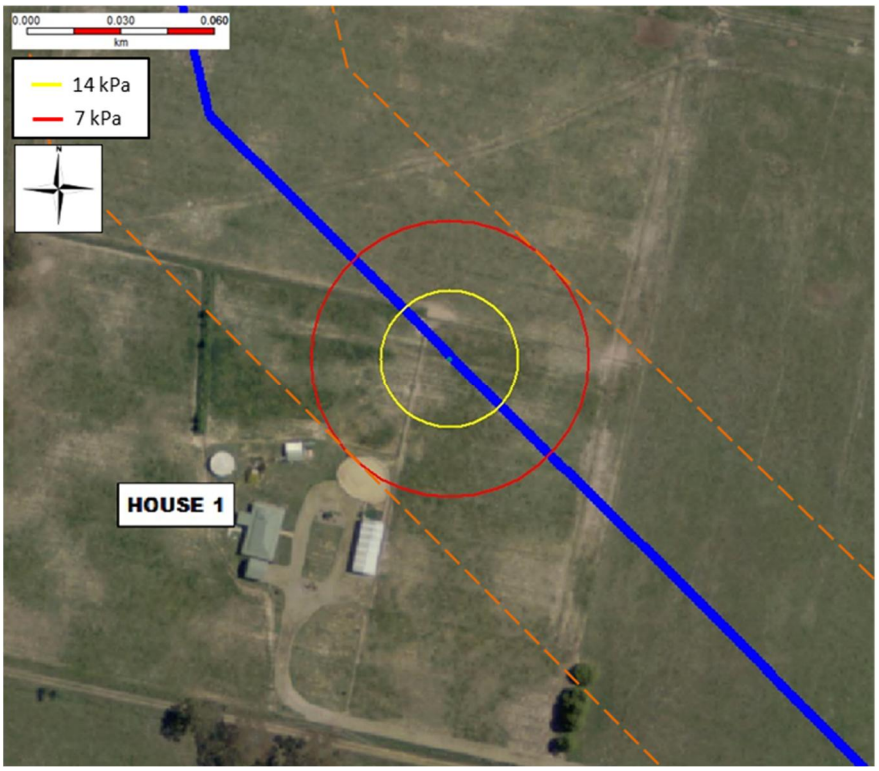


Figure 12: Explosion – Delayed ignition of gas cloud near House 1

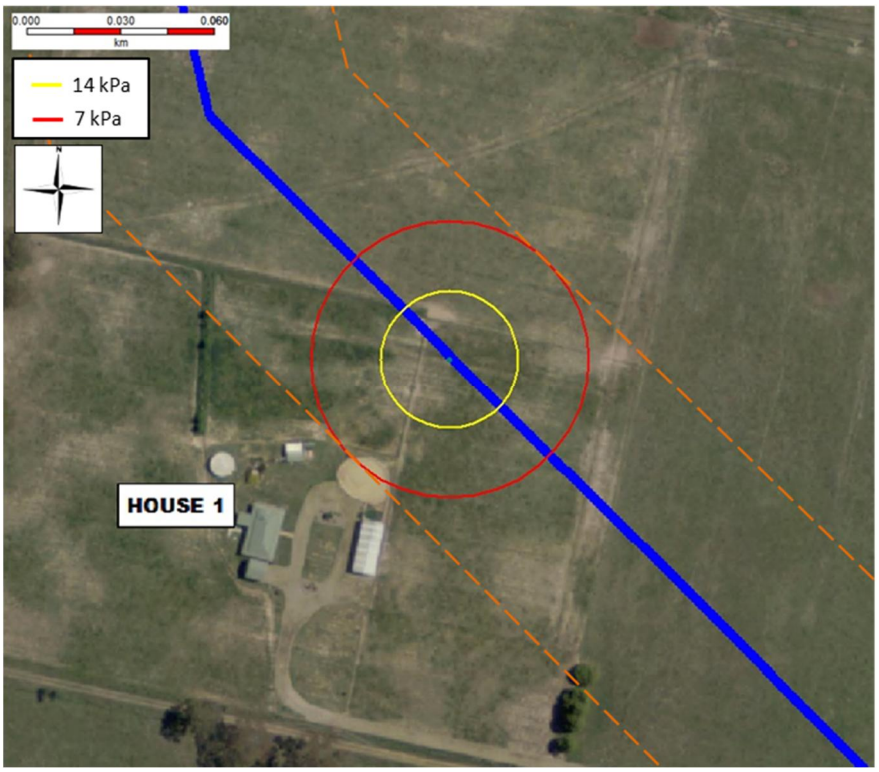


Figure 13: Explosion – Delayed ignition of gas cloud near House 2

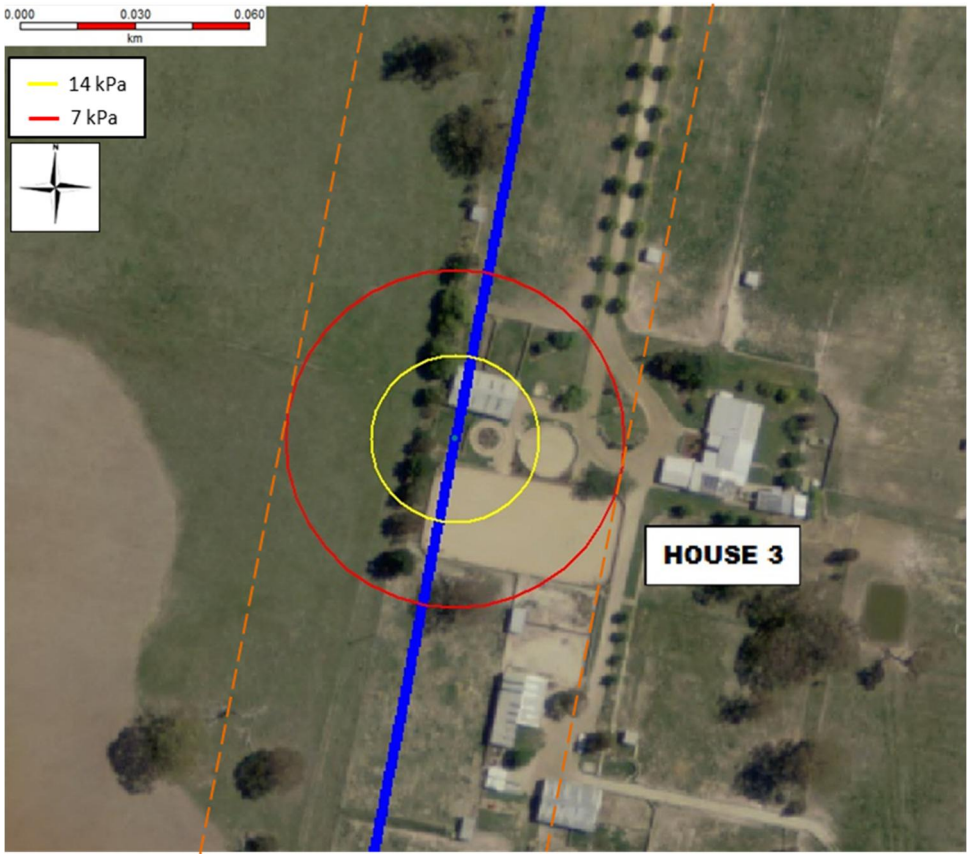


Figure 14: Explosion – Delayed ignition of gas cloud near House 3

6.0 CONCLUSIONS

A Preliminary Hazard Assessment (PHA) was completed to assess whether there are any constraints with the Brown's Creek to Orange Gas Pipeline Relocation, from a risk and safety perspective. It assessed the risks associated with the proposed development in terms of accidental loss scenarios and their potential for hazardous incidents.

As part of this assessment, a fire and explosion consequence analysis was conducted to provide a better understanding of the consequences of the potential pipeline hazards and to provide recommendations for the elimination of hazards or the reduction of the consequences which may cover issues such as the location of pipeline route, and safe distances between houses, airport runway and potential impacts on the surrounding area.

The major findings of this assessment were:

- Depending on the release conditions, including the mass of material involved and how rapidly it is ignited the results may be a localised fire, such as a jet fire or a flash fire. The pipeline deviation would run through open areas and explosion of the vapour cloud formed through the release is considered highly unlikely.
- If an explosion were to occur, an overpressure of 14 kPa, which will make a house uninhabitable and badly cracked, would not reach existing nearby residential houses.
- The maximum distance to LFL from a 25 mm hole leak in the pipeline is 21.6 m and hence the resulting flash fire envelope would not reach any nearby residential houses.
- For a medium 25 mm hole leak from the pipeline, thermal radiation effects of the resulting jet fire scenarios, would not impact on nearby residential houses. Even the 4.7 kW/m^2 thermal effect distance which corresponds to "causing pain in 15 – 20 seconds and injury after 30 seconds exposure (at least second degree burns will occur)" and is the lowest level of thermal effect listed in Table 2 would not impact the occupants of the residential houses in the vicinity.
- The released material must come into contact with a source of ignition. In some cases this may be heat or sparks generated by mechanical damage while in others, the possible ignition sources could be vehicles along Huntley Rd and Aerodrome Rd.
- External interference is the main cause of loss of gas. For the pipeline deviation this potential is minimised as it would be buried at a depth of 1200 mm. It would have a resistance to penetration through use of appropriate pipe thickness and marker tape would be laid 300 mm above the pipeline. The pipeline would have a 15 to 20 m easement and part of the pipeline would be laid within the Orange Aerodrome property boundary.

The proposed development does not increase in any significant way the risk of potential releases as it is a diversion of a short length of an existing pipeline, operating under the same duty. In addition, the diverted route will run through an area with the same population density and consequence effect distances will be relative to surrounding residential houses as the existing route.

Based on the assumptions used in this study relating to the design and operation of the pipeline, the assessment has demonstrated that the proposed pipeline diversion does not pose an unacceptable risk to the surrounding community and that there are no constraints from a safety point of view to the location of the proposed pipeline deviation.

APPENDIX A METEOROLOGICAL CONDITIONS

The three representative weather conditions used in the consequence analysis as shown in Table 1 are based in the Orange Aerodrome wind rose as shown in Figure 15 and stability distribution as shown in Figure 16.

Based on data from the Bureau of Meteorology, all models have been prepared with an air temperature of 25ºC and a relative humidity of 80%.

