aboriginal object; or

b) 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 s.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 s.90, subject to such conditions and restrictions as are specified in the AHIP. Therefore an AHIP issued under s.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.

Consultation with the Aboriginal community is required under DECCW policy when an application for an approval under Part 6 of the NPWS 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 4.0**.

9.3 Local Government

Under the provisions of the EP&A Act, Local Environmental Plans (LEPs) and Regional Environmental Plans (REPs) 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.

There are six LEPs that affect this project:

1 Gloucester Local Environmental Plan 2000;

2 Great Lakes Local Environmental Plan 1996;

3 Dungog Local Environmental Plan 2006;

4 Port Stephens Local Environmental Plan 2000;

5 Maitland Local Environmental Plan 1993; and

6 Newcastle Local Environmental Plan 2003.

9.3.1 Gloucester Local Environmental Plan 2000

The *Gloucester Local Environmental Plan 2000* (GLEP) is the statutory (legal) planning document that applies to the whole of the Gloucester LGA.

The GLEP requires that a development consent is required should any proposed impact to non-Aboriginal heritage be required (Clause 42). Should impact to Aboriginal archaeological sites be required, the Gloucester Council may grant consent following the lodgement of an assessment which meets DECCW guidelines and following comment from DECCW upon the application, and following consent under NPWS Act (Clause 45(1)). Should impact to non-Aboriginal archaeological sites be required, the Gloucester Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application, and following consent under the Heritage Act (Clause 45(2)).

Should development occur within the vicinity of a heritage item, heritage conservation area, archaeological site, potential archaeological site or any building, works or relic more than 50 years old, Council must assess impacts of the development (Clause 46).

Heritage items, heritage conservation areas, archaeological sites and potential archaeological sites are listed in Schedule 5 of the GLEP.

9.3.2 Great Lakes Local Environmental Plan 1996

The *Great Lakes Local Environmental Plan 1996* (GLLEP) is the statutory (legal) planning document that applies to the whole of the Great Lakes LGA.

The GLLEP requires that a development consent is required should any proposed impact to non-Aboriginal heritage be required (Clause 21(4)). Should impact to Aboriginal archaeological sites be required, the Great Lakes Council may grant consent following the lodgement of an assessment which meets DECCW guidelines and following comment from DECCW upon the application, and following consent under NPWS Act (Clause 21(7)). Should impact to non-Aboriginal archaeological sites be required, the Gloucester Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application, and following consent under the Heritage Act (Clause 21(8)). Should impact to heritage items of State significance be required, the Gloucester Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application (Clause 21(11)).

Should development occur within the vicinity of a heritage item, heritage conservation area, archaeological site or potential archaeological site, Council must assess impacts of the development (Clause 21(5)).

Heritage items are listed in Schedule 2 of the GLLEP.

9.3.3 Dungog Local Environmental Plan 2006

The *Dungog Local Environmental Plan 2006* (DLEP) is the statutory (legal) planning document that applies to the whole of the Dungog LGA.

The DLEP requires that a development consent is required should any proposed impact to Aboriginal or non-Aboriginal heritage be required (Clause 25(1)). Should impact to Aboriginal heritage places be required, the Dungog Council may grant consent following the assessment of a heritage impact statement which meets DECCW guidelines and following comment from DECCW upon the application (Clause 25(2)). Should impact to non-Aboriginal archaeological sites be required, the Dungog Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application (Clause 25(2)).

Heritage items and heritage conservation areas are listed in Schedule 3 of the DLEP.

9.3.4 Port Stephens Local Environmental Plan 2000

The *Port Stephens Local Environmental Plan 2000* (PSLEP) is the statutory (legal) planning document that applies to the whole of the Port Stephens LGA.

The PSLEP requires that a development consent is required should any proposed impact to non-Aboriginal heritage be required (Clause 55). Should impact to Aboriginal archaeological sites be required, the Port Stephens Council may grant consent following the lodgement of an assessment which meets DECCW guidelines and following comment from DECCW upon the application (Clause 59(1)). Should impact to non-Aboriginal archaeological sites be required, the Port Stephens Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application (Clause 59(2)).

Should development occur within the vicinity of a heritage item, heritage conservation area, archaeological site or potential archaeological site, Council must assess impacts of the proposed development (Clause 60).

Items of State and local heritage significance are listed in Schedule 2 of the PSLEP.

