



## SOUTHERN REGIONAL WATER PIPELINE PROJECT

# Supplementary Report to the Draft Environmental Impact Statement

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# Abbreviations

## GENERAL

AS	Australian Standard
ASS	acid sulfate soils
BCC	Brisbane City Council
CAMBA	China-Australia Migratory Bird Agreement
CHMP	Cultural Heritage Management Plan
CLR	Contaminated Land Register
CoG	Coordinator-General
DEH	Department of the Environment and Heritage (Australian Government)
DMR	Department of Main Roads (Queensland)
EIS	Environmental Impact Statement
EM	environmental work method
EMP	Environmental Management Plan
EMR	Environmental Management Register
EPA	Environmental Protection Agency (Queensland)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
GIS	geographic information system
ICC	Ipswich City Council
IPA	<i>Integrated Planning Act 1997</i> (Qld)
JAMBA	Japan-Australia Migratory Bird Agreement
NBBT	North Beaudesert Balance Tank
NRM&W	Natural Resources, Mines and Water (Queensland Government Department of)
RE	regional ecosystem
REF	Review of Environmental Factors

ROW	right of way
SDPWOA	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
SRWP	Southern Regional Water Pipeline
SRWP Co	Southern Regional Water Pipeline Company
VMA	<i>Vegetation Management Act 1999</i>
WTP	water treatment plant



# Glossary

Acid sulfate soils	Soil, sediment or rock that contains elevated levels of metal sulfides, which can generate sulfuric acid when exposed to oxygen.
Amenity	The quality of being pleasant or attractive; something that contributes to physical or material comfort.
Aquatic	Biota living in or on water for all or a substantial part of the life span.
Balance tank	A large water tank provided for temporary storage of water to regulate flows in the water supply system.
Benthic	Growing on or living on a sea or lake bottom.
Best practice	Implies continual improvement to maintain maximum performance.
Biodiversity	The variety of all life forms; the different plants, animals and micro-organisms, the genes they contain and the ecosystems of which they form a part.
Biota	The total flora and fauna of a region.
Blasting	The use of explosives to break up or otherwise aid in the extraction or removal of a rock or other consolidated natural formation.
Canopy	The uppermost layer in a forest, formed by the crowns of the trees.
Carriageway	The trafficked section of a roadway.
Catchment	The land area drained by a river and its tributaries.
Cathodic protection	A method employed to minimise the rate of corrosion of structures such as pipelines and storage tanks. The method involves a more active metal being placed next to a less active metal, creating an anode which is then corroded in place of the less active metal.
Contaminated land	Land contaminated by hazardous substance(s) which may pose a risk to human health or the environment.
Contaminated Land Register	A register of proven contaminated land which is causing or may cause serious environmental harm, which is maintained by the EPA.
Controlled action	Any activity likely to result in a significant negative impact on a matter of national environmental significance as defined under the EPBC Act, actions taken by the Commonwealth and actions affecting Commonwealth land.
Corrosion	The destructive conversion of a metal to a metallic oxide through exposure to air, moisture or chemicals. Also referred to as rusting.
Cultural heritage	Possessing historical, archaeological, architectural, technological, aesthetic, scientific, spiritual, social, traditional or other special cultural significance, associated with human activity.
Ecosystem	A relatively self-contained ecological system defined by the types of organisms found in it and their interactions.

Edge effects	The often negative ecological impacts that occur at the boundaries of ecosystems, particularly where habitats are fragmented or located adjacent to disturbed land uses. These impacts may include changes in species composition, gradients of moisture, sunlight, soil and air temperature and wind speed, amongst other factors.
Endangered regional ecosystem	A listing under the <i>Vegetation Management Act 1999</i> (VMA) where a regional ecosystem type occupies less than 10% of its pre-clearing extent, or where 10-30% of the pre-clearing extent remains but is less than 10,000 ha.
Endangered species	A species at serious risk of disappearing from the wild if present land use or other causal factors continue.
Environment	The term is used in its broadest sense to include physical, biological, cultural and social aspects.
Environmental Impact Statement	A report documenting the outcomes of investigations into the potential environmental impacts of a Project or activity which is typically required as part of state or federal approvals processes.
Environmental Management Plan	Documentation of the procedures and physical methods that will be used to manage a particular activity such that its environmental impact is minimised.
Environmental Management Register	A register of land that has been, or is being used for a notifiable activity under the <i>Environmental Protection Act 1994</i> , and about which the EPA has been notified.
Erosion	The process by which material such as soil or rock is worn away or removed by wind or water.
Fragmentation	The breaking of an entity into smaller parts, referring in particular to an area of habitat being separated such that the resulting smaller areas are not capable of supporting flora and fauna populations to their original level.
Freehold land	Land over which the Crown has granted an interest which carries the exclusive right to the use and enjoyment of the land for an indefinite period of time.
Geology	The science that deals with the earth, the rocks of which it is composed and the changes it has undergone or is undergoing.
Groundwater	The water beneath the surface of the ground, consisting largely of surface water that has seeped down.
Habitat	The locality or environment in which a plant or animal lives.
Hollow	A natural cavity of a tree which provides habitat for fauna species.
Horizon	A soil layer of more-or-less well defined character.
Hydraulic	Of or relating to water or other liquid in motion; operated, moved or affected by water or liquid.
Main Roads	Queensland Department of Main Roads.
Micro-tunnelling	A method of trenchless construction that involves the pushing of a pipe between two pits, wherein a drill is located at the front of the pipe for excavating soil and rock.
Migratory	Moving regularly or occasionally from one region or climate to another, such as migratory birds.
<i>Not of concern</i> regional ecosystem	A listing under the VMA where a regional ecosystem type occupies more than 30% of its pre-clearing extent and more than 10,000 ha.
<i>Of concern</i> regional ecosystem	A listing under the VMA where a regional ecosystem type occupies 10-30% of its pre-clearing extent or more than 30% remains but is less than 10,000 ha.

Piling	A construction method, used at river and creek crossings, involving the driving of concrete piles in the riparian zone and/or the waterway itself to support the pipeline.
Population	A group of individuals of a species living in a certain area.
Precautionary principle	Refers to the principle that, where there are serious threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason to postpone environmental protection measures.
Proponent	The person or organisation putting forward a proposition or proposal.
Pump station	A facility for pumping water to assist its movement through the pipeline.
Regional ecosystem	A vegetation community consistently associated with a particular geology, landform and soil, used by the Queensland Government as the basis for nature conservation planning.
Rehabilitation	Activities undertaken to return disturbed land to a predetermined beneficial land use/productivity.
Remnant vegetation	Wholly and predominantly intact native vegetation, excluding young regrowth.
Riparian	Frequenting, growing on or living on the banks of streams or rivers.
Review of Environmental Factors (REF)	An initial study to identify potential environmental constraints.
Runoff	The drainage of water from waterlogged or impermeable soil into rivers and creeks; rainfall or other water not absorbed by the soil.
Sand	Sediment composed of particles within the size range 63 µm to 2 mm.
Sediment	Solid material settled from suspensions in a liquid.
Silt	A type of sediment with particles finer than sand and coarser than clay (i.e. 2-63 µm).
Species	A taxonomic grouping of organisms which are able to interbreed with each other but not with members of other species.
Spoil	Surplus soil and rock material after backfilling pipeline trenches.
Stakeholder	Persons, parties or organisations with specific interests in the Project.
Terms of Reference	A document prepared by the Office of the Coordinator-General outlining those issues to be addressed by the EIS.
Terrestrial	Living or found on land, as opposed to in rivers, lakes, oceans or in the atmosphere.
Threatened species	A collective term for plant or animal species considered 'endangered' or 'vulnerable'.
Topsoil	The surface or upper part of the soil, often containing seed or other reproductive parts of plants. Generally the most biologically rich soil horizon.
Trenching	Installation of a pipe by excavating a trench, followed by pipe placement and backfilling with soil and rock material.
Understorey	The vegetation layer between tree canopy and the ground cover in a forest, composed of shrubs and small trees.
Vibration	The rapid back-and-forth movement, often invisible, in space, of an object against which some force has been applied.

Vulnerable	A native plant or animal species or population whose ability to survive in the wild is compromised by exposure to threatening processes such as habitat destruction or disease.
Waste	Any gas, liquid, solid or energy that is surplus to, or unwanted from, any industrial, commercial, domestic or other activity.
Weed species	A plant growing where it is not wanted.

# Executive summary

This Supplementary Report to the draft EIS for the Southern Regional Water Pipeline (SRWP) project is prepared in response to formal submissions received by state and federal agencies and the public. The Coordinator-General compiled the formal submissions received from the Department of the Environment and Heritage (Commonwealth), the Queensland Environmental Protection Agency, Queensland Transport, Department of Main Roads, Department of Emergency Services and interested community groups and the public.

The supplement to the draft EIS includes a summary of the key issues, concerns and comments from these submissions. In response, this document provides detailed discussion and additional supporting material, including mapping showing proposed amendments to the version of the alignment published in the draft EIS.

The supplement to the draft EIS includes a number of refinements to the proposed alignment based on further investigations and specific issues detailed in the submissions. These refinements to the alignment include:

- A deviation to the route proposed for the Stapylton Balance Tank. Detailed field investigations will be completed for this deviation.
- Chambers Flat Road route alignment. The proposed re-alignment was investigated for biological, engineering and social constraints.
- North Beaudesert Balance Tank. Detailed design and field investigations are required for the site.
- A deviation to the route proposed for the Mount Crosby to Brisbane River alignment. Detailed field investigations will be completed for this proposed deviation to determine an appropriate basis for selecting an alignment.

The draft Environmental Management Plan (EMP) included with the draft EIS has been updated to reflect particular comments received in submissions. A copy of the revised EMP is included as an Appendix to the supplement. It is important to note that the revised EMP includes reference to a series of management plans that are being developed prior to construction. These new plans are a direct result of issues and concerns raised in submissions. The SRWP Company will maintain a policy of best management practices throughout.

# 1 Introduction

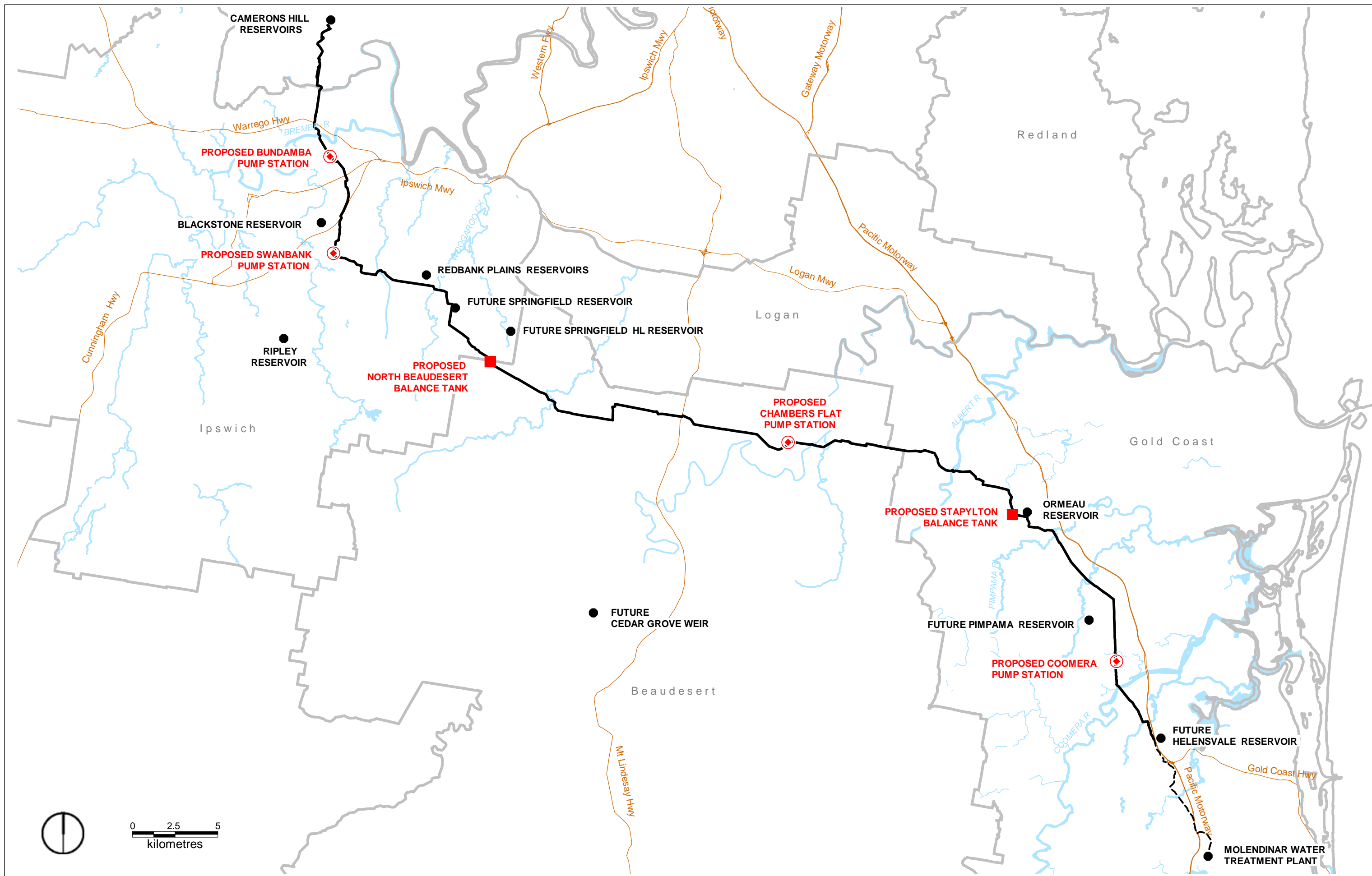
This is the Supplementary Report to the draft Environmental Impact Statement (EIS) for the Southern Regional Water Pipeline (SRWP). It is provided to the Coordinator-General in response to submissions received during the period of public comment on the EIS from 29 April-29 May 2006. In addition, the Supplementary Report includes a number of refinements resulting from further investigations. Refinements to the alignment are included in Figure 1.1 and discussed in Section 5 below.

Submissions were received either through the Coordinator-General from relevant state and federal agencies and other interested stakeholders, groups or individuals, or directly to the SRWP Alliance office. Submissions made to the SRWP Alliance office included the feedback from a series of staffed public display sessions held from 13-15 May 2006.

Responses to submissions on the draft EIS are presented in the format of a written reply to each part or component of a particular submission. Accordingly, some responses are cross-referenced to similar replies in order to provide a concise document.

Importantly, the response to each submission considers the relevant economic, engineering, social and environmental aspects of the proposal. Where appropriate, these aspects are discussed in detail.

Table 1.1 below provides a summary of all responses to stakeholder submissions.



**Source:** Base data supplied by Brisbane City Council, Ipswich City Council, Beaudesert Shire Council, Gold Coast City Council  
**Projection:** GDA94 (MGA56)  
**File Path:** O:\BRS\Projects\BEG601- SRWP\T08 Gis Data\Workspaces\EIS\EIS Supplement\Figure 1.1 Locality.Wor  
**Date:** 27 June 2006

Table 1.1 Summary of responses to stakeholder submissions on the draft EIS

	Submission received from	Comment/issue	Addressed at
Federal	Department of the Environment and Heritage	There is a need to clarify that while assessment of the SRWP Project will be conducted in accordance with the bilateral agreement between Queensland and the Australian Government, the Project will still require approval by the Minister for the Environment and Heritage under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).	2.1.1, Table 2.1
		There needs to be a clear explanation of how the SRWP is compatible with the National Water Initiative and the water reform objectives of the National Competition Policy.	2.1.2
		It should be made clear that 30 m is an average corridor width and that the impact width can be reduced in sensitive environmental areas, that is, in areas of or nearby to habitat for listed threatened species or listed migratory species.	2.1.3
		It would be of value to note in this section that threatened species listed under the EPBC Act such as the Swift Parrot and Regent Honeyeater are known to be present in the vicinity of the SRWP during winter (that is, outside of the time that surveys were undertaken) and that suitable habitat for these species is present along the SRWP route.	2.1.4
		Each regional ecosystem should provide an indication of the listed threatened species that may be present.	2.1.4, Table 2.2
		You should also note that <i>Eucalyptus tereticornis/E. crebra</i> forest provides foraging habitat for the Swift Parrot (endangered) and Regent Honeyeater (endangered, migratory).	2.1.4
		The draft EIS describes a number of sensitive environmental areas including Springfield, Swanbank and Spring Mountain. Given that Mount Crosby-Camersons Hill has substantial areas of remnant vegetation and has recorded listed threatened species such as the Collared Delma (vulnerable), <i>Notelaea lloydii</i> (vulnerable), <i>Sophora fraseri</i> (vulnerable), and the Regent Honeyeater (endangered, migratory), then this area should also be regarded as a sensitive environmental area.	2.1.5
State	Queensland Environmental Protection Agency	For any <i>Integrated Planning Act 1997</i> , IPA application that involves works being undertaken on State land (i.e. reserves, rivers and creeks), there will be a need for an evidence of 'resource entitlement' - refer to s. 3.2.1(5) of the IPA.	3.1.1
		Issues under the <i>Coastal Protection and Management Act 1995</i> :	3.1.1
		For those parts of pipeline works that are located on State coastal land above the level of mean high water spring tide but within the coastal management district, a development approval for Operational Works that are 'interfering with quarry material on State coastal land above mean high water spring tide' may be required.	3.1.1
		Dot point 9 should read: <i>Coastal Protection and Management Act 1995</i> and <i>Coastal Protection and Management Regulation 2003</i> .	3.1.2
		There should also be an explanation of the <i>Coastal Protection and Management Regulation 2003</i> , particularly with regard to the 'prescribed tidal works code'.	3.1.2
		At Section 1.7.4 of the draft EIS, the State Coastal Management Plan section should also refer to the State Coastal Management Plan 2001 and (draft) SEQ Regional Coastal Management Plan 2006.	3.1.3