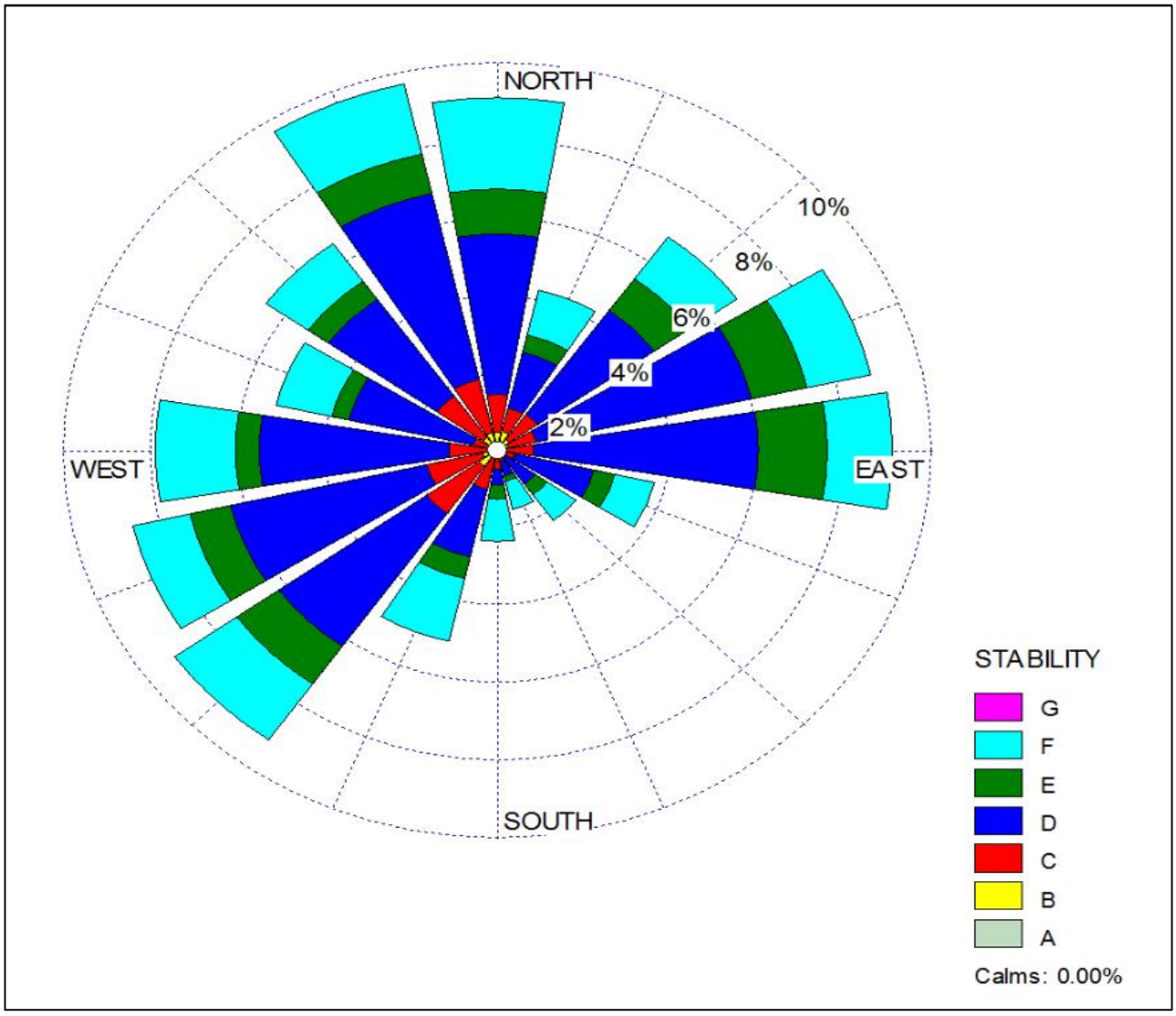


Table 15: Orange Aerodrome Wind Speed and Atmospheric Stability Rose

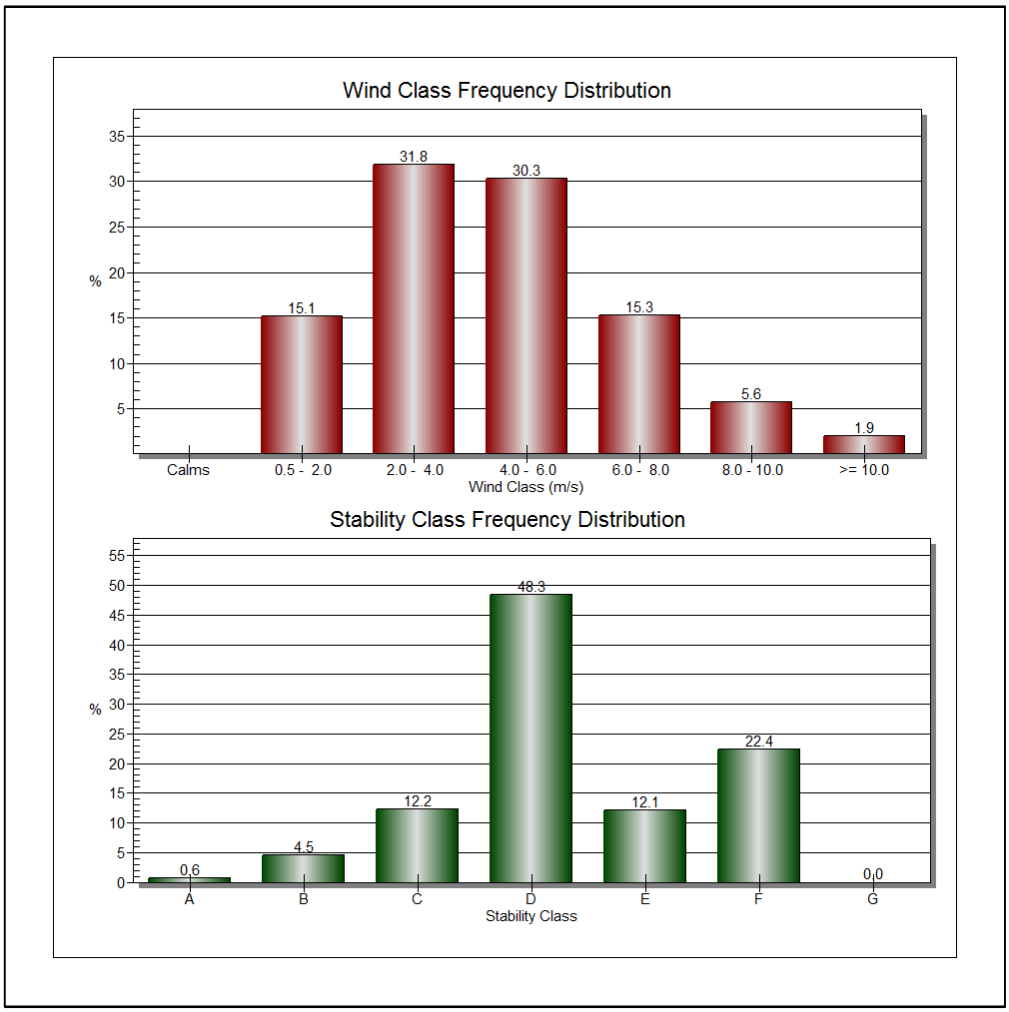
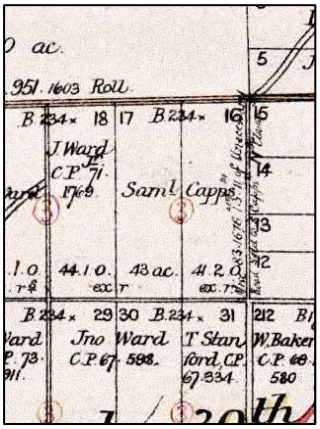


Table 16: Orange Aerodrome Wind Speed and Atmospheric Stability Distribution

Attachment D
Cultural Heritage Assessment



Browns Creek to Orange Gas Pipeline Relocation Project

Cultural Heritage Assessment

November 2012

Authors

Sam Harper

Nicola Hayes

LGA: *Orange*

Client: *GHD*

Proponent: *East Australian Pipeline Pty Ltd (EAPL), a wholly owned subsidiary of APA Group*

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Report Register

The following register documents the development and issue of this document.

Issue No.	Notes/Description	Issue Date
v1	Draft for proponent comment	26 September 2012
v2	Draft with client comments	2 October 2012
v3	Draft for RAP comment	2 October 2012
v4	Final following RAP comments	2 November 2012

EXECUTIVE SUMMARY

Orange City Council is undertaking an Environmental Impact Statement (EIS) to seek approval for an expansion of Orange Aerodrome. This expansion would resolve the existing operational constraints at the aerodrome, significantly improving the capacity of the aerodrome and enabling larger jet aircraft to access the aerodrome in the future. The expansion would provide the necessary facilities to enable the aerodrome to function as a 'hub' for a range of aviation-related services and activities.

As a result of the proposed expansion of the Orange Aerodrome, the existing Brown's Creek to Orange pipeline will need to be relocated. This proposal has been separated from the Orange Aerodrome Expansion EIS, and East Australian Pipeline Pty Ltd (EAPL) is undertaking a separate EIS to seek approval for this relocation.

The diverted pipeline section will be approximately 2 km in length and located around the perimeter of the extended aerodrome at a cost in the vicinity of $1.7 m to $2 m.

The new alignment of the pipeline will involve new easements and a pipeline license variation.

This investigation found that:

- No Aboriginal sites or areas of archaeological potential were identified within the Browns Creek to Orange Gas Pipeline Relocation Project study area; and

- No historical sites or areas of potential were identified within the Browns Creek to Orange Gas Pipeline Relocation Project study area.

It is recommended that:

1. No further cultural heritage assessment is required for the Browns Creek to Orange Gas Pipeline Relocation Project project.

2. If Aboriginal objects are located during development works all works in the area of the find should cease, and the NSW OEH and representatives from the Orange LALC should be notified. Where required, further archaeological investigation should be undertaken. Development works in the area of the find(s) may recommence if and when outlined by the management strategy, developed in consultation with and approved by the OEH.

3. If suspected skeletal remains are located during development works all works in the area of the find should cease, the local Police should be notified, an archaeologist from OEH and representatives from the Orange LALC should be notified. Construction and related works in the area of the remains may not resume until the proponent receives written approval in writing from the relevant statutory authority, including the Police, Coroner in the event of an investigation, OEH in the case of Aboriginal remains or Heritage Branch in the case of non-Aboriginal remains outside of the jurisdiction of the Police or Coroner.

4. If historical items are located during development works all works in the area of the find should cease and the NSW Heritage Council should be notified. Where required, further archaeological investigation should be undertaken. Development works in the area of the find(s) may recommence if and when outlined by the management strategy, developed in consultation with and approved by OEH and the Heritage Council.

Detailed Unanticipated Discovery Protocols are provided in Appendix 3 of this report.

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Project Description

Orange City Council is undertaking an Environmental Impact Statement (EIS) to seek approval for an expansion of Orange Aerodrome. This expansion would resolve the existing operational constraints at the aerodrome, significantly improving the capacity of the aerodrome and enabling larger jet aircraft to access the aerodrome in the future. The expansion would provide the necessary facilities to enable the aerodrome to function as a 'hub' for a range of aviation-related services and activities.

As a result of the proposed expansion of Orange Aerodrome, the existing Brown's Creek to Orange pipeline will need to be relocated. This proposal has been separated from the Orange Aerodrome Expansion EIS, and East Australian Pipeline Pty Ltd (EAPL) is undertaking a separate EIS to seek approval for this relocation.

APA Group, comprised of the Australian Pipeline Trust and APT Investment Trust, is a major ASX-listed energy transmission company in Australia with interests in almost 12,000 km of natural gas pipeline infrastructure, and over 2,300 km of gas distribution networks in Australia.

East Australian Pipeline Pty Ltd (EAPL), a wholly owned subsidiary of APA Group, is proposing to divert an existing 100mm Licensed Pipeline around a proposed runway extension and facilities development at Orange Aerodrome. The Aerodrome development activities are being approved by the Local Planning Authority (LEP) under Part 4 of the Environmental Planning and Assessment Act (EP&A Act).

The existing Brown's Creek to Orange Pipeline was laid under Commonwealth legislation, but is now licensed by the NSW Department of Trade and Investment as License 22. The pipeline does not have a NSW Permit and as such advice has been received that an approval under Part 5.1 of the EP&A Act is required. A formal Pipeline License variation will be sought following the EP&A Act approval.

The diverted pipeline section will be approximately 2 km in length and located around the perimeter of the extended aerodrome at a cost in the vicinity of $1.7 m to $2 m.

The new alignment of the pipeline will involve new easements and a pipeline license variation.

This report documents the results of a cultural heritage assessment of the Brown's Creek to Orange Pipeline relocation.

The report was commissioned by GHD.

1.2 Project Background

The Orange Aerodrome expansion is being progressed by Orange City Council to allow for F100 operations at maximum take-off weight for flights to destinations including Telfer in WA. The works involve an extension to the existing 11/29 runway requiring realignment of the existing roads.

The proposed pipeline diversion would relocate the pipeline to facilitate the proposed runway extension and new aerodrome infrastructure. Without modification to the existing pipeline both locations would involve unacceptable risks to the pipeline and the new assets. It may be possible to accommodate some of the development activities prior to pipeline diversion; however a relocation of the asset will enable on site works to progress safely and enable the proposed infrastructure buildings to be established in the vicinity of the current easement area.

1.3 Proposed Works

The current Orange Aerodrome is located on Aerodrome Road, Orange with an area of approximately 160 ha. It is proposed for the aerodrome to be expanded to the west with an additional 80 ha to enable the extension to the runway (see NOHC 2012).

The current 100mm high pressure gas pipeline to Orange passes through the current aerodrome heading north and positioned to the west of the existing runway. The proposal is to move the existing pipeline to the western side of the expanded area to avoid the runway extension works and away from the proposed and any future new buildings (Figures 1.1 and 1.2).

The pipeline will be buried along the entire route. It is expected that the new pipeline route will be inside the aerodrome land, following the new western boundary located between the fence line and the perimeter road.

The pipeline diversion will involve a full pipeline construction involving easement stripping. The pipe laying activities will be relatively short however the connections onto the existing pipeline will be carried out live using specialist equipment.

Proposed works include:

- Temporary Facilities: A range of temporary facilities will be required during pipeline construction. These may include work areas for equipment, pipe delivery and storage and borrow pits to source additional fill material (if required). The location of the temporary facilities will be based upon logistical requirements.

- Access: During construction, some access tracks may be required to areas such as the pipeline easement and work areas. Depending upon how advanced site development works are the work may be either inside or outside the aerodrome perimeter fence. Existing roads, access tracks and disturbed areas will be utilised as far as practicable to minimise disturbance to the surrounding areas.

- Clearing: An impact width of 15 - 20 m will be required for construction and large mature trees will be preserved wherever practicable. Removal of topsoil is to be stockpiled and reused during rehabilitation.

- Grading: Topsoil will be removed, where required, and stockpiled separately for reuse during rehabilitation.

- Trenching: Either a wheel trencher or an excavator will be used to dig the trench in which the pipe will be laid. In rocky terrain rock saws (a type of trenching machine) or excavators using rock picks are likely to be used. Blasting is possible where mechanical means are impractical. The length of trench left open at any given time will be the minimum practicable dependent on land use and prevailing conditions. The pipeline trench will be approximately 400 mm wide.

- Stringing: Pipe will be transported to site on trucks in 18 metre lengths. The pipe is laid out adjacent to the trench and held off the ground on skids (typically wooden blocks) that protect the pipe coating from damage.

- Lowering In and Backfilling: If the trench bottom does not contain any rocks or other material that may damage the pipe coating the pipe will be laid directly on the trench bottom. However, if there are rocks or other debris present sandbags or foam pillows will be placed on the trench bottom to support the pipe. Soft material, typically sifted spoil, will be placed around the pipe. The pipe will then be lifted off the skids and lowered into the trench using side-boom tractors. The trench will be backfilled, ensuring that topsoil is replaced last, and soil packed down to minimise the potential for subsidence.

- Crossings: Several different methods are feasible for crossing roads, and other infrastructure corridors. Where the pipeline crosses the road it is estimated that casing pipe will be placed before the road construction to avoid underboring.

- Clean up and Restoration: Clean up and restoration measures will be applied to the ROW, work areas and access tracks in consultation with the relevant landholder/owner. Generally clean up and restoration will involve removal of foreign material (construction material and waste), surface contouring, respreading topsoil, respreading vegetation and reseeding/revegetating (typically with native grass or other approved species). Restoration will be undertaken in accordance with the Australian Pipeline Industry Association (APIA) Code of Environmental Practice and will ensure that:

    - Topsoil cover is re-established and any land and waterways disturbed by project activities are returned to a stable condition as soon as possible after construction;
    - Stable landforms are re-established to original topographic contours;
    - Natural drainage patterns are reinstated;
    - Erosion control measures (e.g. contour banks, filter strips) are installed in erosion prone areas; and if required
    - Disturbed habitats are recreated.

A site compound will be established during construction, covering an area approximately 900 m^2 for the storage of equipment and materials.

1.4 Project Framework

The proposed pipeline relocation will be assessed under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A ACT) for State Significant Infrastructure (SSI).

1.5 This Report

1.5.1 Outline

This report:

- Describes the proposed relocation works (Section 1);
- Describes the methodology employed in the study (Section 2);
- Describes the environmental setting of the study area (Section 3);
- Provides information relating to the Aboriginal consultation program undertaken for this project (Section 4);
- Provides information relevant to the Aboriginal cultural and archaeological context of the study area (Section 5);
- Provides a historical heritage context for the study area (Section 6);
- Describes the results of the data review, field survey and Aboriginal consultation program conducted in the context of the assessment (Section 7);
- Provides the statutory and policy context for this assessment (Section 8) and
- Provides management recommendations based on the results of the investigation (Section 9).

