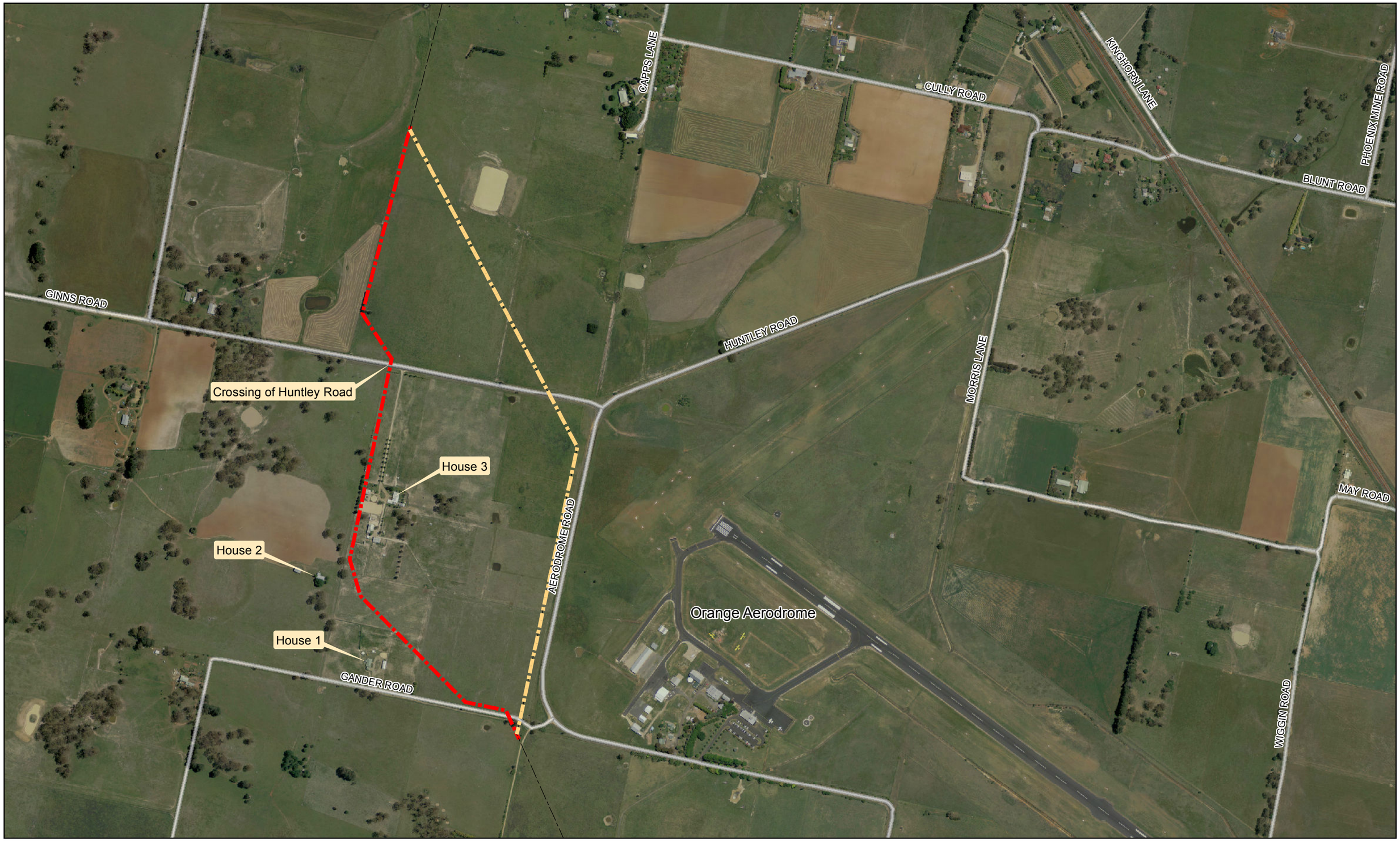

0 50 100 200 300 400

Metres

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

N

LEGEND

- Brown's Creek to Orange gas pipeline
- Relocated pipeline
- Existing pipeline

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

Job Number	21-21326
Revision	A
Date	19 Nov 2012

Identified sensitive receivers for consequence modelling

Figure 6-1

G:\21\21326\GIS\Maps\MXD\21_21326_Z052_GasPipeline_Identified points on Interest.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Orange City Council, Aerial Imagery, 2012. LPMA, Street Map, 2012. Created by:apmiller

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6.2.3 Impact assessment

Hazard identification

Natural gas is a buoyant, flammable gas which is lighter than air. On release into the open, the non-ignited gas tends to disperse rapidly at altitude. Ignition at the point of release would result in a jet fire. On release in an enclosed area an explosion or a flash fire is possible.

Natural gas in the pipeline is composed predominately of methane. Methane is a flammable gas and also an asphyxiant. Because methane is odourless, Mercaptans (4.6 milligrams per cubic metre) is added to the gas to allow detection. The gas may also contain hydrogen sulphide (concentration of 5.7 milligrams per cubic metre).

Other hazardous materials (as defined by the *Australian Code for Transportation of Dangerous Goods by Road and Rail*) that would be stored on-site during the construction phase of the proposal include:

- 15 litres of paint primer.
- 1,000 litres diesel fuel.
- Small quantities of hydrocarbons.

Neither the storage nor transportation of the above-listed hazardous materials would result in the proposal being considered potentially hazardous. As such, these materials were not included in the PHA.

A total of 10 potentially hazardous scenarios were identified for the proposal including:

- Loss of pressure through corrosion.
- Loss of pressure through erosion.
- Loss of pressure due to mechanical impact.
- Pressure increases or surges.
- Land subsidence.
- Spontaneous loss of integrity of pipe (rupture).
- Aircraft or heavy vehicle crash.
- Damage to pipeline through vandalism / terrorism.
- Neighbouring bush fire.
- Nearby explosion at tie-ins / offs.

Further details on these hazards, including their potential initiating events and proposed controls are summarised in Table 8 of Attachment C.

Operating experience indicates that most damage to pipelines results from external interference, particularly from excavator machinery. Therefore, the causes of gas release listed in Table 6-4 were carried forward for further detailed consequence analysis.

Table 6-4 Potential major hazards

Hazard	Description
Pipeline – External parties excavation – Natural Gas fire or explosion.	Fires or explosions arising from excavation, drilling and other penetration work undertaken by third parties in the vicinity of the pipeline. Third parties include other natural gas companies, landholders and other utility companies.
Pipeline – Contractors Excavation – Natural Gas fire or explosion.	Fires or explosions arising from pipeline excavation, drilling and other penetration work by APA Group and its contractors in the vicinity of the pipeline.

Based on the potential hazards identified, the release scenario listed in Table 6-5 was modelled. Full bore rupture of the pipeline was not considered to be credible as the relocated pipeline has been designed to meet the requirements of the 'No rupture' clause 4.7.2 in AS2885.1 to satisfy the criteria applicable to the largest equivalent defect length produced by threats in the area.

Table 6-5 Modelled release scenarios

Scenario	Justification
25 mm hole – gas released in the vertical direction.	This scenario represents a puncture to the pipeline by digging equipment penetrating the top of the pipeline. Due to the area being classified as rural, the most likely machinery able to damage the pipeline is an excavator with maximum weight of 25-30 tonnes and equivalent single point penetration of twin point tiger tooth. Hence, a 25 mm hole leak is taken to be representative of these cases.

Consequence analysis

Flash fire

Delayed ignition of a vapour cloud in an uncongested area leads to a flash fire. A summary of the worst case results are shown in Table 6-6 measured at the cloud centreline. These results are also represented graphically in Attachment C.

Table 6-6 Distance to lower flammable limit (LFL) and 0.5 LFL

Hole size (mm)	Release direction	Weather[1]	Distance to LFL (m)	Distance to 0.5 LFL (m)	Offset to the nearest house (m)
25	Vertical	D2	12.4	13.1	45
25	Vertical	D7	3.1	3.3	45
25	Vertical	F2	21.6	22.8	45

Notes: 1. Refers to wind speed and atmospheric pressure as per Table 1 in Attachment C.

Based on the model, the flash fire envelope from a 25 millimetre leak near House 1, 2 or 3 releasing the gas in the vertical direction, with an atmospheric stability of class F, and a wind speed of 2 m/s would not reach House 1, House 2 or House 3. Please note that the structures around House 3 are uninhabited.

The consequence effect distance would be the same at Huntley Road, however the risk is lower at this point as the pipe would have a greater wall thickness, and additional protection (pipeline marker tape) as detailed in Section 3.2.

Jet fire

PHAST was used to calculate the thermal radiation effects of the resulting jet fire scenarios. A summary of results for 25 millimetres release scenarios at various locations along the pipeline are listed in Table 6-7 below. A pictorial of the results is also provided in Attachment C.

Table 6-7 Distance to thermal radiation at various levels from a jet fire

Hole size (mm)	Release direction	Weather	Distance to 4.7 kW/m^2 (m)	Distance to 12.6 kW/m^2 (m)	Distance to 23 kW/m^2 (m)	Distance to 35 kW/m^2 (m)	Offset to the nearest house (m)
25	Vertical	D2	23.3	N/A	N/A	N/A	45
25	Vertical	D7	31.0	18.0	9.8	3.1	45
25	Vertical	F2	23.3	N/A	N/A	N/A	45

As shown in Table 6-7, the impact of a jet fire resulting from a 25 millimetre leak would not impact on Houses 1, 2 or 3. Figures 7, 8 and 9 of Attachment C illustrate a series of thin ellipses where the thermal radiation will be above 4.7 kW/m^2, 12.6 kW/m^2, 23 kW/m^2 and 35 kw/m^2. None of these radiation levels will reach Houses 1, 2, or 3.

The radiation effect zones of a medium leak of 25 millimetre at Huntley Road resulting in a jet fire is the same as that near House 1, 2 and 3. As mentioned previously, the risk is lower at this point due to the requirement that additional protection measures be adopted (refer to Section 3.2).

Vapour cloud explosion

VCE events result from the congestion of flammable vapour in the presence of an ignition source.

The area through which the pipeline will travel is very open, with only a few houses and trees. Therefore, it has been assumed that only 10 per cent of any gas cloud would be congested and have an explosive strength of 2. The effects of explosion overpressure criteria are listed in Table 3 of Attachment C. As shown in Table 6-8, an overpressure of 14 kPa will make a house uninhabitable and badly cracked. This blast effect does not reach House 1, 2 or 3.

Table 6-8 Distance to overpressure levels from an explosion

Distance to 7kPa (m)	Distance to 14kPa (m)	Distance to 21kPa (m)	Offset to the nearest house (m)
44.3	21.9	N/A	45

The main hazards associated with the gas pipeline were found to be associated with external interference (due to excavation by external parties) with the potential to result in a fire or explosion.

For the relocated pipeline the potential for external interference is minimised as it would be buried at a depth of 1,200 millimetres. It would have a resistance to penetration through the use of appropriate pipe thickness and marker tape would be laid 300 millimetres above the pipeline. The pipeline would have a 15 to 20 metre wide easement and part of the pipeline would be laid within the Orange Aerodrome property boundary.

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. Results of the preliminary hazard assessment showed that the maximum distance to the lower flammable limit from a 25 millimetre hole leak in the pipeline is 21.6 metres and hence the resulting flash fire envelope would not reach any nearby residential houses.

For a medium 25 millimetre hole leak from the pipeline, the 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 to 20 seconds and injury after 30 seconds exposure (at least second degree burns will occur)" which is the lowest level of thermal effect would not impact the occupants of the residential houses in the vicinity.

The relocated pipeline would run through open areas and explosion of the vapour cloud formed through the release is considered highly unlikely. The consequence analysis showed that if an explosion were to occur, the blast overpressure would not reach any nearby sensitive receivers.

The proposal would 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 conditions.

Orange City Council is in the progress of acquiring a section of the land which currently occupies one residential house (House 3) for the proposed Orange Aerodrome Expansion. Any future developments of this area will require an assessment to be completed to ensure the risk of the future developments will not impact on the diverted gas pipeline and vice versa.

6.2.4 Mitigation measures

The following measures would be implemented to manage hazards and risks during design, construction and operation of the proposal:

- The relocated pipeline would be designed, constructed and operated in accordance with the requirements of AS 2885, *APIA Code of Environmental Practice Onshore Pipelines 2009* and the pipeline licence.
- A construction health and safety risk assessment would be undertaken prior to construction to identify any construction hazards and risks and associated controls to be implemented during construction works.

6.2.5 Conclusion

The preliminary hazard assessment found that the proposal would 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 conditions. The proposed pipeline does not pose an unacceptable risk to the surrounding community and there are no constraints from a safety perspective to the location of the proposed pipeline relocation.

6.3 Noise

6.3.1 Overview

This section assesses noise and vibration issues associated with the construction of the proposal. Due to the nature of the proposal there are no operational noise sources and minimal noise is anticipated from maintenance activities. Therefore, noise during operation and maintenance of the proposal has not been discussed further. Construction noise levels at sensitive receivers have been predicted and mitigation measures have been provided for implementation to minimise noise during construction.

6.3.2 Existing environment

Land uses within the immediate surroundings of the proposal site are predominantly rural residential and agricultural land uses. The majority of the properties in the area are medium-sized farms containing residential dwellings and associated sheds and barns.

Sensitive receivers which have the potential to be impacted by construction noise include the following rural residential properties:

- 173 Aerodrome Road, approximately 280 metres south of the proposed works.
- 175 Aerodrome Road, approximately 90 metres southwest of the proposed works.
- 864 Huntley Road, approximately 60 metres east of the proposed works.
- 793 Huntley Road, approximately 390 metres west of the proposed works.
- 1 Capps Lane, approximately 480 metre northeast of the proposed works.
- 15 Capps Lane, approximately 510 metres northeast of the proposed works.

The residential receiver locations are shown on Figure 6-2.

Table 6-9 presents a summary of the background and ambient noise levels in the vicinity of the proposal. The measured noise levels have been provided by Orange City Council from the Wilkinson Murray Report *Orange Aerodrome Expansion Construction and Operational Noise Assessment* (2012) which was prepared for the Orange Aerodrome Expansion EIS. Orange Aerodrome is directly adjacent to the proposal site and the monitoring location at 1 Cully Road, Huntley is considered representative of the background noise environment for the purposes of this assessment. The measured levels at this location have been adopted to establish the construction noise management levels. The background noise levels are typical of a rural area with noise from local roads, agriculture and intermittent air traffic.

Table 6-9 Summary of measured noise levels (16 to 27 February 2012)

Noise monitoring location	Rating Background Level dB(A)[1]			LAeq(period) dB(A)[2]		
	Day	Evening	Night	Day	Evening	Night
	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm
1 Cully Road, Huntley	31	33	32	49	50	41

Notes: *1. Rating Background Level (the median of the lowest 10 percentile levels of daily L_{A90} noise levels determined over each period of interest).*
2. L_{Aeq} is the logarithmic average noise level measured over an assessment period.

15 Capps Lane
1 Capps Lane
793 Huntley Road
864 Huntley Road
175 Aerodrome Road
173 Aerodrome Road
Orange Aerodrome
CAPPS LANE
CULLY ROAD
KINGHORN LANE
PHOENIX MINE ROAD
BLUNT ROAD
GINNS ROAD
HUNTLEY ROAD
AERODROME ROAD
GANDER ROAD
MORRIS LANE
MAY ROAD
WIGGIN ROAD

0 50 100 200 300 400
Metres

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

N

LEGEND
- Relocated pipeline
- Existing pipeline
- Brown's Creek to Orange gas pipeline
- Cadastre

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

Job Number	21-21326
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Date	19 Nov 2012

Sensitive receivers within the immediate vicinity of the proposal

Figure 6-2

G:\21\21326\GIS\Maps\MXD\21_21326_Z049_GasPipeline_SensitiveReceivers.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Orange City Council, Aerial Imagery, 2012. LPMA, Street Map, 2012. NSW LPI, Cadastre, 2012. Created by:apmiller

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6.3.3 Construction noise criteria

Construction noise was predicted by establishing noise management levels and assessment criteria in accordance with the DECC *Interim Construction Noise Guideline (ICNG)* (2009). The ICNG provides noise management goals that assist in assessing the potential impact of construction noise. The ICNG recommends the following noise management goals during construction for residential receivers:

- The daytime construction noise management level ($L_{Aeq\ (15\ min)}$) should not exceed the background noise level (L_{A90}) by more than 10 decibels (dBA). This management level applies during the ICNG recommended standard construction hours of Monday to Friday 7 am to 6 pm, and Saturday 8 am to 1 pm, with no works on Sundays or public holidays.
- Receivers experiencing noise levels greater than 75 dBA are considered to be 'highly affected'.
- For works outside standard construction hours, the noise level should not exceed the background noise level by more than 5 dBA.

Based on the above, the established noise management levels that apply to surrounding receivers during construction are presented in Table 6-10 below.

Table 6-10 Construction noise management levels

Location	Construction noise management level $L_{Aeq\ (15\ min)}$ in dBA		Highly affected noise level $L_{Aeq\ (15\ min)}$ in dBA
	During standard construction hours	Outside standard construction hours	
1 Cully Road, Huntley	41	36	75

6.3.4 Impact assessment

Equipment likely to generate significant noise during construction along with the corresponding noise levels are shown in Table 6-11.

