17A TERRESTRIAL ECOLOGY

17A.1 INTRODUCTION

This chapter provides further assessment and information on terrestrial flora and fauna for the Supplementary EIS, based on the findings of a supplementary summer seasonal survey including differences in species, communities, and habitats, response to various submissions on the EIS, and refinements/modifications to the Project. The information presented builds on the EIS Volume 2, Chapter 17A Terrestrial Ecology and should be read in conjunction with the EIS chapter.

Chapter 6 Project Operations of the Supplementary EIS provides further details on changes to the Project.

Further detailed information is located in the addendum to the terrestrial ecology technical report relating to the Supplementary EIS, presented as STR 17A-1-SV2.5 Southern Coal Seam Methane Water Supply Pipeline – Supplementary Terrestrial Ecology Assessment.

The specific objectives of the terrestrial ecological assessment are as described in the EIS Volume 2, Chapter 17A Terrestrial Ecology, section 17A.1.

17A.2 METHODOLOGY

Unless otherwise noted, the methods adopted for the supplementary terrestrial flora and fauna assessment are the same as those for the previous assessment, as provided in the EIS Volume 2, technical report TR 17A-1-V2.5.

This chapter presents responses to various submissions on the EIS, and the findings of the supplementary seasonal survey undertaken in February and March 2009, for the proposed pipeline. No additional desk-based assessment was completed for the proposed pipeline. However, the impact assessment for the proposed pipeline has been reviewed and updated in light of changes to the northern portion of the pipeline alignment.

17A.2.1 RELEVANT LEGISLATION

The legislation pertaining to terrestrial flora and fauna remains the same as presented in the EIS Volume 2 Chapter 17A Terrestrial Ecology, section 17A.2 and associated technical report. However one legislative amendment and one new draft policy are relevant to this supplementary assessment: *Vegetation Management (Regrowth Clearing Moratorium) Act 2009*, and consultation draft Policy for Biodiversity Offsets (EPA 2008).

On 7 April 2009, the Queensland Government implemented a three-month moratorium on clearing high-value regrowth vegetation. The moratorium took legal effect on 8 April 2009 under the *Vegetation Management (Regrowth Clearing Moratorium) Act 2009*. As provided for within that legislation [s 7(b)], the moratorium period was subsequently extended by for a further three months to expire on 7 October 2009. Some small areas of regrowth vegetation within the study area fall under this moratorium as described in the Supplementary EIS technical report STR 17A-1-SV1.5. The watercourse provisions of the moratorium do not apply to this Project.

The Queensland Government has developed a draft policy on Biodiversity Offsets for public consultation. The draft policy is not intended to replace offset programs already in place, such as those required under the *Vegetation Management Act*. At the time of writing this Supplementary EIS, no final policy for Biodiversity Offsets has been released. Nonetheless, the draft policy has been considered in the Supplementary EIS.

17A.2.2 DESCRIPTION OF STUDY AREA

The study area for the terrestrial ecological impact assessment is as presented in the EIS, with the exception of alignment changes to the northern portion, from the northern end of Baileys Road. At the intersection of Baileys and Giligulgul Roads, the proposed pipeline proceeds in a north-east direction within the road reserve. Where Giligulgul Road intersects with the Leichhardt Highway, the alignment turns into the road reserve of the Leichhardt Highway on the western side and progresses in a northerly direction until the south-eastern corner of Lot 3 FT695. At this point, the proposed alignment traverses this allotment in a northerly direction to enter the MLA areas at the south-east corner.

17A.2.3 STUDY METHODOLOGY

Field surveys were undertaken in the study area in February and March 2009 to verify ecologically sensitive areas and species of plants and animals that are known or likely to occur in the study area and surrounds.

The summer season survey of terrestrial flora involved verification, extension and update of the assessment results from the earlier winter survey (August 2008), including RE type and remnant status as mapped by DERM, mapping and description of other vegetation regrowth (non-remnant vegetation) and the list of species of plant that occur in the study area. Supplementary and/or extended targeted foot traverses were performed within marginal and core habitat of recorded and prospective threatened and regionally significant species to delineate population extent and approximate size. The location of the flora field survey effort is presented in the Addendum to the terrestrial ecology technical report STR 17A-1-SV1.5.

