9 Ground survey of Young to Wellington Gas Pipeline

The field survey formed an important part of the Aboriginal Heritage Assessment. As part of the overall heritage assessment, cultural input has been sought from all interested parties before, during and after the field survey.

Field survey was scheduled to be carried out once crops had been harvested and following the heat of January. Since most of the ground is previously cleared agricultural land used for grazing or crops, visibility and exposure [see below] would have been at a maximum just after harvest. Unfortunately, summer rains from the northern cyclones brought large amounts of rain. While visibility was hampered to some degree, it was considered adequate for the ground survey.

9.1 Participants

For the section of the alignment examined approximately within the Wellington LALC boundaries, representatives of Gallanggabang Aboriginal Corporation [GAC] included Wayne Carr [Aboriginal Sites Officer], Lee Thurlow [Cultural Heritage Officer], Jane Austin, Melissa Gilpin, Neville Brown and Darren Martin. Tim Hampton represented Waagan Waagan Project Group [WWPG].

For the section of alignment examined within the boundaries of the Orange LALC, representatives of that organisation included Chad Morgan, Amy Armstrong, Blair Fuller, Ian Bell,

For the section of the alignment examined within the boundaries of the Cowra LALC, representatives of several organisations were involved. Neville Williams, Shawn Williams, Wayne Williams, Stuart Cutmore and Mitchell Cutmore represented Mooka Traditional Owners Council [Mooka]; Edward [EJ] McGrath, Joseph McGrath, Rebecca Ingram, Daniel Ingram, and Eva Coe represented Cowra LALC. Rebecca Ingram and Eva Coe are also members of Kalari Ngunnawal Descendants [KND].

Young LALC and associated individual stakeholders were unfortunately overwhelmed by several heritage commitments, and only Keith Freeman was able to attend. On one day he was accompanied by his nephew, Jirrah Freeman. This was endorsed by Young LALC CEO, Norma Freeman.

Peter Garretty of CNC carried out land liaison and logistic duties.

9.2 Survey methodology

The major aim of the field survey was to identify and document the material record of Aboriginal heritage within the study area. A copy of the proposed methodology was sent to all stakeholders in **Consultation letter 1**. This was modified following stakeholder feedback. As part of the field assessment, strategies were developed that would either avoid harm to Aboriginal heritage or propose appropriate mitigation procedures.

The pipeline runs through a variety of environments and ecosystems, many of which have previously been subject to disturbance by a range of different land uses [Sections 5.3 and 6]. As a consequence, a range of methods were employed, appropriate to the terrain being investigated. The survey also took account of exposure and visibility. Survey was carried out by walking along the proposed alignments, with approximately 3 km being driven. The areas driven were steep slopes flanking the broader valley to the east. The likelihood of sites being encountered in these situations was considered to be nil.

The pipeline RoW is 30 m wide, within a 100 m corridor. This was examined in detail. In order to ensure that no cultural heritage nearby would impacted by the works and associated infrastructure, the width of the area surveyed was 100 m in total. The team consisted of between 5 and 7 people on most days. Spacing between people varied from 15 m to 20 m, giving excellent observation over most of the ground, except where crops (typically lucerne) were over 20 cm. At this amount of crop cover, visibility decreased. Visibility was assessed for most paddocks and has been a consideration in recommendations for monitoring.

Areas where there was considered to be a likelihood of cultural heritage were identified from maps and aerial photos prior to the survey as well as during the course of the field survey. These included previously registered cultural heritage sites; land within 200 m of a creek or waterway; alluvial flats; dunes; high ground vantage points; soaks; and ill defined drainage lines.

All those areas defined above with a likelihood of cultural heritage were assessed on foot following standard practice to ensure effective coverage. All associated works areas and potential access tracks, including any that may lie outside the alignment, were also examined.

Best practice requires re-examination of any sites that had previously been recorded within the study area. At this time there are none listed on the AHIMS register maintained by DECCW.

The ground survey identified archaeological sites, features and objects on the surface. No (PADs) were identified.

All mature trees of an age sufficient to bear evidence of traditional practices were examined.