Table 6-11 Construction equipment sound power levels, dB(A)

Plant and equipment	Sound power level (Typical)[1]
Excavator	107
Compactor	108
Grader	110
Truck	107
Light vehicle	106
Generators	100
Side Boom Crane[2]	112

Note: *1. Sound power levels for construction equipment have been obtained from Australian Standard, AS 2436 – 2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites.*

2. Sound power level data provided by APA Group.

Predicted construction noise levels

Table 6-12 lists the predicted construction noise levels at varying distances from the proposal. Potential exceedances of the construction noise management levels during standard construction hours are indicated in bold.

Table 6-12 Construction equipment noise levels at varying distances in dB(A)

Equipment	Distance (m)					
	25	50	100	250	500	1000
Excavator	**67**	**60**	**53**	**45**	38	31
Compactor	**68**	**61**	**54**	**46**	39	32
Grader	**70**	**63**	**56**	**48**	41	34
Truck	**67**	**60**	**53**	**45**	38	31
Light vehicle	**66**	**59**	**52**	**44**	37	30
Generator	59	52	45	37	30	23
Side Boom Crane	**72**	**65**	**58**	**50**	**43**	29

Note: Bold text indicates noise levels that exceed the construction noise management levels.

A summary of the predicted noise levels at potentially impacted residential receivers when construction works are directly adjacent to the receiver are shown in Table 6-13.

Table 6-13 Noise levels at the nearest surrounding receivers in dB(A)

Location	Predicted noise level range
173 Aerodrome Road	36 to 49
175 Aerodrome Road	45 to 58
864 Huntly Road	52 to 65
793 Huntly Road	32 to 45
1 Capps Lane	30 to 43
15 Capps Lane	30 to 43

Assessment of predicted construction noise

Construction of the proposal would cause a short-term localised increase in noise levels primarily as a result of the following activities:

- Movement of construction vehicles and machinery.
- Operation of generators and equipment for excavation, trenching, compacting and other construction activities.

Construction activities during the recommended standard construction hours are predicted to exceed the construction noise management levels at six residential receivers up to 600 metres from the construction works, as shown Table 6-13. These predicted levels are due to the very low background levels and proximity of residences to the proposed works.

The predicted construction levels are considered to be typical for the type of construction activities and although noise levels appear high compared to the ICNG noise management levels, all the predicted noise levels would be below 75 dBA, the highly affected construction noise level recommended by the ICNG.

Furthermore, construction noise levels have been predicted assuming that all equipment would be operating simultaneously without the implementation of any noise management controls. Additionally, construction would progress along the pipeline alignment during the construction period which would alter noise impacts with respect to individual receivers. During any given period, equipment would operate at maximum sound power levels for only brief periods. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is unlikely that all construction equipment would be operating at their maximum sound power levels at any one time and certain types of construction machinery would be

present in the study area for only brief periods during construction. Therefore, noise predictions are considered to be conservative.

Potential impacts are expected to be minimised due to the progressive nature of trenching works, localising potential impacts to one section of the corridor at a time. Where the construction noise management levels are exceeded, mitigation measures detailed in Section 6.3.5 would be implemented, where feasible and reasonable, and potentially impacted residences would be informed of the nature of the works, expected noise levels, duration of works and a method of contact. It is considered that with the implementation of these controls, construction noise impacts are not likely to be significant.

Construction traffic

Heavy vehicle movements would result from the construction of the proposal. These would mainly be associated with the transport of construction machinery and equipment to the proposal site, import and disposal of fill material via trucks, and removal of machinery post construction.

As discussed in Section 6.5, traffic is not expected to increase significantly, and it is anticipated that traffic noise impacts during construction are not likely to be significant.

Out of hours work

Construction activities would be undertaken during standard working hours recommended by the ICNG (refer to Section 3.8). Night works would not be required. Extended working hours may be required to ensure the proposal is completed to meet the Orange Aerodrome Expansion program. Extended hours would be limited to 8 am to 1 pm on Sundays with a small working crew. If works outside the standard ICNG recommended hours are required, an out-of-hours work procedure would be prepared as part of the CEMP and nearby sensitive receivers notified in accordance with the ICNG requirements.

Construction vibration

Potential earthworks could result in minor vibration during construction as a result of trenching. The nearest sensitive receiver is located more than 50 metres from the proposal site and, therefore, vibration levels are not anticipated to have a significant impact on the surrounding infrastructure, residents or environment. Vibration levels are not anticipated to exceed those recommended in *DIN 4150-3 1999: Structural Vibration – Part 3: Effects of vibration on structures*.

The proposal would not result in any operational noise or vibration impacts.

6.3.5 Mitigation measures

The following mitigation measures would be implemented during construction to reduce noise impacts on the surrounding residential receivers:

- Works would be conducted in accordance with the ICNG and all reasonable and feasible practices would be undertaken to minimise or avoid noise.
- The site configuration would be designed to minimise noise impacts to the surrounding community. The design would consider the following:
  - Construction compound would be arranged in such a way that the primary noise sources are at a maximum distance from residences, with solid structures eg sheds, containers, etc (where used) placed between residences and noise sources and as close to the noise sources as is practical.

  - Compressors, generators, pumps and any other fixed plant would be located as far away from residences as possible and behind site structures.
- Where practical, equipment would be selected to minimise noise emissions. Equipment would be fitted with appropriate silencers and be in good working order. Machines found to produce excessive noise compared to normal industry expectations would be removed from the site or stood down until repairs or modifications can be made.
- The final selection and design of noise mitigation measures would be undertaken with consideration to best management and economically achievable practice during the development of the CEMP.
- The CEMP would be reviewed in response to complaints and amended where practical throughout the construction phase of the proposal.
- General construction activities would be limited to the recommended construction hours, where feasible.
- If out-of-hours work is required, constructions hours would be limited to 8 am to 1 pm on Sundays with a small working crew. An Out of Hours Works Procedure as part of the CEMP would be prepared.
- Vibration levels are not anticipated to exceed those recommended in *DIN 4150-3 1999: Structural Vibration – Part 3: Effects of vibration on structures*. However, if soil compaction works were to occur within 10 metres of a building or structure a suitably qualified professional would be consulted and further assessment may be required.

Worker training

All site workers would be sensitised to the potential for noise impacts on local residents and encouraged to take practical and reasonable measures to minimise the impact during the course of their activities. This would include toolbox talks covering:

- Avoid shouting and slamming doors.
- Where practical, machines should be operated at low speed or power and switched off when not being used rather than left idling for prolonged periods.
- Minimise reversing.
- Avoid dropping materials from height and avoid metal to metal contact on material.

Community relations

Consultation and cooperation between the site workers and surrounding residents would assist in minimising uncertainty, misconceptions and adverse reactions to construction noise and would include:

- Close liaison between adjacent residents and the parties associated with the construction works to provide effective feedback in regard to perceived emissions. In this manner, equipment selections and work activities could be coordinated, where necessary, to minimise noise disturbances, and to ensure prompt response to complaints, should they occur.
- Any noise complaints would be addressed immediately in accordance with APA Group's standard resolution procedures.
- Upon receipt of a noise complaint noise monitoring would be undertaken and reported as soon as possible. If noise levels are significantly above the predicted noise levels then the works process would be reviewed in order to identify a means to attempt to minimise noise impacts.

6.3.6 Conclusion

Construction activities have the potential to exceed the construction noise management level at six residential receivers. These potential impacts are expected to be minimised due to the progressive nature of trenching works, localising potential impacts to one section of the corridor at a time. Recommended noise mitigation measures detailed in Section 6.3.5 would be implemented, where feasible and reasonable, and all potentially impacted residences would be informed of the nature of the works, expected noise levels, duration of works and a method of contact. There would be no noise or vibration impacts during the operation of the proposal.

6.4 Land use

This section describes existing land ownership and land uses in the vicinity of the proposal. The impacts of the proposal on land ownership and land use are assessed and appropriate mitigation measures provided.

6.4.1 Existing environment

The relocated pipeline would be constructed across Lot 1 DP 219587, Lot 7 DP 559537 and Lot 384 DP 1045095 zoned as E3 Environmental Management under the Orange LEP 2011 (refer to Figure 6-3). Lot 7 DP 559537 and Lot 384 DP 1045095 are being acquired by Orange City Council as part of the Orange Aerodrome Expansion and Lot 1 DP 219587 is privately owned (refer to Figure 3-1). The proposal site is currently used for rural purposes including grazing and cropping.

The majority of the properties in the surrounding area are medium-sized farms containing residential dwellings and associated sheds and barns. The nearest sensitive receivers to the proposal are residential rural properties (Lots 383 DP 1045095 and 384 DP 1045095) located approximately 60 metres southwest of the proposal and immediate east respectively. No other sensitive receivers are situated within 200 metres of the proposal.

Land uses in the study area based on zonings from the Orange LEP 2011 are provided in Figure 6-3.

6.4.2 Impact assessment

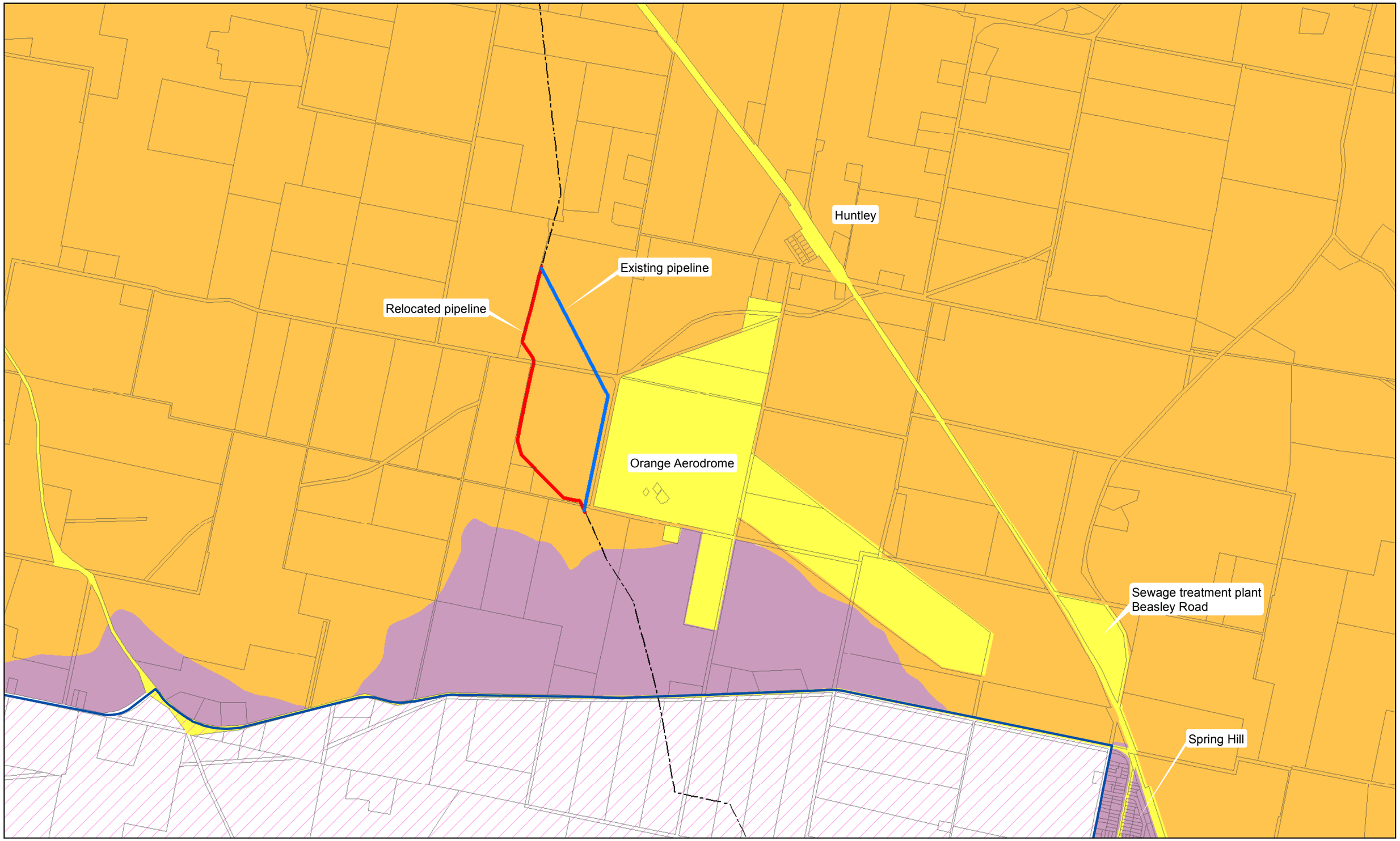
The proposal site is zoned as E3 Environmental Management under the Orange LEP 2011. As discussed in Section 4.2.3, development for the purposes of ‘public utility undertakings’ are prohibited in the E3 Environmental Management zone. However, the proposal is identified as State significant infrastructure under the State and Regional Development SEPP which overrides the provisions of the Orange LEP.

The relocated pipeline would be constructed across Lot 1 DP 219587, Lot 384 DP 1045095 and Lot 7 DP 559537 as shown in Figure 3-1. Lot 7 DP 559537 and Lot 384 DP 1045095 are being acquired by Orange City Council as part of the Orange Aerodrome Expansion and Council would provide a 15 to 20 metre wide easement to accommodate the pipeline within the future aerodrome site. Lot 1 DP 219587 is privately owned and EAPL would acquire an easement of approximately 238 square metres.

Land use impacts as a result of the proposal are considered minor. The acquisition of the easement for the pipeline would not have a significant impact on existing land uses (agriculture and/or grazing). As the relocated pipeline would be buried, it is anticipated that previous land use activities may be resumed, provided that they do not include excavation activities. Shallow rooted vegetation and the re-establishment of grassland (for grazing) would be compatible within the pipeline easement. Certain activities not deemed suitable within the easement include: excavation, installation of permanent structures, or deep rooted vegetation due to the

potential to damage the pipeline. This would pose restrictions on future development along the pipeline easement. As the majority of the pipeline would be constructed on land acquired by Orange City Council, impacts on future land use is not likely to be significant. The property owner of Lot 1 DP 219587 would be compensated for development restrictions within the easement.

During construction, residential rural premises within the vicinity of the southern extent of the proposal site may experience minor temporary impacts as a result of increased noise, dust and traffic. However, impacts would be temporary and limited to the construction stage of the proposal. No changes to property access arrangements are anticipated.



0 100 200 400 600 800

Metres

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

N

LEGEND

- Orange local government area boundary
- Cadastre
- Cabonne local government area
- Relocated pipeline
- Existing pipeline
- Brown's Creek to Orange gas pipeline

Orange LEP (2011) Zoning

- E2-E4: Environment protection
- RU1-RU5: Rural
- SP2-SP3: Special purpose

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

Job Number	21-21326
Revision	A
Date	19 Nov 2012

Existing land uses

Figure 6-3

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Data source: Data Custodian, Data Set Name/Title, Version/Date. NSW LPI, Cadastre, March 2012. Created by:apmiller

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6.4.3 Mitigation measures

All acquisition would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991,* where private treaty negotiations are unable to be concluded. No specific mitigation measures are considered necessary for the impacts on land use identified above. The mitigation measures summarised in Chapter 7 are considered sufficient to reduce potential impacts associated with the proposal.

6.4.4 Conclusion

The proposal would not result in any long-term impacts on land use. The mitigation measures outlined in Chapter 7 are considered sufficient to reduce any potential impacts.

6.5 Traffic and access

This section describes existing traffic and access arrangements and potential impacts that may occur as a result of construction of the proposal. Mitigation measures have been provided, where required.

6.5.1 Existing environment

The existing pipeline within the vicinity of the aerodrome runs to the immediate west of Aerodrome Road. The existing pipeline crosses Gander Road at the southern end and Huntley Road to the north. There are currently no pedestrian and bicycle networks or existing bus services in the vicinity of the proposal.