9.3.5 Maitland Local Environmental Plan 1993

The *Maitland Local Environmental Plan 1993* (MLEP) is the comprehensive statutory (legal) planning document that applies to the whole of the Maitland LGA.

The MLEP requires that a development consent is required should any proposed impact to non-Aboriginal heritage items (Clause 32) or heritage conservation areas (Clause 33) be required. Should impact to heritage items of State significance be required, the Port Stephens Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application (Clause 34). Should development occur within the vicinity of a heritage item, Council will require an assessment of impacts (Clause 38).

The MLEP does not list any specific controls in relation to objects of Aboriginal heritage significance, although the MLEP's definition of the term "relic" is somewhat ambiguous.

Heritage conservation areas are listed under Schedule 1 and heritage items are listed in Schedule 2 of the MLEP.

9.3.6 Newcastle Local Environmental Plan 2003

The *Newcastle Local Environmental Plan 2003* (NLEP) is the comprehensive statutory (legal) planning document that applies to the whole of the Newcastle LGA, with the exception of Newcastle City which is subject to a separate LEP.

The NLEP requires that a development consent is required should any proposed impact to non-Aboriginal heritage be required (Clause 55). Should impact to Aboriginal archaeological sites be required, the Newcastle City Council may grant consent following the lodgement of an assessment which meets DECCW guidelines and following comment from DECCW upon the application (Clause 31). Should impact to non-Aboriginal archaeological sites be required, the Port Stephens Council may grant consent following the lodgement of an assessment and following comment from the Heritage Council upon the application (Clause 32). Should development occur within the vicinity of a heritage item or a heritage conservation area, Council may require submission of a heritage impact statement (Clause 33).

Heritage items and heritage conservation areas are listed in Schedule 6 of the PSLEP.

10.0 Heritage Management Commitments

The following heritage management commitments are made regarding the project. These are made on the basis of:

- legal requirements under the provisions of Part 3A of the EP&A Act;
- the findings of the field survey and previous work done in the study area;
- the assessed heritage significance of the archaeological sites;
- the assessed heritage potential of PADs;
- the stated interests of the Aboriginal community; and
- the likely impacts resulting from the various components of the proposed development.

The heritage management commitments are provided in two levels:

- general commitments that are applicable to all sites and the study area as a whole (**Section 10.1**); and
- specific commitments for Aboriginal sites (Section 10.2) and historic sites (Section 10.3).

10.1 General Heritage Management Commitments

While it is considered that there is a low potential for impacts to Aboriginal or historic heritage, the following general heritage management commitments are made:

- Aboriginal sites/objects and historic heritage places/items within 100 m of the pipeline will need to be identified and flagged so that construction crews will not accidentally damage them[4].
- An Aboriginal Heritage Management Plan (AHMP) should be developed with provisions for dealing with any Aboriginal object or site that may be encountered in the course of construction. The AHMP will detail procedures for management of existing Aboriginal heritage sites and procedures for management of objects that are encountered during the construction phase of the development (e.g. procedures for construction in the vicinity of known sites and PADs, procedures for the discovery of skeletal remains, procedures for the discovery of unrecorded Aboriginal objects). The Awabakal Descendants Traditional Owners Aboriginal Corporation have requested they be consulted during the development of the AHMP, for the portion of the pipeline route within traditional Awabakal lands south of the Hunter River. ATOAC recommend that all relevant Aboriginal stakeholders be consulted for the AHMP for their areas of cultural association. Management commitments in the AHMP will include, but not limited to, the management commitments outlined in this section and in **Section 10.2** below.
- All standing structures will be avoided by the pipeline construction footprint.

[4] The exception to this is if they are on neighbouring property that will not be impacted by construction work.

- Should historical archaeological sites be encountered during the excavation process, then work will cease at that location and a qualified historical archaeologist consulted.
- Should Aboriginal archaeological sites be encountered during the excavation process, then work will cease at that location and DECCW and the relevant Aboriginal stakeholders notified.
- Construction crews will be made aware of the potential for cultural heritage values to occur in the project area. Training and induction will be provided and reinforced during regular toolbox talks.