The survey of terrestrial fauna also involved verification, extension and update of the assessment results form the earlier dry season survey (August 2008), including trapping, ultrasonic bat detection, spotlighting, call broadcast, active searches for herpetofauna, nocturnal vehicle traverses, birds and other incidental evidence of fauna. The location of the fauna survey effort is presented in the Addendum to the terrestrial ecology technical report STR 17A-1-SV1.5.

17A.3 EXISTING ENVIRONMENT

This section describes the existing environment as it applies to the proposed pipeline, including the revised northern portion of the alignment and builds on the previous surveys presented in the EIS Volume 2 Chapter 17A Terrestrial Ecology and associated technical report.

17A.3.3 REGIONAL ECOSYSTEMS

During the August 2008 survey, fourteen regional ecosystems (REs) were identified within the Study Area. The seasonal survey of February and March 2009 confirmed the existence and field-validation of the fourteen REs previously identified within the study area, and identified a further four REs in the modified route sections, as described in Table 17A-1 and Figure 17A-2-SV2.3. A total of 18 REs have been identified in the Study Area.

Table 17A-1: Field verified regional ecosystems within the study area

RE Code	RE description (EPA 2006)	VMA status	DERM Biodiversity status	EPBC Act status
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Not listed
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp.* tall woodland on alluvial plains	Of concern	Of concern	Not listed
11.3.19†	*Callitris glaucophylla, Corymbia* spp. and/or *Eucalyptus melanophloia* woodland on Cainozoic alluvial plains	Not of concern	No concern at present	Not listed
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Not of concern	Of concern	Not listed
11.3.27c†	Freshwater wetlands: mixed grassland or sedgeland with areas of open water +/- aquatics	Not of concern	Of concern	Not listed
11.5.1	*Eucalyptus crebra, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii* woodland on Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed
11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed
11.5.4	*Eucalyptus crebra, Callitris glaucophylla, C. endlicheri, Eucalyptus chloroclada, Angophora leiocarpa,* woodland on Cainozoic sand plains/remnant surfaces(deep sands)	Not of concern	No concern at present	Not listed
11.5.21	*Corymbia bloxsomei* +/- *Callitris glaucophylla* +/- *Eucalyptus crebra* +/- *Angophora leiocarpa* woodland on Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed

RE Code	RE description (EPA 2006)	VMA status	DERM Biodiversity status	EPBC Act status
11.7.2	*Acacia spp.* woodland on lateritic duricrust. Scarp retreat zone	Not of concern	No concern at present	Not listed
11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus spp., Corymbia spp., Acacia spp., Lysicarpus angustifolius* on laterised duricrust	Not of concern	No concern at present	Not listed
11.7.6	*Corymbia citriodora* ssp. *variegata* or *Eucalyptus crebra* woodland on lateritic duricrust	Not of concern	No concern at present	Not listed
11.7.7	*Eucalyptus fibrosa* ssp. *nubila* +/- *Corymbia spp* +/- *Eucalyptus spp.* woodland on lateritic duricrust	Not of concern	No concern at present	Not listed
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	Endangered
11.9.7†	*Eucalyptus populnea*, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks	Of concern	Of concern	Not listed
11.9.10†	*Acacia harpophylla, Eucalyptus populnea* open forest on fine-grained sedimentary rocks	Of concern	Endangered	Not listed
11.10.1	*Corymbia citriodora* open forest on coarse-grained sedimentary rocks	Not of concern	No concern at present	Not listed
11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Not of concern	No concern at present	Not listed

Note: † REs recorded in the new sections of the alignment during the February/March 2009 survey.

The four REs not previously field verified and any amendments of findings associated with regional ecosystems following the further surveys, further description is provided in the Addendum to the technical report, STR 17A-1-SV1.5, sections 4.1 and 4.2.

17A.3.4 SPECIES OF PLANT

Field surveys undertaken during February 2009 identified 437 species of plant in the study area (86 more than in the August 2008 survey), of which 390 (89.2%) were native.