Local road network

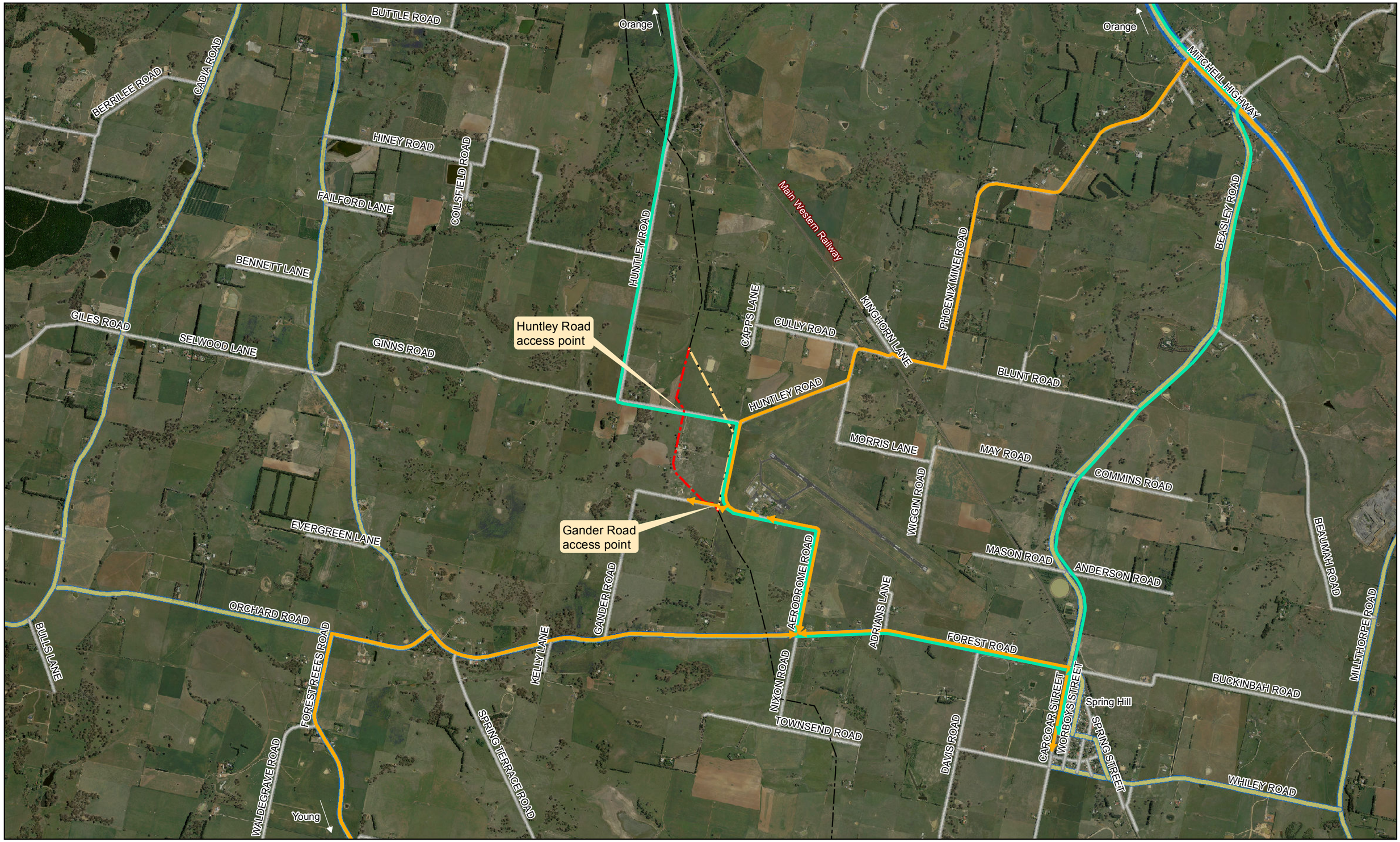
The local road network in the vicinity of the proposal is shown on Figure 6-4. Aerodrome and Huntley Roads are both local collector roads, with two-way, sealed, undivided carriageway and a speed limit of 100 kilometres per hour. Gander Road is an unsealed road that provides access to local properties including 173 and 175 Aerodrome Road. Other roads within the local road network include: Beasley and Phoenix Mine Road to the east of the proposal, and Forest Road to the south.

Existing traffic volumes

Traffic surveys were undertaken by Orange City Council's Metro Count tube classification counters in March 2012. The results of the surveys are summarised in Table 6-9.

Table 6-14 Existing traffic volumes – March 2012

Location	AM peak hour (vph)	PM peak hour (vph)	Average daily traffic (vpd)
Aerodrome Road – North of Forest Road	57	69	540
Huntley Road – East of Aerodrome Road	23	23	195
Huntley Road – 500 m north of Ginns Road	97	110	929
Huntley Road – East of Forest Road	467	506	5391



0 125 250 500 750 1,000
Metres

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

N

LEGEND

- Relocated pipeline
- Existing pipeline
- Brown's Creek to Orange gas pipeline
- Highways
- Major Roads
- Secondary Roads
- Other Roads
- Railways
- Light vehicle routes from Orange & Spring Hill
- Haulage route

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

Job Number 21-21326
Revision A
Date 10 Jan 2013

Local road network in the vicinity of the proposal

Figure 6-4

G:\21\21326\GIS\Maps\MXD\21_21326_Z050_GasPipeline_LocalRoadNetwork.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Orange City Council, Aerial Imagery, 2012. LPMA, Street Map, 2012. Created by:apmiller

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6.5.2 Impact assessment

Road network

Huntley Road and Aerodrome Road are proposed to be relocated as part of the Orange Aerodrome Expansion. Both roads would be relocated to the west of the existing aerodrome as shown in Figure 1-2.

The relocated pipeline would be constructed along the proposed relocated Aerodrome Road and would cross both new roadways before reconnecting into the Brown's Creek to Orange Gas Pipeline in the open paddock area at the northern extent of the proposal site. Construction would be undertaken prior to the relocation of Huntley and Aerodrome Roads.

The proposal would require installation under two existing roads: Gander Road and Huntley Road, and would be constructed in a manner that minimises disruptions to the local road network. Gander Road would remain accessible during construction with partial diversions established, if required. Huntley Road is expected to be relocated as part of the Orange Aerodrome Expansion by the time of pipeline construction, and would therefore not require any road closures.

No road upgrades would be required as part of the proposal.

Access

All access during construction would be restricted to existing roads (Huntley and Gander Road) and within the construction corridor. Access to the construction compound would be off Gander Road, as shown in Figure 3-2. Delivery trucks would access the construction compound from Gander Road, as shown in Figure 3-2, then travel north along the pipeline corridor delivering pipes as required. Trucks would exit onto Huntley Road and into the surrounding road network. The proposal would not require the establishment of new access routes.

Access to private properties would be maintained during construction. A detour may be required for access to Lot 1 DP 219587 (173 Aerodrome Road) off Gander Road during construction. This would be undertaken in consultation with the affected property owner(s).

Road traffic generation

The proposal would result in a temporary minor increase in local traffic during construction due to the delivery of materials and equipment to the site and transport for the construction crew.

It is expected that a maximum of nine heavy vehicle movements would be required for the delivery of materials and equipment over the construction period (16 weeks). This includes a maximum of four heavy vehicle movements to site to deliver the total quantity of pipe required (the pipe would be transported to site in 12 metre-length extended semi-trailers). It is assumed that delivery of the pipe would occur in the morning after the morning peak movements and would occur every alternate day for a total of four days.

It is estimated that there would be an average of nine workers accessing the site daily, and during construction peak, up to 16 workers. Based on the characteristics and rural location of the site, it has been assumed there would be a typical car driver rate of 100 per cent, and a maximum of 32 light vehicle movements would be required to transport workers to and from the site daily as a worst case scenario.

It is likely that construction workers would be sourced from Orange. The most direct route from Orange to the aerodrome is via Huntley Road and Aerodrome Road; however an alternative route is via Mitchell Highway, Beasley Road, Forest Road and Aerodrome Road.

The additional movements generated from the construction of the proposal are considered minimal and unlikely to have a significant effect on the performance of intersections in the

vicinity of the site. Construction works would be of short duration and would only cause minor impacts on local traffic and a negligible impact on the operation of the surrounding road network. With the implementation of controls provided in Section 6.5.3, traffic and access impacts are not expected to be significant.

Site distances and intersection performance

In assessing this proposal it is appropriate to assess the traffic safety of the proposed entry/exit locations to/from the compound site and construction corridor, by determining whether there is adequate longitudinal sight distance to allow approaching drivers sufficient sight distance to avoid potential conflicts. The specific sight distance criteria used has been derived from the Austroads Publication *Guide to Traffic Engineering Practice, Part 5: Intersections at Grade* (Austroads 2005).

In order to obtain adequate safe sight distances on Aerodrome Road, in the vicinity of Gander Road, it is recommended that during construction of the pipeline the speed limit be reduced from 100 kilometres per hour to a maximum of 80 kilometres per hour. A comparison of the required and available approach sight distance (ASD) and safe intersection sight distance (SISD) for vehicles approaching and departing the proposed access road is shown in Table 6-10 for a vehicle speed of maximum 80 kilometres per hour.

Table 6-15 Sight distance requirements

Driveway (Entry/Exit)	ASD (minimum requirement)		SISD (desirable requirement)	
	Required	Measured	Required	Measured
Aerodrome Road 80 km/h	103 m	200 m (north+ south)	170 m	200 m (north+ south)
Huntley Road 80 km/h	103 m	200 m (north+ south)	170 m	200 m (north+ south)

With the reduced speed limit and the expectation that Huntley Road would be disused by this time, it can be concluded that the proposed access arrangements to the site compound and corridor meet a satisfactory level of traffic safety because it would satisfy the sight distance requirements for both (ASD) and (SISD) measured in accordance with Austroads.

6.5.3 Mitigation measures

The following mitigation measures are recommended to minimise the potential impacts during construction of the proposal:

- Access to surrounding properties would be maintained for the duration of the proposal.
- Traffic Management/Control Plan(s) would be prepared in consultation with the relevant traffic authority(s). All traffic control devices would be in accordance with *AS 1742.3 – 1996 Traffic Control Devices for Works on Roads*.
- The speed limit on Aerodrome Road in the vicinity of Gander Road would be reduced during pipeline construction to a maximum of 80 kilometres per hour.
- Residents would be notified in advance of traffic disruptions and access changes through letter box drops.
- All areas impacted by construction activities are to be restored to their pre-works condition.

6.5.4 Conclusion

The proposal would have minimal impact on surrounding road network. Potential minor impacts may be experienced during construction; however these impacts would be adequately mitigated through the implementation of mitigation measures provided in Section 6.5.3.

6.6 Air quality

This section describes the existing air quality within the proposal area and nearby sensitive receivers. Impacts on air quality as a result of the proposal have been assessed and mitigation measures provided, where required.

6.6.1 Existing environment

The existing air quality at the proposal site is typical of a rural/agricultural setting. The main contributors to air quality are dust and emissions from the aerodrome operations and vehicles along nearby roads.

The landscape in the study area is predominantly agricultural with isolated rural residential properties. The nearest sensitive receivers to the proposal are residential rural properties (Lots 383 DP 1045095 and Lot 384 DP 1045095) located approximately 60 metres southwest and immediate east of the relocated pipeline respectively. No other sensitive receivers are situated within 200 metres of the proposal. The house located on Lot 384 DP 1045095 would be vacated at the time the proposal is constructed. The location of potential sensitive receivers (residential dwellings) surrounding the proposal site are shown in Figure 6-2.

6.6.2 Impact assessment

Construction of the proposal may have short-term localised impacts on air quality as a result of:

- The generation of dust from topsoil removal, trenching activities, construction vehicle movements along unsealed areas, and wind blowing over stockpiles.
- Exhaust emissions from the operation of construction plant and equipment.

Impacts during construction, due to the generation of dust and exhaust emissions, would be short-term and localised to the construction corridor and adjacent receivers. These potential impacts are expected to be minor considering the volume and low intensity of earthworks (one excavator and side-boom) and the progressive nature of trenching works, localising potential impacts to one section of the corridor at a time.

The operation of the proposal would not have long-term impacts on the local air quality. Inspection of the pipeline, by air or ground would continue on a regular basis in association with the current regular fortnightly patrols of Pipeline Licence Number 22, and the pipeline would be managed in accordance with APA Group's standard management procedures.

Potential impacts during construction would be adequately reduced with the implementation of mitigation measures outlined in Section 6.6.3.

6.6.3 Mitigation measures

The following mitigation measures would be implemented as part of the Construction Environmental Management Plan (CEMP) to minimise potential impacts on air quality:

- Appropriate erosion and sedimentation controls would be implemented in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004) and as outlined in Section 6.9.3 to minimise dust emissions.

- Appropriate dust suppression controls would be implemented, as required. This would include suspending excavation activities during high wind events or the use of water sprays.
- All haulage vehicles would have their loads covered while transporting material to or from work areas.
- Disturbed areas would be revegetated soil as soon as practicable.
- Vehicular speeds would be limited to 15 kilometres per hour along unsealed access areas.
- Vehicles and machinery would be maintained in good working condition, with appropriate exhaust pollution controls that meet all relevant Australian Standards.
- Plant and machinery would be turned off when not in use, and would not be left idling for long periods.

6.6.4 Conclusion

With the implementation of mitigation measures provided in Section 6.6.3, impacts on air quality as a result of the proposal would be adequately managed and are not considered to be significant.

6.7 Heritage

This section includes a summary of the *Brown's Creek to Orange Gas Pipeline Relocation Project Cultural Heritage Assessment* (Navin Officer 2012) undertaken for the proposal. This section describes registered heritage items in the vicinity of the proposal and assesses any potential impacts on these items. Mitigation measures have been provided to ameliorate potential impacts. A full copy of the assessment report is provided as Attachment D.

6.7.1 Assessment approach and methodology

The heritage assessment was prepared in accordance with the OEH *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010b) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a). The assessment included a desktop review, consultation and a field survey.

Desktop review

A range of archaeological and historical data was reviewed to determine the likely presence of heritage resources in the vicinity of the proposal site. The results of previous heritage assessments were also reviewed including the *Orange Aerodrome Expansion EIS* (GHD 2012b). A search was made of the following statutory and non-statutory heritage registers and schedules:

- Heritage Schedule(s) of the Orange LEP.
- Aboriginal Heritage Information Management System (AHIMS) (NSW OEH).
- World Heritage List (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)).
- National Heritage List (Australian Heritage Council).
- Commonwealth Heritage List (Australian Heritage Council).
- Register of the National Estate (Australian Heritage Council).
- The State Heritage Inventory (NSW OEH).

- National Trust Register (National Trust of Australia NSW).

Consultation

Consultation was undertaken as per the requirements set out in the document *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a). In summary, this included:

- **Stage 1 – Notification of the proposal and registration of interest.** An advertisement was placed in the *Central Western Daily* on the 15 June 2012 with a 14 day period for registration. Stage 1 Round 1 letters were sent on the 12 June 2012, Stage 1 Round 2a letters were sent on the 21 June 2012 and Stage 1 Round 2b letters were sent on the 25 June 2012, all with a 14 day period for registration. The Kallari Ngunawal Descendants were the only registered stakeholder for the proposal.
- **Stage 2 – Presentation of information about the proposal**. A draft copy of the heritage assessment report was provided to the registered stakeholder for their information, and was accompanied by a request for comments on the proposal.
- **Stage 3 – Gathering information about cultural significance**. Information was requested from the registered stakeholder. A site visit was conducted on 3 August 2012. On the day, no representative attended the site visit.
- **Stage 4 – Review of draft heritage assessment report**. A copy of the draft heritage assessment report was sent to the registered stakeholder for their comment. No comments were received.

Further details of the consultation undertaken are provided in Attachment D.

Field survey

A field survey was undertaken by archaeologists from Navin Officer on 22 March 2012 as part of the survey for the *Orange Aerodrome Expansion EIS* (GHD 2012b). The study area for the heritage assessment included all areas in and around the area of direct impact (ground disturbance). The purpose of the field survey was to identify all visible heritage sites and features, and to define areas of archaeological potential that may require further management. Particular attention was paid to old growth trees and rock outcrops for possible Aboriginal markings.

Additional survey was undertaken on 3 August 2012. Kallari Ngunawal Descendents were confirmed for participation in this field survey, however, no field representative attended on the day.

6.7.2 Heritage context

Aboriginal context

The proposal site traverses Wiradjuri territory. Wiradjuri territory is located within the Murray Darling Basin and extends from Dubbo and Bylong in the north, to Tallangatta in the south, and from Lithgow west to the Hay Plain and Ivanhoe.

A number of archaeological surveys have been conducted in the Orange region. The results of these surveys are detailed in Attachment D. In general, the results of these previous surveys suggest the following:

- 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 within 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.

The location of the proposal site on an open plateau within the broader landscape context of undulating slopes and hills is within close proximity to semi-permanent and permanent water sources and may have acted as part of an effective travel route.

Historical context

The history of the Orange region of Central West NSW is closely tied to the growth of pastoralism beyond the Blue Mountains and the discovery of gold.

The first documented European visitors to the Central West crossed the Blue Mountains in 1813 when they encountered an expansive area of prime grazing land. As a result, 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.

In 1826, Governor Darling re-defined the limits of location and opened the entire region to private settlement. Sheep grazing then became the dominant pastoral activity. Some of the settlers amassed large pastoral runs with significant homesteads between the 1820s and 1840s.

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

Orange was built on a Village Reservation marked out in 1828 to 1829, but it remained unoccupied until the mid-1840s. The Village of Orange was proclaimed on 18 November 1846.

Ophir, located approximately 30 kilometres northeast of Orange, is the location of the first gold discovery in Australia in 1851 by Edward Hargraves. The gold rush at Ophir had a major impact on settlement in the Central West. At the height of the gold rush, the fledgling township of Orange was largely depopulated, however mass migration to the area ultimately served to consolidate the settlement. 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. During the mid -1860s Orange also benefited from the discovery of gold at Lucknow to the southeast. This influx of wealth, a growing population, and expansion of the wheat industry led Orange to become a commercial centre. Orange developed steadily during the rest of the 1860s and early 1870s with a population of 1,456 by 1871.

The first aerodrome in Orange was built in 1938 on a 100-acre site in close proximity to the Township of Orange. The aerodrome was moved to its current location in 1960.

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

- Old fence lines.
- Indications of field systems.
- Traces of agricultural and industrial processing or extractive sites.
- Occupation remains of former dwellings.
- Nineteenth-century structures.
- Standing buildings and structures.
- Sites associated with early roads.

6.7.3 Impact assessment

The study area is highly modified due to past and present agricultural and aerodrome operations. Given the highly modified nature of the study area, there is a low potential for unrecorded Aboriginal or historical archaeological sites to be present within the study area.

Based on the results of the database searches:

- No Aboriginal artefacts, sites or areas of potential were listed within the study area.
- No historical artefacts, sites or areas of potential were listed within the study area.