Submission received from	Comment/issue	Addressed at
	It is considered that wherever possible such spoil material should be suitably disposed of at a site outside the coastal management district.	3.1.6, 3.3.4, 4.1.3
	Whilst the river crossings are important, a project description for each tidal creek should be provided, particularly given that it is proposed to use the 'trenching method' across Saltwater Creek.	3.1.4
	The alternative methods need to be evaluated for the construction of the crossings identifying the reasons why the crossing method was selected and these other methods were not considered viable.	3.1.5
	Whilst noise, air and vibration are important, there would be a number of coastal management issues that should also be considered, particularly in relation to the State Coastal Management Plan 2001.	3.1.3, 3.1.7
	<i>Coastal</i> The draft Environmental Management Plan (EMP) does not identify any strategies to be undertaken specifically in association with the works within the coastal management district. This section needs to be expanded to include a number of additional sections.	3.1.3, 3.1.5, 3.1.6 Appendix B
	<i>Contaminated land</i> The draft EIS has identified a number of sites listed on the Environmental Management Register along or in close proximity to the proposed alignment.	3.1.8
	<i>Heritage</i> The draft EIS focuses solely on Aboriginal cultural heritage. Further information is required outlining whether the Project is likely to impact on European heritage material or sites, and if so, how it will be dealt with.	3.1.9
	<i>Nature conservation</i> Where the alignment is along or in close proximity to endangered ecological communities, further information is required as set out in the Terms of Reference. For example, the exploration of alternative alignments is not discussed.	3.1.10
	Despite Part 3, it is unclear whether the impact width will be reduced where the proposed alignment is along or in close proximity to endangered ecological communities, and if so, the detail of the reduction and other measures to reduce impact is required.	2.1.3
	It is unclear how long trenches will remain open and construction disturbance will continue.	3.1.11
	At 4.7.5 seasonal limitations are acknowledged. The EIS should set out strategies to allow for the actual flora and fauna values to be higher than assessed in the limited field survey and desktop review.	3.1.12
	The draft EIS does not provide extensive discussion as to the potential impacts and proposed mitigation measures in relation to sensitive environmental areas, and flora and fauna in both aquatic and terrestrial environments. The extent to which the hierarchy has been applied in alignment choice is unclear.	3.1.13
Queensland Transport	The EIS should include a section on potential railway corridors which will be crossed by the SRWP. Reference to the approvals required for these crossings should be included and described.	3.2.1, 3.2.2
	The method of micro-tunnelling requires further discussion in reference to rail corridor crossings.	3.2.2

Submission received from	Comment/issue	Addressed at
Department of Main Roads	Main Roads could manage giving approval on pipelines in road reserves at a site specific engineering level, but other considerations (for example, broader environmental impacts which might come to light in the broader EIS assessment) would also need to be addressed.	3.3.1, 3.3.4
	The EIS states that a detailed Traffic Management Plan will be developed prior to the commencement of construction, following the completion of the detailed design phase for the SRWP in Section 4.14.1. It is important that Main Roads officers are involved in the detailed design phase.	
	<i>Cooneana olive trees, Cunningham Hwy</i>	3.3.2
	The proponent should note that there are rare species of olive trees near the Cunningham Highway which are currently awaiting gazettal as an endangered species under the environmental protection legislation.	
	Reference is made in Section 4.14.2 of the current draft EIS that major roads with large traffic volumes need to be maintained at 100% capacity to avoid severe traffic impacts. However, in Appendix D (Traffic impact assessment) under Class 1 roads (pipe crosses a major highway), it is stated in the last dot point that there is likelihood that there will be a necessity for reduced speed zones and potential loss of road capacity of 10-20% depending on shoulder width. This reduction in performance is not acceptable and discussions with district officers are required to further minimise its impact.	3.3.3
	<i>Construction - Temporary construction access and maintenance access</i>	3.3.4
	Temporary construction accesses and maintenance accesses from state-controlled roads will require approval under s. 62 of the <i>Transport Infrastructure Act 1994</i> (TIA) and construction approval under s. 33 of the TIA before commencing any work. In consultation with district officers, the proponent should use the <i>Road planning and design manual</i> in designing appropriate access intersections.	
	<i>Traffic management for works adjacent to the state-controlled road network</i>	3.3.4
	The management of all traffic (including pedestrian and cycle traffic) through work site locations in SCR reserves is to be undertaken in accordance with Main Roads' <i>Manual of uniform traffic control devices</i> , in particular Part 3, 'Works on roads'.	
	<i>Timing of construction - p. 3-17, Major road crossing</i>	3.3.4
The EIS states that the Alliance proposes to cross '... major road crossing using trench-less methods'. Main Roads' South Coast Hinterland and the Metropolitan Districts require detailed engineering drawings and other information on how the Alliance proposes to undertake these works before approval can be provided.		
<i>Transport (description of the Project)</i>	3.3.4	
State-controlled roads impacted upon by the preliminary alignments of the pipeline should be identified for road impact assessments. This information should be provided with general timing of the development, including typical programs which transport construction materials from sources and transport output materials to destinations. A general description of the types of traffic likely to be generated for the life of the Project should also be included as part of the description stage.		

Submission received from	Comment/issue	Addressed at
	<p><i>Traffic, transport and access arrangements</i></p> <p>To assist the road impact assessment for each alignment affecting a state-controlled road, the following information should be identified and described in Section 4.10.</p> <ul style="list-style-type: none"> <li>• <i>Local traffic volumes:</i> These can be accessed from local councils to calculate 'before' and 'after' project values for increased local traffic along roads affected by the pipeline construction activities. These values are important for the assessment of pavement rehabilitation requirements and or safety issues and to inform possible traffic management strategies.</li> <li>• <i>Source pipe:</i> The source pipeline segments and haulage routes are required for assessment of payment conditions, safety considerations, and road impact management strategies.</li> <li>• <i>Sources of other construction materials:</i> Sources of other construction materials should be identified to ensure that road accesses and links to sources of construction materials are also assessed for payment conditions, safety considerations and to develop road impact management strategies.</li> </ul>	3.3.4
	<p><i>Impacts and impact mitigation</i></p> <p>This section should more clearly separate impact assessments from mitigation strategies. Its title should reflect road impact assessments and detail road assessment findings, such as 'Impact Assessments'. Mitigation strategies should be inserted in Section 4.14.3 (Road management strategy/Traffic management plans).</p> <p>It is recommended that the proponent reviews the preferred process of assessing and mitigating road impact and traffic management components of a Project as described in Main Roads' <i>Guide to assessment of road impacts of development</i> (2006).</p>	3.3.4
	<p><i>Road management strategy/Traffic Management Plans</i></p> <p>It is recommended that further assessments and impact management strategies be included and addressed in a Supplementary Environmental Impact Statement (S/EIS). To support this, the proponent is strongly encouraged to contact the district offices for specific purposes as given above. Please contact Mr Antonia Nardi, Senior Engineer (Development Control) in the Metropolitan Office on (07) 3834 8248 and Mr Richard Kretuchmer, Senior Town Planner in the South Coast Hinterland (Nerang) Office on (07) 5596 9479.</p>	3.3.4
Department of Emergency Services	<p>In Section 6 - Conclusion and recommendation, another dot point should be added for an Emergency Management Plan.</p> <p>In the Appendix F Environmental Management Plan, Section 5.11 - Safety (page F-27), it states that development of a Safety Plan and an Emergency Response Contingency Plan are warranted. Are these plans in addition to the emergency evacuation route (EM 11.3)? The wording is ambiguous.</p> <p>In Section EM 11.1 - Storage compound (page F-27), dot point one should also state that signage should be in accordance with Australian Standards applicable to the hazard.</p> <p>In Section EM 11.3 - Emergency evacuation route (page F-28), another dot point should be added.</p> <ul style="list-style-type: none"> <li>• Provide these emergency procedures and arrangements to the Department of Emergency Services.</li> </ul> <p>In regard to Commitment 4.15, could you please advise the time frame proposal to meet this commitment? It is recommended that consultation be undertaken with the Department of Emergency Services in the development of the risk assessment.</p>	3.4.1 3.4.1, Appendix B 3.4.1, Appendix B 3.4.1, Appendix B 3.4.1

	Submission received from	Comment/issue	Addressed at
Community	Anne Page, Brisbane Region Environment Council	I would like to commend the SRWP Project Group on their efforts to provide environmentally sensitive infrastructure design and installation in south-east Queensland. The comments outlined here are intended to assist in ensuring the best environmental outcomes are achieved for the Project. I support the pipeline route utilising Carters Road rather than the Power easement east and west of the Mt Lindesay Highway because of local sightings of spotted tailed quolls from 1998-2006.  Various construction and operational issues	5.2  4.1.2, Section 2, Section 3
	Ted Fensom, Brisbane Region Environment Council	BREC points out that the State Government should have reflowed air photos for the pipeline route.  The proposal by Carter Road residents to put the pipeline through Munruben Wetlands irrespective of Powerlink's clearing and construction road is unacceptable. The <i>Rare Frogs of Munruben</i> by Dr Glen Ingram (2000) has been ignored by Powerlink as have elements of the doubly protected <i>Melaleuca irbyana</i> . The towers have not been raised as at Scrubby Creek to protect <i>Melaleuca nodosa</i> or utilised as singular poles (Logan Motorway). The amelioration of Powerlink's damage should not be hampered by putting the pipeline through Munruben Wetlands and further messing up the hydrology and ecological balances.	4.1.1  5.2
		Main Roads are doing serious damage upstream at Jerry's Downfall- siltation, then stopping environmental flow on Chambers Creek and refusing to put in sustainable dry cell underpasses for vulnerable Koalas, endangered Spotted-tailed Quolls and macropods under a new 10 lane Mt Lindesay Highway at Munruben. The only other sustainable fauna linkage and bioregional corridor across Mt Lindesay Highway is near Rathdowney. This area is definitely needed as an inter-urban break (spot rezonings of shops and pub south of North Maclean).	Section 2, Section 3
	Vince Sawyer	I am finding it impossible to believe that we can rely on an EIS, when the maps and routes for the construction that we have seen are many, many years old. Surely new versions are available.  I also can't believe that there is a proposal to run the pipe through Jerry's Downfall, an extremely sensitive environmental area where the construction of the Mount Lindsay Highway Upgrade is already having a devastating effect. The necessity to clear such a vast swathe of land is the greatest problem in that area where so little natural environment is left to house all kinds of native fauna.	4.1.1

Submission received from	Comment/issue	Addressed at	
Brett Kerr on behalf of the Flinders-Greenbank/Karawatha Conservation Partnership	<p>The Flinders to Greenbank/Karawatha Corridor extends from Karawatha Forest Reserve in Brisbane City to Flinders Peak Conservation Estate in the west and traverses several local, state and federal government lands. The corridor comprises the largest area of intact lowland eucalypt forest in South East Queensland and supports flora and fauna of national, state, regional and local significance. Significant land acquisitions by local government in past years have endeavoured to protect the integrity of the corridor. However, residential and industrial development and major infrastructure corridors are progressively eroding the biodiversity and connectivity values of this corridor.</p> <p>The Flinders-Greenbank/Karawatha Conservation Partnership (FGKCP) recognises the importance of the development of the pipeline to meet increased demands in urban water consumption in South East Queensland. However, the present alignment of the easement traverses the 'Springfield Wildlife Corridor', which has recently been dedicated to Ipswich City Council's White Rock/Spring Mountain Conservation Estate. The Springfield Wildlife Corridor is part of a regionally significant biodiversity corridor as identified by the Queensland Environment Protection Agency in the SEQ Biodiversity Planning Assessment. The proposed easement will traverse the Springfield Wildlife Corridor at the narrowest point of the corridor which may greatly impact on the long-term viability of the Flinders-Greenbank/Karawatha Wildlife corridor to function as a long-term viable wildlife corridor.</p> <p>To ensure the long- term viability of the Flinders-Greenbank/Karawatha Corridor, it is strongly recommended that the proposed pipeline easement uses the existing cleared powerline easement that already traverses the corridor. This will minimise detrimental impacts and further fragmentation of this valuable corridor. It is noted that the pipeline easement uses the powerline easement in the North Beaudesert area where the terrain is very similar to the terrain located in the Springfield Wildlife Corridor.</p> <p>It is also strongly recommended that the proposed North Beaudesert Storage Balance Tank is not located in the Springfield Wildlife Corridor.</p>	5.3	
Submissions to public displays	Key issues arising from feedback on public displays held as part of formal consultation for EIS have been tabulated and are addressed in this document.	4.2. Table 4.1	
Business	Anthony Stephens, Darlington International Raceway	The quarry site is located within a nominated Key Resource Area under the draft State Planning Policy for the Protection of Extractive Resources and its future expansion is anticipated. A request for SRWPA to consider an alternative location is proposed.	5.1

## 2 Response to Federal Agency submission

The draft EIS was released for public consultation on 29 April 2006. Input was invited from federal, state and local government agencies, stakeholders and the community and submissions were accepted until 29 May 2006. Six staffed, public displays of the EIS were held in May 2006 to provide the public with the opportunity to view, discuss and supply input to the document. The Federal Department of the Environment and Heritage (DEH) responded to the Coordinator-General with detailed comments on 26 May 2006.

This section responds to the comments provided by DEH on the draft EIS.

### 2.1 DEPARTMENT OF THE ENVIRONMENT AND HERITAGE

#### 2.1.1 Clarification of process for approving the EIS

The Commonwealth Minister for the Environment has accredited the EIS process under the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWOA) through a bilateral agreement between the Queensland and Commonwealth Governments. Consequently, the process for assessing this EIS satisfies the impact assessment requirements of all relevant State and Commonwealth statutes.

While the assessment will be carried out under this bilateral agreement, the Federal Environment Minister retains approval rights over the Project. Table 2.1 is a revised version of Table 1.2 in the draft EIS and more clearly reflects the approvals process for the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 2.1 List of significant approvals required for the SRWP Project

Legislation	Relevant authority	Action/approval
<i>State Development and Public Works Organisation Act 1971</i> (Qld)	Coordinator-General	Coordinator-General Report on EIS
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Federal Minister for Environment, Department of the Environment and Heritage	Controlled action; assessment through bilateral agreement; approval and conditions by Federal Minister
<i>Coastal Protection and Management Act 1995</i>	Environmental Protection Agency Local authorities	Various prescribed tidal works

## 2.1.2 Compatibility with federal water policy

### National Competition Policy Framework

The following extracts from the Australian Government National Competition Policy (NCP) 2005 Annual Report set out the framework for the NCP.

*'In April 1995, the Australian Government, States and Territories entered into three Inter-Governmental Agreements – the Conduct Code Agreement (CCA), the Competition Principles Agreement (CPA), and the Agreement to Implement the National Competition Policy and Related Reforms (Implementation Agreement). These Agreements aim to provide a timely, coordinated and comprehensive approach to competition reform across all levels of government.*

*The commitments embodied in these Agreements effectively underpin NCP in Australia. These reforms perform a mutually reinforcing role with other competition policy initiatives.'*

The National Water Initiative (NWI) would comprise one of these initiatives.

*'The NCP framework targets particular opportunities for governments to encourage competitive outcomes. These include the following:*

- *the implementation of competitive neutrality for all government business activity operating in a contestable market, which requires that such businesses not benefit commercially simply by virtue of their public ownership. For example, they should be liable for the same taxes and charges, rate of return and dividend requirements as their private sector competitor;*
- *the structural reform of public monopolies, where their markets are to be opened to competition or they are to be privatised, to ensure they have no residual advantage over potential competitor;*
- *the provision of access arrangements to services provided by significant infrastructure facilities (such as electricity grids, airports and communications networks) that would be uneconomic to duplicate, to encourage competition in upstream and downstream markets and reduced prices for related product;*
- *ensuring commitment to related reforms in key infrastructure areas of electricity, gas, road transport, and until 2005, water with a view to improving efficiency, implementing nationwide markets and standards, and protecting the environment.*

*Benefits to the community from this reform process are becoming more evident, particularly in terms of lower prices to consumers.*

*NCP reforms have contributed to reductions in costs and prices across most infrastructure services that have been subject to reform. However, it is important to recognise that this is a long-term process. Ongoing commitment by all levels of government to effective reform will be necessary to realise significant returns.'*

The SRWP Project would fit strategically within this Policy Framework as the SRWPCo is established as a corporation that is required to:

- operate economically as a commercial entity
- provide infrastructure that will improve efficiency in the supply and transfer of bulk water across the southern part of the south-east Queensland conurbation
- ensure that the environmental impacts of the SRWP are minimised.

### National Water Initiative

The following extract from the National Water Initiative (NWI) website provides information on the NWI.

*'The National Water Initiative (NWI) is Australia's blueprint for national water reform. The NWI was signed by the Queensland State Government on 25 June 2004.*

*The NWI builds on the previous Council of Australian Governments (COAG) framework for water reform which was signed by the Australian Government and all state and territory governments in 1994. Since 1994, national reform agreements of this kind have proved important in Australia for guiding the shape of water reform and maintaining the pace of water reform. The 1994 Council of Australian Governments' Water Resource Policy requires all States to look at the costs of managing water and the value that should be placed on it.*

*The NWI represents the Australian Government's and state and territory governments' shared commitment to water reform in recognition of:*

- *the continuing national imperative to increase the productivity and efficiency of Australia's water use;*
- *the need to service rural and urban communities; and*
- *the need to ensure the health of river and groundwater systems, including by establishing clear pathways to return all systems to environmentally sustainable levels of extraction (NWI 2004, para. 5I).*

*Just under half of the NWI's 70 or so actions involve national actions or other action by governments working together. This reflects not just the emphasis in the Agreement on greater national compatibility in the way Australia measures, plans for, prices, and trades water. It also represents a greater level of cooperation between governments to achieve this end.*

*The National Water Initiative signifies:*

- *a commitment to identifying over-allocated water systems, and restoring those systems to sustainable levels*
- *the expansion of the trade in water, resulting in the more profitable use of water and the more cost-effective and flexible recovery of water to achieve sustainable environmental outcomes*



- *more confidence for those investing in the water industry due to more secure water access entitlements together with better registry arrangements, monitoring, reporting and accounting of water use, and improved public access to information*
- *more sophisticated, transparent and comprehensive water planning , and*
- *more effective and efficient management of water in urban environments, for example through the increased use of recycled water and stormwater.*

*The NWI assigns a number of responsibilities to the Natural Resource Management Ministerial Council (NRMMC). These include the development of a comprehensive national set of performance indicators for the NWI and overseeing implementation of the NWI, particularly for actions that require national coordination. In December 2004, the Australian Government established the National Water Commission to assist with implementation of the NWI.'*

The following extract is taken from the Queensland Water Plan (2005). The Plan sets out the strategies that the State Government is putting into effect to meet its commitment to the National Water Initiative and water reform in general.