Three species recorded in the study area are 'declared plants' listed as Class 2 pests under the *Land Protection (Pest and Stock Route Management) Act 2002* and as described in the terrestrial ecology technical report to EIS TR17A-1-V2.5.

The assessment undertaken for the EIS identified potential habitat in the study area for twelve threatened species of plant (refer to EIS Volume 2, Chapter 17A Terrestrial ecology, Table 17A-2), although no threatened species of plant of state significance were recorded in the study area during the winter survey (August 2008). The February 2009 survey recorded three rare or threatened species of plant under the Nature Conservation (Wildlife) Regulation 2006, one of which, Belson's Panic (*Homopholis belsonii*), has a conservation status of 'vulnerable' under the EPBC Act (refer to Table 17A-2 and Figure 17A-3-SV2.3).

Table 17A-2: Threatened species of plant recorded in the study area

Scientific name	Common name	Conservation status	
		NC Act	EPBC Act
Homopholis belsonii	Belson's Panic	E	V
Gonocarpus urceolatus	Raspweed	V	—
Desmodium macrocarpum	no common name	R	—

Notes: E = Endangered, V = Vulnerable, R = Rare

Belson's Panic (a perennial grass growing to about 0.5 metres high) was identified throughout the northern extent of the realigned northern portion of the Study Area (that is, road reserve) and is a relatively common to infrequent component of the ground layer within remnant and non-remnant RE 11.9.5 and RE 11.9.10. Detailed foot traverses of all regrowth distributions of these vegetation types within the road reserves of the Leichhardt Highway identified that a minimum canopy cover and exclusion of **Cenchrus ciliaris* corresponded with the existence of this species. Population estimates were not established due to the frequency and dominance of the grass within a number of the sampled vegetation communities. However, it is estimated that in excess of 3,000 individual specimens exist within the aforementioned areas.

Gonocarpus urceolatus (Raspweed) is a slender herb and has a conservation status of 'vulnerable' under the NC Regulation. It was identified in three disjunct locations in three different vegetation types. All populations were identified in shallow depressions within RE 11.5.1, RE 11.5.4 and RE 11.7.4.

Desmodium macrocarpum (no common name) was found at one location within RE 11.5.1. Detailed population estimations revealed that the distribution declined exponentially away from a core population which was identified in close proximity to the road reserve. Detailed foot traverses within this vegetation type failed to locate any other specimens. An herbaceous perennial, *Desmodium macrocarpum* has a conservation status of 'rare' under the NC Regulation.

Five priority taxa species of plant for the Brigalow Belt South bioregion (Environmental Protection Agency 2002a) were recorded in the Study Area: *Acacia melvillei* (Yaran), Acacia shirleyi (Lancewood) *Acacia omalophylla* (Yarran), *Acacia aprepta* (Miles Mulga) and *Dodonaea macrossanii* (no common name). *Acacia melvillei* was recorded at several locations in RE 11.3.2, RE 11.9.5, RE 11.9.7 and 11.9.10. *Acacia omalophylla* was recorded in RE 11.7.2, RE 11.7.4 and RE 11.10.7. *Acacia aprepta* was recorded at several locations only in RE 11.7.4. *Dodonaea macrossanii* was recorded at one location only in RE 11.7.7. *Acacia shirleyi* was relatively common in RE 11.7.2 and also recorded in RE 11.7.7. Specimens of *Acacia triptera* (Spur-leaf Wattle), which had been downgraded from a conservation status of 'rare' under the NC Regulation were also encountered within RE 11.5.1.

17A.3.5 FAUNA HABITATS

Seven broad fauna habitat types exist within the Study Area: dry eucalypt forest, eucalypt woodlands, *Acacia* scrub (Lancewood and Miles Mulga), *Acacia-Belah* scrub (i.e. Brigalow), riparian (Queensland Blue Gum), cleared lands, and wetlands (natural or artificial). These fauna habitats are as described in the EIS terrestrial ecology report TR 17A-1-V2.5. No additional broad fauna habitat types were identified in the February and March 2009 surveys.