Where archaeological material was encountered on the designated study area, potential deviations were examined and assessed. These have been included in recommendations for deviations to the alignment provided to the client.

All previously unrecorded Aboriginal sites found in the course of the survey were mapped using hand held GPS. Sites, features and objects were photographed and recorded. Site cards were provided to DECCW [posted Wednesday 31 March]. All site locations are provided within region 55H using GDA94 co-ordinates and UTM projection.

During the survey, Aboriginal participants were invited to comment on the cultural significance of each recorded site as well as the social, cultural and historic values of the larger study area. Following the survey, other stakeholders were provided with the opportunity to comment on the results and provide any additional information through their relevant organisations.

9.2.1 Exposure, Visibility and Coverage

In making records of surveys, standard practice includes documentation of **exposure** and **visibility**. These are measured on a scale of 0 – 10, with 10 being the highest and certain to allow the observation of any archaeological evidence that may be present.

Exposure

Exposure refers to the nature of the ground itself, whether it has been eroded and scoured or whether soil has been built up either by erosion or other natural processes. In a typical situation where pastoral and arable activities take place, soil may be moved down slope, making exposure better on the upper reaches and worse on the lower reaches. Ploughing increases exposure (Gaynor 2004, Roper 1976) in the sense that

while objects may be obscured and culturally modified soils destroyed, objects from throughout the potential sediment (the upper 25 cm or so) are brought to the surface.

In country of the type through which the proposed alignment traverses, where there has not been significant ground disturbance from soil removal or road works, ploughed fields or ripped areas are usually rated 10 because the depth of ploughed soil is generally greater than the total possible depth of archaeological deposits. This can be seen where underlying cobbles from the B horizon may be dragged to the surface. Exposure is usually excellent (rating 8 – 10), except in low-lying areas, typically near creeks and drainages, where a rating of 0 – 4 is more typical.

Visibility

Visibility is simply the amount of ground surface that can be observed during survey. It refers to the amount of ground cover that obscures observation. Vegetation is the main factor, although dust must also be considered for smaller artefacts. In the predominantly agricultural areas through which the pipeline is planned, crops seriously affect visibility depending on the time of year. For this reason it is important that the timing of the field survey is carefully planned in consultation with land owners and local Aboriginal stakeholders. Visibility is also affected by speed of transit [foot or vehicle], ground condition [claypan, ploughed paddock, etc], and factors that might obscure particular items [quartz artefacts in a naturally occurring broken quartz field, size of artefact expected]. Natural rock is largely lacking in the region and so is not a major consideration. Visibility is usually good during surveys conducted in bare paddocks (rating 4 – 10).

For many surveys in NSW, visibility is estimated from the amount of ground that is not covered by vegetation or soil. A scale of 0 – 10 may be used or a coarser grained scale may be used (table 8).

Table 8 Visibility scores used for survey

% of ground visible	scale
0	no visible ground surface
0 – 10	very poor
10 – 30	poor
30 – 50	fair
50 – 70	good
70 – 90	very good
90–100	excellent

Coverage analysis

Coverage analysis takes into account the expectation of observing items and sites given exposure of the land surface and visibility of the ground, as discussed above. These factors contribute to reduce the actual amount of ground actually observed. Coverage analysis is carried out to provide a more accurate estimate of site distribution.

Coverage is calculated by adjusting the area examined for amounts of visibility and exposure.

Coverage estimates rarely differentiate between the objects, features or sites that form the archaeological record. Coverage varies, however, according to the item or site.

Trees, for instance, are always visible in this region, whether standing or fallen. Coverage for scarred trees will therefore be in the order of 100%.

For individual objects (almost exclusively pieces of quartz which form part of the background distribution of lithic items and which do not constitute sites as generally recognized in Australian archaeology, but which are protected as Aboriginal Objects in the NP&W Act 1974), coverage is difficult to estimate.

For larger individual objects such as axes, mortars, hammers and the like, coverage would appear difficult to assess. These objects are probably over-represented, because any cobble-sized object seen would be more visible and more likely to be identified.