1.5.2 Copyright

- The Navin Officer Heritage Consultants logo and business name (copyright to this rests with Navin Officer Heritage Consultants Pty Ltd);
- Generic content and formatting which is not specific to this project or its results (copyright to this material rests with Navin Officer Heritage Consultants Pty Ltd);
- Descriptive text and data relating to Aboriginal objects which must, by law, be provided to OEH for its purposes and use;
- Information which, under Australian law, can be identified as belonging to Indigenous intellectual property;
- Content which was sourced from and remains part of the public domain

1.5.3 Restricted Information

Information in this report relating to the exact location of Aboriginal sites should not be published or promoted in the public domain.

No information provided by Aboriginal stakeholders in this report has been specifically identified as requiring access restrictions due to its cultural sensitivity.

1.5.4 Confidentiality

No information in this report has been classified as confidential.

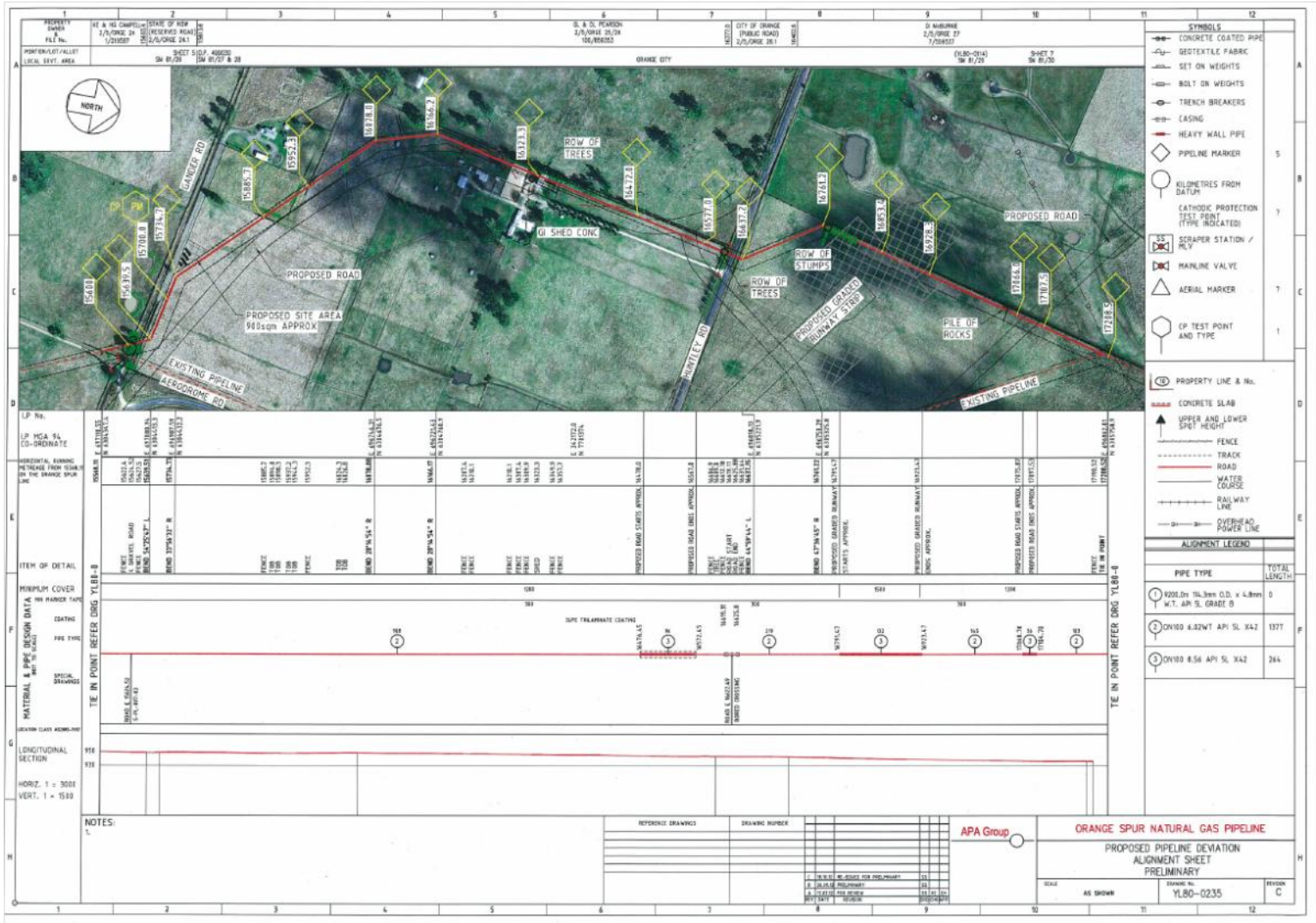

Figure 1.1 Proposed pipeline route schematic (Provided by GHD)

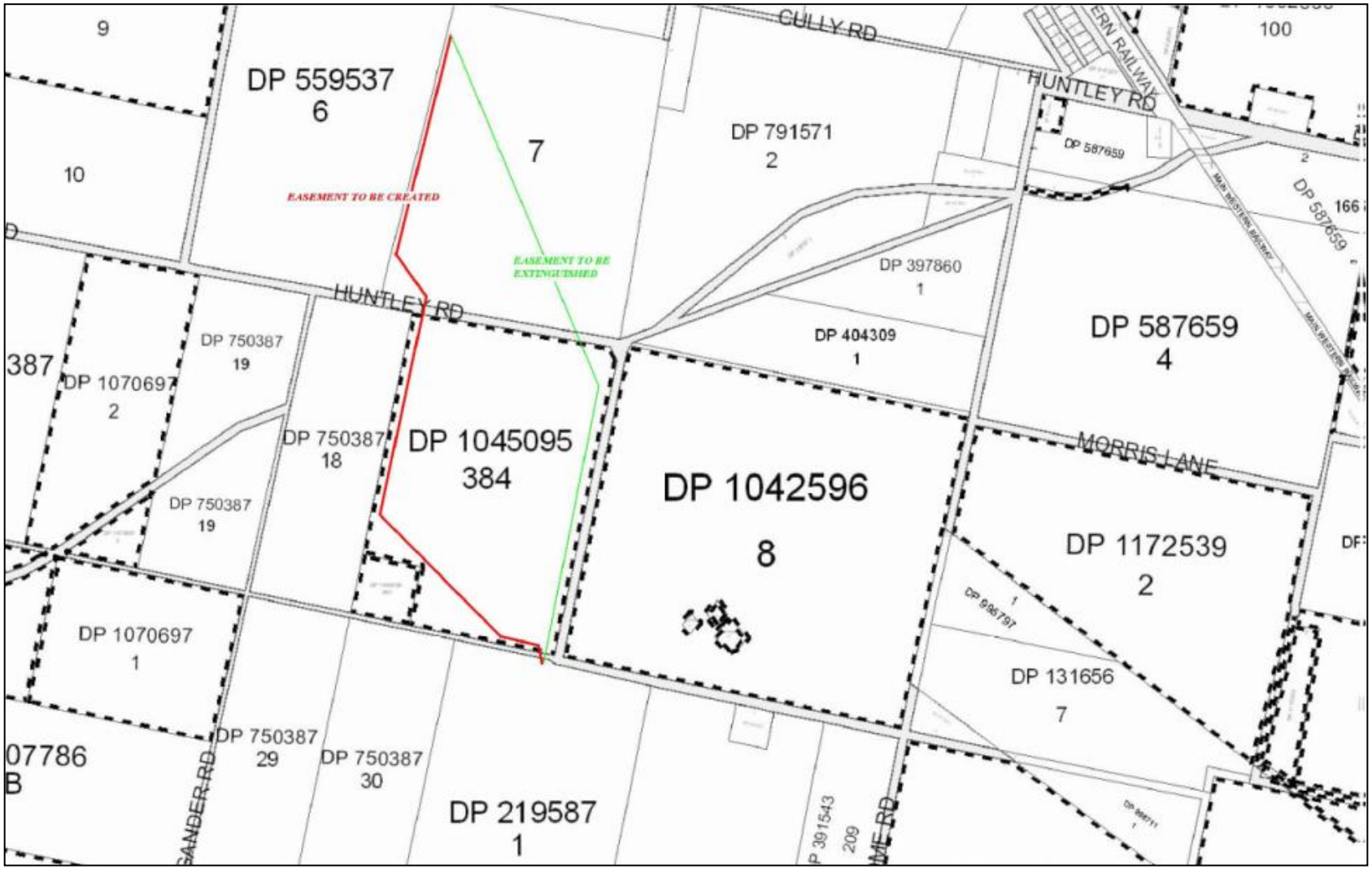

Figure 1.2 Location of the current pipeline easement (red) and the proposed relocation easement (green) over cadastral mapping (Provided by GHD)

2. STUDY METHODOLOGY

2.1 Contributors

An archaeological survey of the proposed Orange Aerodrome Expansion site, including the proposed pipeline relocation, was undertaken by archaeologists Sam Harper and Nicola Hayes on the 22nd of March 2012. Sam has a Bachelor of Arts with Honours in Archaeology from the Australian National University, and Nicola has a Bachelor of Arts and Graduate Diploma of Arts in Archaeology and Heritage Management from the Australian National University.

Additional survey was undertaken on Friday the 3rd of August 2012 by Sam Harper and Deirdre Lewis-Cook. Deirdre has a Bachelor of Arts from the University of New England and a Masters in Archaeology from the Australian National University. Kallari Ngunawal Descendents were confirmed for participation in this field survey, however no field representative attended on the day.

This report was prepared by Sam Harper and edited by Nicola Hayes.

2.2 Literature and Database Review

A range of archaeological and historical data was reviewed for the proposed Orange Aerodrome Expansion study area and its surrounds. This literature and data review was used to determine if known Aboriginal and/or historical archaeology sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The review of documentary sources included heritage registers and schedules, local histories, and archaeological reports.

Searches were undertaken of the following statutory and non-statutory heritage registers and schedules:

- Statutory Listings:
  - Aboriginal Heritage Information Management System (AHIMS) (NSW OEH);
  - World Heritage List;
  - The National Heritage List (Australian Heritage Council);
  - The Commonwealth Heritage List (Australian Heritage Council); and
  - Heritage Schedule(s) from the Orange Local Environmental Plan.
- Non-Statutory Listings:
  - The Register of the National Estate (Australian Heritage Council);
  - The State Heritage Inventory (NSW OEH); and
  - Register of the National Trust of Australia (NSW).

Databases searches were based on the following coordinates:

Eastings: 694000 – 703000

Northings: 6301000 – 630800 with a buffer of 50 metres.

2.3 Field Methodology

Field survey was undertaken by archaeologists Sam Harper and Nicola Hayes.

Fieldwork was undertaken over the course of one day on the 22nd of March, 2012. The primary objective of the survey methodology was to attain as comprehensive ground coverage as possible within the areas subject to the proposed direct development impacts. The study area assessed covered an area approximately 16 hectares in area, in and around the areas of proposed construction.

All areas of ground disturbance and surface visibility were inspected, all old growth trees within direct impact areas were inspected for possible Aboriginal scars and all rock outcrops were inspected for possible grinding or other Aboriginal marks. Direct impact areas as well as buffer zones were surveyed for surface artefacts and assessed for potential archaeological deposits.

Additional fieldwork was undertaken over the course of one day on the 3rd of August 2012, following changes to the proposal.

Information was recorded using a handheld differential Trimble Juno GPS, digital camera and notebook.

2.4 Sampling Strategy

A full coverage survey was conducted of the proposed Orange Aerodrome pipeline relocation site, dependent on visibility and access.

2.5 Recording Parameters

2.5.1 Aboriginal Sites and Potential Archaeological Deposits

The archaeological survey aimed at identifying material evidence of Aboriginal occupation as revealed by surface artefacts and areas of archaeological potential unassociated with surface artefacts. Potential recordings fall into two broad categories: sites and potential archaeological deposits.

Aboriginal Sites

A site is defined as any material evidence of past Aboriginal activity that remains within a context or place which can be reliably related to that activity.

Most Aboriginal sites are identified by the presence of three main categories of artefacts: stone or shell artefacts situated on or in a sedimentary matrix, marks located on or in rock surfaces, and scars on trees.

Frequently encountered site types within southeastern Australia include stone artefact occurrences - including isolated finds and open artefact scatters, coastal and freshwater middens, rock shelter sites - including occupation deposit and/or rock art, grinding groove sites and scarred trees.

Potential Archaeological Deposits

A potential archaeological deposit, or PAD, is defined as any location where the potential for subsurface archaeological material is considered to be moderate or high, relative to the surrounding study area landscape. The potential for subsurface material to be present is assessed using criteria developed from the results of previous surveys and excavations relevant to the region. Where necessary, PADs can be given an indicative rating of their 'archaeological potential' based on a combined assessment of their potential to contain artefacts, and the potential archaeological value of the deposit. Table 3.1 illustrates the matrix on which this assessment is based. Locations with low potential for artefacts fall below the threshold of classification. In such cases the potential incidence of artefactual material is considered to be the same as, or close to that for background scatter. Where there is moderate potential for artefacts, the predicted archaeological potential parallels the potential significance of the deposit. For deposits with high potential for artefacts, the assessed archaeological potential is weighted positively.

The boundaries of PADs are generally defined by the extent of particular micro-landforms known to have high correlations with archaeological material. A PAD may or may not be associated with surface artefacts. In the absence of artefacts, a location with potential will be recorded as a PAD. Where one or more surface artefacts occur on a sedimentary deposit, a PAD may also be identified where there is insufficient evidence to assess the nature and content of the underlying deposit. This situation is due mostly to poor ground surface visibility.