17A.3.6 SPECIES OF ANIMAL

Overall field surveys (both August 2008 and February 2009) identified 191 animal species in the Study Area, comprising 10 frogs, 33 reptiles, 28 mammals and 120 species of bird (Table 17A-4). The February and March 2009 survey recorded substantially more herpetofauna than the earlier winter survey though markedly less birds, most likely due to warmer weather conditions and in the case of the birds, fewer flowering eucalypts and Acacias.

Table 17A-3: Summary of species of terrestrial fauna recorded in the study area during field surveys

Taxa	August 2008		February 2009		Total species
	Native	Introduced	Native	Introduced	
Mammals	19	7	17	7	28
Birds	105	4	78	3	120
Frogs	6	1	8	1	10
Reptiles	18	0	27	0	33
Total	148	12	130	11	191

One species of national significance (Brigalow Scaly-foot) and two other species of state significance (Little-pied Bat, *Chalinolobus picatus* and Golden-tailed Gecko, *Strophurus taenicauda*) were recorded during field surveys. The vulnerable Glossy Black-cockatoo (*Calyptorhynchus lathami*) was also tentatively recorded.

Several other species of prominent conservation value were recorded including the Great Egret (*Ardea alba*) and the Rainbow Bee-eater (*Merops ornatus*) listed under the migratory provision of the EPBC Act and 14 species considered priority taxa by the Southern Brigalow Belt Expert Fauna Panel (Environmental Protection Agency 2002b). An additional species (Little Forest Bat *Vespadelus vulturnus*) has also been considered significant given it reaches its northern distributional limit in the Study Area.

Fifteen species recorded during the surveys are currently considered priority taxa as defined by the Expert Fauna Panel for the Southern Brigalow Belt (Environmental Protection Agency 2002a). Four of these species have been presented above under matters related to national and state significance (i.e. Brigalow Scaly-foot, Golden-tailed Gecko, Little-pied bat and Glossy Black-cockatoo) with the remaining 11 species being:

- Common Brush-tail Possum (*Trichosurus vulpecula*)
- Greater Glider (*Petauroides volans*)
- Black-striped Wallaby (*Macropus dorsalis*)
- Rufous Bettong (*Aepyprymnus rufescens*)
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)
- Little Forest Bat (*Vespadelus vulturnus*)
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*)
- Speckled Warbler (*Chthonicola sagittata*)
- Salmon-sided Frog (*Limnodynastes salmani*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Pale-headed Snake (*Hoplocephalus bitorquatus*).

The location of threatened species and communities within the study area is presented in Figure 17A-3-SV2.3, with further information on each species provided in the Addendum to the technical report STR 17A-1-SV1.5.

17A.4 POTENTIAL IMPACTS

Impacts associated with the proposed pipeline are generally the same as those described in the EIS Volume 2, Chapter 17A Terrestrial Ecology chapter and technical report. However, due to the realignment of the pipeline in sections and new information on the regional ecosystems and habitats present, the assessment vegetation and habitat loss has been updated.

17A.4.1 LOSS OF VEGETATION AND HABITATS (LAND CLEARANCE)

The proposed southern CSM water supply pipeline will require removal of approximately 157 hectares of vegetation, including 93 hectares of remnant vegetation and 64 hectares of non remnant vegetation, as summarised in Table 17A-3. Of this total, 1.6 hectares is remnant Endangered (RE 11.9.5) and 7.0 hectares is remnant Of Concern (RE 11.3.2 and 11.3.4). This total compares with the 85.7 hectares (55.8 remnant, 30.0 non remnant) in the EIS assessment, prior to the route realignment.

Regional vegetation management code

Clearing of native vegetation for the purpose of a significant project under the *State Development and Public Works Act 1971* (section 26) is a relevant purpose under the *Vegetation Management Act 1998* for which a vegetation permit can be granted under the *Integrated Planning Act 1997*. The vegetation clearing will be assessed against the performance requirements outlined in the Regional Vegetation Management Code. In the case of the southern CSM water supply pipeline, the code is that for the Brigalow Belt and New England Tablelands bioregions (Department of Natural Resources and Water 2006) and the specific performance requirements for significant projects (Part S of the Regional Vegetation Management Code).

In order to meet requirements that include maintaining the current extent of assessable vegetation, offsets are an acceptable solution under the Code.