*'The Queensland Water Plan 2005-2010 is the Queensland Government's program to meet future water needs for consumption and the environment. It outlines strategies and actions to ensure Queensland's economic growth is underpinned by sustainable water resource management. Significant actions include:*

- *statutory, catchment-based, water resource plans to provide secure water allocations for farms, businesses and homes*
- *legally protected environmental flows to ensure the health of our rivers and groundwater systems*
- *water trading agreements to provide access to water and encourage high value use*
- *Wild Rivers legislation to protect our pristine rivers*
- *pricing water to reflect the costs of supply and encourage people to invest in efficient water supply and use*
- *liaison with local government and the community to develop regional plans to ensure long term water supply, including new infrastructure*
- *programs and financial incentives to encourage smarter use of our existing supplies through more efficient use, reuse, and recycling of water*
- *development of regional strategies to set water quality objectives and to better manage pollution sources and rivers*
- *monitoring and research to underpin sustainable water management.*

The SRWP will allow augmentation of existing potable water supplies to the local government areas of Brisbane, Ipswich, Logan and Gold Coast Cities as well as Beaudesert Shire. Existing potable water supplies are from the water storage

facilities at Camerons Hill (Mt Crosby) and connecting to the Gold Coast network at Helensvale. A number of future water sources are expected to contribute to the SRWP Infrastructure Facility and may include the desalination project on the Gold Coast.

The philosophy underlying the SRWP is the provision of an interconnected water and dual-flow transfer system linking existing reservoirs and pipelines to new water infrastructure in the region. This will result in sustainable water resource management outcomes for the lifetime of the Project by establishing a framework for transfer of new and proposed water sources.

The SRWP will provide both a long-term primary mechanism to support expected increased demands in urban water consumption as well as the infrastructure required to minimise the impact of extended dry periods. The pipeline has been designed with a dual-flow capability in order to facilitate these objectives for water movement. A primary purpose is to enable the delivery of water from proposed future desalination facilities on the Gold Coast as an emergency supply measure for the greater Brisbane area.

The construction of the SRWP by late 2007 will provide an integrated water infrastructure network for the South East Queensland region taking into account:

- a 2050 time horizon
- South East Queensland Regional Plan 2005-26
- South East Queensland Infrastructure Plan and Program 2005-26
- South East Queensland Regional Water Supply Strategy
- Strategic SEQWater planning studies such as *Responding to drought in South East Queensland - Contingency planning for urban water supply*
- Current and future supply sources such as the proposed Wyaralong Dam-Cedar Grove Weir proposal and the potential Tilley's Bridge Dam and desalination facilities planned for the Gold Coast
- Future growth and regional development nodes.

The SRWP strategy is entirely consistent with the context of current regional and infrastructure planning as well as the philosophies underlying water resource management.

The SRWP creates an opportunity to develop a true regional bulk water supply system in south-east Queensland, which can be owned and operated across the region. This has the potential to provide greater flexibility, increased efficiency and improved reliability for customers and consumers.

### 2.1.3 Construction corridor width and vegetation clearance

The approximately 90 km length steel pipeline will be buried with a minimum cover of approximately 750 mm for the bulk of its traverse, and consists of pipe ranging from 750-1050 mm in diameter. Generally, the pipeline will be constructed within a 30 m wide easement. It is expected that the pipe will be supplied in 13 m lengths and will be rubber ring jointed or welded at connection points. The pipe will be

coated for corrosion protection prior to delivery. Cathodic protection will also be provided to supplement the protective coating. The pipeline will be operated at a maximum allowable operating pressure of 1.6 MPa.

A corridor of up to 30 m is required to allow construction to be completed quickly, safely and with minimal impact on site-based activities and adjacent landowners. In some cases, the easement width will be reduced because of overriding engineering, environmental or social constraints. A restricted corridor of 12-20 m will be achieved by reducing the width of the right of way (ROW) and the movement of vehicles and machinery through the construction site. Other construction options include removing excavated material from the construction corridor or laying pipe (temporarily) outside the corridor and transporting into the work area as required. In these constrained easement situations, the duration of construction is expected to be longer than for activities in unconstrained easements. Figures 2.1 and 2.2 illustrate the layout of construction activities in constrained and unconstrained situations.

Construction activities may commence at a number of workfronts from mid-October 2006. It is anticipated that multiple workfronts will be required for major river and road crossings, and for works in constrained and unconstrained corridors, until completion of construction in late 2007 (Figure 2.3).

A number of methods can be employed to mitigate construction impacts in environmentally sensitive areas and these are detailed in the draft EMP at Appendix B.

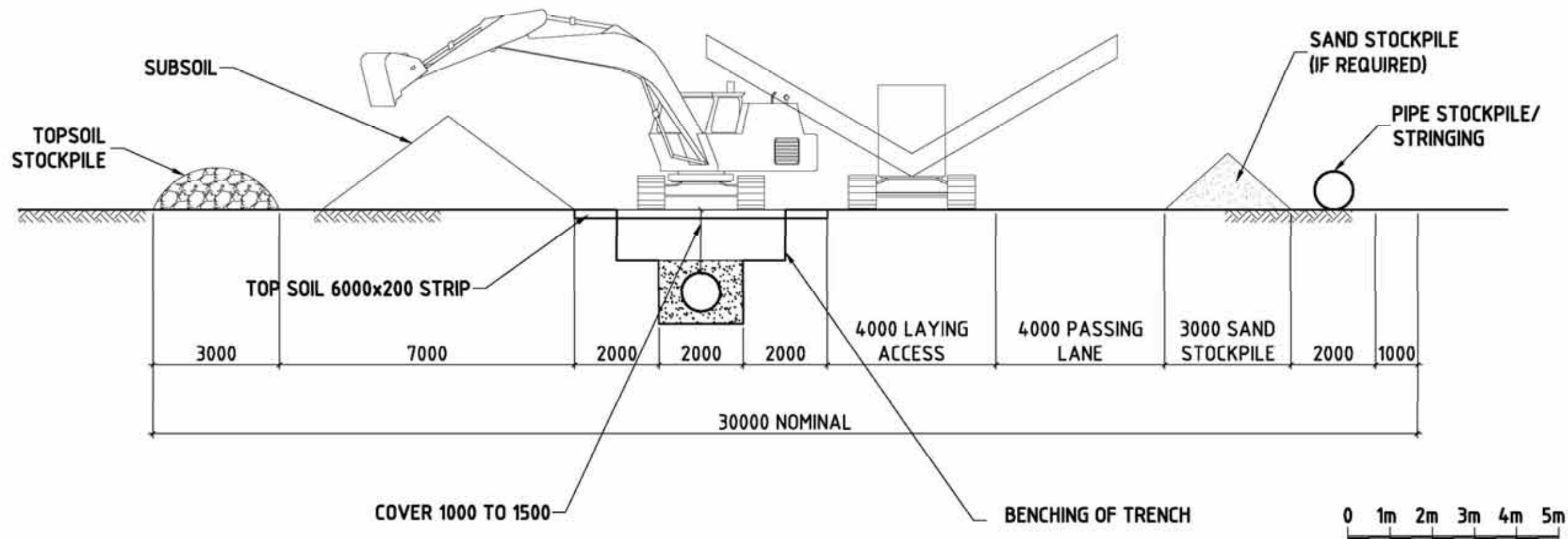
#### 2.1.4 Listed threatened/migratory species

Environmental assessment of the corridor was undertaken through a combination of database searches to identify historical records of significant species and field surveys of representative areas along the alignment.

The *Eucalyptus tereticornis* and *E. crebra* woodlands found around Mt Crosby are recognised as important foraging habitat for the Swift Parrot during the winter months. Further disturbance or fragmentation of important habitat in these areas, and along the alignment as a whole, is to be minimised wherever possible.

While woodland habitat suitable for the Regent Honeyeater (*Xanthomyza phrygia*) may be present along the alignment, this species occurs mainly inland of the Great Dividing Range and records from south-east Queensland are now uncommon (DEH 2004). This is supported by a search of the *Birds Australia* database, which records only one sighting from 2814 surveys across the whole project area.

While specific regional ecosystem types may be classified as 'not of concern', these areas may provide suitable habitat for listed threatened species. Table 2.2 identifies the significant species associated with particular RE types.



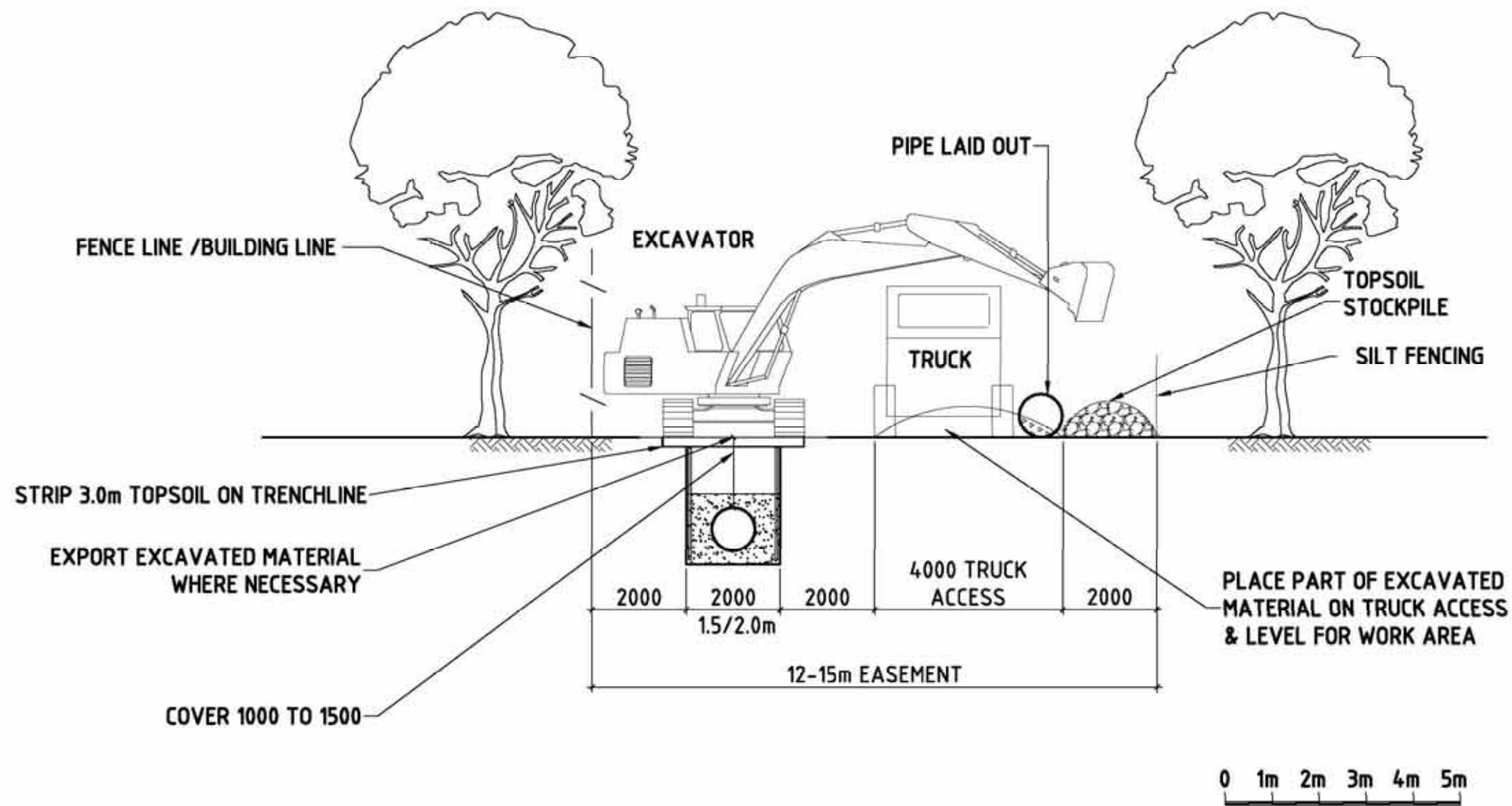
## TYPICAL CORRIDOR CROSS SECTION FULL WIDTH EASEMENT

Source:

Projection: GDA94 (MGA56)

File Path: O:\BRS\Projects\BEG\BEG601- SRW\P\T08 GIS Data\Workspaces\ EIS\EIS Supplement\Figure 2.1 Construction Techniques Full Width Easement.Wor

Date: 28 June 2006



## TYPICAL CORRIDOR CROSS SECTION IN LIMITED CONSTRUCTION AREAS

Source:

Projection: GDA94 (MGA56)

File Path: O:\BRS\Projects\BEG\BEG601- SRWP\T08 GIS Data\Workspaces\ EIS\EIS Supplement\Figure 2.2 Construction Techniques Limited Construction Area.Wor

Date: 28 June 2006



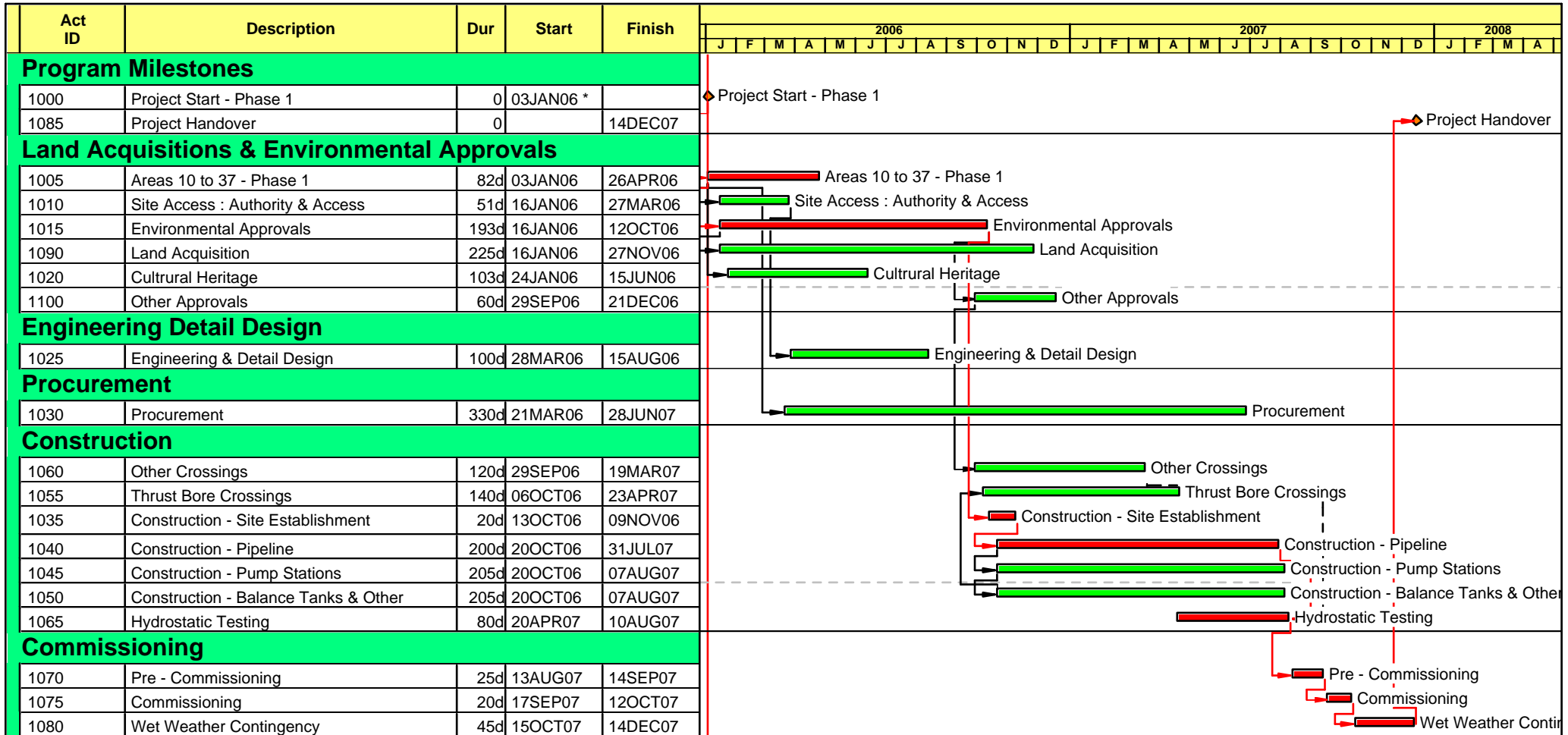


Figure 2.3 Critical Construction Timing - SRWP - Mt Crosby to Helensvale



- █ Early bar
- █ Progress bar
- █ Critical bar
- █ Summary bar
- ◆ Start milestone point
- ◆ Finish milestone point

## Mt Crosby/Camerons Hill

A number of remnant patches of 'endangered' and 'of concern' regional ecosystem types occur adjacent to the proposed alignment from the Camerons Hill Reservoir through Mt Crosby. A number of significant species including the EPBC-listed Collared Delma (*Delma torquata*), Lloyd's Mock Olive (*Notolaea lloydii*) and Brush Saphora (*Sophora fraseri*) have been recorded in these areas.