During the course of the field surveys:

- No Aboriginal artefacts, sites or areas of archaeological potential were identified within the study area and no further concerns were expressed by the registered stakeholder, the Kallari Ngunawal Descendants.
- No historical artefacts, sites or areas of potential were identified within the study area.

Given the results of the desktop and field surveys, construction and operation of the proposal would have no identifiable impact on heritage resources in the study area.

6.7.4 Mitigation measures

As the potential for heritage resources to be found in the proposal area is predicted to be very low, no specific safeguards are required. However, in the event that heritage resources or skeletal remains are discovered during the proposed construction activities, the following measures would be implemented:

- If Aboriginal objects are discovered during construction, all works in the area of the find would cease and the OEH and representatives from the Orange Local Aboriginal Land Council (LALC) notified as soon as possible to determine the course of action. Development works in the area of the find(s) would recommence based on a management strategy developed in consultation with and approved by the OEH.
- If historical items are located during development works, all works in the area of the find should cease, and the NSW Heritage Council notified. Where required, further archaeological investigation would 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.
- If suspected skeletal remains are discovered during construction, all works in the area of the find would cease and the local police, the OEH and representatives from the Orange LALC notified as soon as possible to determine a course of action. Development works in the area of the remains would not resume until the proponent receives written approval

from the police or coroner and from the relevant statutory authority, including 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.

Detailed unanticipated discovery protocols are provided in Appendix 3 of Attachment D.

6.7.5 Conclusion

Construction and operation of the proposal would have no impact on heritage resources in the study area. With the implementation of the mitigation measures described in Section 6.7.4, the proposal would not have a significant impact on heritage resources.

6.8 Soils, geology and topography

This section provides information on the existing soil, geology and topography of the proposal site and assesses the potential impacts of the proposal on this environment. It includes an assessment of the potential for acid sulfate soils, salinity and contamination to occur within the study area. Mitigation measures proposed to ameliorate the potential impacts on soils, geology, and topography are also identified.

6.8.1 Assessment approach and methodology

The assessment of soils, geology and topography included a desktop assessment of the following online databases and resources:

- OEH Soil Landscapes of Bathurst 1:250,000, Sheet SI 55-8 (Kovac et al 989).
- NSW Department of Primary Industries (DPI) Orange 1:100,000 Geological Map, Sheet 8731 (Meakin et al 1997).
- Department of Infrastructure, Planning and Natural Resources (DIPNR) NSW Natural Resource Atlas.
- OEH Contaminated Lands Register.
- The Commonwealth Scientific and Industrial Research Organisation Australian Soil Resource Information System.

6.8.2 Existing environment

Soils, geology and topography

The OEH soil landscapes sheet for the area indicates that soils are of the Spring Hill type. Soil materials present generally comprise of krasnozems (red to brown, acid, strongly structured clay soils) on higher areas, with yellow podzolic and solodic soils on lower slopes and drainage lines.

The site is underlain by tertiary age bedrock comprising of pyroxene olivine basalt, plagioclase basalt, alkali basalt, trachybasalt and trachyandesite. The topography of the area is gently undulating with broad flats. The elevation of the area is between 900 and 980 metres above sea level. Slopes range from 2 to 5 per cent in gradient and are generally between 500 to 700 metres in length.

Acid Sulfate Soils

The Australian Soil Resource Information System indicates the proposal site has a low probability of containing acid sulfate soils. Acid sulfate soil mapping in the DIPNR NSW Natural Resource Atlas also indicates that acid sulfate soils are not present within the study area. Furthermore, the study area is 900 to 980 metres above sea level, and acid sulfate soils are generally found in areas less than 5 metres above sea level.

Salinity

Salinity potential mapping in the DIPNR NSW Natural Resource Atlas did not indicate the presence of saline soils in the study area.

Contamination

A search of the OEH Contaminated Lands Register did not identify any sites within the vicinity of the proposal. Furthermore, a review of background information, land use and field observations indicates minimal potential for widespread contamination within the proposal site.

6.8.3 Impact assessment

Construction of the pipeline would result in the generation/excavation of approximately 864 cubic metres of spoil which would be mostly reused for backfilling. The pipeline would be installed below ground level and the ground level would be restored to match the existing conditions upon completion of construction and would not result in significant changes to the existing site topography. Surplus spoil would be spread on top of the pipeline and easement area in thin layers to counter any subsidence.

Excavation and stockpiling of soils during construction could potentially have the following impacts if not managed appropriately:

- Erosion through exposed soils and stockpiled materials.
- Dust generation from excavation works, and vehicle movement over exposed soils.
- An increase in sediment loads entering the stormwater system and the nearby receiving waterways.

Mitigation measures provided in Sections 6.8.4 and 6.9.3 would be implemented to adequately reduce potential erosion and sedimentation impacts.

There is the potential for chemical and fuel spills to occur from poorly managed equipment/vehicles which could result in localised contamination of soil. There is also the potential to encounter previously unknown contamination during excavation works, and if not managed appropriately, spreading of contaminated spoil to previously uncontaminated areas.

The potential for these impacts would be appropriately managed with the implementation of the mitigation and management measures outlined in Section 6.8.4. Standard procedures would be provided in the CEMP in the event that suspected contamination is encountered during construction activities.

The proposal would not result in operational impacts on soils, geology or topography.

6.8.4 Mitigation measures

Construction

The following mitigation measures would be implemented during construction to minimise the potential impacts of the proposal on soils, geology and topography:

- The CEMP would include a management procedure in the event that unexpected contamination or acid sulfate soils are identified during construction.
- The potential to encounter previously unknown contamination would be investigated during detailed design.
- Any imported fill would be required to be certified contamination and weed free. If a risk of contamination is perceived, screening level testing would be undertaken on the material

to determine existing contaminant levels prior to the fill material being transported and used on-site.

- The CEMP would include specific erosion and sediment control measures consistent with the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004) and *Managing Urban Stormwater: Soils and Construction, Volume 2A Installation of Services* (DECCW 2008).
- Erosion and sediment control measures would be established prior to work beginning and would be maintained in effective working order throughout the duration of the works and until the site is suitably stabilised.
- Erosion and sediment controls would be inspected weekly and immediately after rainfall to ensure effectiveness over the entire duration of the construction works.
- Any stockpiles of soils or fill would be managed in an appropriate manner to prevent dust, erosion and sediment runoff.
- Measures to prevent tracking of soils/sediments from the work sites to roadways as a result of work vehicle/machinery movement would be implemented.
- Vehicle and machinery movement would be confined to established roadways and the construction corridor.
- Topsoil and suitable understorey vegetation would be scraped and stockpiled for later use in restoration.

6.8.5 Conclusion

The proposal is not likely to result in significant impacts on soils, topography and/or geology. Erosion and sedimentation impacts may occur during construction; however, these impacts would be appropriately managed with the implementation of the mitigation measures outlined in Section 6.8.4.

6.9 Surface water quality and groundwater

This section provides information on existing surface water and groundwater resources and assesses the potential impacts of the proposal on these resources. Mitigation measures are proposed to minimise the potential impacts of the proposal on surface water and groundwater.

6.9.1 Existing environment

The proposal is located within the Summer Hill Creek catchment, a surface water catchment of the Macquarie River. The study area generally drains through Summer Hill Creek to Suma Park Dam (the water supply for Orange). Summer Hill Creek and Suma Park Dam are both situated more than 5 kilometres from the proposal.

One minor ephemeral drainage line occurs within proximity to the northern extent of the proposal site. General drainage within the proposal site drains northwest into an ephemeral drainage line. The drainage line runs northeast where it merges with Summer Hill Creek on the northern side of Lucknow. A farm dam is located in Lot 7 DP 559537 approximately 100 metres north-west of the proposal site.

The study area is zoned as a drinking water catchment in the Orange LEP. As such, any developments are required to consider the following:

- Distance between the development and any waterway that feeds into the drinking water storage.
- On-site use, storage and disposal of any chemicals on the land.

- Treatment, storage and disposal of wastewater and solid waste generated or used by the development.

Flooding

The proposal is approximately 1 to 2 kilometres north of the topographic catchment divide and, therefore, just within the Summer Hill Creek catchment boundary. Regional flooding does not impact the proposal site due to its location near the top of the catchment. The proposal site is not identified as flood affected land on the Orange LEP.

Groundwater

The proposal is located within the groundwater management area Orange Basalt. Groundwater in NSW is managed according to designated groundwater management areas which are designated by geographical boundaries or geological feature. The geology of this area is basalt with relatively small pores, resulting in groundwater primarily flowing through fractures rather than pore spaces. This makes groundwater analysis difficult, as bores on which interpretation is based, may not intercept regionally significant fracture networks. The groundwater catchment for the study area aligns with the surface water catchment of the study area.

Groundwater recharge within Orange Basalt is estimated to be 4 per cent of annual rainfall (NSW Office of Water, 2010). This equates to approximately 30 to 35 millimetres per annum averaged across the groundwater area. The Orange Basalt is a relatively productive aquifer, with yields from bores averaging 4.5 litres per second.

Based on the NSW Natural Resource Atlas groundwater data, there are 505 uses attributed to the 244 bores located within 6 kilometres of the proposal (some bores have multiple uses). The primary uses for groundwater bores within the study area are for stock, domestic and irrigation purposes. Eighty-six of the 244 bores had groundwater level data recorded at the time of bore hole drilling. The majority indicate a groundwater level of 5 metres or more below ground level. However, this does not capture any temporal variability in water levels. Bores nearest to the aerodrome indicate water levels between 3.7 and 8 metres below ground level.

Time series groundwater levels which were available from bores approximately 8 kilometres north of the aerodrome showed no overall trend in declining groundwater levels, although the sampling frequency was limited. Seasonal variation in groundwater levels at shallower depths was between 2 to 4 metres.

Groundwater quality from bores within the study area indicate that, aside from two records of ‘hard’ groundwater, groundwater quality within the Orange Basalt is generally described as ‘good’, ‘fresh’, or ‘very good’.

Regional groundwater management

The proposal is within an area defined as a zone of ‘groundwater vulnerability’ (Orange LEP 2011). The groundwater vulnerability classification aims to maintain the hydrological functions of key groundwater systems and protect vulnerable groundwater resources from depletion and contamination. Two key considerations for developments in areas of groundwater vulnerability are:

- Whether or not the development (including any on-site storage or disposal of solid or liquid waste and chemicals) is likely to cause any groundwater contamination or have any adverse effect on groundwater dependent ecosystems.
- The cumulative impact (including the impact on nearby groundwater extraction for potable water supply or stock water supply) of the development and any other existing development on groundwater.

6.9.2 Impact assessment

Surface water

Construction works have the potential impact surface water quality through the introduction of pollutants into nearby drainage lines. The proposal would not directly intercept any watercourses, however, potential impacts on surface water quality may include:

- Sediment runoff from soil disturbance activities and stockpiles.
- Spills of fuels, oils and chemicals.
- Temporary changes to surface water flows quantity and direction during trenching and excavation activities and the construction of new infrastructure.

As discussed in Section 6.8, construction activities have the potential to expose soil that may be eroded leading to sedimentation of surrounding land and drainage lines. Topsoil would be stripped and stockpiled for later reuse in landscaping and respreading. Erosion and sedimentation during these works has the potential to impact surface water quality by increasing turbidity, changing drainage line morphology and altering surface water flow paths. Standard mitigation and management measures based on the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004) to minimise erosion and sedimentation potential are provided in Section 6.9.3.

The flat topography of the study area, and minimal vegetation clearing required for construction, would limit the potential for sediment laden water to enter nearby drainage lines during construction, impacting local water supplies. Furthermore, the implementation of mitigation measures outlined in Section 6.9.3 would also minimise the potential for erosion causing sediment laden water to enter drainage lines. The proposal would not impact Summer Hill Creek and Suma Park Dam as they are located more than 5 kilometres from the proposed works.

Flooding

During construction, surface water flow paths may be affected resulting in minor local flooding, however, this would be minimal given the proposal is located at the top of the catchment. The risk of flooding would be higher around drainage lines as they are generally associated with low points in the topography. The construction compound and stockpiles would be located away from drainage lines to avoid potential inundation of stockpiles and materials/liquids storage areas.

Groundwater

Potential impacts on groundwater during construction may include impacts on groundwater quantity and quality. Such impacts may result from:

- Interception of groundwater during trenching and excavation activities.
- Contamination of groundwater through seepage from material and waste stockpiles, or spills of fuels, oils or chemicals.

Trenching to a maximum depth of 1,500 millimetres (to achieve a depth of cover of 1,200 millimetres) would be required along the length of the proposal. This depth is shallower than the standing groundwater levels recorded in 98 per cent of the bore holes within 6 kilometres of the proposal site, even when accounting for seasonal variation and the effects of vegetation clearing. Therefore, it is considered that groundwater is unlikely to be encountered during construction of the proposal. Consequently impacts on groundwater quality and quantity are not expected.

Removal of vegetation has the potential to raise the groundwater table and increase salinity. Given that there would be a minimal amount of vegetation cleared during construction of the proposal (approximately 0.12 hectares) salinity hazards are anticipated to be negligible.

The proposal would not result in impacts on surface or groundwater quality during operation as no chemicals would be used or generated.

6.9.3 Mitigation measures

Measures to mitigate the potential impacts to surface water and groundwater associated with construction and operation of the proposal would include, but not be limited to, the following:

- An Erosion and Sedimentation Control Plan (ESCP) would be prepared as part of the CEMP. The ESCP would incorporate specifications outlined in the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004) and *Managing Urban Stormwater: Soils and Construction, Volume 2A Installation of Services* (DECCW 2008).

  The ESCP would include:

  – Measures specified in Section 6.6.3 and 6.8.4.
  – Catchment areas and the direction of on-site and off-site water flow.
  – A procedure for regular inspection, maintenance and cleaning of sediment control works.
  – Regular monitoring of Bureau of Meteorology weather forecasts.
- Disturbed surfaces would be compacted and stabilised in anticipation of rain events to reduce the potential for erosion.
- Any material transported onto pavement surfaces would be swept and removed at the end of each working day.
- Stockpiles would be located away from drainage lines to avoid sediment entering the waterway.
- Clean water would be diverted around the construction site.
- Dust suppression measures would be implemented as detailed in Section 6.6.3, including the watering down of spoil stockpiles during windy conditions.
- Disturbed areas would be stabilised immediately following completion of works to ensure no areas remain unstable for any extended length of time.
- Dedicated plant and equipment wash down areas would be located away from drainage lines.
- Personnel would be provided with appropriate training in the handling of fuels, oils and chemicals including emergency response.
- Appropriate numbers of spill kits would be maintained on-site.
- Construction equipment would not be used if there are any signs of fuel, oil or hydraulic leaks. Leaks would be repaired immediately or the equipment would be removed from site and replaced with a leak-free item.
- All chemicals stored on-site would be recorded on a hazardous substance register. The relevant Material Safety Data Sheets (MSDS) would also be kept on-site.
- All fuels, chemicals and other hazardous liquids would be stored in a secure bunded area away from drainage lines and stormwater inlets.
- Disturbed areas would be stabilised immediately following completion of works to ensure no areas remain unstable for any extended length of time.

6.9.4 Conclusion

The proposal would have a minimal impact on flooding, surface water and groundwater resources within the study area given the implementation of the mitigation measures outlined in Section 6.9.3.

6.10 Ecology

This section includes a summary of the *Brown's Creek to Orange Gas Pipeline Relocation Flora and Fauna Impact Assessment* (GHD 2012c) undertaken for the proposal. The section examines terrestrial flora and fauna and their habitats in the study area and the presence and likelihood of occurrence of threatened species, populations and ecological communities. Impacts on terrestrial ecology in the study area associated with the proposal are assessed and mitigation measures identified to ameliorate potential impacts. A full copy of the ecology assessment is included as Attachment E.

6.10.1 Assessment approach and methodology

The ecology assessment included a desktop review of databases and relevant literature based on a 10 kilometre radius of the site and field surveys to identify potential ecological constraints associated with the proposal. The 'subject site' encompassed the construction corridor of 15 to 20 metre width along the route of the pipeline and compound The 'study area' was defined as the subject site and any adjacent areas, which are likely to be affected by the proposal, either directly or indirectly, generally within 100 metres of the subject site. The 'locality' was defined as the area within a 10 kilometre radius of the study area.

Field surveys were conducted on 21 to 23 March 2012 for the related *Orange Aerodrome Expansion EIS* (GHD 2012b) and included terrestrial flora and fauna surveys of the site. Flora surveys were conducted within the site using quadrat surveys and transects. Two 50 metre by 20 metre quadrats were surveyed for vegetation and habitat characteristics at locations where native vegetation exists (refer to Attachment E, Figure 3). Transects were investigated within and around the study area using the random meander technique to identify the potential occurrence of threatened plant species and ecological communities.

A variety of survey techniques were used to target threatened fauna species and assess habitat values within the study area. Fauna surveys included targeted diurnal bird surveys, Microchiropteran bat surveys, spotlighting, and call playback for the Powerful Owl (*Ninox strenua*) and the Barking Owl (*Ninox connivens*).

Habitat assessments for the likelihood of occurrence of threatened species included active searches for specific food trees and evidence of foraging, feeding scars, scratches and diggings, nests or other potential fauna roosts and hollow-bearing trees. Opportunistic and incidental observations of fauna species were recorded at all times during field surveys. Farm dams and roadside drains were surveyed for waterbirds and reptiles and frog calls were recorded.

6.10.2 Existing environment

Database search results – flora

The desktop assessment undertaken on 23 February 2012 identified two threatened ecological communities listed on the TSC Act in the Orange CWMA subregion along with one EPBC Act listed ecological community predicted to occur in the locality.