Table 17-4: Likely extent of vegetation clearing resulting from the southern CSM water supply pipeline

RE Code	RE description (EPA 2006)	VMA status	EPA Biodiversity status	EPBC Act status	Extent of clearing (ha)			Extent remaining in subregions in 2005 (ha)*	Extent reserved in subregions in 2005 (ha)*
					Remnant	Non Remnant	Total		
11.10.1	*Corymbia citriodora* open forest on coarse-grained sedimentary rocks	Not of concern	No concern at present	Not listed	1.1	0.6	1.7	98,978	233
11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Not of concern	No concern at present	Not listed	6.8	0	6.8	70,514	4,819
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Not listed	4.2	7.4	11.6	139,033	1,190
11.3.19	*Callitris glaucophylla, Corymbia* spp. and/or *Eucalyptus melanophloia* woodland on Cainozoic alluvial plains	Not of concern	No concern at present	Not listed	0	0.8	0.8	28,800	0
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Not of concern	Of concern	Not listed	1.9	0	1.9	72,279	35
11.3.27c	Freshwater wetlands	Not of concern	Of concern	Not listed	0.3	0	0.3	1,222	0
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp.* tall woodland on alluvial plains	Of concern	Of concern	Not listed	2.8	2.3	5.1	6,116	3
11.5.1	*Eucalyptus crebra, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii* woodland on Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed	19.7	13.4	33.1	174,991	40
11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed	4.8	14.6	19.4	-	-
11.5.21	*Corymbia bloxsomei +/- Callitris glaucophylla +/- Eucalyptus crebra +/- Angophora leiocarpa* woodland on Cainozoic sand plains/remnant surfaces	Not of concern	No concern at present	Not listed	10.2	0.6	10.8	72,024	0
11.5.4	*Eucalyptus crebra, Callitris glaucophylla, C. endlicheri, Eucalyptus chloroclada, Angophora leiocarpa,* woodland on Cainozoic sand plains/remnant surfaces(deep sands)	Not of concern	No concern at present	Not listed	4	0.5	4.5	23,171	0

RE Code	RE description (EPA 2006)	VMA status	EPA Biodiversity status	EPBC Act status	Extent of clearing (ha)			Extent remaining in subregions in 2005 (ha)*	Extent reserved in subregions in 2005 (ha)*
					Remnant	Non Remnant	Total		
11.7.2	*Acacia spp.* woodland on lateritic duricrust. Scarp retreat zone	Not of concern	No concern at present	Not listed	3.5	0	3.5	34,391	1
11.7.4	*Eucalyptus decorticans* and/or *Eucalyptus spp., Corymbia spp., Acacia spp., Lysicarpus angustifolius* on laterised duricrust	Not of concern	No concern at present	Not listed	4.0	5.3	9.3	78,839	60
11.7.6	*Corymbia citriodora* ssp. *variegata* or *Eucalyptus crebra* woodland on lateritic duricrust	Not of concern	No concern at present	Not listed	21.5	0	21.5	168,824	554
11.7.7	*Eucalyptus fibrosa* ssp. *nubila +/- Corymbia spp +/- Eucalyptus spp.* woodland on lateritic duricrust	Not of concern	No concern at present	Not listed	6.6	8.9	15.5	52,278	100
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	Endangered	1.6	3.0	4.6	69,654	1,059
11.9.7	*Eucalyptus populnea*, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks	Of concern	Of concern	Not listed	0.0	5.6	5.6	50,340	0
11.9.10	*Acacia harpophylla, Eucalyptus populnea* open forest on fine-grained sedimentary rocks	Of concern	Endangered	Not listed	0.0	1.0	1.0	49,649	2,419
TOTAL					93	64	157	1,191,103	10,513

* Based on three subregions (Taroom, Barakula and Southern Downs). Data from Accad et al (2008)

The performance requirements of the Code and their application to the proposed pipeline is presented in the Supplementary EIS terrestrial ecology technical report STR 17A-1-SV1.5, section 6.1, addressing:

- PR S.1: Limits to clearing
- PR S.2: Wetlands
- PR S.3: Watercourses
- PR S.4: Connectivity
- PR S.5: Soil erosion
- PR S.6: Salinity
- PR S.7: Conserving remnant endangered regional ecosystems and of concern regional ecosystems
- PR S.8: Essential habitat
- PR S.9: Conservation status thresholds
- PR S.10: Acid sulfate soils.