These environmental constraints were identified in the Business Case (KBR 2005b) and route selection has allowed for significant species and communities from the outset. For example, initial field surveys undertaken for the Review of Environmental Factors (REF) (KBR 2005a) identified suitable Collared Delma habitat to the west of the Mt Crosby Bowls Club, with the result that an alternative alignment adjacent to Mt Crosby Road has subsequently been proposed.

As with the other sections of the alignment, the route adjacent to Mt Crosby has been designed to take advantage of existing disturbed areas by traversing the edge of vegetated areas wherever possible. Examples include the use of existing cleared access tracks in the 'endangered' regional ecosystem (RE) along Lake Manchester Road and on the west side of the Bowls Club. The benefits of this approach include minimising the area exposed to edge effects, such as the alteration of micro-climatic conditions (increased light intensity, greater wind penetration, lower humidity) and associated impacts (weed invasion, fragmentation of habitat for significant species). As with other environmentally sensitive areas, the width of the construction corridor can be constrained as appropriate to minimise damage and large trees will be retained wherever possible.

Table 2.2 Significant species associated with regional ecosystem types on the pipeline alignment

Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
Camerons Hill	12.11.6	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> open forest on metamorphics ± interbedded volcanics	Not of concern		<b>Moderate</b> —avoid unnecessary clearing or damage to edges of remnant communities. Clearing will be controlled through EMP
	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	
	12.11.4	Semi-evergreen vine thicket on metamorphics ± interbedded volcanics	Of concern	<i>Fontainea venosa</i> (Vulnerable)	
Camerons Creek (Mt Crosby)	12.3.3	<b><i>Eucalyptus tereticornis</i> woodland to open forest on alluvial plains</b>	<b>Endangered</b>		<b>Low-moderate</b> —avoid clearing riparian vegetation and follow existing road reserve
Mt Crosby (Jambaroo Way)	12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> woodland on metamorphics ± interbedded volcanics	Of concern		<b>Low</b> —remain in cleared easement and follow existing road reserve
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
	12.11.6	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on metamorphics ± interbedded volcanics	Not of concern		
Brady Court Marstaeller Rd	12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> woodland on metamorphics ± interbedded volcanics	Of concern		<b>Low</b> —remain in cleared easement and avoid unnecessary clearing or damage to edges of remnant communities
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
Rea Rd (Karalee)	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	<b>Low</b> —remain in cleared easement following existing dirt road. Clearing will be controlled through EMP
Brisbane Rd Bundamba	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	<b>Moderate</b> —remain in cleared area and avoid unnecessary clearing or damage to edges of remnant communities



Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
Railway Street (Ipswich)	Non-remnant	Contains a number of mature trees including <i>Eucalyptus fibrosa</i> and <i>Corymbia henryi</i> . Vegetation structure poor with no well-defined herb layers and an understorey dominated by exotic grass species. The section of the alignment running south-east from Harold Street exhibited very limited habitat values. Habitat values of the section of the alignment between the southern end of Railway Street and the south-eastern end of Harold Street included foraging area for medium to large mammals (i.e. wallabies and possums).	Non-remnant		Moderate—tree clearing and other construction impacts will need to be managed by EMP
Cunningham Hwy	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	Low—remain in cleared easement and avoid unnecessary clearing or damage to edges of remnant communities
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		
East of Swanbank Power Station (Swanbank)	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	High—clearing will be required and will be guided by EMP. The bulk of this site is already slated to be cleared for other Projects. Could not be accessed for field inspection
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
Blackheath Rd (Swanbank)	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	Moderate—remained in cleared tracks and areas where possible. Clearing will be guided by EMP
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		
East of School Rd (Swanbank)	12.8.24	<i>Corymbia citriodora</i> , <i>E. crebra</i> ± <i>E. moluccana</i> open-forest	Endangered		Low—avoid any damage to the adjacent community
East of Keidges Rd (Swanbank)	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	Low—remain in cleared easement and avoid unnecessary clearing or damage to edges of remnant communities
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		

Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
West of Augusta Parkway (Springfield)	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	High—much of the site has already been earmarked for urban development and will be cleared. Could not be accessed for field inspection
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Of concern		
	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		
Spring Mountain Forest Reserve	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		Moderate-high—in reasonable condition though some of the mature trees have been lopped or removed. Keep to cleared areas and paths where possible and regulate clearing through EMP
Wirrabara Drive	12.9-10.19	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> open forest on sedimentary rocks	Not of concern		Low—remain in cleared easement and avoid unnecessary clearing or damage to edges of remnant communities
	12.9-10.12	<i>Eucalyptus seeana</i> , <i>C. intermedia</i> , <i>Angophora leiocarpa</i> woodland on sedimentary rocks	Endangered		
East of Greenbank Sub-station	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		Low-moderate—reduce riparian vegetation clearing to minimum or directional drill
	12.3.6	<i>Melaleuca quinquinervia</i> , <i>E. tereticornis</i> , <i>L. suaveolens</i> woodland on coastal alluvial plains	Not of concern		
South east of Greenbank Sub-station	12.9-10.12	<i>Eucalyptus seeana</i> , <i>C. intermedia</i> , <i>A. leiocarpa</i> woodland on sedimentary rocks	Endangered		Low-follow existing road reserve and easements
North of Old Pub Lane	12.9-10.12	<i>Eucalyptus seeana</i> , <i>C. intermedia</i> , <i>A. leiocarpa</i> woodland on sedimentary rocks	Endangered		Low—remain near roadside and avoid unnecessary clearing or damage to edges of remnant communities
	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	
Old Pub Lane	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	Low—remain in cleared easement and road reserve
Cnr Old Pub Lane/Teviot Road	12.9-10.12	<i>Eucalyptus seeana</i> , <i>C. intermedia</i> , <i>A. leiocarpa</i> woodland on sedimentary rocks	Endangered		Low—remain near roadside and avoid unnecessary clearing or damage to edges of remnant communities through EMP
	12.9-10.2	<i>Corymbia citriodora</i> , <i>E. crebra</i> open forest on sedimentary rocks	Not of concern	<i>Notolaea lloydii</i> (Vulnerable)	

Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
Easement	12.9-10.12	<i>Eucalyptus seeana</i> , <i>C. intermedia</i> , <i>A. leiocarpa</i> woodland on sedimentary rocks	Endangered		Low—remain in cleared easement and regulate vegetation removal through EMP
	12.9-10.7	<i>Eucalyptus crebra</i> woodland on sedimentary rocks	Not of concern		
Koorngal Road	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		Moderate—remain in cleared easement and avoid unnecessary clearing or damage to edges of remnant communities
	12.3.6	<i>Melaleuca quinquinervia</i> , <i>E. tereticornis</i> , <i>Lophostemon suaveolens</i> woodland on coastal alluvial plains	Not of concern		
Chambers Flat	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		Moderate high—remain in road reserve. Corridor to be constrained to outside of the mapped boundary of remnant vegetation. Avoid clearing remnant habitat trees. Clearing will be guided by EMP
	12.3.3	<i>Eucalyptus tereticornis</i> woodland to open forest on alluvial plains	Endangered		
	12.3.6	<i>Melaleuca quinquinervia</i> , <i>E. tereticornis</i> , <i>Lophostemon suaveolens</i> woodland on coastal alluvial plains	Not of concern		
Randle Road (Buccan)	12.9-10.4	<i>Eucalyptus racemosa</i> woodland on sedimentary rocks	Not of concern	<i>Acacia perangusta</i> (Vulnerable)	Low—remain in road reserve and avoid clearing remnant habitat trees. Clearing will be guided by EMP
Buccan Conservation Park (Buccan)	12.9-10.19	<i>Eucalyptus fibrosa subspecies fibrosa</i> open forest on sedimentary rocks	Not of concern		Low—keep to road reserve along Randle road and regulate clearing of existing vegetation
	12.9-10.17	Open forest complex often with <i>E. acmenoides</i> , <i>E. major</i> , <i>E. siderophloia</i> ± <i>C. citriodora</i> on sedimentary rocks	Not of concern		
	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		
	12.11.5	Open forest complex with <i>Corymbia citriodora</i> , <i>Eucalyptus siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	
Stubbin Street	12.11.10	Notophyll vine forest ± <i>Araucaria cunninghamii</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Macadamia integrifolia</i> (Vulnerable), <i>Pouteria eerwah</i> (Endangered)	High—in remnant vegetation between Randle Road and Stubbin Street. Keep to existing tracks where possible and set up work sites for directional drilling in previously cleared areas. Clearing and works to be regulated through EMP
	12.9-10.17	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Not of concern		
	12.11.9	<i>Eucalyptus tereticornis</i> open forest on metamorphics ± interbedded volcanics. Usually higher altitudes.	Of concern		

Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
North of Paterson Road	12.11.5	Open forest complex with <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	Moderate—Some clearing will be required and will be regulated through EMP. Could not be accessed for field assessment
South of Peachey Road	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		Low-medium—minimise or avoid clearing of remnant vegetation
South of Venner Drive	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	High—field assessment required to direct clearing of remnant vegetation to within existing disturbed areas. Clearing will be controlled through EMP
	12.11.3	Open forest generally with <i>E. siderophloia</i> , <i>E. propinqua</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable), <i>Marsdenia coronata</i> (Vulnerable), <i>Corchorus cunninghamii</i> (Endangered)	
Hotham Creek area	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	Low-medium—minimise clearing of riparian vegetation; remain in cleared easement or road reserve
	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		
	12.11.9	<i>Eucalyptus tereticornis</i> open forest on metamorphics ± interbedded volcanics	Of concern		
Old Coach Road	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	Low—remain in cleared easement. Most remnant vegetation has been cleared for urban development
	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		
Yaun Creek	12.3.11	<i>Eucalyptus tereticornis</i> , <i>E. siderophloia</i> , <i>C. intermedia</i> open forest on alluvial plains near coast	Of concern		Low—avoid any damage to vegetation community
	12.3.1	Gallery rainforest (Notophyll vine forest) on alluvial plains	Endangered	<i>Macadamia integrifolia</i> (Vulnerable), Coven's Fig Parrot (Endangered, migratory), <i>Sophora fraseri</i> (Vulnerable)	
	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern		

Location in study area	Regional ecosystem type	Short description	Conservation significance	Associated significant species	Likelihood of impact—recommendations
Coomera River to Pacific Motorway	12.11.5	Tall-open forest complex <i>C. citriodora</i> , <i>E. siderophloia</i> , <i>E. major</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable)	<b>Low</b> —remain in cleared easement and avoid clearing large remnant trees. Clearing will be controlled through EMP
	12.11.3	Open forest generally with <i>E. siderophloia</i> , <i>E. propinqua</i> on metamorphics ± interbedded volcanics	Not of concern	<i>Sophora fraseri</i> (Vulnerable), <i>Marsdenia coronata</i> (Vulnerable), <i>Corchorus cunninghamii</i> (Endangered)	

# 3 Response to State Agency submissions

Submissions were received from four Queensland Government agencies:

- Environmental Protection Agency
- Queensland Transport
- Department of Main Roads
- Department of Emergency Services.

In order to limit the replication of responses to particular queries, reference is provided to other sections of the document where the response is provided.

## 3.1 QUEENSLAND ENVIRONMENTAL PROTECTION AGENCY

The Queensland Environmental Protection Agency (EPA) provided a formal submission to the COG on 29 May 2006. A meeting was held with EPA on 14 June to discuss particular issues and to clarify the content of the SRWP response, which is presented below.

### 3.1.1 Coastal issues

Resource entitlements to conduct works on State land are being sought from Greg Coonan at the Department of Natural Resources, Mines and Water (NRM&W). To date, discussions with EPA and NRM&W indicate that the allocation of resource entitlement for the purposes of Integrated Planning Act (IPA) applications will be approved.

The Brisbane River crossing will involve the laying of the pipeline on a piled structure. Temporary works will be required to enable machinery to position the piles. It is not anticipated that any material from below mean high-water spring tide level will need to be removed from the site and only minor spoil movements will occur within the system.

The requirements for approval to undertake works on State coastal land above the mean high-water springs tide level, but within the coastal management district, will be addressed in a Prescribed Tidal Works application. The process for this application is described in detail in 3.1.2 below.

### 3.1.2 Coastal legislation and the 'Prescribed Tidal Works Code'

Reference to the Coastal Protection and Management Regulation 2003 was inadvertently omitted from the list of legislative instruments triggering approval requirements for the SRWP Project (see Section 1.7.2 of the draft EIS). By way of amendment, this Supplementary Report to the draft EIS now includes reference to:

- the *Coastal Protection and Management Act 1995* and Regulation

The Regulation was amended in 1995 to include:

- a definition of 'prescribed tidal work'
- a code that the local authority could use to assess any application for prescribed tidal work.

Where the SRWP crosses a tidal section of a river, either by trenching or bridging, a development permit for prescribed tidal works will be needed before the works can commence. At this time, this requirement will only apply to the crossing of the Brisbane River, as it is proposed that the pipeline will be micro-tunnelled beneath the bed of all the other tidal rivers. SRWPA sought legal opinion on an interpretation of works that could be reasonably considered to constitute tidal works. The response indicated that the proposed crossing method should not be considered under the definition of prescribed tidal works, so no approval should be sought.

The boundary between Ipswich City Council (ICC) and Brisbane City Council (BCC) lies along the centre of the Brisbane River. Therefore, the tidal works lie within two local governments. In this circumstance, the Minister for Local Government and Planning will be responsible for determining the appropriate entity to act as Assessment Manager for the application for prescribed tidal work over the Brisbane River. An application will be made to the Minister requesting a determination of the assessment manager.

The EPA and DMR will be concurrence agencies for the development application. NRM&W, Queensland Transport (QT) and Maritime Safety Queensland (MSQ) may also be concurrence agencies for the application.

### 3.1.3 State Coastal Management Plan 2001

Section 1.7.4 of the draft EIS (see State Coastal Management Plan) omitted specific reference to the (draft) SEQ Regional Coastal Management Plan 2006. By way of amendment, this supplement to the draft EIS now includes reference to:

- the State Coastal Management Plan 2001
- the draft SEQ Regional Coastal Management Plan 2006.

With respect to specific policy, the SRWPA has used the same philosophy for coastal environments and resources for other environments along the alignment. The proposed route has been selected with the aim of minimising disturbance to coastal species, processes and ecosystems and crossing methodologies have been selected to avoid or minimise construction impacts on these environments. The environmental work methods (EMs) outlined in the revised Environmental Management Plan (see Appendix B) apply across the project area and will be used to

develop site and task-specific management plans. SRWPA believes that the methods outlined are appropriate to protect tidal as well as freshwater waterways.

#### 3.1.4 Pipeline construction on tidal waterways

The draft EIS proposed trenching as the preferred method for crossing Saltwater Creek. Based on comments received from the EPA, SRWPA has reviewed its construction method and now proposes to use piling as an alternative construction method for this creek. Based on a series of site assessments, the site for crossing is not tidally influenced and is approximately 250 m upstream of the upper tidal bounds.

There are no proposals for tidal creeks to be crossed using trenching technologies. Further, all tidal river crossings within the Coastal Management District will be completed by either piling (the Brisbane River) or using micro-tunnelling techniques that are below the river bed (such as for the Bremer, Logan, Albert and Coomera Rivers). The method reduces the potential for disturbance to both riparian and aquatic environments as outlined below at Section 3.1.5.

All construction methods proposed for either river or creek crossings are being considered under relevant statutory approvals. The Department of Primary Industries and Fisheries has been consulted in relation to marine plant protection and the Department of Natural Resources, Mines and Water for terrestrial and riparian vegetation and works within watercourses.

As described in 3.1.2 above, prescribed tidal works approvals are being negotiated with relevant local authorities.

#### 3.1.5 Construction methods for river and creek crossings

Waterway crossings can be achieved using a number of different methods. The engineering and environmental implications of these methods were assessed to select the most efficient way of crossing waterways. A basic description of the crossing methodologies and their application is provided below.

- *Trenching*: Trenching involves creating an open trench through the bed of the waterway to lay the pipe. The timing for trenching will be during low or no flow. This method has the highest potential for environmental impact but requires the least time for construction. As such, this is the preferred method for crossing ephemeral freshwater creeks, but not the larger tidal river crossings. Spoil management, reinstatement and general works associated with trenching will be managed according to the revised EMP (see Appendix B).
- *Piling*: Piling involves raising the pipe on concrete piles above the surface of the waterway. Generally, the pipe will be raised to above flooding levels and the method requires minimal clearing or disturbance to riparian banks. Piling has been selected as the preferred crossing methodology for permanent creeks and/or substrate conditions that are not conducive to trenching or micro-tunnelling.
- *Micro-tunnelling*: This method involves directing the pipe beneath the bed of the waterway using hydraulic methods. Entry and exit pits are required to



situate construction equipment. Generally, there will be minimal impact to riparian banks so as to reduce the depth of pits. Micro-tunnelling has been selected as the preferred crossing method for all major waterway and road crossings.

### 3.1.6 Environmental Management Plan

The revised construction EMP (Appendix B) is prepared to outline the types of performance-based control measures that must be implemented to reduce and manage environmental impacts during the construction of the SRWP.

The revised EMP represents a synthesis of work methods which can be implemented for preparation of task/site specific work methods for construction. Site-specific plans would then consist largely of a plan or drawing with the relevant EMs indicated at the appropriate locations as well as any environmental constraints that must be considered on-site. Photographs would be used to indicate work methods completed on-site. The drawing can then be signed off by the contractor as each EM is completed, thus providing a simple and auditable record.

Site/task specific work methods within the EMP for the Project will be populated and expanded once detailed design has been completed. However, Appendix B does contain reference to independent management plans for:

- vegetation management
- fauna management
- spoil management
- management of commissioning waters
- management of acid sulfate soils
- blasting management
- traffic management.