10.2 Aboriginal Heritage Management

The findings of this assessment can be summarised as:

- a review of the AHIMS database administered by DECCW suggest there are five previously recorded Aboriginal sites within a 1 km-wide buffer zone along the pipeline route or within the field area. However two sites (AHIMS #37-2-0336 and #37-2-0337) were erroneously identified as being in the study area near Clareval when they were, in fact, located in the Hunter Valley; they have since been destroyed under a s.90 permit. Two were not re-identified due to access restrictions (#38-1-0008 and #28-1-0027). One, a bora ground (#38-1-0006), was re-identified during the survey;
- a total of nine Aboriginal sites were identified during the field survey – two (possible) scarred trees, four low-density artefact scatters, and three isolated finds;
- a total of 14 potential archaeological deposits were identified during the survey;
- alternative routes were recommended to the proponent in order to minimise the potential for impacts to these sites;
- there are no indications at present that there are specific Aboriginal heritage values that would be affected by the development, except for the archaeological deposit associated with LEA8 and LEA9; and
- on the basis of this assessment, it is considered the proposed development may encounter subsurface Aboriginal objects. It is recommended that the proponent prepare an Aboriginal Heritage Management Plan (AHMP) to manage the risk of impact to Aboriginal objects.

Table 22 details management requirements for Aboriginal sites identified in the study area. This includes the ultimate impact and management requirements for each site.

Table 22: Management Commitments for Aboriginal Heritage Sites within the Study Area

Site ID	Within Study Area?	Final Impact?	Final Management Requirement
LEA1	Yes. Field Area	No	Nil. This site is considered to be too close to the creek bank to be affected.
LEA2	Yes. Field Area	No	Nil. It is understood that the proponent is not considering any further development in this area.
LEA3	Yes. Field Area	No	Avoid any ground-breaking activities within 100 m of this location.

Site ID	Within Study Area?	Final Impact?	Final Management Requirement
LEA4	Yes. Within the pipeline Buffer Zone	No	Nil. A subsequent inspection of the site on 10 October 2008 failed to relocate the object, despite it being located in a prominent position.
LEA5	Yes. Buffer Zone	No	Pipeline alignment should be approximately 20 m further west (i.e. 30 m from the site) to avoid impacts from trenching and spoil deposition. Should realignment be unfeasible and damage to the site unavoidable, surface artefact collection should be conducted.
LEA6	Yes. Buffer Zone	No	Nil. Alignment of the pipeline is within the disturbed road easement and will avoid this site.
LEA7	Yes. Buffer Zone	No	Nil. Alignment of the pipeline is within the disturbed road easement and will avoid this site
LEA8	Yes. Buffer Zone	Potential	Recommend test excavation along the western bank of Deadmans Creek and collection of surface artefacts.
LEA9	Yes. Buffer Zone	Potential	Recommend test excavation along the western bank of Deadmans Creek and collection of surface artefacts.
AHIMS #38-1-0008	Yes. Field Area	No	Nil. Gas field infrastructure is not expected to impact this site.
AHIMS #38-1-0031	Yes. Field Area	No	Nil. Gas field infrastructure is not expected to impact this site.
AHIMS #38-1-0006 *(This site was re-identified during the survey and was not given a new site ID).*	Yes. Buffer Zone	Potential	Ensure pipeline alignment remains in road easement on the eastern side of Black Camp Road. Recommend retaining archaeologist and Aboriginal community representative to monitor construction in this area, under AHMP procedures.
AHIMS #38-4-0010	Yes. Buffer Zone	Potential	Ensure pipeline alignment remains in road easement on eastern side of Black Camp Road. Recommend retaining archaeologist and Aboriginal community representative to monitor construction in this area, under AHMP procedures.
Three unrecorded sites on Tiedman's Block (FLALC 2006)	Yes. Field Area	Potential	Existence of these sites not verified. Should CPF Facility 1 be chosen as the CPF site, then consultation with FLALC should be conducted and if the sites are within the proposed footprint, they should be salvaged under AHMP procedures.

The following table (**Table 23**) details management requirements for potential archaeological deposits identified in the study area. This includes the ultimate impact and management requirements for each PAD.