The southern CSM water supply pipeline will meet the performance requirements of the Regional Vegetation Management Code, provided that during detailed design, the alignment is modified within the assessed alignment corridor to avoid remnant vegetation in the two areas where the remnant vegetation is less than 200 metres in width (see PR S.4) and with the provision of suitable offsets to maintain the current extent of vegetation.

17A.4.5 WEEDS AND PEST SPECIES

Twelve species of introduced animals were recorded in the Study Area as presented in the EIS Volume 2, Chapter 17A, section 17A.4.5.

17A.4.9 SIGNIFICANCE OF IMPACTS

For the majority of species and communities, the results of the February 2009 summer surveys did not significantly change the significance assessments for these communities and species as detailed in the EIS Volume 2 terrestrial ecology technical report TR17A-1-V2.5.

One vulnerable flora species listed under the NC Regulation, *Gonocarpus urceolatus* (raspweed) was recorded in the February 2009 surveys but was not listed or assessed as part of the earlier EIS studies. *Gonocarpus urceolatus* (Raspweed) was identified in three disjunct locations in three different vegetation types, with recorded numbers of 20, 10 and 35. All populations were identified in shallow depressions within RE 11.5.1, RE 11.5.4 and RE 11.7.4. Detailed foot traverses within these vegetation types did not locate any other specimens.

The proposed pipeline has the potential to remove 65 individual *Gonocarpus urceolatus* spread across three populations. These three populations were found in three distinct REs (11.5.1, 11.5.4 and 11.7.4) totalling 27.5 hectares (remnant) within the Study Area. This represents a relatively small extent of the total 277,000 hectares of similar REs mapped within the three subregions that the Study Area crossed and 100 hectares which is located in reserves. Threats to this species include inappropriate fire regimes, weed invasion and loss of habitat. The first two threats are likely to be currently occurring given the location of the three populations near to the highway.

17A.5 MITIGATION MEASURES

Mitigation measures are the same as those described in the EIS Volume 2 Chapter 17A Terrestrial Ecology chapter and technical report. The realignment of the pipeline in sections has not modified the measures required.

The southern CSM water supply pipeline route falls outside of the MLA areas and as such is not exempt from meeting the requirements of the regional vegetation management codes (Department of Natural Resources and Water 2006) and subsequent offsets (Department of Natural Resources and Water 2007). section 17A.6 below provides further discussion on the regional vegetation management codes and associated offsets.

17A.5.2 MANAGEMENT OF THE MITIGATION PROCESS

Weed Management

As stated in the EIS Volume 2, Chapter 17A Terrestrial Ecology, section 17A.5.2, as part of the Biodiversity Management Plan, a pest management plan will be developed to control weeds on site during the construction, operational and decommissioning phases of the Project. The WJV's Environmental Advisor/s for the Project will be responsible for the development and implementation of the weed management plan.

Vehicle weed washdown facilities

All vehicles and equipment must be cleaned prior to entering the proposed pipeline area. In addition vehicles and equipment that have been exposed to weed infestation areas will be cleaned on leaving the proposed pipeline area. The washdown water from the washdown facilities shall be managed to ensure it does not enter creek, other waterways or gullies.

Western Downs Regional Council is currently formulating the establishment of a multi-user weed washdown facility at Wandoan. This facility will support the Wandoan Coal Project, as well as other projects proposed or occurring in the region.

The construction of the washdown facility and the procedures adopted in its operation and management will be consistent with the Queensland Primary Industries and Fisheries washdown/ cleandown procedures located at http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/4790_7078_ENA_HTML.htm

Weed management planning

The WJV's strategy towards weeds present on site, including but not limited to parthenium, will firstly be containment, and secondly eradication where practical. Eradication would likely include a staged program over areas of the proposed pipeline site over a number of years, in co-ordination with the Department of Transport and Main Roads.