Two threatened flora species, *Eucalyptus aggregata* (Black Gum) and *Eucalyptus canobolensis* (Silver-leaf Candlebark); listed under the TSC Act have previously been recorded in the locality of the subject site. Three threatened flora species listed under the EPBC Act were identified as

potentially occurring in the vicinity of the study area. These are listed in Table 6-11 including their likelihood of occurrence within the study area.

Table 6-16 Threatened flora species identified from the desktop assessment

Scientific Name	Common Name	TSC Act	EPBC Act	Likelihood of occurrence
Eucalyptus aggregata	Black Gum	V[1]	-	Nil
Eucalyptus canobolensis	Silver-leaf Candlebark	V	E[2]	Nil
Euphrasia arguta		Prel. CE	CE[3]	Low
Thesium australe	Austral Toadflax	V	V	Low

Notes: *1. V – Vulnerable*
2. E – Endangered
3. CE – Critically Endangered

Database search results - fauna

The desktop assessment identified four previously recorded threatened fauna species listed under the TSC Act and 13 fauna species listed under the EPBC Act as potentially occurring in the vicinity of the study area. These are listed in Table 6-12 below including their likelihood of occurrence within the study area.

Table 6-17 Threatened fauna identified from the desktop assessment

Scientific Name	Common Name	TSC Act	EPBC Act	Likelihood of occurrence
Rostratula australis	Australian Painted Snipe	E	V, M	Low
Oxyura australis	Blue-billed Duck	V		Nil
Stictonetta naevosa	Freckled Duck	V		Low
Leipoa ocellata	Malleefowl	E	V, M	Nil
Erythrotriorchus radiates	Red Goshawk	CE	V	Nil
Anthochaera phrygia	Regent Honeyeater	CE	E	Nil
Polytelis swainsonii	Superb Parrot	V	V	High
Lathamus discolor	Swift Parrot	E	E	Nil
Petrogale pencillata	Brush-tailed Rock-wallaby	E	V	Nil
Phascolarctos cinerus	Koala	V	V	Low
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Low
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	Moderate
Pseudomys fumeus	Smoky Mouse	E	E	Nil
Litoria booroolongensis	Booroolong Frog	E	E	Nil

Scientific Name	Common Name	TSC Act	EPBC Act	Likelihood of occurrence
Macquarie australasica	Macquarie Perch	V	E	Nil
Maccullochella peelii peelii	Murray Cod	-	V	Nil

The desktop assessment identified no previously recorded threatened species listed under the FM Act as occurring within the vicinity of the study area.

Ten migratory species listed under the EPBC Act were identified from the protected matters search, however, these were considered unlikely to occur in the study area. No other ecological Matters of National Environmental Significance under the EPBC Act were identified as occurring within the study area, or vicinity.

A full list of threatened species, communities and migratory species listed under the TSC and EPBC Acts including assessments of likelihood of occurrence is included in Appendix A of Attachment E.

Site description

The study area is comprised mainly of cleared agricultural paddocks and small patches of highly modified remnant native vegetation. Planted gardens and windbreaks are found adjacent to farm houses. Occasional farm dams are present in paddocks and vegetated roadside ditches are also present (refer to Figure 6-5).

Flora species and vegetation communities

The subject site is dominated by introduced flora species. The flora survey identified 60 flora species within the study area, of which 20 species were native and 40 introduced. A full list of recorded species is provided in Appendix B of Attachment E. No threatened flora species were recorded in the study area and none identified from the desktop assessment are likely to occur within the study area. One noxious weed, Blackberry (*Rubus* sp.), a Class 4 weed listed under the *Noxious Weeds Act 1993* for the Orange City Council control area, was recorded during the survey.

Introduced Hawthorn (*Crataegus monogyna*) and Radiata Pine (*Pinus radiata*) are scattered throughout the study area. Native groundcover species noted in paddock areas include Slender Wallaby Grass (*Austrodanthonia penicillata*), Weeping Lovegrass (*Eragrostis parviflora),* Common Cranesbill (*Geranium retrorsum*), *Oxalis exilis*, and *Euchiton sphaericus*. Kangaroo Grass (*Themeda australis*) is present in a roadside ditch at the western end of the study area. Native sedges and reeds (*Cyperus* sp. and *Juncus* spp.) were noted around farm dams and drainage ditches.

Native woodland patches in the study area consist almost entirely of Ribbon Gum (*Eucalyptus viminalis*). The patch of trees at the northern end of the proposal also contains Radiata Pine (*Pinus radiata*) and Silver Wattle. Occasional native species (including *Austrodanthonia* spp.) are present in the groundcover. The vegetation community falls within the classification of *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland*, an Endangered Ecological Community (EEC) listed under the TSC Act. Due to the highly modified and fragmented nature of the vegetation, such as grazing, clearing, and the dominance of introduced groundcover species, the woodland comprises a degraded form of the EEC and falls within the Biobanking definition of low condition vegetation (DEC, 2009).

Orange Aerodrome

0 50 100 200 300 400

Metres

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

N

LEGEND

- Existing gas pipeline
- Proposed gas pipeline realignment
- Waterways
- Wetland
- Temporary compound
- Construction corridor
- Hollow-bearing tree
- Stag
- Dam
- Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland
- Planted Trees and Gardens
- Study Area 100m Buffer Area

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

Job Number	21-21326
Revision	A
Date	10 Jan 2013

Vegetation and fauna habitat features

Figure 6-5

G:\21\21326\GIS\Maps\MXD\21_21326_Z051_GasPipeline_VegetationandFaundaHabitats.mxd

Data Source: Orange City Council, aerial imagery, 2012. NSW Department of Lands: Cadastre - Jan 2011; Geoscience Australia: 250k Data - Jan 2011. Created by: apmiller

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Fauna

The fauna field surveys identified a low diversity of species, with 45 species recorded. This included 27 bird species (including three introduced species), twelve mammal species (including three introduced species), one reptile species and five frog species. Seven microchiropteran bats were recorded, including the Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), listed as vulnerable under the TSC Act. No other threatened fauna species were recorded during the surveys.

Migratory species recorded included three species of duck and two raptors. No individual migratory species listed under the EPBC Act are considered to have a moderate to high likelihood of occurrence in the study area (refer to Appendix B of Attachment E).

Fauna habitat

Fauna habitat within the study area is considered highly disturbed due to the extensive history of agricultural land uses. Four main habitat types were identified within the study area: paddocks, farm dams and drainage lines, and woodland. A detailed description of each habitat type is provided in Attachment E.

The following two threatened fauna species were considered to have a moderate to high likelihood of occurrence in the study area based on previous recordings and available habitat features:

- The Superb Parrot, listed as vulnerable under the TSC Act and the EPBC Act, is known from many records in the locality, all to the northwest of the study area. This species could forage in the woodland patch and in paddock trees, although these are considered low quality habitat given that the vegetation is highly disturbed through clearing and grazing. It is highly unlikely to nest in the study area.
- The Eastern Bentwing Bat, listed as vulnerable under the TSC Act, was recorded once in the locality. The study area has no breeding habitat and only limited potential roosting habitat (two culverts under roads). The species could forage throughout the study area.

Vegetation and habitat features are illustrated in Figure 6-5.

6.10.3 Impact assessment

The proposal would result in minor impacts to flora and fauna during construction of the proposal, these potential impacts are discussed below. The proposal would not result in impacts on native biodiversity values during operation.

Vegetation clearing

The majority of the proposal site is located in cleared agricultural land and impacts would mainly be restricted to areas of exotic grassland (refer to Figure 6-5). Construction of the proposal would disturb approximately 0.12 hectares of native vegetation which is classified as Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC, including two mature hollow-bearing trees.

Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC within the study area is fragmented and highly modified. An assessment of significance (Seven Part Test) was undertaken in accordance with Section 5A of the EP&A Act and concluded that the activity would not have a significant impact on the EEC as the proposal would result in the clearing of a negligible area (0.12 hectares out of a total 1.4 hectares) of this highly fragmented community (refer to Appendix C of Attachment E).

Fauna habitat clearing

The site provides very limited habitat resources for native fauna species and would only contain foraging and shelter resources for some native fauna. Mature trees have value for fauna populations as sources of foraging resources such as nectar, sap or seed. The presence of hollows also provides valuable nesting resources for common bird and bat species. The clearing of up to 0.12 hectares of native vegetation including two mature trees would remove a negligible proportion of available foraging resources for local populations of the Superb Parrot and other native fauna. The removal of up to two hollow-bearing trees is not considered to be significant as there are many hollow-bearing trees present in the small woodland patch in the west of the study area and in the surrounding locality. No farm dams would be removed.

Impacts on threatened fauna species

The Superb Parrot and the Eastern Bentwing Bat are considered to have a moderate to high likelihood of occurrence in the study area. However, the extent of nesting habitat in the study area for each of these mobile and wide-ranging species is limited. The species may forage on occasion within the study area, but would not rely on these habitats for their conservation in the locality. Assessments of significance were undertaken for the Superb Parrot (listed as vulnerable under the TSC and EPBC Acts) and Eastern Bentwing Bat (listed as Vulnerable under the TSC Act) to determine the significance of impacts associated with the removal of 0.12 hectares of native vegetation (including the removal of up to two hollow bearing trees). The assessments concluded that the proposal would not have a significant impact on either of the species or local populations as it would result in the removal of a negligible area of poor quality foraging habitat for these species. Assessments of significance are provided in Appendices C and D of Attachment E.

The proposal is considered unlikely to pose a significant impact on any migratory species listed under the EPBC Act predicted to occur within the locality. Furthermore the assessment of significance for the Superb Parrot under the EPBC Act concluded that the proposal would not have a significant effect on the species (refer to Appendix D of Attachment E). No Matters of National Environmental Significance would be significantly impacted by the proposal. Therefore a referral to the Commonwealth is not required.

Other construction impacts

If not managed appropriately, construction activities may have the potential to cause fauna injury or mortality; however, given the cleared and modified nature of the study area, this is unlikely. Mobile fauna such as birds are expected to avoid injury by moving away from the construction area. The implementation of mitigation measures provided in Section 6.10.4 would ensure that impacts to fauna during construction of the proposal are appropriately minimised.

The proposal is not likely to further introduce weeds or result in edge effects in native vegetation. Impacts to water quality in farm dams and drainage ditches immediately adjacent to the site would be adequately mitigated through the implementation of management controls listed in Section 6.10.4.

Key threatening processes relevant to the proposal are discussed in detail in Section 5.3 of Attachment E and include clearing of native vegetation, loss of hollow-bearing trees and the removal of dead wood and dead trees. Mitigation measures to limit the impacts of key threatening processes are outlined in Section 6.10.4 below.

6.10.4 Mitigation measures

The mitigation of potential impacts on biodiversity arising from the proposal has been presented according to the hierarchy of avoidance, mitigation and offsetting of impacts.

Detailed design

The detailed design of the pipeline route would avoid identified native vegetation and hollow bearing trees where possible.

Construction

The mitigation measures outlined below are recommended to ensure potential impacts of the proposal on biodiversity are reduced during construction:

- An environmental induction would be given to all workers prior to works commencing. This would include information on the ecological values of the site and required protection measures to be implemented.
- Retained trees would be fenced off or clearly marked to avoid additional impacts on vegetation. Fencing should protect the entire Tree Protection Zone (ie 10 times the diameter of the trunk at breast height).
- Stockpiles of construction materials, fill or vegetation would be placed in existing cleared areas and not within areas of adjoining native vegetation.
- Any open sections of the pipeline trench would be covered at night to ensure no animals become trapped. The trench would be checked each morning and any trapped animals released.
- The clearing of mature and hollow-bearing trees and stags would be minimised and or avoided where possible.
- Any hollow-bearing trees to be removed would be marked prior to clearing. The removal of hollow bearing trees would be undertaken in accordance with a tree hollow management protocol and would involve the presence of a qualified ecologist or wildlife expert experienced in the rescue of fauna.
- Habitat features such as mature tree trunks within the site would be salvaged and placed within woodland areas as far as is practicable.
- Erosion and sediment controls would be implemented in accordance with mitigation measures provided in Section 6.9.3.
- All areas disturbed during construction would be suitably stabilised as soon as possible following construction.

Offsetting of impacts

As the proposal would result in very limited impacts on native biota, formal offsets are not required. However, if grasses are replanted, the following native species are recommended: Slender Wallaby Grass (*Austrodanthonia penicillata*), Weeping Lovegrass (*Eragrostis parviflora),* and Kangaroo Grass (*Themeda australi).*

6.10.5 Conclusion

With the implementation of the mitigation measures described in Section 6.10.4, the construction of the proposal would not have a significant impact on any local populations of native biota, including threatened species, EECs and their habitats, which occur in the study

area or in adjoining habitats. The proposal would not result in impacts on native biodiversity values during operation.

6.11 Visual amenity

This section assesses the potential visual and landscape character impacts of the proposal on the surrounding environment and provides mitigation measures to ameliorate these impacts.

6.11.1 Existing environment

The visual character of the proposal site is dominated by cleared rural lands and the neighbouring aerodrome. The aerodrome is the dominant feature in the area and includes a terminal building, hanger buildings, runways, taxiways and car park. Local roads in the surrounding area follow the natural topography which dips at drainage lines and rises gently to cross low ridgelines.

The rural landscape is characterised by expansive, predominantly flat or slightly undulating, rural farm land.

6.11.2 Impact assessment

Temporary visual impacts may occur as a result of the positioning of equipment and materials within the construction corridor and the compound site. This would result in minor, temporary visual impacts to road users along Aerodrome Road, Huntley Road and Gander Road, as well as users of the aerodrome, and nearby residential properties.

Earthworks would also expose soil during the construction period that would also be visible. Overall, the potential visual impacts are considered to be minimal and limited to the construction stage of the proposal. Following construction, all disturbed areas would be appropriately restored to their pre-works condition, or better. The relocated pipeline would be buried along its entire length and the proposal would not result in any operational impacts on the surrounding visual amenity.

6.11.3 Mitigation measures

The following mitigation measures are recommended to minimise the potential impacts on visual amenity during construction of the proposal:

- Fencing with material attached (e.g. shade cloth) would be provided around the construction compound to screen views of the construction compound from adjoining properties.
- All work site(s) would be left in a tidy manner at the end of each work day.
- All impacted areas would be restored to their original condition or better following the completion of works in accordance with the APIA Code of Environmental Practice.
- All waste generated on-site would be collected and disposed of in a responsible manner at a licensed facility.
- All construction plant and equipment and materials would be removed as soon as possible following completion of construction works.

6.11.4 Conclusion

Construction of the proposal is likely to have a minor, short-term impact on the visual amenity. With the implementation of the mitigation measures provided in Section 6.11.3 and throughout Chapter 7 of this EIS, these impacts are unlikely to be significant. No operational impacts on visual amenity are anticipated.

6.12 Waste

This section describes the types of wastes that may be generated as a result of the proposal and the waste management procedures that would be implemented.

6.12.1 Construction waste

Waste likely to be generated during construction of the proposal would include:

- Green waste from vegetation removal.
- Surplus materials used during site establishment such as safety fencing, erosion controls and barriers.
- Surplus construction materials such as excess pipe materials.
- Surplus spoil from trenching.
- Domestic waste including food scraps, aluminium cans, glass bottles, plastic and paper containers, and putrescible waste generated by site construction personnel.

Construction of the pipeline would result in trenching approximately 864 cubic metres of spoil which would be reused for backfilling. Spoil would be temporarily stockpiled in skip bins for reuse in backfilling (if deemed suitable and no contamination is encountered). Any excess spoil would be classified in accordance with the OEH *Waste Classification Guidelines 2009* and disposed of off-site at a suitably licensed disposal facility.

Vegetation removal would be minimised, where practicable. Suitable vegetation would be shredded or processed on-site into wood chip or mulch and would be reused in the rehabilitation of areas disturbed during construction. Any noxious weeds encountered would be removed, bagged and disposed of at an OEH licensed disposal facility.

Overall waste generated from the construction of the proposal is considered to be minimal. General waste produced during construction would be managed in accordance with the waste management hierarchy, within which waste avoidance is a priority, followed by reuse and recycling/reprocessing, with disposal as a last resort. The proposal would not generate waste during operation. Mitigation measures provided in Section 6.12.2 would be implemented to ensure waste is managed appropriately on-site.

6.12.2 Mitigation measures

The following mitigation measures would be implemented to during construction to ensure the appropriate management of waste:

- Any waste unable to be reused or recycled would be classified and in accordance with the OEH *Waste Classification Guidelines (DECCW 2009)* and disposed of at an OEH licensed facility.
- Upon completion of the works, all vehicles, construction equipment, materials, and refuse relating to the works would be removed from the work sites and any adjacent affected areas.
- Potentially contaminated material not identified in this EIS would be identified on-site through either visual or odour observation (i.e. unusual discolouration or odours). Any identified contamination to be removed from site would be tested prior to disposal to an approved landfill by an approved waste removal contractor, in accordance with the OEH requirements.
- Noxious weeds removed during works would be managed in accordance with the Department of Primary Industries' requirements that relate to its classification status.

- Waste receptacles would be provided in work areas.
- A waste log would be maintained on-site.