Table 23: Management Commitments for Potential Archaeological Deposits

Site ID	Within Study Area?	Final Impact ?	Final Management Requirement
PAD1	Yes. Field Area	No	Nil required. The pipeline route was moved approximately 20 m westwards to climb the ridge via a shallow re-entrant between two spurs to avoid the PAD.
PAD2	Yes. Buffer Zone	Yes	PAD unavoidable. Provisions of AHMP apply.
PAD3	Yes. Buffer Zone	No	Nil. Proposed alignment does not impact PAD.
PAD4	Yes. Buffer Zone	Yes	PAD unavoidable. Provisions of AHMP apply.
PAD5	Yes. Buffer Zone	Yes	PAD unavoidable. Provisions of AHMP apply.
PAD6	Yes. Buffer Zone	No	Nil. It is recommended that the gas pipeline remains within the road easement. Recommend retaining archaeologist and Aboriginal community representatives to monitor excavation works in this area of Black Camp Road, under the provisions of an AHMP.
PAD7	Yes. Buffer Zone	No.	Nil. Alignment of the gas pipeline remains within the road easement.
PAD8	Yes. Buffer Zone	No	Nil. Alignment of the gas pipeline remains within the road easement.
PAD9	Yes. Buffer Zone	No	Nil. The pipe line is located within the disturbed road easement and will pass to the south of this PAD; impact is unlikely.
PAD10	Yes. Buffer Zone	No	Nil. The pipe line is located within the disturbed road easement and will pass to the east of this PAD; impact is unlikely.
PAD11	Yes. Buffer Zone	Yes	PAD unavoidable. Provisions of AHMP apply.
PAD12	Yes. Buffer Zone	Yes	PAD unavoidable. Provisions of AHMP apply.
PAD13	Yes. Buffer Zone	No	Nil. The present alignment along the fence line is considered to be sufficient to minimise impact to this area.
PAD14	Yes. Buffer Zone	No	Nil. Current alignment of pipeline will pass to the north of this PAD; no impacts are expected.

10.3 Historic Heritage

The findings of this assessment can be summarised as:

- there are a total 1,475 heritage-listed items in the LGAs where the study area is located (**Table 16**);
- there are no previously heritage-listed historic heritage items within the study area;
- there is one item that has been nominated for listing on the Register of the National Estate (RNE) – the Vale of Gloucester – but has not yet been formally registered. The field area component of the study area is located within a large tract of this item;
- a total of 11 items of potential historic heritage value were identified during the field survey. One of these is considered to be of local heritage significance and three exhibit features that may be of historic heritage value pending further research; and
- on the basis of this assessment, it is considered the proposed development is not likely to encounter historic heritage items or relics.

Table 24 details management requirements for historic heritage items identified in the study area. This includes the original impact of the proposed route, shows recommendations made to avoid impacts to the identified sites, and the ultimate impact and management requirements for each site.

Note also that the recommendations in **Table 24** reflect that the proponent has made the changes to alignment recommended to them in the initial management recommendation on 17 October 2008.

Table 24: Management Requirements for Historic Items within the Study Area

Site ID	Within Study Area?	Final Impact?	Final Management Requirement
LEH1	Yes. Buffer Zone	No	Nil required. This building is located greater than 100 m outside the proposed alignment (and on the opposite side of the highway) and is therefore not considered to be under threat from the pipeline.
LEH2	Yes. Buffer Zone	No	Nil required. The current alignment of the pipeline is approximately 80 m west of the item.
LEH3	Yes. Buffer Zone	No	Nil required. This item is located more than 100 m west of the proposed alignment and is not considered to be under any threat from the development. Should realignment be considered in the vicinity of this site any ground-breaking activities should not be conducted within 50 m of the building with preference given to the eastern side of Black Camp Road or within the road easement.
LEH4	Yes. Buffer Zone	Potential	The pipe line is located within the disturbed road easement and will pass to the east of this site; however the site is adjacent to the road side and impacts may occur during construction.
LEH5	Yes. Buffer Zone	No	The pipe line is located within the disturbed road easement and will pass to the east of this site; however the site is adjacent to the road side and impacts may occur during construction.

Site ID	Within Study Area?	Final Impact?	Final Management Requirement
LEH6	Yes. Buffer Zone	No	Nil required. The pipeline will pass 100 m west of this site. No impacts expected.
LEH7	Yes. Buffer Zone		Nil required. The pipeline passes 100 m north of the site. No impacts expected.
LEH8	Yes.	Possible	Nil required. This item is not considered to have heritage significance.
LEH9	Yes.	Possible	Nil required. This item is not considered to have heritage significance.
LEH10	Yes. Buffer Zone	No	Nil required. Pipeline passes 100 m west of this site. No impacts expected.
LEH11	Yes. Buffer Zone	No	Nil required. Pipeline passes 100 m west of this site. No impacts expected.
Vale of Gloucester	Field Area	No detrimental impact	Nil required. Some effect due to introduction of new industry within the Vale of Gloucester agricultural area, however, the impacts are not considered to be detrimental or significant (refer below for further discussion)

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