In order to minimise the impact and prevent the spread of declared plants, the following initiatives will be implemented and will apply throughout all stages of the proposed pipeline:

- weed awareness and education program via induction and regular toolbox talks to WJV staff and contractors
- ongoing research into appropriate control strategies for declared plants
- ongoing consultation with stakeholders, including neighbours, government agencies, local authorities and weed control contractors
- accurate mapping of on-site, local and regional weed infestations
- vehicle washdown protocols (including Weed Hygiene Declaration per http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/4790_7075_ENA_HTML.htm) to ensure that all vehicles and equipment are inspected and cleared prior to entering or leaving the proposed pipeline area
- ongoing monitoring to assess effectiveness of control strategies and to identify any weed outbreaks or control program shortfalls, in association with Western Downs Regional Council and state government departments. This will include a formal annual review of any parthenium affected areas and other identified weed areas as part of the annual review of the pest management procedure
- annual reviews of weed management strategies.

Weed control

For any declared plant currently existing on along the proposed pipeline alignment, or for any that are identified on site throughout the life of the pipeline, control methods consistent with those outlined in the relevant species Fact Sheet prepared by the Queensland Primary Industries and Fisheries, and available at http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/4790_7005_ENA_HTML.htm will be adopted, in consultation with relevant stakeholders.

In the case of Parthenium weed, herbicide control involves a knockdown herbicide to kill plants that are present and a residual herbicide to control future germination. Timing of spraying is critical so that Parthenium weed is removed when plants are small and before seeding has occurred. The management

procedure proposed for Parthenium weed is the combined application of Ally herbicide and Surpass 300 herbicide.

Where there is a risk of weed resistance to herbicide application, the WJV will use alternative control measures or different herbicides.

17A.6 RESIDUAL IMPACTS AND OFFSETS

Residual impacts for the proposed pipeline include the removal of 93 ha of remnant vegetation and 64 ha of regrowth (non-remnant) vegetation and associated habitat.

A Green Offsets Package for the proposed pipeline will be developed in consultation with DERM and DEWHA giving consideration to relevant State and Commonwealth policies relating to offsets. The offset assessment presented in the EIS has been reviewed and updated in the subsections below.

17A.6.1 OFFSETS

Biodiversity offsets for the revised proposed pipeline are considered below under the Policy for Vegetation Management Offsets (Department of Natural Resources and Water 2007), the draft policy for Biodiversity Offsets (Queensland Government 2008) and the Draft Policy Statement: Use of environmental offsets under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth Department of the Environmental and Water Resources 2007).

Vegetation Management Act 1999

Offsets are an acceptable mechanism to meet the performance requirement of the Regional Vegetation Management Code (Department of Natural Resources and Water 2006) where the performance requirement includes maintaining the current extent of assessable vegetation. Three of the performance requirements (see section 17A.4.2) require offsets (Table 17A-7).

Table 17A-5: Proposed clearing requiring offsets to meet the performance requirements

Performance requirement	Regional Ecosystem(s)	Listed in Table 3*	Extent of clearing (ha)
PR S.2 Wetlands	11.3.27	No	0.3
PR S.3 Watercourses	11.3.2 11.3.25 11.3.4 11.5.1 11.5.21 11.5.4	No	10.0
PR S.7 Conserving remnant endangered (e) regional ecosystems and of concern (oc) regional ecosystems	11.3.2 (oc) 11.3.4 (oc) 11.9.5 (e)	No	4.2 2.8 1.6

* Table 3 of the Policy for Vegetation Management Offsets lists regional ecosystems that have a remnant extent below 5% of their pre-clearing extent and that are less than 500 hectares in total extent, or that have a remnant extent less than 200 hectares, or that are at risk of the remnant extent falling below 200 hectares. Different offsetting requirements apply to ecosystems listed in Table 3.

Clearing of remnant regional ecosystems as detailed in Table 17A-7 would require offsets that meet the following criteria:

- limitations on offset vegetation
- selection and location of appropriate regional ecosystem
- remnant mapping
- obtaining ecological equivalence
- ensuring ongoing management
- ensuring the offset is legally secured
- other requirements including ownership of land and financial contributions.