2.5.2 Historical Sites and Features

Historical archaeology refers to the 'post-contact' period and includes: domestic, commercial and industrial sites as well as most maritime sites. It is the study of the past using physical evidence in conjunction with historical sources. The three primary types of places or items that may form part of the historical archaeology context include:

1. Below ground evidence, including building foundations, occupation deposits, features and artefacts; and above ground evidence, including buildings, works, industrial structures and relics that are intact or ruined;

2. Areas of land that display evidence of human activity or occupation; and

3. Shipwrecks, deposits and structures associated with maritime activities.

The information found in historical archaeological sites is often part of a bigger picture which offers opportunities to compare and contrast results between sites. The most common comparisons are made at the local level, however, due to advances in research and the increasing sophistication and standardisation of methods of data collection, the capacity for wider reference (nationally and, occasionally, internationally) exists and places added emphasis on identification and conservation of historical archaeological resources.

3. LANDSCAPE CONTEXT

3.1 Site Location

The study area is located in the northwestern corner of the Central Tablelands of NSW, approximately 15 km south of the City of Orange, at an elevation of 949 m above sea level (ASL).

The study area falls within the South Eastern Highlands Bioregion and is characterised by a temperate climate with warm summers (NSW NPWS 2003). It falls within the Orange subregion which is characterised by low hilly to hilly plateau with the peaks of Mount Canobolas dominating the landscape in the southwest (NSW NPWS 2003).

3.2 Geology

The geology of the study area comprises extensive Tertiary basalts from the Canobolas volcanic formation and small stocks of granite including pyroxene olivine basalt, plagioclase basalt, alkali basalt, trachybasalt and trachyandesite with limited limestone and serpentinite (NSW NPWS 2003).

3.3 Landforms, Geomorphology and Soils

The study area traverses a large elevated plateau approximately 900 m ASL. The plateau is characterised by a relatively flat landform with large to medium sized rural holdings, within a low hilly to hilly landscape bordered by the Canobolas peaks. The Canobolas complex comprises numerous volcanic features including plugs, dykes and domes a result of Tertiary volcanic activity.

The soil profile in this area comprises deep red and brown loams on basalt with fine metasediments. Surrounding slopes comprise mellow texture contrast soils on any slopes with a sand component in the bedrock, and nearby swampy valley floors comprise alluvial loams and black clays.

3.4 Natural Resources and Features

The study area falls within the Macquarie River catchment, and is located between the tributaries of Spring and Summer Hill creeks, and drainage in the area leads into the Spring Creek Reservoir.

Vegetation within the study area comprises low density forest, with areas of Yellow Box and Blakely's red gum on lower areas, and red stringybark, broad-leaved peppermint and white gum on hill slopes. The vegetation is relatively disturbed across areas of logging, grazing and other pastoral use.

3.5 Land-use History

Prior impacts in and around the study area can generally be classified as moderate to high. Land within the study area has been cleared for grazing and pasture improvement, with sheep and cattle grazing in the area from the 1820's, and wheat and cereal cropping from the 1850's. Intensive horticulture has continued through the 20th century and the area continues to be used predominantly for pastoral practices.

The areas of greatest disturbance are in and around the aerodrome, dating to the early 1960's, and include large scale land clearance and construction of runways, buildings and associated infrastructure and services.

4. ABORIGINAL CONSULTATION

4.1 Consultation Requirements for Proponents

As per the Director-General's Requirements for the Environmental Impact Assessment for the Browns Creek to Orange Gas Pipeline Relocation project, this cultural assessment complied with the NSW OEH *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW OEH 2010).

This document sets out the requirements for 'consulting with those Aboriginal people who can provide information about the significance of Aboriginal cultural heritage as part of the assessment process that informs any AHIP [Aboriginal Heritage Impact Permit] application' (NSW OEH 2010: 1).

The requirements apply to all activities throughout NSW that have the potential to harm Aboriginal objects or places, and that also require an AHIP. Although AHIPs were not required for this stage of the project, the OEH 2010 *Aboriginal cultural heritage consultation requirements for proponents* were implemented. This included:

Stage 1 – Notification of project proposal and registration of interest:

> An advertisement was placed in the *Central Western Daily* on the 15th June 2012 with a 14 day period for registration ending 29th June 2012.
>
> Stage 1 round 1 letters (Table 4.1) were sent on the 12th June 2012 with a 14 day period for registration ending 26th June 2012.
>
> Stage 1 round 2a letters (Table 4.2) were sent on the 21st June 2012 with a 14 day period for registration ending 5th July 2012.
>
> Stage 1 round 2b letters (Table 4.3) were sent on the 25th June 2012 with a 14 day period for registration ending 9th July 2012.

See Table 4.4 for a list of Registered Aboriginal Stakeholders for the project.

Table 4.1 Stage 1 Round 1 Letters

Name	Organisation
The Secretary	Orange Local Aboriginal Land Council (OLALC)
The Secretary	Office of the Registrar, *Aboriginal Land Rights Act* (1983) NSW
The Secretary	National Native Title Tribunal
The Secretary	Native Title Services Corporation Limited (NTSCORP)
The Secretary	NSW Office of Environment & Heritage, North West Branch, Dubbo
The General Manager	Orange City Council
The General Manager	Central West Catchment Management Authority, Orange

Table 4.2 Stage 1 Round 2a Letters

Name	Organisation
Ms Dorothy Stewart	Binjang Wellington Wiradjuri Heritage Survey
The Secretary	Dhuuluu-Yala Aboriginal Corporation
Ms Helen Riley	Mingaan Aboriginal Corporation
Mr Neville Williams	Mooka
Chairperson	Wellington Valley Wiradjuri Aboriginal Corporation
Mr Robert Clegg	Wiradjuri Council of Elders
Chairperson	Wiradjuri Traditional Owners Central West Aboriginal Corporation

Table 4.3 Stage 1 Round 2b Letters

Name	Organisation
Mr Ian Bell	-
Ms Rebecca Ingram	-
Ms Annette Steel	Orange Local Aboriginal Land Council

Table 4.4 Registered Aboriginal Stakeholders for the Orange Project

Name	Organisation	Date Registered
Ms Rebecca Ingram and Ms Eva Coe	Kallari Ngunawal Descendants	19 July 2012
Ms Nita	Wellington Valley Wiradjuri Aboriginal Corporation	19 September 2012

Stage 2 – Presentation of information about the proposed project:

A draft copy of the due diligence assessment undertaken prior to the Director-General's requirements for the Orange Aerodrome Expansion project, which included the project methodology and archaeological results, was provided on the 13 July 2012 to the registered Aboriginal stakeholder at that time (Kallari Ngunawal Descendants) for their information, and was accompanied by a request for comments on the project.

Notification will be provided to the registered Aboriginal parties that the Browns Creek to Orange Gas Pipeline Relocation component of the aerodrome upgrade is being assessed in a separate EIS.

Stage 3 – Gathering information about cultural significance:

A site visit was conducted on the 3rd of August. A representative of the Kallari Ngunawal Descendants was invited to attend, however, no representative attended the site visit. A phone conversation was undertaken on the 8th of August with the Kallari Ngunawal Descendants, and no comments were provided at this stage.

Stage 4 – Review of draft cultural heritage assessment report:

A copy of this report was provided to registered Aboriginal stakeholders on 5th October 2012 with an opportunity to comment by 2nd November 2012. No comments were received on this report.

4.2 Native Title Claim

A registered Native Title Claim (NC09/4) exists immediately to the north, and outside of, the study area (see Appendix 2).

5. ABORIGINAL CULTURAL AND ARCHAEOLOGICAL CONTEXT

5.1 Tribal Boundaries

The Proposed Orange Aerodrome Pipeline Relocation study area traverses the area which was, at the time of European settlement, inhabited by members of the Wiradjuri linguistic group, and falls into the tribal area delineated by Tindale (1974) as 'Wiradjuri'. This territory is located within the Murray Darling Basin and extends from Dubbo and Bylong in the north to Tallangatta in the south and west from Lithgow to the Hay Plain and Ivanhoe.

Wiradjuri territory extends into three general physiographic regions: the highlands (central tablelands) in the east, the riverine plains in the west and the transitional western slopes zone in-between (White 1986: 39). The present day study area is located in the central tablelands.

5.2 Previous Archaeological Research

A number of archaeological surveys have been conducted in the region around the proposed Orange Aerodrome Pipeline Relocation study area. These surveys provide a regional context for the study area.

In 1981 Pearson completed a major regionally based research investigation. His thesis was an investigation of Aboriginal and early European settlement patterns within the Upper Macquarie River region of NSW. The majority of his field coverage was directed by information from informants and was thus skewed toward large or obtrusive sites which had been recognised by local residents. Pearson excavated three rock shelter sites (Botobolar 5, and Granites 1 and 2) which provided a regional record of Aboriginal occupation dating back to around 7000 years before present (BP) ().

Pearson's analysis of the patterns of Aboriginal occupation involved an examination of site location characteristics in four sample areas. The following points summarise Pearson's results relevant to the present investigation:

- There is a strong relationship between site location and distance from water sources. Distance to water varied from 10 to 500 m, but in general the average distance from water decreased as site size increased;

- Sites were found on hilly or undulating places rather than on river flats or the banks of waterways. However it was found that the regional incidence of landform variation biased this sample;

- Good drainage and views over watercourses and river flats were also considered to be important site location criteria;

- Most sites were located in contexts which would originally have supported open woodlands, with small numbers in original grassland or forest contexts. However, this result is skewed by the predominance of the first vegetation type;

- Burial sites and grinding grooves were situated as close to habitation areas as geological constraints would allow;

- Ceremonial sites such as earth rings ('bora grounds') were located away from campsites;

- Stone arrangements were also located away from campsites in isolated places and tended to be associated with small hills or knolls or were on flat land;

- Quarry sites were located where stone outcrops with desirable working qualities were recognised and were reasonably accessible;

- Based on ethnohistoric information, Pearson suggests that Aboriginal campsites were seldom used for longer than three nights, and that large sites probably represent accumulations of short visits.

South of Orange, Ross carried out a preliminary survey of the Cadia area for a proposed copper mine in 1981, locating a possible scarred tree and two isolated finds (Ross 1981). Kohen subsequently conducted an archaeological survey of a proposed small to medium sized copper-gold mine at Cadia in 1991. He re-inspected Ross' scarred tree and considered the scar was unlikely to have an Aboriginal origin. He located one site (NPWS Site #44-1-0017), comprising seventeen artefacts including chert, quartz and quartzite, and three isolated finds (Kohen 1991:13-15).

Kohen noted that the impression gained from the limited archaeological surveys in the Cadia-Orange area was that there was 'little evidence of prehistoric Aboriginal occupation, with campsites being relatively uncommon and small' (ibid: 8). However, he conceded that this impression was probably a result of the few surveys which had been conducted in the area.

Haglund noted that in 1984, no sites had been listed for the Orange City Area on the NSW NPWS Aboriginal Site Register. She concluded that sites would be unlikely to remain in the heavily modified central area of the town, and that the most likely site types to occur in the surrounding areas were small scatters of stone artefacts, scarred trees and quarry sites (Haglund 1984a:5).

A survey was completed in 1982 by Cubis for the proposed Wallerawang to Wellington 330 kV power transmission line. Fifty five Aboriginal archaeological sites were recorded within or in close proximity to (within one kilometre) the transmission line study area (Cubis 1982).

In 1985 Haglund conducted a desktop assessment of the prehistoric heritage within the Mudgee shire. At the time of assessment the National Parks and Wildlife Services (NPWS) register listed 59 Aboriginal archaeological sites located within the boundaries of the shire. Haglund noted that eleven more sites were known to exist but had not been added to the NPWS register. It was recommended that an archaeological survey be conducted prior to any future developments within the shire.

South of Cadia, Paton surveyed two small mining lease areas at Junction Reef near Blayney. No sites were recorded in the course of these surveys (Paton 1990).

An archaeological assessment was conducted in 1993 by Davies for the proposed Telecom optic fibre cable route between Orange and Narromine. Some 76 previously recorded sites occurred within the optic fibre cable study area. Archaeological material was found at nine locations in the course of Davies' survey, comprising five artefact scatters, three isolated artefacts and one scarred tree.

In 1993 Paton surveyed an 277 km optical fibre cable route from Mitchell in the ACT to Orange, locating nine sites comprising seven artefact scatters, one scarred tree and an artefact scatter/stone arrangement/raw material source in the course of the survey.

No Aboriginal sites were located during a survey by Dallas (1993) of the Canobolas Wool Top Expansion Project north of Orange, nor in the course of small area surveys of road realignments some 20 km west of Orange (Kelton 1995a & b). One scarred tree and an isolated find were located by Kelton (1994) in the proposed 'Moulder Hill' residential area west of Orange.

Navin Officer Heritage Consultants 1996 conducted an archaeological survey of the Orange to Cadia Transmission line. Two Aboriginal artefact scatters and one isolated find were located in the course of surveys of the transmission line easement.

In 1996 Kelton completed an archaeological survey for the proposed Long Point Road Orange to Mudgee Link in central west NSW. Sixteen Aboriginal archaeological sites were recorded which included: eleven open campsites (stone artefact scatters), three stone quarry sites, an isolated artefact, and one site which consisted of a previously recorded burial site and three scarred trees.

A subsequent supplementary report was prepared for the project which involved an archaeological survey for a section of road that had been re-designed to avoid a section of the original proposal

which involved traversing extremely steep country. No sites had previously been recorded for the study area and the survey resulted in the recording of one Aboriginal site – a quarry (D-QS-4).

An assessment of the Suma Park and Spring Creek Reservoirs near Orange was undertaken by Oakley (2002). Seven sites were situated on low gradient spurs, and many were either just visible above the water line of the reservoir. An eighth site was located on a naturally occurring quartz outcrop on a low gradient slope.

An extensive survey of over 632 ha, near the Mitchell Highway approximately six kilometres west of the Orange CBD, was undertaken in 2003 (Heritage Concepts 2003). One artefact scatter with associated PAD was recorded on a slope above Broken Shaft Creek and assessed as being the remnants of a larger deposit that had moved down slope from a nearby terrace through colluvial action.