Specific management plans have been developed following statutory applications for vegetation clearing, geotechnical investigations and traffic studies. Other plans will be formulated once detailed design is completed.

#### Dredging

It is not anticipated that dredging will be required for any tidal waterway crossings. However, in order to accommodate any possible future issues regarding the need for dredging activities at particular sites, the revised EMP (Appendix B) includes a number of work methods that would be used to formulate a site-based management plan.

### 3.1.7 Amendments

At Section 4.8.8, the draft EIS incorrectly refers to Table 4.10 as describing the construction areas required to establish crossing construction sites at each of the rivers. This table is located at Table 4.13.

Section 4.8.9 incorrectly refers to Section 4.12 as providing full details of the mitigation measures proposed and the management of their implementation. Information regarding mitigation measures and their implementation is included in the revised EMP (Appendix B).

### 3.1.8 Contaminated land

A number of potentially contaminated sites were identified in the draft EIS using GIS data supplied by the Brisbane, Ipswich and Gold Coast City Councils. A meeting was held between SRWPA and the EPA on 2 June 2006 to review the information supplied in the draft EIS.

As a result of the meeting, SRWPA provided the EPA with a list of affected property titles for the purposes of seeking information on Site Management Plans. To date, no Site Management Plans are identified for the properties likely to be affected by the SRWP. However, SRWPA will contact the EPA in the event that any unregistered contaminated sites are identified during field-based exercises.

### 3.1.9 Heritage

The SRWPA has appointed an archaeologist to identify significant cultural heritage issues within the proposed pipeline corridor (BCA 2005). Findings have identified two areas of significant historical non-Aboriginal cultural heritage:

- *Gold Coast:* The corner of Teviot Road and Pub Lane, and the area that crosses the Laurel Hill Station area at Willow Vale relate to a historical pub.
- *Ipswich:* The significant area is Swanbank which features landscapes associated with mining that may need to be considered in terms of their historical significance.

The SRWPA is working with the Gold Coast, Beaudesert, Ipswich and Brisbane City Councils to identify any other significant heritage sites within the proposed pipeline corridor.

The SRWPA will appoint an archaeologist to advise as to how to minimise impact on any area of significant historical heritage. The SRWPA will continue to liaise with the four Council Cultural Heritage Officers to meet the needs of stakeholders with regards to the preservation of significant heritage.

In addition, SRWPA is in the process of finalising and certifying three Cultural Heritage Management Plans (CHMPs) with relevant Aboriginal groups. This is a significant milestone for the Project and will continue through to implementation of the CHMPs prior to and during construction.

### 3.1.10 Endangered ecological communities

Overall route selection is addressed at Sections 3.2.1 of the draft EIS and 2.1.5 above. The proposed pipeline route aims to minimise the impact on all REs, with route selection based on available RE mapping, initial broad-level field observations and detailed investigations of specific areas by a team of ecologists.

This section of the Supplementary Report expands on the brief description provided in Table 2.2 for areas where the pipeline is located in, or in close proximity to, 'endangered' regional ecosystem types. For each area, potential impacts and route selection are discussed in detail. In all cases, the hierarchy from the Terms of Reference has been applied by asking the following questions:

- What is the potential for damage to the ecological community?
- Can that damage be avoided by selecting an alternative route or employing appropriate construction management techniques?
- How can the potential impacts be mitigated through rehabilitation and restoration?
- Do any losses of conservation value need to be offset?

#### Camerons Creek, Mt Crosby

The patch of remnant *Eucalyptus tereticornis* woodland (RE 12.3.3) is located on a south-facing slope below the Camerons Hill Reservoir. Two unsealed vehicle tracks traverse this area, with subterranean water and sewer mains present. Vegetation was of moderate quality, with evidence of previous disturbance. The riparian area along Camerons Creek at the base of the slope was dominated by mature individual *Casuarina cunninghamiana* and was highly disturbed, with exotic species dominating at ground level.

#### *Route selection*

In this location, the pipeline alignment was restricted by the:

- location of the water treatment plant (WTP)
- location of the desired connection point
- existing pipework surrounding the plant.

Alternatives considered included locating the pipeline on the southern edge of the WTP. However, there was insufficient room for construction here and, hydraulically, the ground levels were too high for the necessary flow characteristics.

The other alternative was to skirt the site to the north-west. This option added considerable length and cost to the alignment for limited benefit in light of the mitigation measures described below.

#### *Impact avoidance/mitigation*

The proposed alignment follows one of the existing cleared access tracks south from Camerons Hill to minimise the need for vegetation clearance. A restricted width construction corridor (see Section 2.1.3) will be employed in this location to minimise further damage to this ecological community. Vegetation in this area will be reinstated where possible to offset any clearing required for pipeline construction.

### East of School Road, Swanbank

This remnant patch (RE 12.8.24) is located to the south of Candowie Street, to the east of School Road. Typical species represented in the ecological community included *Corymbia citriodora*, *Eucalyptus crebra* and *E. moluccana*.

#### *Route selection*

This section of pipeline follows an existing road reserve. This alignment offered the most direct route and minimised the impact on owners of private property in the vicinity. Future infrastructure is planned in this area and has constrained the alignment to this location. Consideration of alternative alignments was not necessary in this location as pipeline construction can proceed without trenching or locating plant or equipment in close proximity to the mapped RE community.

#### *Impact mitigation*

It is anticipated that a full 30 m construction corridor can be used in this location without impacting on the endangered ecological community.

### West of Woogaroo Creek, Springfield

This remnant patch of vegetation (RE 12.8.24) is located to the west of the future Springfield Reservoir. Typical species represented in this community included *Corymbia citriodora*, *Eucalyptus crebra* and *E. moluccana*. The endangered ecological community is located adjacent to a remnant patch designated as 'of concern' by the Queensland EPA and is unlikely to be affected by the proposed alignment.

#### *Route selection*

This is a straight section of pipeline that runs along the western edge of the future Springfield development site. Future development of this site will result in the clearing of a significant portion of the existing vegetation. Consideration of alternative alignments was not necessary in this location as pipeline construction could proceed without trenching or locating plant or equipment in close proximity to the endangered community.

#### *Impact mitigation*

It is anticipated that a full 30 m construction corridor could be used in this location without damaging the endangered ecological community. Construction management will focus on avoiding the 'of concern' regional ecosystem type directly adjacent to the alignment.

### Wirrabarra Drive, Greenbank

This is a remnant patch (RE 12.9-10.12) located on the south side of the existing transmission line easement. The vegetation was dominated by *Angophora leiocarpa* along the edges, but all vegetation within the easement is young regrowth.

#### *Route selection*

In this location, the alignment was restricted to the existing cleared area below the transmission line easement. This alignment minimised the impact on owners of private property and avoided further disturbance of the adjacent vegetation; therefore no alternative alignments were considered.

#### *Impact mitigation*

The existing transmission line easements are sufficient to accommodate a full 30 m construction corridor without damaging the endangered community.

### South-east of Greenbank Substation

This area comprised isolated remnant patches of an endangered regional ecosystem type (RE 12.9-10.12). Species typically represented in this type included *Eucalyptus seeana*, *Corymbia intermedia* and *Angophora leiocarpa*.

#### *Route selection*

In this location, the alignment was restricted to the existing cleared area below the transmission line easement. This alignment minimised the impact on owners of private property and avoided further disturbance of the adjacent vegetation; therefore no alternative alignments were considered.

#### *Impact mitigation*

The existing transmission line easement is sufficient to accommodate a full 30 m construction corridor without damaging the endangered community.

### North of Old Pub Lane and Corner of Teviot Road, Greenbank

This area comprised isolated remnant patches of an endangered regional ecosystem type (RE 12.9-10.12), over 100 m from the proposed alignment. Species typically represented in this type included *Eucalyptus seeana*, *Corymbia intermedia* and *Angophora leiocarpa*.

#### *Route selection*

In this location, the alignment was restricted to the existing cleared area below the transmission line easement. This alignment minimised the impact on owners of private property and avoided further disturbance of adjacent vegetation; therefore no alternative alignments were considered.

#### *Impact mitigation*

The existing transmission line easement is sufficient to accommodate a full 30 m construction corridor without damaging the endangered community.

### Powerlink easement, Greenbank

This area comprised a fragmented tract of an endangered regional ecosystem type (RE 12.9-10.12). Vegetation quality varied adjacent to the alignment but was primarily regrowth beneath the transmission line. The canopy was dominated by *Angophora leiocarpa*, *Eucalyptus seeana*, *E. crebra* and *Corymbia intermedia*. There were a large number of vehicle tracks across the property and the area has been previously grazed by cattle resulting in a generally disturbed understorey and ground layer throughout.

#### *Route selection*

In this location, the alignment was restricted to the existing cleared area below the transmission line easement. This alignment minimised the impact on private property owners and avoided further disturbance of the adjacent vegetation; therefore no alternative alignments were considered.

#### *Impact mitigation*

The existing transmission line easement is sufficient to accommodate a full 30 m construction corridor without damaging the endangered community.

### Chambers Flat Road, Chambers Flat

This is a small remnant patch of open woodland directly adjacent to the road reserve on the north side of Chambers Flat Road. The canopy comprised *Eucalyptus moluccana*, *E. tereticornis* and *E. siderophloia* with a number of large trees (primarily *E. moluccana*) directly adjacent to the road and in the road reserve. This is a young stand which shows evidence of previous disturbance. There is a high degree of weed invasion at the road edge, with vegetation quality and structure improving north from Chambers Flat Road.

#### *Route selection*

The alignment in this location was constrained by the endangered and 'of concern' ecological communities on the north side of Chambers Flat Road and the private properties to the south. Locating the pipeline further north, under the recently cleared transmission line easement, was also investigated but was later rejected on the grounds that the EPBC-listed Wallum Froglet (*Crinia tinnula*) has previously been recorded calling in this area (Ingram 2000). In addition, local sightings of *Dasyurus maculatus maculatus* contributed to the decision to avoid the intact vegetation communities (A. Page and S. Van Dyck pers. comm.).

#### *Impact mitigation*

Clearing and construction will be offset from Chambers Flat Road to preserve the large trees directly adjacent to the road reserve wherever possible. A restricted corridor will be used in this location to minimise the need for vegetation clearance. Revegetation will be implemented to offset any need to clear on the edge or in the vicinity of the endangered RE type.

### Creek crossing adjacent to Chambers Flat Road

This is a small patch of endangered *Eucalyptus tereticornis* woodland (RE 12.3.3) on the north-western side of a small waterway. Local infestations of Camphor Laurel (*Cinnamomum camphora*) will be managed on the site.

#### *Route selection*

This section of the alignment is situated between Chambers Flat Road and the waterway, and will avoid disturbance of the intact vegetation on the opposite bank.

#### *Impact mitigation*

A restricted corridor is likely to be used in this location and the waterway will act as a buffer for the mapped remnant patch.

### Yaun Creek, Upper Coomera

This is a narrow strip of complex to simple *Notophyll* vine forest. *Waterhousea floribunda* is often predominant along stream channels and this regional ecosystem type is recognised as habitat for the endangered Coxen's Fig-Parrot (*Cyclopsitta diophalma*) and the threatened *Fontainea rostrata* and *Macadamia integrifolia*. The north bank of Yaun Creek has experienced significant recent disturbance under the transmission line easement and is dominated by weed species. The south bank has been cleared of all vegetation. The site is surrounded by housing developments is now isolated from remnant patches of vegetation to the west.

#### *Route selection*

The alignment is restricted to the existing cleared easement and has been selected to avoid impacting on the surrounding ecosystem.

#### *Impact mitigation*

The existing transmission line easement is sufficient to accommodate the construction corridor without causing further damage the endangered ecological community present to the west of the site.

### 3.1.11 Open trenches

Backfilling of trenches will occur on a daily basis and it is anticipated that trenches will remain open for a maximum duration of 24 hours. The length of a trench remaining open for this period will typically be less than 50 m for a given work front. In total, up to 15 work fronts may be active concurrently and will include major river and road crossings (using micro-tunnelling).

Unattended open trenches will be secured by temporary fencing to meet safety requirements. Exclusion fencing can also be erected on either side of the trench to discourage fauna from entering the work site. Fencing will not present any significant barrier to fauna movement given the restricted sections where it will be employed and the short time frames for fencing to be in place.

Trench plugs and ramps will be placed in trenches to encourage animals to leave trenches on their own and shade shelters can be erected to protect animals until they can be removed by qualified fauna handlers.

Open trenches will be monitored twice daily to remove captured animals.

### 3.1.12 Management strategies for flora and fauna

The likelihood of additional species and communities being identified during the construction phase of the Project is quite high and the need for additional studies to determine potential impacts and impact mitigation was identified in the draft EIS. Since the publication of the draft EIS, \$5000 has been allocated to support an existing research program into Spotted-tailed Quoll (*Dasyurus maculatus maculatus*) populations in the Greenbank/North Beaudesert area.

During the construction phase, suitably qualified Environment Officers will be present on-site to deal with any hitherto unidentified environmental issues and to identify local species and communities as the need arises. Sites will be inspected for significant plant species and any discernible signs of fauna activity prior to the commencement of works.

On-site strategies for flora and fauna management include:

- fencing off significant species or communities identified during construction works and avoiding where possible
- where plant species are unavoidably in the construction pathway, obtaining seed for propagation and planting or physically relocating individuals
- monitoring any open pits for fauna on a daily basis prior to the commencement of works
- employing professional spotter/catchers on site to relocate individual animals found in the work area.

Environmental work methods (EMs) are detailed in the revised EMP (see Appendix B) and these will continue to be refined as the Project proceeds towards construction and ultimate completion.

### 3.1.13 Impact mitigation and application of hierarchy in alignment choice

Discussion of the potential impacts of pipeline construction in the draft EIS reflects the highly fragmented and disturbed nature of the environments in the project area. The pipeline alignment traverses semi-rural and urban environments for its entire length. The general nature of land use along the alignment was established through work undertaken for the Business Case (KBR 2005b) and the Review of Environmental Factors (REF) (KBR 2005a).

Reconnaissance of the alignment and limited field surveys conducted for the REF (KBR 2005a) confirmed that extensive clearing has occurred across the project area and that environments are often highly modified as a result of previous land use. Habitat areas, where they exist, are typically isolated and exhibit a highly degraded structure.

Significant effort was devoted to understanding environmental values and constraints along the corridor through the development of the REF (KBR 2005a) to inform route selection during the early stages of the Project. This work included a thorough review of published and unpublished data, including:



- regional ecosystem mapping
- reconnaissance survey of accessible points
- interpretation of recent aerial photography
- database searches to identify the location of significant species and habitat likely to be encountered in the project area.

Both the REF (KBR 2005a) and the EIS have also drawn on local expertise obtained from local environment groups and through consultation with state agencies and local councils. For example, the Brisbane Regional Environment Council (BREC) has provided records of Spotted-tail Quolls (*Dasyurus maculatus maculatus*) in the Greenbank/North Beaudesert area. Reports prepared by Dr Glenn Ingram (2000) record the presence of the vulnerable Wallum Froglet (*C. tinnula*) along the transmission line in Chambers Flat.

Sections 2.1.5 (Mt Crosby/Camerons Hill) and 3.1.10 (Endangered ecological communities) provide further detail on how impacts on specific species and communities have been avoided or mitigated.

#### *Terrestrial flora and fauna*

The methodology adopted for the EIS (see Section 4.7 of the draft EIS) expanded on the work completed for the REF (KBR 2005a) to further refine the preferred alignment and guide appropriate construction management. The detailed field methodology was designed to target representative areas of habitat considered most likely to be impacted by pipeline construction.

Ecological habitat assessments were carried out by a team of qualified ecologists for all areas potentially affected by construction works. Specific areas targeted for field survey included:

- mapped ecological communities and large, contiguous areas of vegetation along or adjacent to the pipeline route
- riparian areas of creeks and rivers along or adjacent to the alignment
- road verges along or adjacent to the alignment.

Highly modified urban, industrial and agricultural sites were not included on the list of priority survey sites. In these areas the post-construction environment will be functionally similar to the existing conditions and species currently occupying these environments will not be excluded through loss or modification of suitable habitat.

The potential impacts likely to result from pipeline construction are common for most species and include:

- habitat loss and fragmentation, resulting in reduced areas of suitable habitat for plant species and reductions in food resources, suitable shelter or breeding sites for fauna
- intensification of edge effects
- soil compaction and damage to tree root systems restricting the uptake of essential water and nutrients, resulting in reduced plant health or even death

- introduction or spread of pest species including fire ants
- loss of threatened flora and fauna species and threatened biological communities as a result of these impacts
- damage to 'endangered' and 'of concern' regional ecosystems as a result of these impacts.

#### *Impact mitigation*

The approach adopted by the SRWP Alliance is, in the first instance, to avoid areas of environmental significance (see Section 3.1.10) by locating the pipeline in existing cleared areas. Where this is not possible, further disturbance to significant vegetation will be minimised by employing a restricted corridor of between 12-15 m rather than a full 30 m wide corridor.

A wide range of impact mitigation measures can be implemented during the construction phase and are addressed in the revised EMP (Appendix B).

Detailed requirements and mitigation measures are being addressed through a number of approvals processes required in addition to the EIS. For example, the SRWP Project is required to comply with the *Regional Vegetation Management Code for ongoing clearing purposes in South East Queensland* (the Code). An application for vegetation clearance has been prepared and submitted to the Department of Natural Resources, Mines & Water. Vegetation Management Plans (VMPs) will also be developed to ensure appropriate management of native vegetation.

Where clearing is necessary and it is not possible to meet the performance requirements listed in the Code, the Project will have reference to the alternative criteria in the *Interim Policy for Management Offsets* (NRM&W 2006). In accordance with SRWPCo policy, all cleared sites will be reinstated and/or revegetated with appropriate species following construction. This policy is in accordance with statutory approvals for clearing of native vegetation.