6.12.3 Conclusion

Waste generated during construction of the proposal is considered to be minimal. Waste management arrangements would be put in place during the construction of the proposal to maximise the avoidance, reduction, reuse, and recycling of waste materials. The proposal would not result in operational waste,

6.13 Social

This section presents an assessment of the potential social impacts of the proposal on the community including a description of the environment of the locality; and the potential impacts that may result from the construction and operation of the proposal. Mitigation measures are provided where required to address any potential negative impacts on the community.

6.13.1 Existing environment

The proposal site is primarily used for rural/agricultural purposes such as grazing and cropping. The majority of the properties in the surrounding area are medium-sized farms containing residential dwellings and associated sheds and barns.

The nearest sensitive receptor to the proposal is 175 Aerodrome Road; a residential rural property (Lot 383 DP 1045095) located approximately 60 metres southwest of the proposal. The house located on Lot 384 DP 1045095 would be vacated at the time the proposal is constructed. No other sensitive receivers are situated within 200 metres of the proposal.

Other sensitive receivers within 500 metres of the proposal include:

- 173 Aerodrome Road located approximately 300 metres to the southwest of the southern extent of the proposal site.
- 864 Huntley Road located approximately to the immediate east (acquired by Orange Council as part of the Orange Aerodrome Expansion).
- 1 Capps Lane located approximately 470 metres to the east of the northern extent of the proposal site.
- 15 Capps Lane located approximately 440 metres to the northeast of the northern extent of the proposal site.
- 793 Huntley Road located approximately 338 metres to the west of the proposal site.

However, these would be from a greater distance and are unlikely to be impacted during construction of the proposal.

6.13.2 Impact Assessment

Social impacts associated with the proposal would be limited to the construction stage. Potential impacts may include reduced visual amenity, minor increases in noise, potential dust, and potential traffic and access disruptions. These potential impacts, however, would be of a temporary nature and minimised through the implementation of mitigation measures proposed in this EIS. Following construction, all disturbed areas would be appropriately restored to their pre-works condition or better.

The proposal is not considered to have significant long-term adverse impacts on the local community. Existing land use activities (grazing) would be resumed following construction so long as they are compatible within the pipeline easement requirements as detailed in

Section 6.4. The property owner of Lot 1 DP 219587 would be compensated for development restrictions within the easement.

6.13.3 Mitigation measures

The following mitigation measures would be implemented to minimise potential impacts on the community during construction works:

- Notifications (letters and door knocks) to potentially impacted customers and stakeholders would be carried out in accordance with APA Group's standard notification procedures.
- Visual impacts would be minimised by maintaining the worksites in a clean and tidy state.
- All impacted areas would be restored to their original condition or better following the completion of works.
- All contractors would be inducted in management measures to reduce the disruption to the surrounding community.
- Consultation with affected and adjacent landowners would be undertaken to determine mechanisms to reduce noise disturbance and manage access arrangements.

6.13.4 Conclusion

Impacts on the surrounding community would be temporary and limited to the construction stage of the proposal. Furthermore, with the implementation of the mitigation measures provided in Section 6.13.3 and Chapter 7, impacts on adjacent sensitive receivers and the directly affected landowner would not be significant.

6.14 Utilities and infrastructure

This section considers the existing utilities within the proposal site. Potential impacts on existing utilities from the construction and operation of the proposal are assessed and mitigation measures provided where required.

6.14.1 Existing environment

No existing services are known to occur within the proposal area. This would be confirmed during detailed design.

6.14.2 Impact assessment

Disruption to existing utilities (telecommunication services, water assets etc.) would be minimised by ensuring that services are located and clearly labelled in advance of any excavation work occurring. A contingency plan would be developed to manage accidental outages.

Commissioning of the pipeline would be undertaken in close consultation with potentially affected local residents and other service users to ensure that outages are programmed and affected users are advised in advance. With the implementation of measures provided in Section 6.14.3, impacts on other services and utilities would be minimised.

6.14.3 Mitigation measures

To minimise the impact on existing infrastructure and utilities during construction, the following mitigation measures would be implemented:

- 'Dial before you dig' would be undertaken prior to commencement of construction works.
- Consultation with other service providers would be undertaken as required.
- Services would be located prior to trenching.
- Communication with residents would be undertaken to provide notice of potential service disruptions.
- Construction in the vicinity of infrastructure would be undertaken in accordance with the requirements of service providers.
- Contingency plans would be developed in case of accidental disruption/outage of services.

6.14.4 Conclusion

Impacts to utilities and services during construction of the proposal would be minimal and appropriately mitigated through the implementation of the mitigation measures provided in Section 6.14.3. No impacts on utilities are anticipated as a result of the operation of the proposal.

6.15 Cumulative impacts

This section describes the cumulative impacts likely to arise from the combination of the construction of the proposal with other projects and activities planned in the Orange area.

The definition of a cumulative impact adopted for the purposes of this EIS encompasses those impacts which may result from a number of activities with similar impacts interacting with the environment in a region. In accordance with this definition, this section focuses on identifying cumulative impacts where these impacts could potentially be significant.

6.15.1 Potential cumulative impacts

A search of the major projects register maintained by DP&I for major projects within the Orange and Cabonne LGAs indicated that no applications have been approved, or are seeking approval for works within the vicinity of the proposal.

In addition to the Orange Aerodrome Expansion, the following development applications are being progressed at the aerodrome:

- Aerodrome terminal building upgrade.
- Aerodrome fuel tank installation.

A brief description of these projects is provided below:

Orange Aerodrome Expansion Project

The Orange Aerodrome Expansion is being progressed by Orange City Council to 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 works involve an extension to the existing Runway 11/29, the construction of a new parallel taxiway, and other works which would require the realignment of the existing Huntley and Aerodrome Roads.

The Orange Aerodrome Expansion would be constructed over approximately 14 months commencing in February 2013 subject to approvals. The Aerodrome Expansion construction schedule is reliant on the timely construction of the pipeline relocation proposal to enable the construction works within the aerodrome site to progress safely. Some of the development activities within the aerodrome may be commenced prior to the pipeline relocation works commencing, and hence occur at the same time as the proposal.

Construction of the Orange Aerodrome Expansion would result in cumulative impacts associated with construction noise, air quality and traffic. However, given the small scale of the pipeline relocation in the context of the proposed larger scale Orange Aerodrome Expansion works, cumulative impacts are likely to be minimal. EAPL would work closely with Orange City Council during construction to ensure that potential cumulative impacts are minimised.

Terminal building upgrade

A development application for upgrade to the aerodrome terminal building is currently being prepared by Orange City Council. The terminal building would be expanded to approximately double its existing size. The upgrade would include:

- Additional area for arrivals and departures.
- Additional check-in facilities.
- Under cover baggage handling area.
- Improved café facilities.
- Additional amenities.

If approved, construction of the upgraded terminal building would occur between March 2013 and May 2014 and would coincide with the construction of the proposal. Construction of the upgraded terminal building would result in cumulative impacts associated with construction noise, air quality and traffic. However, given the small scale of the terminal building upgrade, cumulative impacts are likely to be minimal.

Aerodrome fuel tank

A development application for installation of a 55,000 litre underground aircraft fuel tank at the aerodrome was approved by Orange City Council in November 2005. The proposed fuel tank would be located between Runway 11/29 and Taxiway B, in close proximity to the RFS water loading area. While this consent has now lapsed, it was noted by Council that the applicant proposes to re-lodge an application for these works. If the development application for these works is lodged and approved, there is potential for the installation of the fuel tank to coincide with the construction of the proposal. Cumulative impacts associated with construction noise, air quality and potential hazards and risk (safety) may occur. However, given the scale of the installation of the fuel tank works, cumulative impacts are likely to be minimal.

6.15.2 Conclusion

EAPL would work closely with Orange City Council to ensure that construction activities within the aerodrome in association with the proposal are not significant. With the implementation of mitigation measures provided in this EIS the construction of the proposal in association with other projects within the aerodrome would result in minimal cumulative impacts.

7. Environmental management and monitoring

This chapter consolidates the mitigation measures detailed throughout this EIS that would be implemented to prevent or reduce the identified environmental impacts. This chapter also provides a framework for the required environmental management plans that would be prepared and implemented for the proposal.

7.1 Compilation of mitigation measures

Table 7-1 summarises the mitigation measures identified in this EIS to ameliorate the adverse impacts and safeguard the environment during construction of the proposal so that the desired environmental outcomes are achieved.

Table 7-1 Summary of mitigation measures

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
General		
Establish environmental management procedures for the protection of the environment.	Prepare and implement a CEMP.	P, C
Hazards and risk		
Ensure appropriate management of hazards and risks during design, construction and operation.	The relocated pipeline would be designed, constructed and operated in accordance with the requirements of AS2885, *APIA Code of Environmental Practice Onshore Pipelines 2009,* and the pipeline licence.	P, C
	A construction health and safety risk assessment would be undertaken prior to construction to identify any construction hazards and risks and associated controls to be implemented during construction works.	P, C
Noise		
Minimise noise emissions.	Works would be conducted in accordance with the ICNG and all reasonable and feasible practises would be undertaken to minimise or avoid noise.	P
	Where feasible and reasonable, the quietest available plant and equipment would be utilised to minimise impacts on nearby residences.	C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	The site configuration would be designed to minimise noise impacts to the surrounding community. The design would consider the following: ◗ Construction compounds would be laid-out in such a way that the primary noise sources are at a maximum distance from residences, with solid structures (sheds, containers, etc) placed between residences and noise sources (and as close to the noise sources as is practical). ◗ Compressors, generators, pumps and any other fixed plant would be located as far away from residences as possible and behind site structures.	P
	Where practical, equipment would be selected to minimise noise emissions. Equipment would be fitted with appropriate silencers and be in good working order. Machines found to produce excessive noise compared to normal industry expectations would be removed from the site or stood down until repairs or modifications can be made.	C
	The final selection and design of noise mitigation measures would be undertaken with consideration to best management and economically achievable practice during the development of the CEMP.	P
	The CEMP would be reviewed in response to complaints and amended where practical throughout the construction phase of the proposal.	C
	All site workers would be sensitised to the potential for noise impacts on local residents and encouraged to take practical and reasonable measures to minimise the impact during the course of their activities. This would include toolbox talks covering; ◗ Avoid shouting and slamming doors. ◗ Where practical, machines should be operated at low speed or power and switched off when not being used rather than left idling for prolonged periods. ◗ Minimise reversing. ◗ Avoid dropping materials from height and avoid metal to metal contact on material.	C
Undertake an appropriate level of consultation with the community.	Consultation and cooperation between the site workers and surrounding residents would assist in minimising uncertainty, misconceptions and adverse reactions to construction noise and would include: ◗ Close liaison between adjacent residents and the parties associated with the construction works to provide effective feedback in regard to perceived emissions. In this manner, equipment selections and work activities could be coordinated where necessary to minimise noise disturbances, and to ensure prompt response to complaints, should they occur.	P, C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	◗ Any noise complaints would be addressed immediately in accordance with APA Group's standard resolution procedures. ◗ Upon receipt of a noise complaint noise monitoring would be undertaken and reported as soon as possible. If noise levels are significantly above the predicted noise levels then the works process would be reviewed in order to identify a means to attempt to minimise noise impacts.	
Minimise noise emissions outside standard construction hours.	General construction activities would be limited to the recommended construction hours where feasible.	C
	If out- of- hours work is required, construction hours would be limited to 8 am to 1 pm on Sundays with a small working crew. An Out of Hours Works Procedure as part of the CEMP would be prepared.	C, P
Minimise vibration impacts during construction	Vibration levels are not anticipated to exceed those recommended in DIN 4150-3 1999: Structural Vibration – Part 3: Effects of vibration on structures. However if soil compaction works were to occur within 10 metres of a building or structure a suitably qualified person would be consulted and further assessment may be required.	C
Land use		
Ensure equitable compensation for land acquired.	All acquisition would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991,* where private treaty negotiations are unable to be concluded.	P, C
Traffic and access		
Minimise traffic impacts.	Access to surrounding properties would be maintained for the duration of the proposal.	C
	Traffic Management/Control Plan(s) would be prepared in consultation with the relevant traffic authority(s). All traffic control devices would be in accordance with *AS 1742.3 – 1996 Traffic Control Devices for Works on Roads*.	P, C
	The speed limit on Aerodrome Road in the vicinity of Gander Road would be reduced during pipeline construction to a maximum of 80 kilometres per hour.	C
	Residents would be notified in advance of traffic disruptions and access changes through letter box drops.	C
	All areas impacted by construction activities are to be restored to their pre-works condition.	C
Air quality		
Control dust emissions.	Appropriate erosion and sedimentation controls would be implemented as outlined in Section 6.9.3 to minimise dust emissions.	C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	Appropriate dust suppression controls would be implemented, as required. This would include suspending excavation activities during high wind events or the use of water sprays.	C
	All haulage vehicles would have their loads covered while transporting material to or from work areas.	C
	Disturbed areas would be revegetated soil as soon as practicable.	C
	Vehicular speeds would be limited to 15 kilometres per hour along unsealed access areas.	C
Minimise emissions	Vehicles and machinery would be maintained in good working condition, with appropriate exhaust pollution controls that meet all relevant Australian Standards.	C
	Plant and machinery would be turned off when not in use, and would not be left idling for long periods.	C
Heritage		
Preserve cultural heritage.	If Aboriginal objects are discovered during construction, all works in the area of the find would cease and the OEH and representatives from the Orange Local Aboriginal Land Council (LALC) notified as soon as possible to determine the course of action. Development works in the area of the find(s) would recommence based on a management strategy developed in consultation with and approved by the OEH.	C
	If historical items are located during development works, all works in the area of the find should cease, and the NSW Heritage Council notified. Where required, further archaeological investigation would 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.	C
	If suspected skeletal remains are discovered during construction, all works in the area of the find would cease and the local police, the OEH and representatives from the Orange LALC notified as soon as possible to determine a course of action. Development works in the area of the remains would not resume until the proponent receives written approval from the police or coroner and from the relevant statutory authority, including 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.	C
Soils, geology and topography		
Manage Acid Sulphate Soils.	The CEMP would include a management procedure in the event that unexpected contamination or acid sulfate soils are identified during construction.	P, C
Manage potential contamination.	The potential to encounter previously unknown contamination would be investigated during detailed design.	P

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	Any imported fill would be required to be certified contamination and weed free. If a risk of contamination is perceived, screening level testing would be undertaken on the material to determine existing contaminant levels prior to the fill material being transported and used on-site.	C
Minimise erosion and sedimentation.	The CEMP would include specific erosion and sediment control measures consistent with the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom, 2004) and *Managing Urban Stormwater: Soils and Construction, Volume 2A Installation of Services* (DECCW 2008).	C
	Erosion and sediment control measures would be established prior to work beginning and would be maintained in effective working order throughout the duration of the works and until the site is suitably stabilised.	
	Erosion and sediment controls would be inspected weekly and immediately after rainfall to ensure effectiveness over the entire duration of the construction works.	
	Any stockpiles of soils or fill would be managed in an appropriate manner to prevent dust, erosion and sediment runoff.	
	Measures to prevent tracking of soils/sediments from the work sites to roadways as a result of work vehicle/machinery movement would be implemented.	
	Vehicle and machinery movement would be confined to established roadways and the construction corridor.	
	Topsoil and suitable understorey vegetation would be scraped and stockpiled for later use in restoration.	
Surface water quality and groundwater		
Minimise erosion and sediment impacts.	An ESCP would be prepared as part of the CEMP. The ESCP would incorporate specifications outlined in the 'Blue Book' *Managing Urban Stormwater: Soils & Construction Volume 1* (Landcom) and *Managing Urban Stormwater: Soils and Construction, Volume 2A Installation of Services* (DECCW 2008). The ESCP would include: • Measures specified in Section 6.6.3 and 6.8.4. • Catchment areas and the direction of on-site and off-site water flow. • A procedure for regular inspection, maintenance and cleaning of sediment control works. • Regular monitoring of Bureau of Meteorology weather forecasts.	P
	Disturbed surfaces would be compacted and stabilised in anticipation of rain events to reduce the potential for erosion.	C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	Any material transported onto pavement surfaces would be swept and removed at the end of each working day.	C
Minimise impacts on water quality from sedimentation to protect natural ecosystems.	Stockpiles would be located away from drainage lines to avoid sediment entering the waterway.	C
	Clean water would be diverted around the construction site.	C
	Dust suppression measures would be implemented as detailed in Section 6.8.4, including the watering down of spoil stockpiles during windy conditions.	C
	Disturbed areas would be stabilised immediately following completion of works to ensure no areas remain unstable for any extended length of time.	C
Manage risk of water quality impacts from spills.	Dedicated plant and equipment wash down areas would be located away from drainage lines.	C
	Personnel would be provided with appropriate training in the handling of fuels, oils and chemicals including emergency response.	C
	Appropriate numbers of spill kits would be maintained on-site.	C
	Construction equipment would not be used if there are any signs of fuel, oil or hydraulic leaks. Leaks would be repaired immediately or the equipment would be removed from site and replaced with a leak-free item.	C
	All chemicals stored on-site would be recorded on a hazardous substance register. The relevant Material Safety Data Sheets (MSDS) would also be kept on-site.	C
	All fuels, chemicals and other hazardous liquids would be stored in a secure bunded area away from drainage lines and stormwater inlets.	C
Ecology		
Minimise impacts on native flora, fauna and ecological communities.	An environmental induction would be given to all workers prior to works commencing. This would include information on the ecological values of the site and required protection measures to be implemented.	C
	Retained trees would be fenced off or clearly marked to avoid additional impacts on vegetation. Fencing should protect the entire Tree Protection Zone (ie 10 times the diameter of the trunk at breast height).	P
	Stockpiles of construction materials, fill or vegetation would be placed in existing cleared areas and not within areas of adjoining native vegetation.	C
Avoid harm to fauna species.	Any open sections of the pipeline trench would be covered at night to ensure no animals become trapped. The trench would be checked each morning and any trapped animals released.	C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
Conserve potential fauna habitat.	The clearing of mature and hollow-bearing trees and stags would be minimised and or avoided where possible.	C
	Any hollow-bearing trees to be removed would be marked prior to clearing. The removal of hollow bearing trees would be undertaken in accordance with a tree hollow management protocol and would involve the presence of a qualified ecologist or wildlife expert experienced in the rescue of fauna.	C
	Habitat features such as mature tree trunks within the site would be salvaged and placed within woodland areas as far as is practicable.	C
Minimise impacts to waterways and protect aquatic habitat	Erosion and sediment controls would be implemented in accordance with mitigation measures provided in Section 6.9.3.	C
	All areas disturbed during construction would be suitably stabilised as soon as possible following construction.	C
Visual amenity		
Minimise impacts to visual amenity.	Fencing with material attached (e.g. shade cloth) would be provided around the construction compound to screen views of the construction compound from adjoining properties.	C
	All work site(s) would be left in a tidy manner at the end of each work day.	C
	All impacted areas would be restored to their original condition or better following the completion of works in accordance with the APIA Code of Environmental Practice.	C
	All waste generated on-site would be collected and disposed of in a responsible manner at a licensed facility.	C
	All construction plant and equipment and materials would be removed as soon as possible following completion of construction works.	C
Waste		
Comply with waste disposal requirements and guidelines.	Any waste unable to be reused or recycled would be classified and in accordance with the OEH *Waste Classification Guidelines* (DECCW 2009) and disposed of at an OEH licensed facility.	P, C
Ensure work areas are returned to their original condition	Upon completion of the works, all vehicles, construction equipment, materials, and refuse relating to the works would be removed from the work sites and any adjacent affected areas.	C
Appropriate management of waste	Potentially contaminated material not identified in this EIS would be identified on-site through either visual or odour observation (i.e. unusual discolouration or odours). Any identified contamination to be removed from site would be tested prior to disposal to an approved landfill by an approved waste removal contractor, in accordance with the OEH requirements.	C