In 2006 OzArk EHM undertook survey of 212 ha between Leeds Parade and the Ophir Road Orange, NSW for the Orange City Council Local Environmental Study (LES). The assessment recorded nine Indigenous sites and one PAD:

The most recent study to be undertaken for this region was in 2009. OzArk completed an indigenous heritage assessment for the Area 51 Recreation Park located northeast of Orange. Seven Aboriginal sites comprising five open sites, one scarred tree and one isolated find were recorded.

5.3 Predictive Aboriginal Cultural and Archaeology Statement

Open artefact scatters are the most common Aboriginal site type present in the Orange region. They may occur almost anywhere that Aborigines have travelled and may be associated with hunting or gathering activities, domestic camps, or the manufacture and maintenance of stone tools. The density of artefacts represented in these scatters can vary dramatically and can be dependent on factors such as stream ordering and the permanence of water sources.

Previous survey results suggest that artefact scatters are most likely to be located on well-drained and locally elevated ground adjacent to permanent water sources. High site densities and relatively dense artefact concentrations can be expected in close proximity to permanent watercourses. Elevated sand bodies within valley floor contexts are a landscape element with high potential.

Isolated finds, generally defined as a single stone artefact which occurs without any associated evidence of Aboriginal occupation within a radius of 60 metres, are recorded in small numbers in the Orange region. Isolated finds may be indicative of: random loss or deliberate discard of a single artefact, the remnant of a now dispersed and disturbed artefact scatter, or an otherwise obscured or subsurface artefact scatter. Except in the case of the latter, isolated finds are considered to be constituent components of the *background scatter* of Aboriginal artefacts present within any particular landform.

Lithic quarry and procurement sites, together with associated flaking floors, may occur wherever rock types, suitable for stone tool manufacture, are exposed. Typically these sites involve the extraction of siliceous rock types for the manufacture of artefacts. Several quarry sites have been recorded in the Orange and adjacent regions.

The location of the proposed Orange Aerodrome Expansion study area on the open plateau within the broader landscape context of undulating slopes and hills, and to the east of Mt Canobolas, is within close proximity to semi-permanent and permanent water sources, and may have acted as part of an effective travel route.

Previous archaeological surveys across the Orange region suggest the following archaeological attributes and site location parameters for the study area:

- Artefact scatters are the most common site type and generally contain low numbers of artefacts and are found in low densities.

- The most important site location determinants appear to be the following (both singly and in

combination): level or near level ground, well drained and locally elevated ground, proximity to permanent water, and location on a major watershed.

- Crest topographies on major watersheds which offer an effective through-access route across rugged and incised terrain appear to have a higher site incidence than lesser order crest-line topographies.

- Site location trends toward mid-valley slope contexts may be indicative of avoidance of cold air drainage.

- Wetland margins are a focus for Aboriginal occupation.

6. HISTORICAL CONTEXT

6.1 Historical Overview

The first documented European visitor to the Central Tableland region was George Evans, who crossed the Blue Mountains in 1813 when he encountered an expansive area of prime grazing land. Consequently, the initial settlement of this area was dictated by the needs of the pastoral industry. Governor Macquarie reserved all land west of the Macquarie River for Government stock and agricultural stations, and limited land-grants and grazing permits to colonists.

Private occupation was restricted to the east of the Macquarie and Campbell Rivers by Governor Macquarie (1810-1821) and his successor, Governor Brisbane (1821-1825) (Heritage Office and DUAP 1996:90).

Several settlements began to emerge in this period within these limits on occupation.

Bathurst was initially occupied from 1815 as a government station on either side of the Macquarie River. Kelso was occupied as a private settlement from 1818. The Wellington Valley was settled as a remote convict stock station from 1823. By the mid 1820s it was recognised that another settlement was needed between Wellington and Bathurst due to the distance between the two. Subsequently, a station was created on Fredericks Valley Creek to the east of where Orange is located today (Hughes Trueman Ludlow 1986:20). Generally, these settlements supported cattle grazing and to lesser degree sheep grazing, along with a small amount of wheat and maize agriculture (Heritage Office and DUAP 1996:90; Hughes Trueman Ludlow 1986:19).

In 1826, Governor Darling re-defined the limits of location and opened this entire region to private settlement. Sheep grazing then became the dominant pastoral activity. This change in the pastoral industry was linked with the movement of ex-convict and free migrant settlers into this region during the later 1820s and 1830s. Some of these settlers amassed large pastoral runs with significant homesteads between the 1820s and 1840s (Heritage Office and DUAP 1996:90-91).

By the 1840s the Central Tableland region was no longer on the frontier, as squatters had moved beyond the limits of location in search of their own runs. The region now served as a supply centre for the newly settled regions to the north. With the survey and laying out of towns and villages such as Bathurst in 1833, Mudgee in 1837, Carcoar in 1838, Rylstone in 1842 and Orange and Wellington in 1846, settlement within this region became more organised (Heritage Office and DUAP 1996:91).

The settled landscape was altered by the gold rushes of the 1850s and created many new townships and settlements. The landscape was changed from one centred on pastoralism to one encompassing both mining and pastoral interests.

Prior to the establishment of the township of Orange the general area was the site of sporadic settlement from the 1820s through to the early 1840s (Hughes Trueman Ludlow 1986:19). This settlement appears to have been built around the track from Bathurst to Wellington Valley which roughly follows the current Mitchell Highway.

Generally, the settlement over this period had three different phases:

1. *The establishment of 'Frederick's Valley' government station at Chinaman's Bend in the 1820s, disbanded early in the 1830s;*

2. *The establishment in the 1830s and 1840s of a number of large land grants along Summer Hill Creek from Lucknow north to the present town;* (*Summer Hill and Frederick's Valley are interchangeable names for the same creek).*

3. *The creation of a small township at Shadforth (known originally as 'Frederick's Valley') in the 1840s* (Hughes Trueman Ludlow 1986:19).

Only one of these early phases of settlement succeeded. The large land grants along Summer Hill Creek were ultimately consolidated into permanent estates that lasted well into the twentieth century and remain in some form or another today (Hughes Trueman Ludlow 1986:21-22, 25).

Orange was built on a Village Reservation marked out in 1828-1829, but remained unoccupied until the mid-1840s. During the 1830s this reservation was surrounded by substantial land grants which developed into permanent estates. The encroachment of these landholders on the perimeter of the reserve, the steadily increasing local population, and the development of the nucleus of a village in the area led surveyor Davidson to urge for the creation of the township of Orange in 1846. By the middle of the decade it was claimed that there were round 1400-1600 people within 45 miles of the Village Reservation. The Village of Orange was proclaimed on the 18th of November 1846 (Hughes Trueman Ludlow 1986:25-27).

Even though the local residents had argued for the creation of the township of Orange there was no immediate rush to take up the newly opened allotments. This reticence can partly be explained by the lack of reliable water at the site, as Blackman's Swamp Creek would dry up during the summer. Consequently, by 1851 there were only seven allotments in the square mile reserve with houses on them. Although the town was sparsely settled it had acquired several civic amenities: in 1848. These comprised a police station and a store which was attached to Mills' Hotel; and in 1849 a court of petty sessions, another store, a Post Office, and a Methodist Chapel. This slow and steady growth had been fuelled by extensive sheep and cattle grazing to the north and east of the township and increasing wheat farming in the general area (Hughes Trueman Ludlow 1986:27-29).

The gold rush at Ophir, located about 30 km north of Orange, in May 1851 had a major impact on settlement in the Central Tablelands. At the height of the rush the fledgling township of Orange was largely depopulated, however, the mass migration to the area ultimately served to consolidate the settlement (Hughes Trueman Ludlow 1986:29).

The township of Orange was incorporated as a municipality in 1860. In 1864 the population rose to over 1,000 which enabled the town to become a borough (Hughes Trueman Ludlow 1986:30-31).

During the mid 1860s Orange benefited greatly from the discovery of gold at Lucknow to the southeast of the township (Heritage Office and DUAP 1996:93). For example, around £250,000 was deposited in the banks in Orange between 1862 and 1865. This influx of wealth, a growing population, and the expansion of the wheat industry led Orange to become a genuine commercial centre. Orange developed steadily during the rest of the 1860s and early 1870s with a population of 1,456 by 1871 (Hughes Trueman Ludlow 1986:31-32).

The next commercial expansion of Orange resulted from its connection to the Main Western Railway in 1877 which enabled rapid communications with Sydney and the coastal market. At this time most of the town's water supply was drawn from private wells. A government engineer recommended the construction of a reservoir and a piped water system for the town, but it was not until 1890 that this occurred (Hughes Trueman Ludlow 1986).

By the late 1880s it had become necessary to extend the township beyond its original square mile extent. In 1888 seventy four lots were put up for auction to the north of the township. In the same year a new borough, East Orange, also one square mile in extent, was created to the east of the original township. From this point until 1912 the town of Orange consisted of two different municipalities (Hughes Trueman Ludlow 1986).

The general prosperity of Orange and its diverse economic base enabled it to survive the collapse of the Lucknow mines between 1887 and 1890, the banking collapse of 1893 and the following depression. Orange's prosperity led it to be seriously considered as the Federal Capital in the early 20th century, but despite the failure of its claim the town continued to grow up until the First World War. By this time the population of the town had reached 8,000 (Hughes Trueman Ludlow 1986:39).

The Great War did not especially disadvantage the town and Orange continued to expand and prosper after 1918 up until the 1930s depression. By the end of the 1930s the town had a population of over 11,000 (Hughes Trueman Ludlow 1986:39-40).

The growth of the town and its general prosperity is largely due to its strong economy which had been supported by a number of different industries over its history (Heritage Office and DUAP 1996:95).

6.2 Orange Aerodrome

The first aerodrome in Orange was built in 1938 at a cost of £10,000 (SMH 24 January 1938). The aerodrome was built on a 100 acre site in close proximity to the Orange township. The aerodrome was moved to its current location in 1960, in close proximity to the Spring Hill settlement.

The current aerodrome comprises a terminal with supervisor's office, 11 private hangars, 3 sheds and a T-Hangar complex. The terminal building was upgraded in 1996 to include check-in facilities, a meeting room, toilet facilities, a supervisor's office and coffee shop.

6.3 Predictive Historical Archaeology Statement

Unrecorded historic sites and features of heritage significance that may occur within the study area include:

- Old fence lines, such as post and rail fencing; these may occur along road easement boundaries and farmlands.

- Indications of field systems, such as drainage channels and ridge and furrow ploughlands; these are likely to survive in low lying agricultural ground, especially in areas that are now used for grazing, rather than cropping.

- Traces of agricultural and industrial processing or extractive sites, such as dairies, factories, and quarries; these may be found throughout agricultural lands on valley floors and adjacent low ranges;

- Archaeological sites, such as the occupation remains of former dwellings including homesteads, houses and huts; these will be distributed in close association with land settlement patterns, and correlated with favourable agricultural lands, trading nodes and transport corridors;

- Nineteenth-century structures, such as farm dwellings, outbuildings, selector's and timber-getters huts; these may survive as standing buildings, ruins or archaeological deposits and are most likely to survive on less developed rural properties, on early portion numbers, and in or near established farm building complexes;

- Standing buildings and structures; these will be focused in the town and along the early centres and corridors of occupation, industry, travel and transport; and

- Sites associated with early roads; these will be closely associated with early cadastral road reserves, watershed ridgelines, and related to early river and creek crossing points.

Structures of historical interest and heritage significance may be standing, ruined, buried, abandoned or still in use.

7. RESULTS

Following database searches:

- No Aboriginal artefacts, sites or areas of potential were listed within the study area (Refer Appendix 1); and
- No historical heritage listed items were within the study area.

During the course of the field survey:

- No Aboriginal artefacts, sites or areas of potential were identified within the study area; and
- No historical sites, objects or areas of potential were identified within the study area.

8. STATUTORY AND POLICY CONTEXT

8.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act) and its regulations, schedules and associated guidelines require that environmental impacts are considered in land use planning and decision making. Environmental impacts include cultural heritage assessment. The Act was reformed by the *Environmental Planning and Assessment Amendment (Infrastructure and other Planning Reform) Act 2005*.

The Part 5 assessment system was created as part of the EP&A Act. The purpose of the Part 5 system is to ensure public authorities fully consider environmental issues before they undertake or approve activities that don't require development consent. As such, it has commonly been used to assess activities such as roads, railways, dredging and forestry works which don't require consent. If these activities are judged by the relevant public authority to significantly affect the environment, then an environmental impact statement will need to be prepared and considered by this authority.

Changes to the EP&A Act which commenced on 1 October 2011 means that some activities under the Part 5 assessment system will be determined by the Minister for Planning and Infrastructure, following an assessment by the Department.

8.1.1 State Significant Development/Infrastructure

A specific assessment system has been created in the Environmental Planning and Assessment Act to consider projects classed as State significant development (SSD) and State significant infrastructure (SSI).

A range of development types such as mines and manufacturing plants as well as warehousing, waste, energy, tourist, education and hospital facilities are considered to be SSD if they are over a certain size or located in a sensitive environmental area.

Major infrastructure proposals, in particular linear infrastructure such as roads, railway lines or pipes which often cross a number of council boundaries, will generally be considered as SSI.

Development which doesn't require consent but which could have a significant environmental impact, such as a port facility or major water supply system, is also likely to be considered as SSI.

The assessment system for State significant development and infrastructure introduced on 1 October 2011 provides for a consolidated assessment of these proposals in one application. The NSW Department of Planning and Infrastructure carries out a single, coordinated assessment of all issues with a proposal, rather than a wide range of State agencies making separate assessments.

Proposals assessed as State significant generally only require approval from the Minister for Planning and Infrastructure (or his delegate), following a comprehensive assessment by the Department of Planning and Infrastructure conducted in consultation with other government agencies and councils.

As a result the following authorisations are not required from other government agencies for State Significant Development (SSD) and State Significant Infrastructure (SSI):

- State heritage item impacts under the *Heritage Act 1977*; and

- Aboriginal heritage permits under the *National Parks and Wildlife Act 1974*.