For sites defined only by a distribution of lithic items on the surface, ploughing, visibility and obscuring natural stone are critical factors. Coverage analysis of such sites has been assessed through controlled experiment that accounts for method of inspection (Gaynor 2004). Given the nature of the land, the state of ploughed paddocks and bare ground, and the nature of sites and features to be expected, it is reasonable in surveys such as this to calculate coverage as above. The coverage analysis provides a more accurate indication of the distribution of sites across the landscape, allowing considered inferences to be made on the likelihood of the presence of Aboriginal cultural heritage.

9.2.3 Background Distribution

The background distribution is estimated at sample locations throughout the study area where required. The method is to take a 40 m rope with the ends tied together, laying this out in a square with 4 steel pegs, providing a 10 m x 10 m [=100 m^2] sample area. All lithic items are counted, giving number of items/100m^2. When there is no evidence of lithic items on the ground surface, it is not possible to make an estimate.

With background distribution estimates, one can examine the density distribution of recorded sites. This is the best way to determine when one should call something a site or ‘background distribution’.

9.2.4 Quartz technology and identification

Quartz is the most common material found within the Study Area, and is often considered to be problematic for archaeological identification and analysis. It is necessary to be able to distinguish between humanly produced pieces of quartz and those that are the product of natural erosion, agricultural cultivation or road grading. This section sets out some of the characteristics relevant to identification of humanly produced lithic items as opposed to crushed road gravel or naturally fractured reef quartz. Discussion of identification of quartz was carried out as appropriate during the course of survey.

Quartz is often used for crushed road base throughout the Study Area. Some of this quartz may be similar to artefactual quartz in composition and form. It is likely that this quartz is sourced from similar outcrops.

There are several criteria that may be used to determine natural pieces from artefacts or lithic items.

Technological criterion

Flaking, bipolar splitting and lamellate production (or fracture line acceleration, see Witter 1989) produce typical features. Even if desired pieces are taken away, some of

the debitage, or by-products of manufacture, will show defined characteristics (Witter 1989, 1990, 1992).

Quality

Quartz with many cracks and crystalline irregularities would have been easily identified in traditional times. The person seeking to manufacture stone tools would not have wished to waste his time on material that was unlikely to produce the desired result, particularly in areas of abundant, high-quality, accessible material.

For the archaeologist, sub-standard material may be identified by orange-rose stained cracks, irregular breaks and small size, being more block-like than flattened.

Abundance

Quartz is locally abundant in the Study Area. There would have been many sources of high quality material as seen from flaked material in sites across much of the region. The Silurian quartz cobbles found in conglomerate layers has been partly metamorphosed and is often flakeable, but may also be processed using bipolar technique and fracture line acceleration. Reef quartz is commonly found on hill flanks.

Surface texture

The surface of quartz is determined by crystal regularity, flaws, weathering and damage. When flaked, quartz is often not glassy smooth in texture because the fracture wave must cross planes of crystal alignment. Bipolar splitting (on an anvil) often produces glassy smooth overall texture, even though there may be small block irregularities. Lamellates may be perfectly smooth. Quartz crushed for road base will have a very slightly roughened texture, which often appears dusty, but is more akin to frosting on glass. There may be pieces that appear to have flake scars and other intentional features like unifacial retouch. This happens commonly from the jostling of gravels during excavation, crushing, transport and packing.

9.2.5 Test excavation

No PADs were located during the course of survey. It would generally be recommended that the alignment be moved to avoid potential impact on sites that may be present in a particular deposit. If this were not possible, for instance when a sand body or waterway crosses the whole alignment, then test excavation may be warranted in order to determine if cultural materials are present. Augering may be used to determine the presence of cultural materials. Should these be present, test excavation would be warranted in order to determine the extent and nature of the site.

9.2.6 Significance assessment

Aboriginal stakeholders are invited to provide assessment of the significance of any sites, features, objects or places that might be encountered. It is recognised that assessment of significance is an essential part of any Aboriginal cultural heritage assessment. Consultation on assessment was conducted in line with DECCW Guidelines.

Opportunities were provided for significance assessment at all stages of the cultural heritage investigations. A draft copy of the report was distributed to registered stakeholders and feedback incorporated in the final report.