Project work methods in the construction EMP will reflect the approval conditions of federal, state and local agencies. Information regarding the environmental values associated with specific sections of the route will continue to be collated, through the life of the Project, for inclusion in the revised EMP and can be presented graphically for use on site.

#### *Aquatic environments*

Targeted aquatic surveys were not conducted for the Project. Primarily, this was because the preferred method of construction, micro-tunnelling, for the majority of tidal river crossings was selected on the basis of minimal environmental impact. At the Brisbane River crossing, the use of piling was not considered to have a level of impact that warranted detailed aquatic survey. However, based on statutory approvals required for all river crossings, reporting of the environmental values of each site will be required for the purposes of auditing.

### 3.2 QUEENSLAND TRANSPORT

Queensland Transport (QT) provided a written submission on the draft EIS to the Coordinator-General on 29 May 2006. The submission provided useful advice on

planning and approvals processes at a strategic level. This advice has been included in the formal communications held between SRWPA and QT.

A number of general comments and suggested amendments are addressed below.

### 3.2.1 General comments and suggested amendments

The SRWP will cross existing rail lines as detailed:

- *Ipswich Line:* the pipe will be micro-tunnelled below the railway line and Brisbane Road concurrently. The micro-tunnelling will commence outside the railway fenced security area and extend to the south side of Brisbane Road. The works will have no impact upon the operation of the rail line.
- *Sydney Brisbane rail line:* the pipe will be micro-tunnelled below the existing track. The extent of micro-tunnelling will be assessed with Queensland Rail (QR) so that there will be no impact upon rail traffic.
- *Beaudesert Rail Line:* QR no longer has an interest in this line. SRWP are working with QT on an appropriate method to cross the line as plans are underway for its removal.

The alignment of the SRWP crosses the proposed Southern Infrastructure Corridor in the Chambers Flat area. The design of the pipeline will assess the impact of the corridor. Where detailed information is available, the design of the pipeline will assess the impact upon the corridor.

### 3.2.2 Relevant policies and approvals

Where the SRWP crosses existing rail lines, approvals will be obtained from QR in accordance with the requirements of the *Transport Infrastructure Act 1994*.

Installation of the pipe below the railway lines will be via micro-tunnelling methods in accordance with AS 4799 (*Installation of underground utility services within railway boundaries*).

The construction of the SRWP will have no impact upon rail traffic.

Particular issues raised by QT and relevant to comments provided by the Department of Main Roads are discussed in Section 3.3 below.

## 3.3 DEPARTMENT OF MAIN ROADS

The Queensland Department of Main Roads (DMR) submitted comments on the draft EIS to the Coordinator-General on 7 June 2006. These comments were considered and a response to particular queries or issues is provided below. In order to provide clarity and to reduce the need for replication, some responses to particular comments may be referenced to other sections of this Supplementary Report.

### 3.3.1 Approvals at a site-specific engineering level

The Department of Main Roads (DMR) will be consulted and included in aspects of the detailed design phase for the Project. In particular, the Department will be advised of the impacts of any changes to the location of the pipeline and consulted

for the scoping phase of traffic management where state-controlled roads are affected.

### **3.3.2 Protection of Cooneana olive trees (Cunningham Highway)**

The recent discovery of threatened species of flora adjacent to the Cunningham Highway is being considered in the detailed design phase for the Project. Discussions have been held with the designated extension officer from DMR. As a result, the Department is providing mapping and other supporting information that will enable SRWP to identify potential issues in regards to the proposed alignment bisecting mapped locations for the threatened species. In the event any issues arise, SRWP will meet on-site with DMR, and any other relevant interested parties, to discuss possible options and methods of mitigating impacts.

### **3.3.3 Road performance of major roads**

The construction procedure for crossing roads using trenchless technology has been reviewed. The procedure will no longer involve construction zones within the 'clear zones' of the various roads determined by the operating speeds along those roads. Consequently there will be no loss of capacity in the traffic lanes.

### **3.3.4 Specific comments on the EIS**

#### **Design**

The potential for construction of the SRWP to impact state-controlled roads (SCRs) has been reviewed. As a result, Table 3.1 lists the SCRs that will be affected by the pipeline, proposed construction methodologies and possible conflicts with projects identified on the Roads Implementation Program for 2005-06.

**Table 3.1 List of state-controlled roads likely to be affected by construction of the SRWP**

Local authority	Road name	Road category	Method of construction	Conflict with projects on Roads Implementation Program 2005-06
Brisbane City	Mt Crosby	District	Crossing the road in three locations by tunnelling	Nil
Ipswich City	Warrego Highway	National highway	Tunnelling	Nil
Ipswich City	Brisbane Road	Regional	Tunnelling	Nil
Ipswich City	Cunningham Highway	National highway	Tunnelling	Nil
Ipswich City	South West Arterial	Regional	Envelope pipe provided in the road construction project	Project No 148/910/3
Beaudesert Shire	Mt Lindesay Highway	Regional	Tunnelling	Nil
Beaudesert Shire	Waterford-Tamborine	District	Tunnelling	Nil
Gold Coast City	Beaudesert-Beenleigh	District	Tunnelling	Nil
Gold Coast City	Tamborine Oxenford Road	District	Tunnelling	Nil

The section of the project pipeline parallel to the Mt Crosby Road will be in an easement through the parkland north of Stumers Road and will then be located in a road reserve with no constructed road toward Lake Manchester Road.

The section of the pipeline parallel to the Cunningham Highway between Whitwood Road and Redbank Plains Road is in an easement in freehold land.

SRWP has the details of DMR Main Roads Planning for the Beaudesert-Beenleigh Road and has held discussions with officials from the South Coast Hinterland District concerning the location of the future road carriageways and the future road boundaries. These discussions will continue in order to develop an equitable outcome.

#### Temporary construction and maintenance accesses

SRWP will negotiate access from State Controlled Roads (SCRs) on a site-by-site basis with the relevant DMR personnel. Where alternative access via local roads is available, SRWP would not be seeking direct access from national highways, state strategic roads and regional roads

#### Traffic management for works adjacent to the state-controlled road network

SRWP is preparing a traffic management plan for the construction phase. Traffic control plans will be prepared in detail for each crossing site and with reference to DMRs *Manual of uniform traffic control devices* (DMR 2003). The traffic management

plan will incorporate the requirements of District DMR *Guide to managing traffic disruptions* where this is applicable.

#### **Timing of construction - major road crossing**

The detailed design of the pipeline is progressing and Main Roads Districts will be provided with the design when plans are finalised. Where applicable, the design proposals will be discussed with the relevant District so that the designs submitted with the application will include the District's requirements.

#### **Transport (description of the Project)**

SRWPCo is proposing to build, own and operate an integrated water infrastructure network between Mt Crosby and Helensvale. Commencement of building the SRWP is set for mid-October 2006 and is due for completion in late 2007. The SRWP will service the growth in residential and industrial demands of Ipswich City, Logan City and Beaudesert Shire Councils and provide interconnectivity between current and proposed water resources, especially during periods of drought.

The SRWP involves a new pipeline commencing at the Camerons Hill Reservoir at Mt Crosby and running south via Swanbank Power Station and south east through North Beaudesert and Chambers Flat before heading south through Ormeau to connect to the existing Helensvale to Molendinar network operated by Gold Coast Water.

The pipeline is approximately 90 km in length and generally, will be constructed underground within an easement of up to 30 m wide. The easement width is required to enable construction to proceed uninhibited and with limited disruption to adjacent stakeholders.

The SRWP Infrastructure Facility includes construction of four new pump stations and two balance tanks. The location of pump stations includes both rural and urban environments. Balance tanks will be located at elevations required to deliver appropriate pressure in the pipeline.

#### *Construction phase*

Construction site offices will be established on the route. The exact number and locations will be determined when the construction program is finalised prior to construction. There will be some areas used for stockpiling of pipe materials to store materials where the rate of supply of the pipe exceeds the construction progress. This is likely to occur in periods of extended wet weather or in other contingent events such as works within constrained easement conditions. Wherever possible, the pipe materials will be delivered from the manufacturers directly to the site for laying.

The supplier of the construction materials is under investigation and the exact routes to be used for haulage of materials and the quantity of materials hauled over particular roads cannot be quantified until the suppliers are appointed.

In the majority of cases, the materials excavated from the pipeline trench will be spoiled along the right of way (ROW). Areas suitable for accepting spoil removed from the site will be selected with regard to policies for:

- imported Red Fire Ants (and associated exclusion zones)
- weed management
- best practice approaches to spoil management.

The types of traffic movements that will be generated during the construction phase include:

- local work trips to the various site offices and work compounds
- transport of employees from the work compounds to the construction areas, normally in four wheel drives or troop carriers
- delivery of the pipe materials on extended semi-trailers
- delivery of pipe fittings
- transport of construction plant to the various work compounds. The plant will move along the pipeline route. There will be some transport of plant by road from one work area to another. This would apply in the case of the under road/rail boring plant and in cases where it would be unsafe to move plant across major and high-speed road corridors
- transport of materials for construction of pump stations along the route
- transport of bedding materials for the pipeline and some spoil materials.

### *Operation phase*

During the operation phase for SRWP, there will be only minor traffic movements. Generally, these will be using four wheel drive vehicles for the purposes of monitoring the condition of the ROW and the status of any rehabilitation or reinstatement works within the easement. Minor traffic movements are likely to occur on a monthly basis and as required. General maintenance of the pipeline at any one location is expected to occur four times in the approximately 100 year lifetime of the pipeline.

When the details of the haul routes and locations of site offices/works compounds have been finalised, SRWP will prepare a detailed assessment in accordance with the *Guidelines for assessment of road impacts of development* (GARID) (DMR 2006). The assessment will set out details of the traffic volumes and types of vehicles together with traffic, transport and access arrangements

SRWP will prepare an assessment of the impact on the roads on the State Controlled Road network in accordance with GARID (DMR 2006). This will include a full description of the numbers and types of vehicles used in the construction and the operation phase of the pipeline. The assessment will include the movement of construction personnel and transport of construction plant, pipeline materials, spoil and bedding materials. The movement of the pipeline materials and fittings will not be known until a preferred supplier has been selected. These could be

manufactured locally, transported from interstate by road or rail, or sourced from overseas and transported through the Port of Brisbane.

SRWP will negotiate directly with the Districts on those sections of road where the construction of the pipeline will increase the traffic volumes and/or pavement loading exceeds the 5% of the existing volumes/pavement life in accordance with GARID (DMR 2006). These negotiations have commenced and will be progressed as detailed design plans for the Project become available.

### 3.4 DEPARTMENT OF EMERGENCY SERVICES

The Queensland Department of Emergency Services submitted comments on the draft EIS to the Coordinator-General on the 23 May 2006. The following is a response to the submission.

#### 3.4.1 Emergency management

A suggestion was put forward that the conclusion and recommendations section of the draft EIS (Section 6) should refer to an Emergency Management Plan.

In response, this Supplementary Report to the draft EIS now includes reference to a Crisis Management Plan. For the purposes of safety management during construction, the SRWP has developed, independently, a Crisis Management Plan that is equivalent to an Emergency Management Plan.

The SRWP Crisis Management Plan will include an Emergency Response Plan, which will be referenced in the overall EMP. The Emergency Response Plan will be developed in addition to the procedures referenced at EM 11.3 (Emergency evacuation route).

All plans and procedures will be in place prior to the commencement of construction, which is currently anticipated to be mid-October 2006.

Emergency procedures and arrangements will be developed in consultation with and provided to the Department of Emergency Services. An additional dot point at EM 11.3 of the revised EMP is included to reflect this commitment (see Appendix B).

The revised EMP also amends EM 11.1 (Storage compound) to include an additional dot point with respect to signage standards.



# 4 Response to community submissions

## 4.1 SUBMISSIONS TO THE COORDINATOR-GENERAL OR SRWP

Four submissions were received from individuals and community groups in response to the draft EIS. This document responds to all issues raised with respect to the SRWP Project but has not ventured to respond on behalf of other agencies or entities. A summary of responses from SRWPA is provided in Table 4.1 below. Where issues raised have been addressed through response to state or federal agencies, these responses are referenced at the beginning of this document and are not replicated here.

### 4.1.1 Aerial photography

Aerial photography provided by the respective local Councils was the most accurate information available at the commencement of the Project. This information was used in the preliminary stages to identify potential constraints to the alignment, with site surveys of publicly accessible areas along the route. The alignment has been continually refined as additional information has been obtained regarding the nature of the environments along the route and changes to the draft EIS alignment are addressed at Section 5.

### 4.1.2 Fauna concerns

Issues with regards to fauna management are discussed in detail in Sections 2.1.4, 3.1.6, 3.1.10, 3.1.11, 3.1.12 and 3.1.13 above.

### 4.1.3 Spoil disposal

Disposal of spoil will require consideration of a range of issues, such as weed and Fire Ant management and acid sulfate soils. Spoil disposal locations will be addressed through the development of a spoil management protocol in the revised EMP (Appendix B).

## 4.2 SUBMISSIONS TO PUBLIC DISPLAYS

Six public information sessions were held from 13-15 May 2006 to provide an opportunity for community comment on the draft EIS. A number of key themes were raised by the public and SRWPA written responses to these themes are detailed below in Table 4.1.

**Table 4.1 Key messages from EIS queries**

Key theme	SRWPA response
Access to properties	In instances where residents' access to property may be inconvenienced, either steel plates placed over the trench or backfilling will provide access to properties.
Alignment selection	All attempts have been made to select an alignment that causes the least disruption to residents and traffic, and avoids environmentally sensitive areas. The Alliance is continuing to refine the alignment in light of public comments and on-going investigations. Alterations to the alignment will be made if an alternate route provides better outcomes in relation to environment, cultural heritage, social impact and constructability.
Alignment within properties	Further investigation will need to be done to allow the project team to determine the precise alignment of the pipeline. These investigations include awareness of ground conditions, including all below-ground services (e.g. fibre optic, power, water and sewage pipes etc.) and consideration of all above-ground features (e.g. significant vegetation, overhead wiring, buildings etc.). Once identified, the exact pipeline location can be confirmed and communicated to all interested parties.
Beaudesert offtake on maps	Initially, one of the design options for the location of the Beaudesert offtake was to construct it near Kenny Road. However, under the draft EIS alignment the Beaudesert offtake will be constructed in the Spring Mountain area.  Under the current proposed route, the only area where the pipeline affects Kenny Road will be when the pipeline crosses Kenny Road from Chambers Flat Road and enters private property on the eastern side, north of the Chambers Flat Road intersection.
Compaction	Compaction was noted as a major concern. The right of way will be levelled to the required gradient using graders, excavators and bulldozers. Topsoil will be removed where required and stockpiled separately for reuse during rehabilitation.
Compensation	Compensation for the easement will be paid upon successful negotiation of the easement prior to construction commencing.
Contracting to the Project	Offers of provision of contract services to the Project have been forwarded to our procurement section
Dust	The main impact on air quality for the Project would be as a result of dust generation during construction. The generation and impact of construction dust emissions will be minimised by the use of appropriate management techniques,

Key theme	SRWPA response
	<p>especially the minimisation of cleared areas and the use of watering to bind the surface layer. For all construction works, comprehensive air quality management strategies will be considered and implemented via the Environmental Management Plan.</p> <p>The generation and impact of construction dust emissions will be minimised by the use of appropriate management techniques, especially the minimisation of cleared areas and the use of watering to bind the surface layer. For all construction works, comprehensive air quality management strategies will be considered and implemented via the Environmental Management Plan.</p>
EIS process	<p>The objective of the EIS is to identify potential environmental, social and economic impacts and to ensure that impacts are avoided where possible.</p> <p>Feedback received during the EIS consultation process will now be considered by the Coordinator-General. Unavoidable impacts must be examined so that the development of the Project, including the preferred choice of pipeline alignments, is based on sound environmental protection and management criteria.</p>
Fill	<p>Fill can be provided to local landowners where practical. Landowners may be required to obtain Council approval in order to use this fill on their properties, and would be required to obtain this approval prior to receiving the fill from the Southern Regional Water Pipeline Alliance (SRWPA) construction team. Note also that because of issues such as Fire Ant management, fill provided by SRWPA may not be moved again to third properties.</p>
Necessity for dilapidation surveys	<p>Properties identified as being at any sort of risk during construction, may be subject to dilapidation surveys.</p>
Noise	<p>Operational noise limit criteria for each of the pump stations were developed based on the requirements of the Environmental Protection Agency's Ecoaccess Guideline Planning for noise control which is the standard against which the Project will be assessed.</p>
Notification prior to construction	<p>Property owners will be notified at least one month before construction starts and will continue open communication with SRWP until construction is complete.</p>
Ongoing management of the pipeline	<p>The SRWP Company is currently considering tenders for the ongoing management of the pipeline post construction. The successful company will be responsible for the maintenance and operation of the pipeline.</p>
Pump station noise	<p>All pump station buildings will be acoustically rated to prevent excessive noise impacts to surrounding land areas. Design will typically include 100 mm reinforced concrete walls and roof, lined with insulation with high acoustical absorption properties.</p>
Pump station size	<p>Architects are currently undertaking design of the Chambers Flat Pump Station building. Final dimensions will be confirmed during detailed design.</p>
Reinstatement	<p>The Alliance will ensure that all land is reinstated to an equivalent or improved condition to that which existed immediately prior to the investigation.</p>
SEQ Regional Plan	<p>The draft South East Queensland Regional Plan was prepared by the Queensland</p>

Key theme	SRWPA response
and Infrastructure Plan	<p>Government, Office of Urban Management. It set out a vision for the SEQ region through the guiding of growth and development through to the year 2026.</p> <p>One of the key initiatives of the Regional Plan is solving the immediate water supply needs of the Gold Coast via the provision of a regional pipeline.</p> <p>The recently released South East Queensland Infrastructure Plan and Program 2005-26 complements the Regional Plan and specifically mentions funding the implementation of the Southern Regional Water Pipeline.</p> <p>The Infrastructure Plan makes the following statement concerning the SRWP Project:</p> <p><i>'Additional pipelines will be required to convey waters from water sources to areas of high growth. A Southern Regional Pipeline Strategy has been developed to supply water from Mt Crosby Treatment Plant to Ipswich, the Western Corridor, Beaudesert and the Gold Coast to ensure future diversity and security of supply.'</i></p>
Traffic management	A traffic management plan is being prepared to manage the flow of local traffic.
Vegetation	All attempts have been made to select an alignment that causes the least disruption to residents and traffic, and avoids environmentally sensitive areas. The revised Environmental Management Plan will address these issues.
People contacted	<p>Prior to the release of the EIS, SRWPA was only contacting landholders who were directly affected by the pipeline (i.e. the pipeline will actually pass through their property).</p> <p>Those private landholders directly affected under the current alignment have already been contacted and have met with a member of the SRWPA Land Team.</p>
Width of the easement	The 30 m easement is required to allow for movement of construction vehicles, pipelines and personnel in and out of the site.