8.4 Implications for the Browns Creek to Orange Gas Pipeline Relocation

The Browns Creek to Orange Gas Pipeline Relocation project will be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A ACT) for State Significant Infrastructure

(SSI). Both Aboriginal and Historical cultural heritage values need to be addressed prior to development approval.

8.4.1 Aboriginal Heritage

No Aboriginal sites or areas of archaeological potential have been identified in the Orange study area.

8.4.2 Historical Heritage

No historical sites or areas of potential have been identified in the Orange study area.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

Based on the desktop review and the results of the field surveys:

- No Aboriginal sites or areas of archaeological potential were identified within the Orange Aerodrome Pipeline Relocation study area; and
- No historical sites or areas of potential were identified within the Orange Aerodrome Pipeline Relocation study area.

Taking into account the results of this assessment and previous heritage studies conducted in the local area, landscape disturbance in the study area, and location of the study area within a broad plateau, it is concluded that there is low potential for unrecorded Aboriginal or historical archaeological sites to be present within the study area.

9.2 Recommendations

It is recommended that:

1. No further cultural heritage assessment is required for the Orange Aerodrome Pipeline Relocation project.

2. If Aboriginal objects are located during development works all works in the area of the find should cease, and the NSW OEH and representatives from the Orange LALC should be notified. Where required, further archaeological investigation should be undertaken. Development works in the area of the find(s) may recommence if and when outlined by the management strategy, developed in consultation with and approved by the OEH.

3. If suspected skeletal remains are located during development works all works in the area of the find should cease, the local Police should be notified, an archaeologist from OEH and representatives from the Orange LALC should be notified. Construction and related works in the area of the remains may not resume until the proponent receives written approval in writing from the relevant statutory authority, including the Police, Coroner in the event of an investigation, OEH in the case of Aboriginal remains or Heritage Branch in the case of non-Aboriginal remains outside of the jurisdiction of the Police or Coroner.

4. If historical items are located during development works all works in the area of the find should cease and the NSW Heritage Council should be notified. Where required, further archaeological investigation should be undertaken. Development works in the area of the find(s) may recommence if and when outlined by the management strategy, developed in consultation with and approved by OEH and the Heritage Council.

Detailed Unanticipated Discovery Protocols are provided in Appendix 3 of this report.

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APPENDIX 1

AHIMS SEARCH RESULTS

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Your Ref Number : Orange Airport
Client Service ID : 64095

Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street
Kingston Australian Capital Territory 2604

Date: 24 February 2012

Attention: Nicola Hayes

Email: nhayes@nohc.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 55, Eastings : 694000 - 703000, Northings : 6301000 - 6308000 with a Buffer of 50 meters, conducted by Nicola Hayes on 24 February 2012

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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43 BridgeStreet HURSTVILLE NSW 2220
Tel: (02)9585 6345 (02)9585 6741 Fax: (02)9585 6094

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

APPENDIX 2

NATIVE TITLE REGISTRATION

NATIONAL NATIVE
TITLE TRIBUNAL

Application Information and Extract from the Register of Native Title Claims

Application Information

Application numbers: Federal Court number: NSD912/09
NNTT number: NC09/4

Application name: Wellington Valley Wiradjuri People

Registration history: Registered from 18/12/2009.

Register Extract (pursuant to s.186 of the *Native Title Act 1993*)

Application filed with: Federal Court of Australia

Date application filed: 24/08/2009

Date claim entered on Register: 18/12/2009

Applicants: Mrs Joyce Williams, Mrs Violet Carr, Mrs Elizabeth (Betty) Ferguson

Address for service:
Philip Teitzel
Teitzel & Partners
PO Box 442
ROSEVILLE NSW 2069
Phone: 02 9416 3138
Fax: 02 9880 9061

Additional Information:

Not Applicable

Area covered by the claim:

The application area covers all the land and waters in the State of New South Wales within the external boundary described as follows:

Commencing at a point north of the Mitchell Highway, about midway between Orange and Bathurst [at Longitude 149.266391 degrees East, Latitude 33.376520 degrees South]; then generally north westerly passing south of Molong and Saddleback Peak to Goobang National Park; then generally north easterly and generally easterly passing south of Wongarbon, north of Gulgong and south of Ulan; then generally south easterly between Bylong Flat and Gingbi; then generally south westerly to north of Capertee; then generally westerly passing north of Sofala and south of Hill End; then generally southerly back to the commencement point, according to coordinate points listed in Attachment B1 to the application.

Areas within the external boundaries that are not covered by the application:
The applicants exclude from the area covered by the application any area over which native title has been extinguished at common law or by statute save and except for those areas of land or waters over which prior extinguishment may be disregarded in accordance with the provisions of either s47, s47A or s47B of the Native Title Act 1993.

In particular the following are excluded:

Category A past acts, as defined in s229 of the Act, including any previous non-exclusive possession acts which are also Category A past acts; and

Grants or vestings which are 'previous exclusive possession acts' (as defined in s23B of the Act) or Category A intermediate period acts (as defined in s232B of the Act) attributable to the Commonwealth and such grants or vestings which are attributable to the State where the State has made provision as mentioned in s23E and s22F of the Act in relation to these acts.

For the avoidance of doubt, the following acts which occurred on or before 23 December 1996, where valid (including Division 2 or 2A of Part 2 of the Act) are included or, for present purposes, are to be treated as included in the definition of 'previous exclusive possession acts', unless excluded from the definition by subsections 23B(9), (9A), (9B), (9C) or (10).

1. The creation or establishment of:
a. a permanent public work
b. a dedicated road
c. an act of adverse dominion where such an act was:
   i. authorised
   ii. authorised or required by the condition of a valid Crown Grant, vesting or other interest
d. an unqualified grant of an estate in fee simple.

2. The grant of:
a. a scheduled interest (see s249C of the Act), including an agricultural lease where intensive cultivation of a permanent nature has been carried out and works or structures of a permanent nature have been constructed in accordance with the terms and conditions of the lease.
b. a residential lease on which a residence has been constructed in accordance with the terms and conditions of the lease (see s249).
c. a commercial lease on which permanent works or structures have been constructed in accordance with the terms and conditions of the lease (see s246).
d. a lease for the provision of community services or amenities within a town or city on which works or structures of a permanent nature have been constructed in accordance with the terms and conditions of the lease (see s249A).

Persons claiming to hold native title:

Schedule A states:
The native title claim group consists of the people known as the Wellington Valley Wiradjuri People, being those Aboriginal people whose traditional land and waters are situated generally in the Wellington Valley in the State of NSW.

The Wellington Valley Wiradjuri Claim Group comprises those people who hold in common the body of Traditional Law and Customs governing the area being the subject of the claim and more particularly described in Attachment "A".

Attachment A states:
The Wellington Valley Wiradjuri Claim Group comprises those people who hold in common the body of Traditional Law and Customs governing the area being the subject of the claim and who:

1. Are related by means of the principle of biological descent from the below listed Apical Ancestors:

(a) Charlotte Riley
(b) Samuel and Jane May
(c) Ellen Plummer
(d) William John King and Margaret (Holland) Dawkins
(e) Jemmy Buckley and Poll (including Thomas Hartley and Clara Buckley)
(f) Arthur Stewart, Alexander Stewart and Charles Stewart
(g) Bessie Macdonald and Lily Macdonald
(h) Ellen Baird/Beard, James and (W) Dolly Beard
(i) George Drew and (Z) Agnes Drew
(j) Michael Mitchell Mickey and Mary Bloomfield
(k) Benjamin Holland and Sarah Hill (Steel) (including Jock Stanley and Emma Holland, James Wighton and Mary Holland)
(l) Edward Williams and Kate Carr (including George Daley and Johanna Williams)
(m) Edward Carr and Sophie Ryan
(n) Bridget Carr
(o) John Button
(p) Ann Daley, mother of George Daley

Registered native title rights and interests:

The following Native Title Rights & Interests were entered on the Register on 18/12/2009:
The claim to non-exclusive rights to use and enjoy the land and waters, being:
a) the right to access the application area;
b) the right to camp on the application area;
c) the right to erect shelter [sic] on the application area;
d) the right to live on the application area;
e) the right to move about on the application area;
f) the right to hold meetings on the application area;
g) the right to hunt on the application area;
h) the right to fish on the application area;
i) the right to have access to and use the natural water resources on the application area; (This right is registered only to the extent that it involves the use of water for non-commercial purposes.)
j) the right to gather and use the natural products of the application area (including food, medicinal plants, timber, stone, ochre and resin) according to traditional laws and customs;
k) the right to conduct ceremony on the application area;
l) the right to maintain and protect places of importance under traditional laws, customs and practices in the application area;
m) the right to speak for and make non-exclusive decisions about the application area;
n) the right to transmit the cultural heritage knowledge of the native title claim group including knowledge of particular sites;
o) The right to cook on the application area and to light fires for all purposes other than the clearance of vegetation

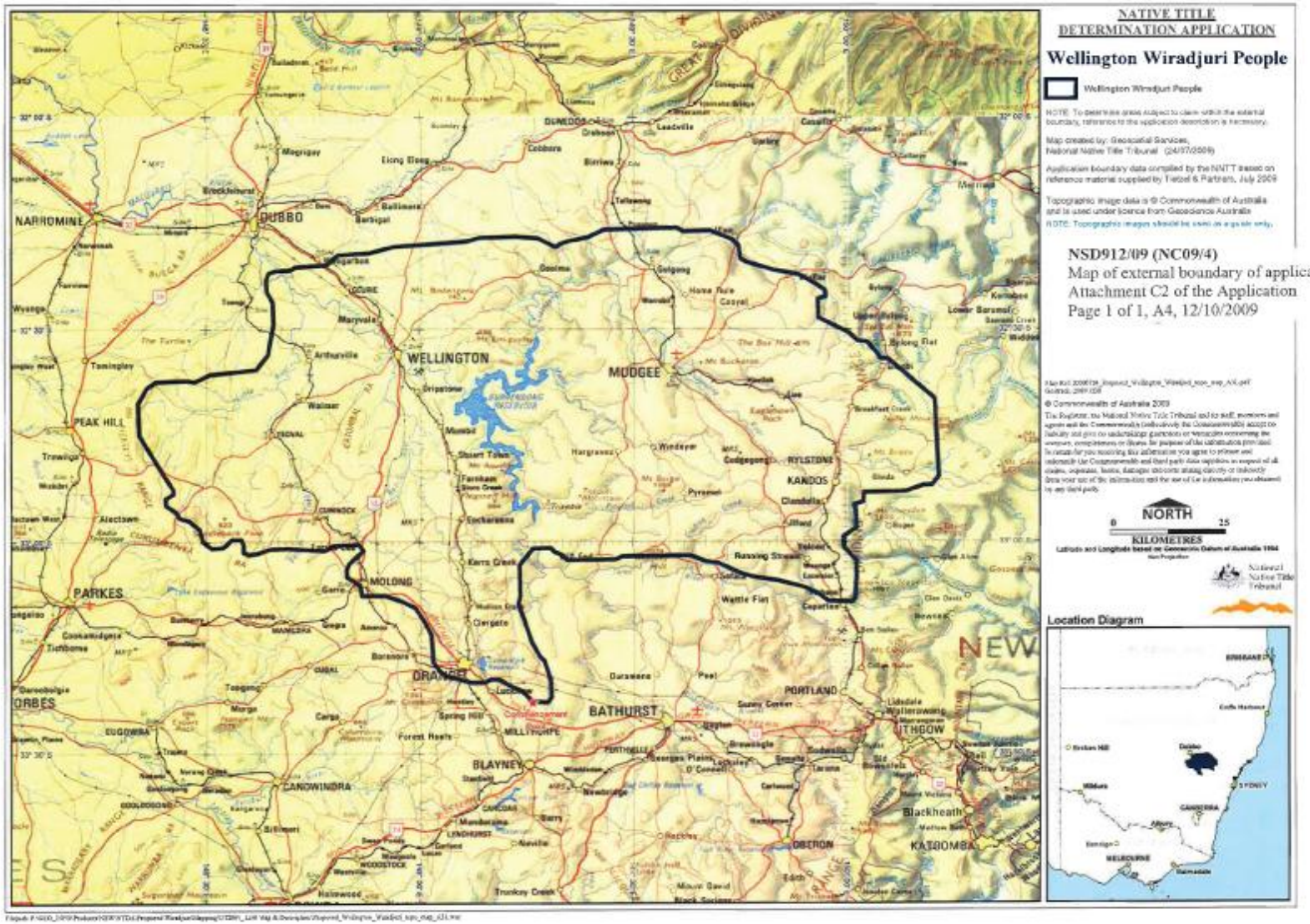
3. The native title rights are subject to:
a) the valid laws of the State of New South Wales and the Commonwealth of Australia
b) the rights (past or present) conferred upon persons pursuant to the laws of the Commonwealth and the laws of the State of NSW
c) the traditional laws and customs of the native title claim group.

Register attachments:

1. External Boundary Description, Attachment B1 of the Application, 4 pages - A4, 12/10/2009

2. Map of external boundary of application (produced by NNTT), Attachment C of the Application, 1 page - A4, 12/10/2009.

Note: The Register may, in accordance with s.188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.