Desired outcome	Mitigation measures	Implementation phase: Preconstruction (P), Construction (C), Operation (O)
	Noxious weeds removed during works would be managed in accordance with the Department of Primary Industries' requirements that relate to its classification status.	C
	Waste receptacles would be provided in work areas.	C
	A waste log would be maintained on-site.	C
Social		
Ensure adjacent affected properties are notified.	Notifications (letters and door knocks) to potentially impacted customers and stakeholders would be carried out in accordance with APA Group's standard notification procedures.	P, C
Minimise impacts on the community.	Visual impacts would be minimised by maintaining the worksites in a clean and tidy state	C
	All impacted areas would be restored to their original condition or better following the completion of works.	C
	All contractors would be inducted in management measures to reduce the disruption to the surrounding community.	C
	Consultation with affected and adjacent landowners would be undertaken to determine mechanisms to reduce noise disturbance and manage access arrangements.	P, C
Utilities and infrastructure		
Minimise impacts on utilities.	'Dial before you dig' would be undertaken prior to commencement of construction works.	P
	Consultation with other service providers would be undertaken as required.	P
	Services would be located prior to trenching.	P
Minimise impacts to service users.	Communication with residents would be undertaken to provide notice of potential service disruptions.	P, C
	Construction in the vicinity of infrastructure would be undertaken in accordance with the requirements of service providers.	C
	Contingency plans would be developed in case of accidental disruption/outage of services.	P

7.2 Environmental management and monitoring

The inclusion of appropriate environmental management measures into the detailed design and construction of the proposal reduce minimise adverse impacts on the community and the environment.

A CEMP would be prepared and implemented for the proposal. The plan would include:

- EAPL's (and APA Group's) environmental policy, objectives and performance targets for construction and operation.
- All required statutory and other obligations, including consents, licenses, approvals and voluntary agreements.
- Management policies, procedures and review processes to assess the implementation of environmental management practices and the environmental performance of the proposal against the objective and targets.
- Requirements and guidelines for management in accordance with:
  - Conditions of consent for the proposal.
  - Mitigation measures specified by this EIS.
  - Relevant construction management guidelines.
- Requirements in relation to incorporating environmental protection measures and instructions in all relevant standard operating procedures and emergency response procedures.
- Specific procedures, including monitoring, as defined by this EIS and the conditions of consent for the proposal.
- Roles and responsibilities of all personnel and contractors to be employed on site.
- Procedures for complaints handling and ongoing communication with the community.
- Monitoring and auditing program.
- Environmental sub-plans specified in this EIS.
- Incident response procedure.
- Contingency plan for utility disruptions and other construction related aspects.

8. Summary and conclusion

This chapter provides an overall summary of the impacts of the proposal, and justification for the proposal in accordance with the principles of ecologically sustainable development.

8.1 Summary

Investigations were undertaken to assess the potential environmental impacts during both the construction and operation of the proposal. These included specialist assessments of heritage, ecology, and hazard and risk. The potential environmental impacts of the proposal are documented in Chapter 6 and mitigation and management measures identified to reduce potential impacts and to protect the environment.

Based on the environmental impact assessment, the proposal would result in the following key adverse impacts on the environment during construction:

- Dust nuisance.
- Construction noise.
- Traffic and access disruption.

These potential impacts would be short-term and resolved following the completion of construction. Mitigation measures have been proposed to reduce these impacts. The environmental performance of the proposal would be managed through the implementation of a CEMP. This would also help to ensure compliance with relevant legislation and any conditions of approval.

The preliminary hazard assessment concluded that the main hazards associated with the proposal were associated with external interference (due to excavation by external parties) with the potential to result in a fire or explosion. The consequence analysis showed that if a fire or explosion were to occur, unacceptable risks to people or structures would not result.

The proposal is required to ensure that the Orange Aerodrome Expansion could progress safely without compromising the integrity of the pipeline and similarly that the pipeline would not pose unacceptable risks on safety or constraints on the future development of the aerodrome.

8.2 Consistency with ecologically sustainable development principles

The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991*. Clause 7(4) of Schedule 2 of the EP&A Regulations lists the principles of ecologically sustainable development as:

- Precautionary principle.
- Inter-generational equity.
- Conservation of biological diversity and ecological integrity.
- Improved valuation, pricing and incentive mechanisms.

An assessment of the proposal against these principles is provided below.

Precautionary principle

A range of environmental investigations have been undertaken as part of the EIS to ensure that potential impacts are understood with a high degree of certainty. Where a higher degree of risk was identified, this included detailed specialist studies. The assessment of the potential impacts of the proposal is considered to be consistent with the precautionary principle. The assessments undertaken are consistent with accepted scientific and methodologies, and have taken into account relevant statutory and agency requirements.

Safeguards have been proposed to minimise potential impacts. The selected construction contractor would be required to prepare a CEMP prior to commencing construction.

Principle of inter-generational equity

Construction and operation of the proposal has the potential to lead to some temporary environmental and social disturbance. These disturbances include potential temporary elevated levels of traffic, dust and noise. Mitigation strategies have been developed in accordance with current best management practice for pipeline construction to achieve, where possible, a neutral or beneficial effect on the environment.

The proposal would return the land to as close as possible to its pre-development state following construction. With the implementation of the identified environmental safeguards and mitigation measures, the proposal would enable the construction of the Orange Aerodrome Expansion to proceed safely and provide the efficient land use for the benefit of future generations.

Conservation of biological diversity and ecological integrity

An ecological assessment has been undertaken to identify potential adverse impacts on biodiversity. The study demonstrates that the proposal would not have a significant impact on any local populations of native biota, including threatened species and ecological communities, which occur in the study area or in adjoining habitats. The proposal would have a very minor impact on one endangered ecological community. However, a number of mitigation measures have been proposed to conserve biological diversity and ecological integrity.

Improved valuation and pricing of environmental resources

The assessment has identified the environmental and other consequences of the proposal and has identified mitigation measures where appropriate to manage adverse impacts. If approved, the construction and operation of the proposal would be in accordance with relevant legislation and the conditions of approval. These requirements would result in an economic cost to the proponent. This indicates that environmental resources have been given appropriate valuation in the development of the proposal.

8.3 Conclusion

The proposal is considered State significant infrastructure and, as such, approval from the Minister for Planning and Infrastructure is required. This EIS has been prepared in accordance with Part 5.1 of the EP&A Act and other relevant legislation to address the requirements of the DGRs. The construction and operation of the proposal requires a licence under Section 11 of the *Pipelines Act 1967*.

Environmental investigations were undertaken as part of the EIS to assess the potential environmental impacts from the construction and operation of the proposal in accordance with relevant environmental legislation, guidelines and procedures established by regulatory agencies. Based on the findings of the environmental investigations, the proposal would result in some minor short-term adverse impacts which would be limited to the construction stage of

the proposal. With the implementation of the mitigation measures provided in this EIS, potential impacts would be mitigated and would, therefore, be unlikely to result in significant impacts.

This EIS demonstrates that the proposal is: justified, consistent with the principles of ecologically sustainable development, and can be managed to meet the appropriate environmental requirements.

9. References

Australian Pipeline Industry Association (2009) *Code of Environmental Practice Onshore Pipelines, March 2009*. Australian Pipeline Industry Association Pty Ltd.

Austroads (2005) *Guide to Traffic Engineering Practice, Part 5: Intersections at Grade*

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Department of Environment, Climate Change and Water (DECCW) 2010a, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*: *Part 6 of the National Parks and Wildlife Act 1974*, NSW Office of Environment and Heritage.

Department of Environment, Climate Change and Water (DECCW) 2010b, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*, NSW Office of Environment and Heritage.

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GHD, *Brown's Creek to Orange Gas Pipeline Relocation Preliminary Hazard Analysis* (2012a).

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Landcom 2004, *Managing Urban Stormwater: Soils and Construction*, *4th edition* (The Blue Book). Landcom.

NSW Office of Water 2010, *Natural Resource Atlas:* http://nratlas.nsw.gov.au/.Accessed on 28 September 2012.

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Kovac M., Murphy B.W. and Lawrie J.A. 1989, *Soil Landscapes of the Bathurst 1:250,000 Sheet map,* Soil Conservation Service of NSW, Sydney.

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Standards Australia 2004, *Australian Standard (AS) 1940-2004 - The storage and Handling of Flammable and Combustible Liquids and Dangerous Goods Code*, Standards Australia.

Standards Australia 2008, *Australian Standard (AS) 2885 Pipelines - Gas and liquid petroleum - General requirements,* Standards Australia.

Attachment A
Director General's Requirements

NSW GOVERNMENT | Planning & Infrastructure

Contact: Swati Sharma
Phone: 02 9228 6221
Fax: 02 9228 6355
Email: swati.sharma@planning.nsw.gov.au

Our ref: 12/14389-1

Mr Geoff Callar
Engineering Strategy Manager
East Australian Pipeline Pty Ltd
PO Box R41
Royal Exchange NSW 1225

Dear Mr Callar

Orange Aerodrome – Gas Pipeline Deviation (SSI 12_5570) – Director-General's Requirements

Please find attached a copy of the Director General's environmental assessment requirements (DGRs) for the preparation of an Environmental Impact Statement (EIS) for the above proposal. These requirements have been prepared in consultation with relevant government authorities. I have also attached a copy of the government authorities' comments for your information. Please note that the Director-General may alter these requirements at any time.

If you do not lodge an EIS for the proposal within 2 years, you must consult further with the Director-General in relation to the preparation of the EIS.

Prior to exhibiting the EIS that you submit for the proposal, the department will review the document in consultation with the relevant agencies to determine if it addresses the requirements in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

I would appreciate it if you would contact the department at least two weeks before you propose to submit your EIS. This will enable the department to:

- confirm the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and
- determine the number of copies (hard-copy and CD-ROM) of the EIS that will be required for reviewing purposes.

If your proposal is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Department of Sustainability, Environment, Water, Population and Communities to determine if an approval under the EPBC Act is required (http://www.environment.gov.au or 6274 1111).

Your contact officer for this proposal, Ms Swati Sharma, can be contacted on the above contact details. Please mark all correspondence regarding the proposal to the attention of the contact officer.

Yours sincerely

Felicity Greenway 28/9/12

Felicity Greenway
Director, Infrastructure Projects
as delegate for the Director-General

Director General's Environmental Assessment Requirements

Section 115Y of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSI 12_5570
Infrastructure Project	**Orange Aerodrome – Gas Pipeline Deviation** The proposal includes the relocation of approximately 2 kilometres of an existing gas pipeline, operating between Brown's Creek and Orange to facilitate an extension to the existing runway for the aerodrome.
Location	Lot/DP: 7/559537, 384/1045095, 2/791571
Proponent	East Australian Pipeline Pty Ltd
Date of Issue	28 September 2012
General Requirements	The Environmental Impact Statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, Part 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation) and include the following: 1. the information required under clause 6 of Schedule 2 of the EP&A Regulation; and 2. the content listed in clause 7 of Schedule 2 of the EP&A Regulation, including, but not limited to: • a summary of the environmental impact statement, • a statement of the objectives of the project, including a description of the strategic need, justification, objectives and outcomes, • an analysis of feasible alternatives to the carrying out of the project, including an analysis of options considered having regard to the project objectives (including an assessment of the environmental costs and benefits of the project relative to alternatives and the consequences of not carrying out the project), the suitability of the chosen option and whether or not the project is in the public interest, • an analysis of the project, including an assessment, with a particular focus on the requirements of the listed key issues, in accordance with clause 7(1)(d) of Schedule 2 of the EP&A Regulation (where relevant), • an identification of how relevant planning, land use and development matters (including relevant strategic and statutory matters, such as relevant water sharing plans and State water environmental management plans) have been considered in the impact assessment (direct, indirect and cumulative impacts) and/or in developing management/ mitigation measures, • a compilation of the measures proposed to mitigate any adverse effects of the project on the environment, • a justification for the preferred project taking into consideration the objects of the *Environmental Planning and Assessment Act 1979*, and • detailing how the principles of ecologically sustainable development will be incorporated in the design, construction and ongoing operation phases of the project.
Key issues	The EIS must address the following specific matters: • **Flora and Fauna** – the EIS must include a flora and fauna impact assessment, fully describing the existing environment to be impacted, and taking into account the *Draft Guidelines for Threatened Species Assessment* (DEC and DPI, 2005) and the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities*

	(DEC, 2004). The EIS must specifically consider impacts on any threatened species and communities listed under both State and Commonwealth legislation recorded on, or in the vicinity of, the site and measures to mitigate, minimise or offset impacts identified. The assessment shall justify the need for clearing of any vegetation and/or habitat features and include an evaluation of potential ecological impacts both on-site and off-site. Where offsets are proposed, the EIS must detail how offset outcomes consistent with "maintain or improve" principles would be achieved. • **Indigenous Heritage** – the EIS must asses the indigenous heritage values of the site (archaeological and cultural), fully describing the existing environment to be impacted, and taking into account the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005); and identify measures to avoid, minimise and/or offset impacts. • **Non-indigenous Heritage** – the EIS must include an assessment of non-indigenous heritage values, including where required, the preparation of a Statement of Heritage Impact for areas that may be impacted by the proposal, including details of any archaeological investigations undertaken. • **Noise** – the EIS must include an assessment of construction noise impacts on sensitive receiver locations (including residential) and include a framework for the mitigation, management and monitoring of noise impacts during construction of the project. The construction noise assessment shall take into account the *Interim Construction Noise Guidelines* (DECC, 2009). • **Traffic and Transport** – the EIS must include a construction traffic assessment, considering impacts on the local and regional road network and identifying any site access or road upgrade requirements. • **Soil and Water** – the EIS must include an assessment of water quality impacts, surface and groundwater, including from erosion, sedimentation and drainage, and the use and disposal of hydrostatic test water. • **Air Quality** – the EIS must include an assessment of construction air quality impacts on sensitive receptor locations (dust and odour). The assessment must consider measures to mitigate, minimise or manage the identified impacts. • **Infrastructure Impacts** – the EIS must include an assessment of impacts on infrastructure, including roads and other utility servicing infrastructure (such as electricity, gas and water supply), and Orange Aerodrome. The EIS must identify measures to respond to these impacts. • **Long Term Management** – the EIS must include an assessment of impacts associated with the operation and maintenance of the deviated section of the pipeline, including access and inspection arrangements. The measures available to ensure the integrity of the extended pipeline area, including subsidence and waterflow management must be detailed. • **Hazards and Risk** - including an assessment of the hazards and risk associated with the proposal including details of hazardous materials used or kept on the premises during the construction and operation phases. The assessment must refer to the Department's Guideline *Applying SEPP 33* (DUAP, 1994), where relevant.
Environmental Risk Analysis	Notwithstanding the above key assessment requirements, the EIS must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this additional key environmental impact must be included in the EIS.

Consultation	You should undertake an appropriate and justified level of consultation with relevant parties during the preparation of the EIS, including but not limited to:
	• local, State and Commonwealth government authorities, including the:
	  ○ Department of Primary Industries (Agriculture, Forests, Fisheries, Minerals and Crown Land divisions),
	  ○ Heritage Council of NSW,
	  ○ NSW Office of Water,
	  ○ Office of Environment and Heritage,
	  ○ NSW Environment Protection Authority,
	  ○ Roads and Maritime Services, and
	  ○ Orange City Council;
	• specialist interest groups, including Local Aboriginal Councils and Aboriginal stakeholders;
	• utilities and service providers; and
	• the public, including community groups and adjoining and affected landowners.
	