# 5 Amendments to the draft EIS alignment

In response to issues arising from the consultation phase of the draft EIS, some key changes have been made to the SRWP alignment. This section addresses recent modifications to the route and the environmental values and potential impacts associated with the new sites.

## 5.1 STAPYLTON DEVIATION, ORMEAU

This Supplementary Report proposes an alternative location for the Stapylton Balance Tank (SBT) in the separation area adjacent to Stephens Quarry and outlines corresponding changes to the pipeline alignment. Figure 5.1 illustrates the new location of the balance tank and associated changes to the route through the Ormeau area.

This modification to the alignment responds to a submission received from the owner of Stephens Quarry with respect to the status of the land for extractive industry. The quarry site is located within a nominated Key Resource Area under the draft State Planning Policy for the Protection of Extractive Resources and its future expansion is anticipated.

Blasting and extractive industry operations would jeopardise the structural integrity of the balance tank and associated infrastructure. For this reason, the new balance tank site is proposed in the nominated 500 m separation area adjacent to the quarry.

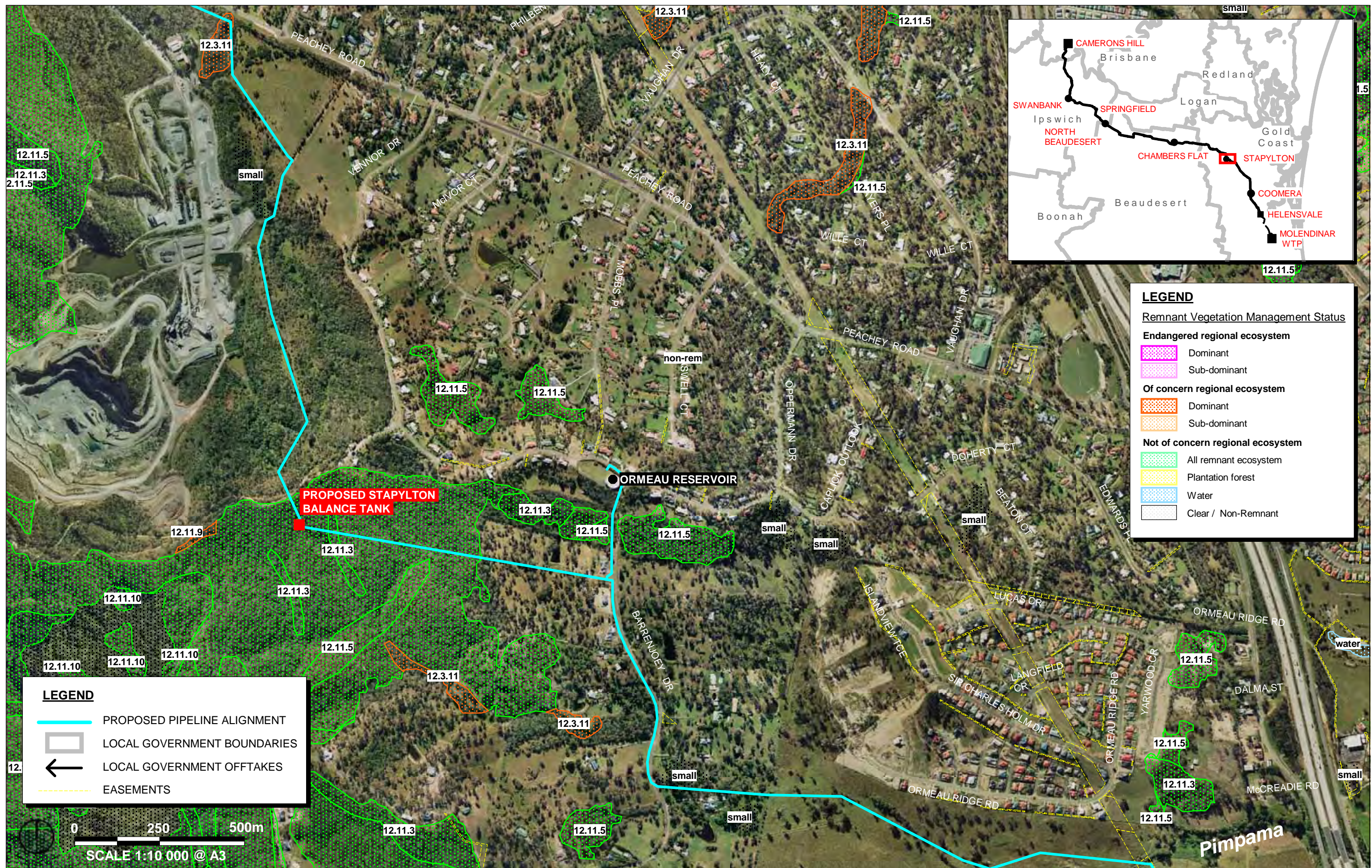
### 5.1.1 Methodology

The methodology developed for the draft EIS was adapted to determine terrestrial biological features of the new alignment and the SBT site. An initial assessment of environmental values was based on a review of regional ecosystem mapping and search results of state and federal databases, including the EPBC Protected Matters Database, Wildlife Online (EPA), and the Queensland Museum and *Birds Australia* databases.

Database search results are presented at Table 5.1. It is noted that *Birds Australia* retains no records for the Stapylton site. The data presented in the *Birds Australia* column of this table is adapted from a recent environmental investigation at a nearby site (KBR 2006).

Limited field assessments have been conducted due to seasonal constraints and access to the site being restricted. However, field studies suitable for the purposes of identifying significant constraints to design and construction will be conducted in July 2006.





Source: Base data supplied by Gold Coast City Council  
 Regional Ecosystem data supplied by Qld Herbarium (Version 4.0.1)

Projection: GDA94 (MGA56)

File Path: O:\BRS\Projects\BEG601-SRW\PT08 Gis Data\Workspaces  
 EIS\EIS Supplement\Figure 5.1 Stapylton Deviation.Wor

Date: 27 June 2006





### 5.1.2 Remnant vegetation

The SBT site is located in an area of mapped remnant vegetation (Queensland Herbarium 2001). Two remnant ecological communities are represented in the immediate vicinity with vegetation comprised of RE 12.11.5 and RE 12.11.3 (both 'not of concern'). RE descriptions for these communities are included at Table 1.2.

**Table 5.1 Summary of desktop survey of database records for significant species potentially occurring in the vicinity of the Stapylton Balance Tank site**

Taxa	Common name	EPBC		Records				Likely occurrence
		Status	Habitat	Birds <i>Australia Atlas</i>	Wildlife Online	Qld Museum	HERBREC	
<b>Birds</b>								
<i>Anaseraus semipalmata</i>	Maggie Goose	M OM	✓					H
<i>Apus pacificus</i>	Fork-tailed Swift	M OM	✓					H
<i>Ardea alba</i>	Great Egret	M OM	✓					H
<i>Ardea ibis</i>	Cattle Egret	M OM	✓		C			H
<i>Cyclopsitta diophthalma coxeni</i>	Coxen's Fig-Parrot	E M	✓					L
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork				R			
<i>Erythroriorchis radiatus</i>	Red Goshawk	V	✓					L
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	M OM	✓					H
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	M OM	✓					H
<i>Hirundapus caudacutus</i>	White-throated Needletail	M OM	✓					H
<i>Lathamus discolor</i>	Swift Parrot	E OM	✓					H
<i>Merops ornatus</i>	Rainbow Bee-eater	M OM	✓		C			H
<i>Monarcha melanopsis</i>	Black-faced Monarch	M OM	✓		C			H
<i>Monarcha trivirgatus</i>	Spectacled Monarch	M OM	✓					H
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	M OM	✓					H
<i>Nettapus coromandelianus albigennis</i>	Australian Cotton Pygmy-Goose	M OM	✓					H
<i>Rhipidura rufifrons</i>	Rufous Fantail	M OM	✓		C			H
<i>Rostratula australis</i>	Australian Painted Snipe	V	✓					L
<i>Rostula benghalensis s. lat.</i>	Painted Snipe	M OM	✓					M
<i>Turnix melanogaster</i>	Black-breasted Button-quail	V	✓					M
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E M	✓					L
<b>Amphibians</b>								
<i>Mixophyes iteratus</i>	Southern Barred Frog, Giant Barred Frog	E	✓		E			M
<b>Mammals</b>								
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat, Large Pied Bat	V	✓					L
<i>Dasyurus maculatus maculatus</i>	Spotted-tail Quoll	E	✓					H
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	V	✓					L
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	V	✓					M
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	✓					H
<b>Reptiles</b>								
<i>Coeranoscincus reticulatus</i>	Three-toed Snake-tooth Skink	V	✓					H

Plants						
<i>Baloghia marmorata</i>	Marbled Baloghia, Jointed Baloghia	V	✓		✓	H
<i>Bosistoa selwynii</i>	Heart-leaved Bosistoa	V	✓			L
<i>Bosistoa transversa</i>	Three-leaved Bosistoa	V	✓			L
<i>Corchorus cunninghamii</i>	Native Jute	E	✓			M
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	✓			L
<i>Endiandra floydii</i>	Floyd's Walnut	E	✓		✓	H
<i>Hydrocharis dubia</i>	Frogbit	V	✓			M
<i>Macadamia integrifolia</i>	Macadamia Nut, Queensland Nut, Bush Nut	V	✓		✓	H
<i>Marsdenia coronata</i>	Slender Milkvine			V	✓	
<i>Plectranthus habrophyllus</i>		E	✓			H
<i>Pouteria eerwah</i>	Shiny-leaved Condoo, Black Plum	E	✓		✓	H
<i>Randia moorei</i>	Spiny Gardenia	E	✓		✓	H

*E* = endangered      *C* = common      *H* = high      *L* = low      *M* = medium  
*V* = *C* = common      *H* = high      *L* = low      *M* = medium  
*V* = vulnerable      *R* = rare  
*M* = migratory species terrestrial or marine      \* = Recognised under CAMBA or JAMBA  
OM = may overfly area

## 5.2 CHAMBERS FLAT ROAD, CHAMBERS FLAT

This supplement also proposes an alternative alignment along the north side of Chambers Flat Road as shown in Figure 5.2. As discussed earlier in Section 3.1.10, the alignment is constrained in this location by the 'endangered' and 'of concern' ecosystems on the north side of Chambers Flat Road and the private properties to the south.

## 5.3 NORTH BEAUDESERT BALANCE TANK, GREENBANK

The location of the North Beaudesert Balance Tank (NBBT) has been determined on the basis of engineering and operational imperatives (Figure 5.3). Based on current investigations, the site is the only feasible location within the corridor for the proposed structures which enable the required functionality of the pipeline system to be achieved.

The siting of the NBBT requires the alignment to traverse a large area of vegetation adjacent to the Springfield residential development site. Land designated as Forest Park in this area is currently being transferred to Ipswich City and will form part of the Flinders to Greenbank/Karawatha Forest Corridor (FGKFC).

While the current alignment follows a designated fire break along the edge of the future corridor, the location of the NBBT coincides with the narrowest point of the FGKFC.

SRWPCo recognises the importance of the corridor as the largest intact lowland eucalypt forest in South East Queensland. Accordingly, SRWPCo is investigating potential offsets to clearing required for the construction of the NBBT.



SRWPA will continue to investigate and implement measures to reduce the impact of construction works at the site, and is committed to site rehabilitation following the completion of construction.

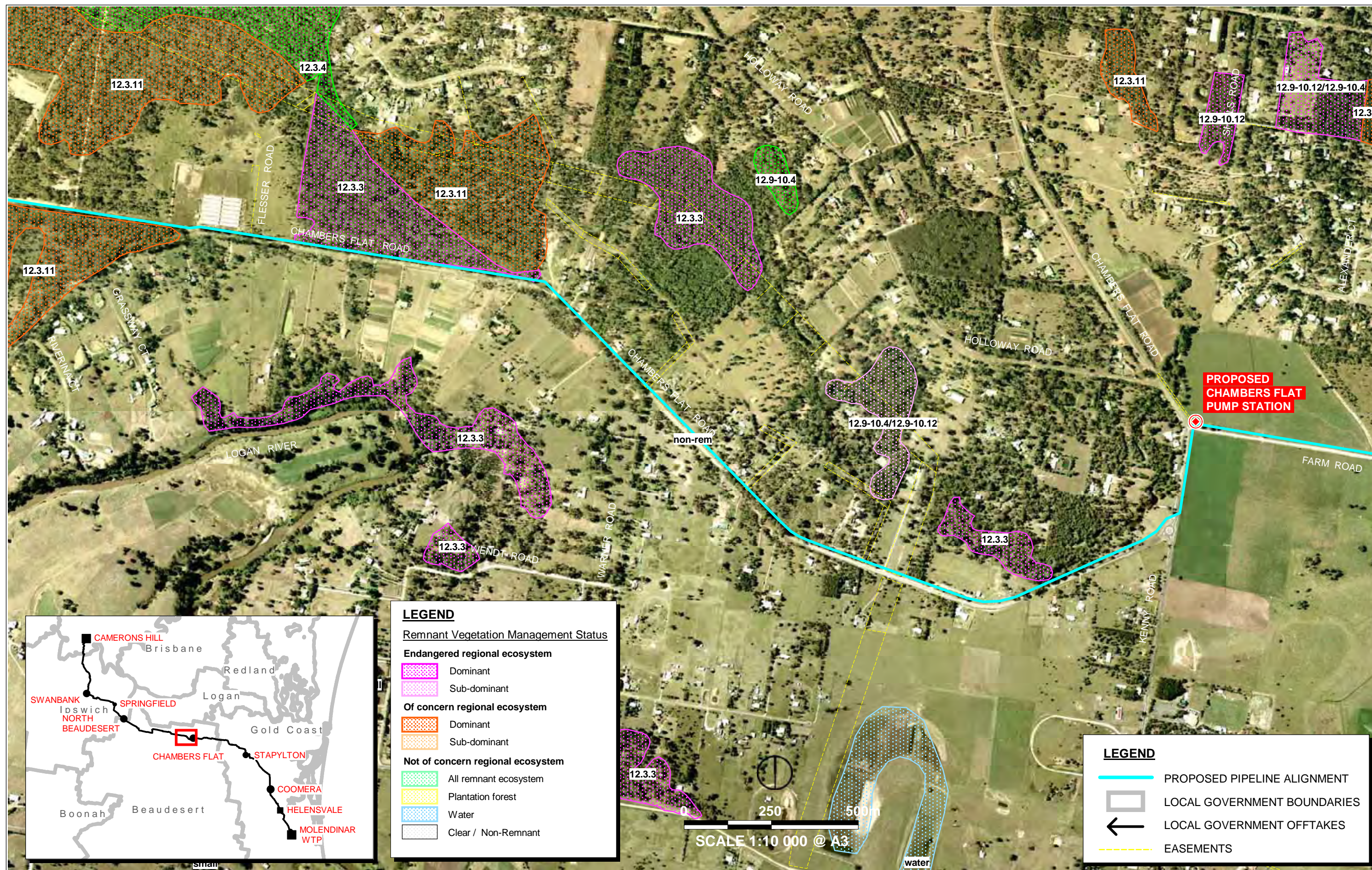
#### 5.4 MT CROSBY DEVIATION, MT CROSBY

As a result of detailed design and construction investigations, the alignment proposed in the draft EIS is under review. Specifically, a more direct route south from Brady Court to the Brisbane River is being considered (see Figure 5.4). The route would include two alignments, one through an existing disturbed corridor and the other through a patch of mapped 'of concern' remnant vegetation (described in Table 2.2).

Desk-top and field investigations will be completed according to the methodology detailed in Section 5.1.1 above in order to develop a basis for selecting an alignment. SRWPCo recognises the potential environmental issues associated with the route alignment change, especially because of the proximity to the Lloyd Bird Environmental Park and the occurrence of listed threatened species of flora (such as *Notolaea lloydi*) and fauna (such as *Delma torquata*) in the area.

A community consultation plan was implemented to discuss the issue with landowners. Initially, properties on the proposed alignment were contacted via a door-knock on Saturday 24 June. A presentation followed on Tuesday 27 June to discuss the potential alignment change with affected landowners. Approximately 50% of landowners attended the presentation and the general comment was positive towards the proposed route amendment. Community engagement on the issue will be on-going.