NATIVE TITLE
DETERMINATION APPLICATION
Wellington Wiradjuri People
Wellington Wiradjuri People
NOTE: To determine areas subject to claim within the external boundary, reference to the application description is necessary.
Map created by: Geospatial Services, National Native Title Tribunal (24/07/2009)
Application boundary data compiled by the NNTT based on reference material supplied by Tietzel & Partners, July 2009
Topographic image data is © Commonwealth of Australia and is used under licence from Geoscience Australia
NOTE: Topographic images should be used on a guide only.
NSD912/09 (NC09/4)
Map of external boundary of application
Attachment C2 of the Application
Page 1 of 1, A4, 12/10/2009
© Commonwealth of Australia 2009
NORTH
0
25
KILOMETRES
Location Diagram
NARROMINE
DUBBO
WELLINGTON
MUDGEE
PEAK HILL
PARKES
MOLONG
ORANGE
BATHURST
ORBES
CANOWINDRA
BLAYNEY
OBERON
KANDOS
RYLSTONE
PORTLAND
LITHGOW
Blackheath
KATOOMBA
SYDNEY
CANBERRA
MELBOURNE

APPENDIX 3

UNANTICIPATED DISCOVERY PROTOCOLS

Protocol to follow in the event that Aboriginal object(s) or historical relics (other than human remains) are encountered and no AHIP has been approved

In the event that object(s) which are suspected of being Aboriginal object(s) or historical relic(s) are encountered during development works, then the following protocol will be followed:

1. Cease any further excavation or ground disturbance, in the area of the find(s);

    a. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be temporarily halted; and

    b. The site supervisor and the Principal will be informed of the find(s).

2. Do not remove any find(s) or unnecessarily disturb the area of the find(s);

3. Ensure that the area of the find(s) is adequately marked as a no-go area for machinery or further disturbance, and that the potential for accidental impact is avoided;

4. Note the location and nature of the finds, and report the find to:

    a. Relevant project personnel responsible for project and construction direction and management, and

    b. Report the find to the Office of Environment and Heritage (OEH).

5. Where feasible, ensure that any excavation remains open so that the finds can be recorded and verified. An excavation may be backfilled if this is necessary to comply with work safety requirements, and where this action has been approved by the OEH. An excavation that remains open should only be left unattended if it is safe and adequate protective fencing is installed around it.

6. Following consultation with the relevant statutory authority (OEH), and, where advised, any other relevant stakeholder groups, the significance of the finds should be assessed and an appropriate management strategy followed. Depending on project resources and the nature of the find(s), this process may require input from a consulting heritage specialist.

7. Development works in the area of the find(s) may re-commence, if and when outlined by the management strategy, developed in consultation with, and approved by the relevant statutory authority.

8. If human skeletal material is encountered, the protocol for the discovery of human remains should be followed (refer attached).

Protocol to follow in the event of the discovery of suspected human remains

The following protocol will be actioned if suspected human material is revealed during development activities or excavations:

1. All works must halt in the immediate area of the find(s) and any further disturbance to the area of the find(s) prevented.

    c. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and

    d. The site supervisor and the Principal/Project manager will be informed of the find(s).

2. If there is substantial doubt regarding a human origin for the remains, then consider if it is possible to gain a qualified opinion within a short period of time. If feasible, gain a qualified opinion (this can circumvent proceeding further along the protocol for remains which are not human). If conducted, this opinion must be gained without further disturbance to the find(s) or the immediate area of the find(s). (Be aware that the site may be considered a crime scene that retains forensic evidence). If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.

3. Immediately notify the following of the discovery:

    a. The local Police (this is required by law);

    b. An archaeologist or Aboriginal Heritage Officer from the Office of the Environment and Heritage (OEH), Environment Protection and Regulation Group, Southern Branch (02 6229 7177, or call the OEH Environment Line: 131555 (excluding mobiles), or 02 9995 5555); and

    c. Representative(s) from the Orange Local Aboriginal Land Council.

4. Co-operate and be advised by the Police and/or coroner with regard to further actions and requirements concerning the find area. If required, facilitate the definitive identification of the material by a qualified person (if not already completed).

5. In the event that the Police or coroner instigates an investigation, construction works are not to resume in the designated area until approval in writing is gained from the NSW Police.

6. In the event that the Police and/or Coroner advise that they do not have a continuing or statutory role in the management of the finds then proceed with the following steps:

7. If the finds are not human in origin but are considered to be archaeological material relating to Aboriginal occupation then proceed with Protocol for the discovery of Aboriginal objects (other than human remains).

8. If the finds are Aboriginal or probably Aboriginal in origin:

    a. Ascertain the requirements of OEH, the Heritage Branch, the Project Manager, and the views of the Aboriginal community.

    b. Based on the above, determine and conduct an appropriate course of action. Possible strategies could include one or more of the following:

        i. Avoiding further disturbance to the find and conserving the remains *in situ*;

        ii. Conducting archaeological salvage of the finds following receipt of any required statutory approvals;

        iii. Scientific description (including excavation where necessary), and possibly also analysis of the remains prior to reburial;

iv. Recovering samples for dating and other analyses; and/or

v. Subsequent reburial at another place and in an appropriate manner determined by the Aboriginal community.

9. If the finds are non-Aboriginal in origin:

   a. Ascertain the requirements of the Heritage Branch, Project Manager, and the views of any relevant community stakeholders.

   b. Based on the above, determine and conduct an appropriate course of action. Possible strategies could include one or more of the following:

      a. Avoiding further disturbance to the find and conserving the remains *in situ*;

      b. Conducting archaeological salvage of the finds following receipt of any required statutory approvals;

      c. Scientific description (including excavation where necessary), and possibly also analysis of the remains prior to reburial;

      d. Recovering samples for dating and other analyses; and/or

      e. Subsequent reburial at another place and in an appropriate manner determined in consultation with the Heritage Office and other relevant stakeholders.

10. Construction related works in the area of the remains (designated area) may not resume until the proponent receives written approval in writing from the relevant statutory authority: from the Police or Coroner in the event of an investigation, from OEH in the case of Aboriginal remains outside of the jurisdiction of the Police or Coroner, and from the Heritage Branch in the case of non-Aboriginal remains outside of the jurisdiction of the Police or Coroner.

Attachment E

Flora and Fauna Impact Assessment

CLIENTS | PEOPLE | PERFORMANCE

Orange City Council

Brown's Creek to Orange Gas Pipeline Relocation

Flora and Fauna Impact Assessment

October 2012

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

This Flora and Fauna Impact Assessment ("Report"):

1. *has been prepared by GHD Pty Ltd ("GHD") for Orange City Council;*
2. *may only be used and relied on by Orange City Council;*
3. *must not be copied to, used by, or relied on by any person other than Orange City Council without the prior written consent of GHD;*
4. *may only be used for the purpose of assessment of ecological impacts resulting from the Browns Creek to Orange Gas Pipeline Realignment (and must not be used for any other purpose).*

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than Orange City Council arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- *were limited to those specifically detailed in section 1.3 and 3 of this Report;*
- *did not include fauna trapping.*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- *construction would be as per that described in section 1.2.*

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on for six months, after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

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1. Introduction

1.1 Background

East Australian Pipeline Pty Ltd (EAPL), a wholly owned subsidiary of APA Group, is proposing to redirect a section of the Brown's Creek to Orange Natural Gas Pipeline around a proposed runway extension and facilities development at Orange Aerodrome (the proposal).

The section of the Brown's Creek to Orange pipeline within proximity to Orange Aerodrome (the pipeline) traverses agricultural land in an easement currently held by APA Group. The pipeline is situated to the immediate west of Aerodrome Road, outside the perimeter of the existing Orange Aerodrome, approximately 15 kilometres south of the City of Orange

The proposed Orange Aerodrome Expansion Project, currently being progressed by Orange City Council, includes the expansion of the aerodrome site by approximately 80 ha to the west for an extended runway, taxiway and associated infrastructure. The Aerodrome Expansion Project would result in the acquisition of land on which the pipeline easement is currently held and construction over the existing pipeline. This would pose an unacceptable risk to the integrity of the pipeline resulting in the need for a modification to ensure that the pipeline is not compromised by the construction and operation of the aerodrome. The proposal will be assessed under Part 4 of the NSW *Environmental Planning and Assessment Act 1979.*

GHD Pty Ltd (GHD) has been commissioned by Orange Council to undertake an ecological assessment for the proposal.

1.2 The proposal

The proposal involves the relocation of the gas pipeline along the relocated Aerodrome Road over approximately 1.8 km and the decommissioning of the existing section of the pipeline which would be located within the proposed aerodrome site. .

The new pipe would be installed prior to the relocation of Huntley and Aerodrome Roads and would cross two existing roads: Gander Road and Huntley Road. Gander Road would remain accessible during construction with partial diversions established if required. Huntley Road is expected to be disused by the time of pipeline construction, and would not require any full road closures.

The new pipeline would be designed in accordance with the T1 classification requirements of AS2885 and would have a pipe thickness of 6.02 mm - 8.56 mm. The pipe would be buried along the entire length at a minimum depth of 1200 mm. Construction of the proposal would require a corridor of approximately 15 m -20 m in width to enable access of machinery/equipment and the temporary storage of materials.

1.3 Purpose of this report

This ecological assessment forms part of the EIS and aims to:

- Identify potential ecological constraints and opportunities, including in particular the presence or likely presence of threatened species, populations and ecological communities and their habitats listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Identify the potential relevance of any Matters of National Environmental Significance (MNES) listed under the EPBC Act with respect to the project;

- Identify the potential impacts of the proposal on threatened biota and their habitats;
- Assess the significance of impacts on threatened biota and MNES and identify the likely requirement or otherwise for further approvals under the NSW *Environment Planning and Assessment Act 1979* (EP&A Act) or EPBC Act; and
- Recommend mitigation and environmental management measures to avoid or minimise adverse impacts on threatened biota and biodiversity values.

1.4 Site description

The pipeline is situated to the immediate west of Aerodrome Road, outside the perimeter of the existing Orange Aerodrome, approximately 15 kilometres south of the City of Orange, within the Orange Local Government Area (LGA) (Figure 1). It is located within the Orange subregion of the Central West catchment.

Orange is approximately 948 m above sea level (BOM, 2012). The Orange subregion into which the area falls is characterised by an undulating landscape with isolated volcanic peaks. The study area is underlain by Cainozoic basalts and is located in an area of relatively flat topography, as is required for an airport. There are no major creeks in the study area. Water bodies are limited to farm dams and drainage ditches alongside roads. The study area is mainly cleared land, comprising paddocks and occasional small stands of trees, and planted gardens at the airport itself.

Orange experiences a temperate climate, influenced by its elevation. Snow usually falls in the district several times each winter. Mean maximum temperatures range from 26°C in January to 9.3°C in July and mean minimum temperatures range from 12.4°C in February to 0.7°C in July. Rainfall is generally evenly spread throughout the year (lower in autumn and early winter, and highest in August) and the region receives an average of 893.9 mm per year (BOM 2012).

1.5 Definitions

- The subject site is defined as the area to be directly affected by the proposal (in accordance with DEC 2005). In this case it encompasses the construction footprint of 15-20 m width along the route of the pipeline and stockpile areas (Figure 2).
- The study area is defined as the project site and any additional areas, which are likely to be affected by the proposal, either directly or indirectly (in accordance with DEC 2005). For the purpose of this report, the study area includes the subject site and adjacent areas, generally within 100 m of the subject site.
- The locality is defined as the area within a 10 km radius of the study area. The locality is mapped on Figure 1.
- The region is defined as the South Eastern Highlands bioregion (Thackway and Cresswell 1995).

LEGEND

- Study Area
- 10km Study Area Buffer
- Highways
- Major Roads
- Secondary Roads
- Other Roads
- HeavyRail
- LightRail
- Waterways

0 0.5 1 2 3 4
Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

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East Australian Pipeline Pty Ltd
Brown's Creek to Orange Gas
Pipeline Relocation EIS

Job Number	21-21326
Revision	B
Date	22 Oct 2012

Regional location

Figure 1

G:\21\21326\GIS\Maps\MXD\21_21326_Z041_PipelineEcology_Locality.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Data source: Data Custodian, Data Set Name/Title, Version/Date. LPMA, Street map, 2012. ESRI Inc., World Imagery, 2012. Created by: apmiller

Proposed high pressure gas main realignment

Existing high pressure gas main

Orange Aerodrome

0 50 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Existing gas pipeline
- Proposed gas pipeline realignment
- Proposed Aerodrome Expansion (not part of this proposal)

East Australian Pipeline Pty Ltd
Brown's Creek to Orange Gas Pipeline Relocation EIS

Job Number	21-21326
Revision	A
Date	19 Nov 2012

The proposal

Figure 2

G:\21\21326\GIS\Maps\MXD\21_21326_Z042_GasPipelineEcology_TheProposal.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Orange City Council, aerial imagery, 2012. Created by:apmiller

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

2. Legislative Context

2.1 NSW legislation

2.1.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the legal and policy platform for proposal assessment and approval in NSW and aims to, inter alia, 'encourage the proper management, proposal and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and EP&A Regulation 2000. The proposal is to be determined under Part 4 of the Act.

In addition, Section 111(4) of the Act states that the determining authority must consider the effect of an activity on:

- 'Critical habitat' (as defined under the TSC Act and FM Act).
- Species, populations or ecological communities, or their habitats (as listed under the TSC Act and FM Act) and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.
- Other protected fauna or protected native plants listed under the National Parks and Wildlife Act 1974.

This report addresses the ecological components of the 'environment' to assist Council with addressing s.111 of the Act.

Section 5A of the EP&A Act lists seven factors that must be taken into account in the determination of the significance of potential impacts of a proposed activity on threatened species, populations or ecological communities (or their habitats) listed under the TSC Act and the FM Act. The '7-part test' is used to assist in the determination of whether a proposal is 'likely' to impose 'a significant effect' on threatened biota and thus whether a species impact statement (SIS) is required. Section 5A of the EP&A Act was addressed as part of the current assessment and 7-part tests were completed for relevant threatened species and ecological communities that may be affected by the proposal.

2.1.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides legal status for biota of conservation significance in NSW. The Act aims to, inter alia, 'conserve biological diversity and promote ecologically sustainable development'. It provides for:

- The listing of 'threatened species, populations and ecological communities', with endangered species, populations and communities listed under Schedule 1, 'critically endangered' species and communities listed under Schedule 1A, vulnerable species and communities listed under Schedule 2.
- The listing of 'Key Threatening Processes' (under Schedule 3).
- The preparation and implementation of Recovery Plans and Threat Abatement Plans.
- Requirements or otherwise for the preparation of Species Impact Statement (SIS).