	The EIS must describe the consultation process and the issues raised, and identify where the design of the infrastructure has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.

Further consultation after 2 years	If you do not lodge an EIS for the infrastructure within 2 years of the issue date of these DGRs, you must consult with the Director General in relation to the requirements for lodgement.

NSW GOVERNMENT | Trade & Investment Resources & Energy

PCU038088

Our reference: OUT12/23437
Your reference: SSI 12_5570

Ms Swati Sharma
NSW Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Ms Sharma

Re: Orange aerodrome – gas pipeline deviation (SSI 12_5570)
Environmental Assessment requirements

Thank you for the opportunity to comment upon this proposal. This response is from the Resources & Energy division of NSW Trade & Investment. Other agencies of the department will forward separate correspondence regarding this matter.

Based upon the information provided in the preliminary Environmental Assessment Report the Resources & Energy division considers that there are no issues with regards to mineral resources.

Should you require information regarding mineral resources please contact Gary Burton, Senior Geologist, Orange office on 6360 5330 or email gary.burton@industry.nsw.gov.au.

Yours faithfully

Gary Burton
FOR

Cressida Gilmore
Chief Geoscientist, Land Use
Minerals & Land Use Assessment
Geological Survey of NSW

20 September 2012

NSW Department of Trade and Investment, Regional Infrastructure and Services
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Office of Environment & Heritage

NSW GOVERNMENT

Your reference: SSI 12_5570
Our reference: DOC12/39713
Contact: Liz Mazzer 02 68835325

Neville Osborne
Manager, Energy Infrastructure Projects
Department of Planning & Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Mr Osborne

RE Orange Aerodrome Gas Pipeline Deviation (SSI 12_5570)
Environmental Assessment Requirements

Thank you for your letter (dated 18th September 2012) seeking the requirements of the Office of Environment and Heritage (OEH) for the preparation of an environmental assessment (EA) for the above proposal.

In summary, the OEH's key information requirements for the proposal include an adequate assessment of:

1. Impacts to Aboriginal cultural heritage objects; and
2. Impacts on flora, fauna, threatened species, populations, communities and their habitats.

OEH can provide advice on the EA where it deals with natural and cultural heritage conservation issues. OEH may also comment on the legitimacy of the conclusions reached regarding the significance of impacts by the proposed development to these components of the environment.

This letter directs you primarily to our generic guidance material. However please note that it is up to the proponent (and later the consent/determining authority after appropriate consultation) to determine the detail and comprehensiveness of the surveys and level of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the level of investigation. It is important that all conclusions are supported by adequate data.

The OEH has responsibilities under the:

- *National Parks and Wildlife Act 1974* - namely the protection and care of Aboriginal objects and places, the protection and care of native flora and fauna and the protection and management of reserves; and the

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- *Threatened Species Conservation Act 1995* which aims to conserve threatened species of flora and fauna, populations and ecological communities to promote their recovery and manage processes that threaten them.
- *Native Vegetation Conservation Act 2003* – ensuring compliance with the requirements of this legislation.

It is the responsibility of the proponent and consent authority to adequately consider the requirements under the *Environmental Planning and Assessment Act 1979* (EP&A Act), including flora, fauna, threatened species, populations and ecological communities and their habitats, and cultural heritage.

Flora, Fauna and Threatened Species

The OEH has no detailed comments to make on the proposal relating to flora, fauna and threatened species at this stage. A copy of our generic Environmental Assessment Guidelines is included in Attachment 1.

These guidelines address requirements under the *Environmental Planning and Assessment Act 1979* and OEH's areas of responsibility relating to flora, fauna and threatened species, populations and ecological communities and their habitats.

Cultural Heritage

The importance of protecting Aboriginal Cultural Heritage is reflected in the provisions under Part 6 of the *NP&W Act 1974*, as amended. That Act clearly establishes that Aboriginal objects and places are protected and may not be harmed, disturbed or desecrated without appropriate authorisation.

Under the *NP&W Act 1974*, it is the responsibility of each individual proposing to conduct ground disturbance works to ensure that they have conducted a due diligence assessment to avoid harming Aboriginal objects by the proposed activity. OEH has produced a generic due diligence process, which is not mandatory to follow, however any alternative process followed must be able to demonstrate their process was reasonable and practicable in attempts to avoid harm to Aboriginal objects.

Consultation must also be in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) as set by OEH if impact to cultural heritage is unavoidable.

Further advice regarding Aboriginal cultural heritage can be found on the OEH web-site at: http://www.environment.nsw.gov.au/licences/achregulation.htm. and within guidance documents listed in Attachment 2.

Should you require further information please contact Liz Mazzer on (02) 68835325 or via email at liz.mazzer@environment.nsw.gov.au.

Yours Sincerely,

R. Taylor

ROBERT TAYLOR
Manager, Environment and Conservation Programs
Conservation and Regulation Division

ATTACHMENT 1: EIA REQUIREMENTS - FLORA AND FAUNA

INTRODUCTION

The *Environmental Planning and Assessment Act (1979)* (*EP&A Act*) requires that proponents of a development/activity and the Consent/Determining Authorities adequately assess the impact of a development or activity in any Environmental Impact Assessment (EIA) documents. These EIA documents include:

- Statement of Environmental Effects (SoEE), or
- Review of Environmental Factors (REF), or
- Environmental Impact Statement (EIS).

These are introductory, generic specifications of the Office of Environment and Heritage (OEH) for an adequate assessment of the impacts of a development proposal on native flora and fauna (ie including protected and threatened species). However, OEH recognises that the scale and complexity of the project will to some extent, dictate the level of information that is required to address the questions posed below. Consequently, flora and fauna assessments need to be tailored to suit the proposal. For example, a development which is proposed on land which has already been totally (or substantially) cleared should address the issues raised below but the amount of work required to address these issues may be substantially less than if the area comprised undisturbed bushland and, therefore, of more significant wildlife habitat value. A preliminary assessment, including a desktop investigation and a preliminary site inspection, may indicate the need for a detailed survey of the site.

It is up to the proponent (and later the consent and/or determining authorities after appropriate consultation) to determine the detail and comprehensiveness of assessment required to form legally defensible conclusions regarding the impact of the proposal. The scale and intensity of the proposed development should dictate the detail of investigation.

It is important that all conclusions are supported by adequate data and that these data are clearly presented in EIA documentation.

OEH will consider the following issues when reviewing an EIA document:

1. **Concerns** - What are OEH's concerns regarding the conservation of natural and cultural heritage in accordance with the relevant legislation? Is the proposal likely to affect natural and cultural heritage? How?
2. **Provision of Information** - Is adequate information provided for a valid assessment of the impacts?
3. **Validity of Conclusions** - Has the proponent arrived at valid conclusions as a result of the assessment of impacts?
4. **Recommended Conditions to Consent** - Should Consent or Approval be granted, what conditions (if any) are required to ensure that the project is developed, and thereafter managed in accordance with natural and cultural heritage conservation and the provisions of legislation administered by OEH?

Thus the EIA document should fully describe the existing environment including flora and fauna, so that future impacts can be properly assessed and then reviewed (eg during the public participation phase).

FLORA

Background

The Australian flora comprises many endemic taxa and is therefore unique in the world.

OEH is concerned at the extent to which vegetation has been cleared and otherwise modified in north-western NSW. This high level of modification has been highlighted in the National State of the Environment Reports (1996 and 2001). Evidence strongly suggests that many plant species and communities are threatened with extinction.

Although the proposed site may be disturbed by various landuses, any remnants of native vegetation are of significant natural heritage value, including riparian and wetland areas. The area of vegetation and habitat at the proposed site may provide an area of high biological diversity, high conservation value or may not be well represented or protected elsewhere. It may also act as a corridor or migratory route for wildlife, drought refuge habitat or have other important values.

The NSW community places a high value on those areas of native vegetation that remain. OEH is committed to the protection, appropriate management, and where necessary, rehabilitation of native vegetation. For these reasons, OEH considers that careful planning should precede any development that involves further vegetation clearance or other significant impact within areas of remnant vegetation.

Negative impacts to native vegetation (eg clearing) should be avoided where possible. Where impacts cannot be avoided, the EIA should detail how a "maintain or improve" outcome for biodiversity will be achieved. Biobanking provides a voluntary mechanism through which this can be achieved. The Biobanking assessment methodology allows quantification of impacts and assessment of the value of offset areas and associated management regimes for those areas. The biobanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

Information about Biobanking is located on OEH's website at http://www.environment.nsw.gov.au/biobanking/

Report Requirements

The EIA documentation should include a report on the flora that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- A map identifying the vegetation communities located in the study area and the areas of each vegetation community to be impacted.
- a complete plant list (including scientific names of those plants) of all tree, shrub, ground cover and aquatic species, categorised according to country of origin (ie., native versus exotic),
- a detailed description of vegetation structure (in terms of a scientifically accepted classification system) and spatial distribution (i.e. plant densities and patterning) on the site, including a vegetation map,
- describe the condition and integrity of the vegetation including a description of any past disturbance,
- an account of the likely original vegetation communities (pre-, or at early settlement), and an assessment of the likely regional distribution of the original communities,
- an assessment of whether the plant communities are adequately represented in conservation reserves or otherwise protected,

- an account of the hydrology of the area and how this relates to the dynamics of the vegetation communities,
- a list of **known** and **likely** threatened species as listed under Schedules 1 & 2 (*Threatened Species Conservation Act 1995*) which might occur at the site. The OEH database needs to be accessed and the likelihood of occurrence of threatened flora species determined,
- an assessment of the impacts of the proposal on flora, on-site and off-site (eg siltation, water availability or drainage changes) and measures to mitigate these impacts,
- an assessment of the significance of the impact of the development at both the site and at the regional scale,
- a detailed rehabilitation/management plan including a list of the plant species to be used during rehabilitation (if required),
- detail methodologies used and a list of the reference literature cited, and
- any other issues that may be considered relevant.

The above guidelines will provide some of the information necessary to conduct an Assessment of Significance required for threatened flora and fauna under Section 5a of the *EP&A Act*, should threatened species be likely or known to occur in the locality of the subject development proposal. Similarly, it will provide some of the information required if an application is found to be necessary under the *Native Vegetation Act (2003)*. However the above relates mostly to the specific environmental assessment processes under the *EP&A Act* and does not constitute an Assessment of Significance.

Similarly, the above guidelines will provide some of the information required for Biobanking, but may not be sufficient for Biobanking offset calculations. Please refer to the Biobanking website or contact OEH for specific information relating to Biobanking assessment requirements. The Biobanking scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

FAUNA

Background

Evidence suggests that Western NSW has suffered the highest extinction rate for indigenous mammals of any region in the world. Many other vertebrate species are currently threatened. One of the major reasons for such a high level of extinction has been the destruction of habitat. Native vegetation including wetland, riparian and remnant environments are very significant areas of fauna habitat. Therefore any development in such areas should fully consider the impact on fauna and its habitat.

Report Requirements

The EIA document should include a report on the fauna (including protected and threatened species), that includes the following:

- detailed location map and identification of the area surveyed (including the location of photographs, transects, areas of significance etc),
- at least one of the following: a land satellite image, vegetation communities map, aerial photograph, or a remnant vegetation map,
- a complete list of all **known** and **likely** terrestrial and aquatic species (eg birds, mammals, reptiles and amphibians including scientific names). It is suggested that invertebrates also be considered as they form part of the food chain for many fauna species,

- those species which are protected, threatened or listed under any international agreements, as well as introduced species,
- those species known or likely to breed in the area,
- any species which have specific habitat requirements found within the project area,
- those species or populations which may be near the limit of their geographic range or are a disjunct/isolated population,
- assessment of the importance or otherwise of the location as a corridor, migratory route or drought refuge, in relation to other remnant vegetation, riparian and wetland areas or habitat in the region,
- assessment of the impacts of the proposal on all fauna and its habitat, at both the site and at the regional scale,
- identification of any mitigation measures proposed to limit or ameliorate the impact of the proposal,
- detailed methodologies used and a list of the reference literature cited, and,
- any other issues that may be considered relevant.

Again, the above guidelines will provide some of the information required for the Threatened Species component of Biobanking, but may not be sufficient for Biobanking offset calculations. Please refer to the Biobanking website or contact OEH for specific information relating to Biobanking assessment requirements

SEPP No. 44 - Koala Habitat Protection

The Shire may be listed in Schedule 1 of SEPP No. 44 - Koala Habitat Protection. If so, the requirements of the SEPP regarding Koala habitat protection should be considered by the proponents.

THREATENED SPECIES OF FAUNA AND FLORA

Background

Apart from the need to consider the impact on protected species, the proponent will need to address the requirements of legislation that currently governs threatened species protection and impact assessment in NSW.

The *Threatened Species Conservation Act (1995)* (*TSC Act*) protects all threatened flora and fauna native to NSW (excluding fish and marine plants). The proponent will need to consider the provisions of this Act.

The *TSC Act* contains lists of threatened species, which are divided into a number of categories – those presumed extinct, endangered species, critically endangered species and vulnerable species. It also contains lists of endangered populations, endangered ecological communities, critically endangered ecological communities and vulnerable ecological communities. This Act also allows for the declaration of critical habitat, key threatening processes and the preparation of both Recovery Plans and Threat Abatement Plans. These listings and plans must be considered as part of the EIA process.

If an activity or development is proposed in a locality likely or known to be occupied by a threatened species, population, ecological community or critical habitat, any potential impact to that threatened species must be taken into account during the development assessment process. However under the *EP&A Act*, some types of development are not required to go through approval processes. Please note that a licence may still be required under the *TSC Act* if such a development/activity is likely to harm a threatened species, population or ecological community.

Proponents can voluntarily use BioBanking to minimise and offset their impacts on biodiversity. The scheme provides an alternative path for proponents to the current threatened species assessment of significance process.

Assessment of Significance & Species Impact Statements

If during the flora or fauna assessment or survey, threatened species are **found** or are **likely** to occur in the area, the proponents must undertake an Assessment of Significance as outlined in section 5A of the *EP&A Act* to determine whether or not the development would be likely to have a significant impact upon threatened species.

The Assessment of Significance is a statutory mechanism which allows decision makers to assess whether a proposed development or activity is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats.

The Assessment of Significance is contained within section 5A of the *EP&A Act* and consists of seven factors which need to be addressed for informed decisions to be made regarding the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats. A copy of OEH's *Threatened species assessment guidelines: The assessment of significance* can be obtained from the OEH website at:

http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf

Following threatened species assessment via the Assessment of Significance, it may be necessary to prepare a Species Impact Statement (SIS). The proponent will need to prepare a SIS in the following circumstances:

- If (after having addressed Section 5A) the flora/fauna assessment concludes that there is likely to be a significant impact to threatened species, or
- The proposed development is likely to affect critical habitat declared under the TSC Act.

If a SIS is required, the proponent (not the consultant) must write to OEH for any formal requirements for the SIS that he might deem appropriate. The SIS must then be prepared in accordance with these requirements and provided to the OEH. In some instances the Minister for the Environment will also need to be consulted for approval.

Methods to reduce the impact on the protected and threatened species should be considered fully, and are considered an integral requirement within any SIS document.

The OEH advises that conducting an Assessment of Significance or an SIS according to the provisions of the *EP&A Act* and the *TSC Act* is a complex task and should be undertaken by suitably qualified person(s).

AVAILABLE DATA

OEH can supply, at the standard cost, fauna prediction data and recorded fauna sightings data (Wildlife Atlas of NSW) to help in the investigation. The following information on site recordings of Flora and Fauna is available from OEH:

- A general search for flora and fauna records can be conducted through the Atlas of NSW Wildlife at: http://www.bionet.nsw.gov.au/

  Please note that not all the information associated with the individual records is available on this website. You can apply to the Office of Environment and Heritage for more detailed information about individual sightings (terms and conditions apply). Contact the Wildlife Data Unit for more information on (02) 9995 5000.

- Detailed information relating to threatened species, populations, ecological communities and their habitats can be obtained from the OEH Threatened Species website at:

  http://www.threatenedspecies.environment.nsw.gov.au/index.aspx

Other reference literature may be available for the subject locality/region. The proponent should explore this possibility thoroughly.

Attachment 2 – Guidance Material

Title	Web Address
Commonwealth Environment Protection & Biodiversity Conservation Act 1999	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
National Parks and Wildlife Act 1974	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Threatened Species Conservation Act 1995	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
Water Management Act 2000	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Aboriginal Cultural Heritage	
Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (2005)	Available from DoP.
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Due Diligence Code for the Protection of Aboriginal Objects in NSW (DECCW 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Biodiversity	
BioBanking Assessment Methodology (DECC, 2008)	http://www.environment.nsw.gov.au/resources/biobanking/08385bbassessmethod.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)	http://www.environment.nsw.gov.au/biobanking/calculator.htm
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna –Amphibians (DECCW, 2009)	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Survey requirements (birds, bats, reptiles, frogs, fish and mammals) for	http://www.environment.gov.au/epbc/publications/guidelines.html

species listed under the EPBC Act	
DECCW Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/
Atlas of NSW Wildlife	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
BioBanking Threatened Species Database	http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biocertification/offsets.htm

Attachment B
Consultation Letters