Details of the criteria are presented in the Policy for Vegetation Management Offsets (Department of Natural Resources and Water 2007). The minimum area of clearing to offset ratio will need to be

determined following Table 2 of the Policy for Vegetation Management Offsets (Department of Natural Resources and Water 2007), up to a ratio of 4:1 depending on the location, habitat quality and ecosystem type of the offsets. Each performance requirement will need to be addressed completely, but a single offset may address more than one performance requirement.

Subject to determining the preferred raw water supply option, and further refinement of actual disturbance as calculated in the Project's detailed design, the WJV will ensure an offset to meet a 3:1 ratio for Project-related disturbance of protected vegetation, deemed by current legislation as requiring an offset on unavoidable impacts. Based on Table 17A-5, a total of 18.9 ha cleared, equates to 56.7 ha at a 3:1 ratio is required for biodiversity off-set.

Draft Queensland Government Policy on Biodiversity Offsets

As noted in section 17A.2.1, the Queensland Government has released a draft Policy for Biodiversity Offsets. Under this draft policy, the Coordinator-General, in consultation with DERM, may consider the appropriate offset requirements for 'significant projects', which may comprise an offset package and/or financial contribution. The draft policy considers offsets for endangered, vulnerable and rare species; endangered and of concern regional ecosystems; and remnant vegetation in subregions with less than 30% of remnant vegetation remaining. It is understood that this policy is currently being revised following consultation and submissions.

Offsets under the EPBC Act

Offsets under the EPBC Act may be required for impacts to matters of national environmental significance, including endangered ecological communities (Brigalow (*Acacia harpophylla* dominant and co-dominant)) and threatened species (e.g. *Homopholis belsonii* and Brigalow Scaly-foot). The offsets should follow the principles outlined in the Draft Policy Statement: Use of environmental offsets under the EPBC Act, and as described in the EIS Volume 2 Chapter 17A Terrestrial Ecology, section 17A.6.1.

Offsets required under the EPBC Act can generally overlap with those required to address State policies, that is the one offset site may address multiple offsetting requirements.

WJV's Biodiversity Offset Strategy

As part of its Biodiversity Offset Strategy, the WJV commits to ensuring a biodiversity offset to meet a 3:1 ratio for Project-related disturbance of remnant endangered regional ecosystem vegetation (using biodiversity status), endangered ecosystems listed under the EPBC Act and vegetation covered under the vegetation management code. For the CSM water supply pipeline areas, these unavoidable impacts include no more than the clearing of 18.9 ha of vegetation, resulting in a biodiversity offset of approximately 56.7 ha. These figures will be refined as part of the Biodiversity Offset Strategy during the detailed design phase.

17A.7 CONCLUSIONS

The objective of the February 2009 ecological surveys aimed to address the TOR for the Project by completing required seasonal surveys. It also provided an opportunity to address route changes since the first (August 2008) surveys.

Generally the vegetation types, habitat types and species present were the same as those recorded during the earlier surveys. However, due to the route modification in the northern section, four REs not identified along the original route were recorded in the summer 2009 survey. Also, one threatened species not recorded in winter 2008 was recorded in the summer 2009 surveys: *Gonocarpus urceolatus*. This species of plant is listed as vulnerable under the NC Regulations and was recorded at three distinct locations.

The proposed pipeline is likely to result in removal of 93 hectares of remnant vegetation, of which 1.6 hectares is listed as endangered. Other impacts and the proposed mitigation remain the same from the EIS technical assessment.

Consistent with the conclusions discussed in the EIS, the proposed pipelines are considered unlikely to result in a significant impact to any threatened species or communities.

17A.8 REFERENCES

Department of Natural Resources and Water 2006, *Regional Vegetation Management Code for Brigalow Belt and New England Tablelands Bioregions*, The State of Queensland (Department of Natural Resources and Water), Brisbane.

Department of Natural Resources and Water 2007, Policy for Vegetation Management Offsets, The State of Queensland (Department of Natural Resources and Water), Brisbane.

Environmental Protection Agency 2002, *Biodiversity Planning Assessment: Brigalow Belt South Landscape Expert Panel Report*, Queensland Government, Brisbane.

Queensland Government 2009, Policy for Biodiversity Offsets. Consultation Draft. Environmental Protection Agency, Brisbane.