The TSC Act has been addressed in the current assessment through:

- Desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the site and hence could occur subject to the habitats present.

- Targeted field surveys for threatened species listed under the Act.
- Identification, assessment and mapping of EECs listed under the Act.
- Identification of suitable impact mitigation and environmental management measures for threatened species, where required.
- Assessment of potential impacts on threatened species.

2.1.3 Fisheries Management Act 1994

The objects of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It provides for:

- The listing of threatened species, populations and ecological communities, with endangered species, populations and communities listed under Schedule 4, 'critically endangered' species and communities listed under Schedule 4A, vulnerable species and communities listed under Schedule 5.
- The listing of 'Key Threatening Processes' (under Schedule 6).
- Diseases affecting fish and marine vegetation (under Schedule 6B).
- Noxious fish and noxious marine vegetation (under Schedule 6C).
- The preparation and implementation of Recovery Plans and Threat Abatement Plans.
- Requirements or otherwise for the preparation of a SIS.

The FM Act has been addressed in the current assessment through undertaking:

- A desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the site and hence could occur subject to the habitats present.
- Assessment of aquatic habitats during terrestrial field surveys.

2.1.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides the basis for the legal protection of native animals and plants in NSW. A wildlife licence is required under the NPW Act to harm or pick protected fauna and flora. All surveys were carried out under a Section 132C scientific licence (SL100146).

2.1.5 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) regulates the clearing of native vegetation on all land in NSW except for land listed in Schedule 1 of the Act. Excluded land under Schedule 1 of the Act includes National Parks and other conservation areas, State forests and reserves, and urban areas. The study area is not excluded land under Schedule 1. Clearing of native vegetation must be undertaken in accordance with a development consent granted in accordance with this Act.

2.1.6 Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* (NW Act), provides for the declaration of noxious weeds by the Minister for Primary Industries. Noxious weeds may be considered noxious on a National, State, Regional or Local scale. All private landowners, occupiers, public authorities and Councils are required to control noxious weeds on their land under Part 3 Division 1 of the NW Act. As such, if present, noxious weeds on the site should be assessed and controlled.

One noxious weed is present in the study area and would require control (see Section 4.3.2).

2.2 Commonwealth legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to ensure that actions likely to cause a significant impact on MNES undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, undertaking, proposal or activity. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for Sustainability, Environment, Water, Populations and Communities (the 'Minister').

The EPBC Act identifies MNES as:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar wetlands).
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- Nuclear actions (including uranium mining).

Potential impacts on any MNES must be subject to assessments of significance pursuant to the EPBC Act Significant Impact Guidelines (DEWHA 2009). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister. Assessments of significance for MNES considered to have the potential to occur at the site are included in Appendix D.

2.3 State planning policies

2.3.1 SEPP 44: Koala Habitat

State Environmental Planning Policy 44 (SEPP 44) aims to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'. Orange LGA is not listed in Schedule 1 of SEPP 44 as an LGA to which the SEPP applies. While preferred Koala feed trees were recorded (*Eucalyptus viminalis*), and the protected matters search (DSEWPAC 2012a) identified Koalas as being predicted to occur in the locality, there are no records for the species in the locality. This SEPP is not considered further in this report.

3. Methods

3.1 Database and literature review

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the TSC Act and FM Act, and MNES listed under the EPBC Act that may be affected by the proposal. Biodiversity databases pertaining to the study area and locality (i.e. within a 10 km radius of the study area) were reviewed and included:

- Office of Environment and Heritage (OEH) Wildlife Atlas database (licensed) for records of threatened species, populations and endangered ecological communities listed under the TSC Act that have been recorded within the locality (OEH 2012a, dated 17 October 2012).
- OEH threatened species profiles online database (OEH 2012b), including records of endangered populations and communities recorded within the Orange CMA subregion.
- Department of Primary Industries (DPI) online protected species viewer for records of threatened aquatic species in the Orange LGA (DPI 2012).
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) Protected Matters Search Tool for Matters of National Environmental Significance (MNES) listed under the EPBC Act within the locality (DSEWPaC 2012a, dated 17 October 2012).
- DSEWPaC online species profiles and threats database (DSEWPaC 2012b).

3.2 Field surveys

Field surveys were conducted for the related Orange Aerodrome Expansion project (GHD 2012) by two senior ecologists on 21 to 23 March 2012. As the pipeline relocation falls within the same study area and largely avoids native vegetation, no additional surveys were conducted.

3.2.1 Terrestrial flora survey

Flora surveys were conducted within the study area using quadrat surveys and transects.

Two quadrats of dimensions 50 metres by 20 metres were surveyed at locations where native vegetation exists (sites Q1 and Q2 in Figure 3). All observations were recorded on proforma field data sheets. Within each plot the vegetation and habitat characteristics were recorded, including:

- Physiography.
- Soils.
- Fire history.
- Disturbance and grazing.
- Dominant vegetation type (canopy, understorey and groundcover).
- Age structure.
- Number of trees and diameter (<20 cm, 21-40 cm, 41-60 cm, 61-80 cm and >80 cm).
- Ground characteristics (such as leaf litter and woody debris).
- Tree habitat characteristics (hollows etc).

Within the 20 metre by 50 metre quadrat, a floristic survey was conducted for a nested 20 metre by 20 metre quadrat. All species occurring in the nested quadrat were recorded, and per cent cover was estimated (Appendix B).

Transects were walked within and around the study area to search likely habitat for plant species using the 'random meander' technique of Cropper (1993) (sites T1 to T6 in Figure 3). As rare plants often exist in discrete populations in specific areas, a random search can increase the probability of finding rare plant populations. A random search effort also encompasses a greater portion of the landscape, as the search is not limited to specific sampling quadrats (only the stratification unit), and is useful in surveying difficult terrain and irregular shaped search areas.

Due to the limitations of time and access to some sites, only dominant species were recorded for some transect locations. These sites were heavily disturbed, and were dominated by introduced species.

3.2.2 Vegetation communities

Surveys of vegetation communities were undertaken across the study area to characterise vegetation formation, class, structure and condition. Plant community composition is especially important in relation to those areas which have the potential to be a threatened ecological community.

The completion of flora surveys enabled determination of the vegetation communities occurring in the study area. The study area was investigated by a random meandering transect to identify communities present and to identify any areas with the potential to be classified as a threatened ecological community. If a potentially suitable area was considered to be a threatened ecological community, an assessment of the area was undertaken using the guidelines set out for classification.

Vegetation communities with the potential to be a threatened ecological community were surveyed through characterisation of all vegetation within a quadrat (20 metre by 20 metre quadrat nested within a 50 metre by 20 metre quadrat) placed randomly within each of the vegetation communities. Quadrats were surveyed as detailed in section 3.2.1 above. The number of quadrats surveyed was dependent on the area of the vegetation community present.

Vegetation types within the study area were identified according to the vegetation classes of Keith (2004) and the vegetation types defined by the NSW Vegetation Types Database. Vegetation condition classes were assigned according to the BioBanking definitions (DEC 2009):

3.2.3 Terrestrial fauna survey

A variety of survey techniques were used to target threatened fauna species and assess habitat values within the study area. Detailed descriptions of survey techniques are outlined below and fauna survey locations indicated on Figure 3. All observations were recorded on proforma field data sheets.

Fauna habitat assessment

Habitat assessments were conducted across the entire study area in order to determine the conservation significance of fauna habitats and to assess the potential presence of native fauna (and especially threatened species) not directly observed during the surveys. General fauna habitat assessments included active searches for potential shelter, basking, roosting, nesting and/or foraging sites. Specific habitat features and resources such as water bodies, food trees, the composition of ground cover, presence of hollow-bearing trees, leaf litter and ground debris were noted. Habitat quality was rated as 'good', 'medium' and 'low', based on the level of breeding, nesting, feeding and roosting resources available. Good quality habitat was considered to have high densities of habitat resources present, while low quality habitat was considered to have low densities of habitat resources.

Indicative habitat criteria for targeted threatened species (i.e. those determined as having the potential to occur within the study area following the TSC and EPBC Act database searches) were

identified prior to fieldwork. Habitat criteria were based on information provided in OEH and DSEWPaC threatened species profiles, field guides, and the knowledge and experience of GHD field ecologists. Habitat assessment assists in the compilation of a comprehensive list of fauna that are predicted within the vicinity of the study area, rather than relying solely on single event surveys that are subject to seasonal limitations and may only represent a snapshot of assemblages present.

Habitat assessments included active searches for the following:

- Specific food trees and evidence of foraging.
- Evidence of activity such as feeding scars, scratches and diggings.
- Trees with bird nests or other potential fauna roosts.
- Burrows, dens and warrens.
- Presence of hollow-bearing trees.

The locations of significant habitat features were captured with a handheld GPS unit and quantitative descriptions collected in proforma field sheets.

Diurnal bird surveys

A targeted survey for diurnal birds was undertaken within the study area, with an emphasis on those habitats of potential relevance for threatened species. Targeted surveys were conducted in the late afternoon of 21 March 2012 and in the early morning of 22 and 23 March 2012, with all birds seen or heard recorded. These included surveys in cleared areas, paddock trees and the large woodland patch. The diurnal bird survey also included searches for habitat features of relevance for particular threatened species, including searching for nests. A total of six person-hours of targeted searches were undertaken during this survey.

Microchiropteran bat survey

Stationary Anabat recordings were undertaken at two locations where bat activity was expected to be higher, based on potential foraging and/or roosting habitats being present. These included a farm dam and the large woodland patch which contains many trees with hollows. Recording commenced approximately half an hour before dusk and continued until the following morning. Calls recorded during the field survey were identified using zero-crossing analysis and AnalookW software (version 3.8m, Chris Corben 2010).

Spotlighting and call playback

Spotlighting was conducted within the large woodland patch, as well as at stands of isolated paddock trees over the two evenings. Spotlighting was conducted for one person-hour each night, using a 55 watt spotlight.

Call playback for the Powerful Owl (*Ninox strenua*) and the Barking Owl (*Ninox connivens*) was undertaken for half a person-hour each evening within the large woodland patch, using a megaphone. Call playback included five minutes of quiet listening before and after each call was played. This woodland patch is located in the west of the study area and contains the only reasonably-sized area of native woodland with hollow-bearing trees.

Farm dams and drains

Farm dams and roadside drains were surveyed throughout the site inspection. These were inspected for waterbirds and reptiles, and calls of frogs were recorded.

Opportunistic observations

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys. This included searches for signs of fauna, such as tracks, scratched trees, and scats, as well as turning fallen timber and surface rocks to look for reptiles.

3.2.4 Survey conditions

Weather conditions were generally fine and mild throughout the surveys. Winds were typically light but strengthened on the third day. Noise from vehicle and aircraft traffic was heard throughout the surveys. Temperature, rain and humidity details from the nearest weather station (Orange Airport) for the survey period and the preceding three days are provided below.

Table 1 Weather Details*

	Temperature		Rain (mm)	Relative Humidity (%) (9 am & 3 pm)	Wind speed (km/h) and direction (9 am & 3 pm)
	Min (˚C)	Max (˚C)			
18-20/03/2012	10.3	19.7	0	88/60	
21/03/2012	11.3	22.9	0	100/71	31 NW / 7 N
22/03/2012	13.4	22.1	0	100/82	28 NNW / 7 NNE
23/03/2012	8.2	14.9	0	71/58	26 SW / 26 WSW

*Observations drawn from Orange Airport AWS {station 063303} (Bureau of Meteorology 2012).

3.2.5 Survey limitations

Given the short duration and timing of the field survey (autumn) it is likely that some species that utilise the study area (permanently, seasonally or transiently) were not detected during the survey. These species may include flora species that flower after rainfall as well as annual, ephemeral or cryptic species. Some fauna species are also mobile and transient in their use of resources and it is likely that not all species that potentially occur in the study area were recorded during the survey period. The habitat values are limited for many species given habitat modification and the absence of suitable habitat features. The habitat assessment conducted for the site allows for identification of habitat resources for such species. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values on site in order to predict potential impacts of the proposal, with particular emphasis on endangered ecological communities, threatened species and their habitats.

3.3 Likelihood of occurrence

Following collation of database records and species and community profiles a ‘likelihood of occurrence’ assessment was prepared with reference to the broad habitats contained within the study area. This was further refined following field surveys and the identification and assessment of habitats present. For this study, likelihood of occurrence within the study area of threatened and migratory species recorded or predicted to occur in the locality (Appendix A) is defined in Table 2.

Table 2 Likelihood of occurrence

Likelihood	Description
Nil	Species considered to have a nil likelihood of occurrence include species not

Likelihood	Description
	recorded during the field surveys that fit one or more of the following criteria: ◗ Are considered locally extinct. ◗ Have not been recorded previously in the locality and for which the study area is beyond the current distribution range. ◗ Have been recorded previously in the locality but rely on specific habitat types or resources that are not present in the study area.
Low	Species considered to have a low likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: ◗ Are a flora species that were specifically targeted by surveys under appropriate conditions (ie during their known flowering period) and not recorded. ◗ Have not been recorded previously in the locality, but potential habitat is present in the study area. ◗ Have been previously recorded in the locality but there are no recent records and/or suitable habitats within the study area are degraded and not likely to sustain a local resident population.
Moderate	Species considered to have a moderate likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria: ◗ Have been recorded in low numbers previously in the locality and could use habitat types or resources that are present in the study area, although habitat is generally in a poor or modified condition. ◗ Resources within the study area are present that may be used opportunistically during variable seasons or migration. ◗ Are cryptic flowering flora species that cannot be readily identified in the field unless flowering and were not surveyed during their known flowering period.
High	Species considered to have a high likelihood of occurrence include species not recorded that fit one or more of the following criteria: ◗ Have frequently been recorded previously in the locality and could use habitat types or resources that are present in the study area that are abundant and/or in good condition. ◗ Are known or likely to maintain resident populations in and surrounding the study area. ◗ Are known or likely to visit the site during regular seasonal movements or migration.
Recorded	Any threatened species recorded during field surveys or previously within the study area.