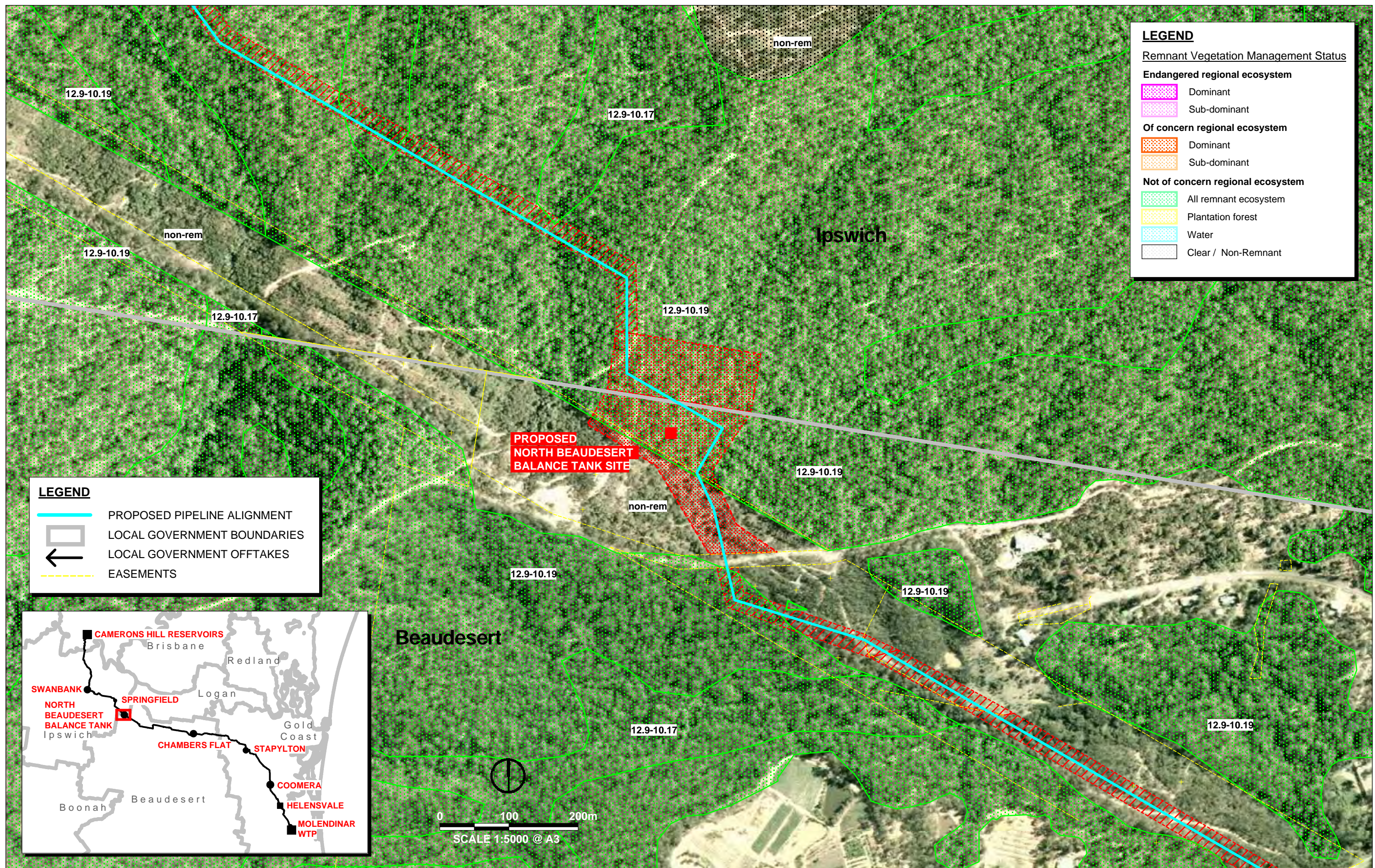
Source: Base data supplied by Beaudesert Shire Council  
Regional Ecosystem data supplied by Qld Herbarium (Version 4.0.1)

Projection: GDA94 (MGA56)

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EIS\EIS Supplement\Figure 5.2 Chambers Flat Rd Deviation.Wor

Date: 28 June 2006





Source: Base data supplied by Ipswich City Council, Beaudesert Shire Council  
Regional Ecosystem Data supplied by Qld Herbarium (Version 4.0.1)

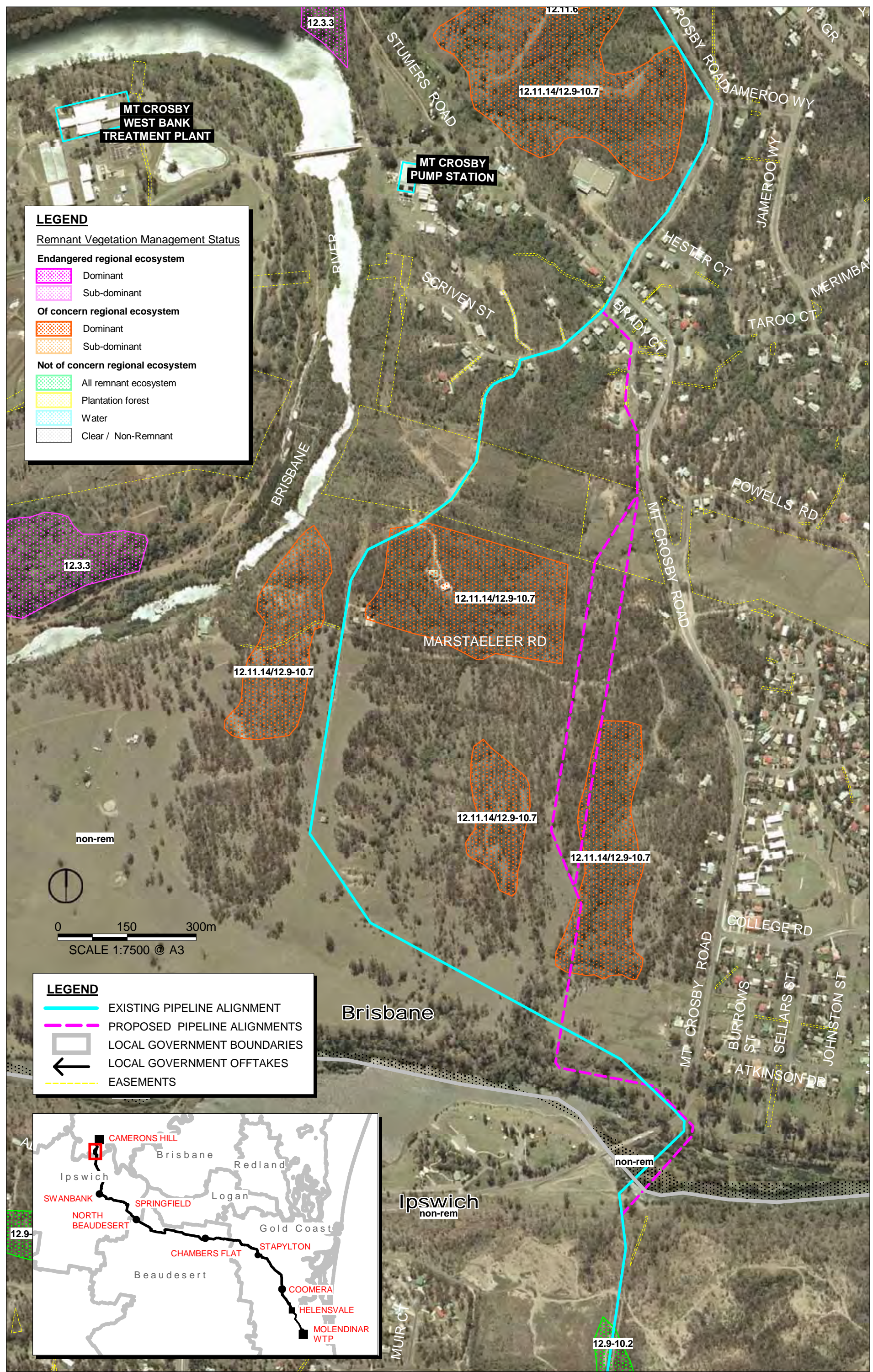
Projection: GDA94 (MGA56)

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EIS\EIS Supplement\Figure 5.3 North Beaudesert Balance Tank.Wor

Date: 28 June 2006









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*Appendix A*

## LIST OF CONTRIBUTORS

*Appendix A*

List of Contributors

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*Appendix B*

**REVISED ENVIRONMENTAL  
MANAGEMENT PLAN**

## *Appendix B*

# Revised Environmental Management Plan

The following Environmental Management Plan (EMP) is prepared to outline the types of performance-based control measures that must be implemented to reduce or minimise environmental impacts during construction of the SRWP. Many of these potential impacts were identified during the EIS and are listed as specific commitments to direct performance criteria within the EMP. The EMP has been revised following receipt of formal submissions from the public comment phase of the EIS. Submissions from state and federal agencies and community stakeholders were considered and included, as appropriate, in the preparation of this EMP.

Performance criteria are discussed in terms of Environmental Work Methods (EMs) and strategies for mitigating and managing potential impacts. The revised EMP is not exhaustive, but does provide an active working document that will be reviewed and audited to achieve best practice environmental and management outcomes. Should additional impacts be identified prior to or during construction of the SRWP, further strategies will be added to the EMP to address these impacts.

### 1.0 PURPOSE

The objective of the EMP is to ensure that all potential environmental impacts that could reasonably be expected to occur during the Project are minimised and fall within acceptable and agreed limits. This will be achieved through pro-active environmental management. Accordingly, emphasis is placed upon integrating environmental management planning with design, construction methods and operation planning.

The requirements of this plan are applicable to all on-site work carried out. All subcontractors and suppliers will be bound to comply with the requirements of this plan, in so far as they are applicable to the nature and scope of their work.

The scope of this plan embraces the impacts created by the design of the Project, the short-term impacts that the work will create during the construction and any long-term impacts that are influenced by the construction methods.

In particular this plan will provide:

- evidence of practical and achievable plans for managing the Project to ensure that environmental requirements are complied with, by providing an integrated planning framework for comprehensive monitoring and control of construction and operational impacts
- relevant local, state and Commonwealth authorities with a framework to confirm compliance with policies and requirements
- the community with evidence that the Project is being managed in an environmentally acceptable manner.

### 2.0 STRUCTURE OF THE EMP

The EMP will be formatted to make it as simple and user-friendly as possible. It will be based on a modular system. This will enable task/site specific plans to be quickly compiled from a pool of 'common' EMs. A single set of generic EMs will be prepared, and each work method will have a unique identifier. Site-specific plans would then consist largely of a plan or drawing with the relevant EMs indicated at the appropriate locations. This drawing can then be signed off by the contractor as each EM is completed, thus providing a simple auditable record.

### 3.0 LEGISLATIVE CONSIDERATIONS

This revised EMP has been developed as a document that will undergo continual change in response to changes in environmental legislation and/or the environmental management procedures and policies of the Principal or Contractor. Further, the EMP has been updated to reflect suggested amendments received through formal submissions in response to the public release of the draft EIS. SRWP will be responsible for being aware of these changes and the requirement to update superseded legislation and policy.

The following legislation and standards should be used as the basis for decision-making and complaint resolution in respect of the EMP.

**Table B.1 Environmental legislation, policies and standards relevant to the Project**

Issue	Standard
Construction—general	<i>Environmental Protection Act 1994</i> (Qld) Environmental Protection Regulation 1998 (Qld) <i>Workplace Health and Safety Act 1995</i> (Qld) Workplace Health and Safety Regulation 1997 (Qld)
Noise and vibration	Environmental Protection (Noise) Policy 1997 (Qld) <i>Workplace Health and Safety Act 1995</i> (Qld) AS 10551/2: Acoustics—Description and management of environmental noise AS 2436: Guide to noise control on construction, maintenance and demolition sites AS 2187.2-1993: Explosives—Storage, transport and use Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration, ANZECC 1990
Air quality	Environmental Protection (Air) Policy 1997 (Qld) National Health and Medical Research Council Guidelines 1985 Draft National Environmental Protection Measures and Impact Statement for Ambient Air Quality 1997
Water quality, and erosion and sedimentation control	Environmental Protection (Water) Policy 1997 (Qld) Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC 2002 <i>Water Act 2000</i> (Qld) <i>Fisheries Act 1994</i> (Qld) Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites—IEAust (Qld) 1996
Acid sulfate soils	Instructions for the Treatment and Management of Acid Sulfate Soils 2001 (Qld)
Contaminated land	<i>Environmental Protection Act 1994</i> (Qld)
Storage and handling of dangerous goods	<i>Environmental Protection Act 1994</i> (Qld) Environmental Protection Regulation 1998 (Qld) <i>Workplace Health and Safety Act 1995</i> (Qld)
Transport of dangerous goods	<i>Road Transport Reform Act 1999</i> (Qld) Australian Code for Transport of Dangerous Goods by Road and Rail
Waste management	Environmental Protection (Waste Management) Policy 2000 (Qld) Environmental Protection (Waste Management) Regulation 2000 (Qld) Waste Management Strategy for Queensland

Issue	Standard
Flora and fauna	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth) <i>Nature Conservation Act 1992</i> (Qld) Nature Conservation Regulation 1994 (Qld) <i>Vegetation Management Act 1999</i> (Qld) <i>Water Act 2000</i> (Qld) <i>Land Protection (Pest and Stock Route Management) Act 2002</i> (Qld)
Cultural heritage	<i>Native Title Act 1993</i> (Cwlth) <i>Native Title (Queensland) Act 1993</i> <i>Queensland Heritage Act 1992</i> Queensland Heritage Regulation 2003 <i>Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987</i> (Qld)
Land use control	<i>Integrated Planning Act 1997</i> (Qld) <i>Land Protection (Pest and Stock Route Management) Act 2002</i> (Qld)

Prior to the commencement of construction, SRWP or contractors engaged by SRWP will apply to the relevant government authorities to obtain permits, licenses and approvals required before proceeding.

#### 4.0 IMPLEMENTATION OF THE EMP

The SRWP will be responsible for implementing the EMP for the whole Project and ensuring compliance with the performance requirements of the EMP. SRWP will also be responsible for ensuring appropriate corrective action is taken for any failure to meet stated performance requirements.

SRWP will appoint a full-time Environmental Officer during construction who will be independent of those who have direct responsibility for the works being performed. This officer will have the necessary authority and responsibility to ensure compliance with the EMP and monitor performance requirements for each of the pre-construction and construction phases of the Project.

Where contractual agreements are entered into for work associated with this project, SRWP will:

- include the EMP in contract documents for all work to be undertaken by the contractors
- ensure that all contractors comply with the requirements of the EMP and nominate Environmental Site Representatives with the necessary authority.

#### 4.1 Review and update

The EMP will be reviewed as required to ensure that it addresses environmental issues and changes in legislation, policies and guidelines including best practice approaches.

As details of design, construction methodology and access needs are refined, so too will the EMP and site specific plans. The 'living' nature of the document means that it will progressively improve and will continue to provide appropriate direction for environmental protection. A major revision of the EMP was undertaken in late June 2006 as a result of submissions received from the public consultation period for the draft EIS.

An EMP for operation of the pipeline will be produced in the latter stages of construction.

#### 4.2 Training requirements

The success of the EMP depends on all those responsible for implementation and review being thoroughly conversant with its contents, interpretation and performance measurements.

SRWP and its contractors will be responsible for ensuring that project personnel have sufficient knowledge and awareness to identify potential environmental issues, and that they are trained to take appropriate corrective action.

It is important that all personnel are familiar with the procedures for reporting on issues that may result in environmental degradation. This includes informing key personnel within SRWP and relevant regulatory authorities.

#### 4.3 Complaints procedure

All complaints about the Project will be directed to and recorded by the Community Liaison Officer. Contact details for the Community Liaison Officer will be provided to all affected landowners and will be available to the public through the Freecall (1800 771 027) number.

A register will be kept recording details of all complaints received, the action taken in response, where necessary, and any corrective actions or procedural changes implemented to prevent recurrence. The initiator of the complaint will be advised of the results of all investigations and actions taken.

The Community Liaison Officer will review the register daily and advise the Environmental Officer of any relevant complaints. The Environmental Officer will then investigate the complaint and instigate any corrective action required.

The register will be regularly audited by either the Manager of Community Consultation or the Project Manager to ensure adequate and timely response to any verified complaint.

### 5.0 CONSTRUCTION MANAGEMENT

The following sections describe specific Environmental Work Methods (EMs) and strategies to mitigate and manage impacts during construction of the SRWP. Each section is grouped according to an overriding EM, with particular strategies necessary to meet performance criteria discussed in more detail.

#### 5.1 Sediment and erosion control

##### Objectives

The proposed pipeline and associated infrastructure locations range in topography, geology and soil types. It is SRWP's objective to minimise environmental impact by preventing soil loss and erosion and to comply with the *Environmental Protection Act 1994* and the Environmental Protection (Water) Policy 1997.

##### Performance criterion

There shall be no deterioration in water quality in creeks or drainage lines adjacent to the proposed development caused by erosion from construction activities associated with the works.

##### Environmental work methods

Construction work often disturbs soils, which can lead to soil erosion. Environmental work methods have been developed that provide erosion control techniques under various conditions. Sediment and erosion controls must be implemented and in place prior to the removal of any vegetation.

A list of these work methods follows:

- EM1.1—Area with highly erodible soils
- EM1.2—Acid sulfate soils
- EM1.3—Stockpiling area
- EM1.4—Stormwater drainage pit
- EM1.5—Drainage channel

- EM1.6—Construction access
- EM1.7—Excavations
- EM1.8—Existing erosion control structure
- EM1.9—Sensitive land/aquatic area
- EM1.10—Topsoil stripping
- EM1.11—Trenching
- EM1.12—Dredging.

Relevant EMs will be indicated on a site plan (construction drawings) where appropriate. Each environmental work method is described in detail below.

#### **EM1.1—Area with highly erodible soils**

Highly erodible soils may be identified by:

- visual inspection of the site to identify the extent and location of existing soil erosion
- reference to Section 4.3.6. and Figure 4.3 of the EIS.

Where highly erodible soils are identified, the following controls should be implemented:

- Keep the work area to a minimum so that the smallest possible ground area is disturbed. The erection of fences around the work site may be useful as it creates a physical barrier that discourages unnecessary 'sprawling'.
- Place erosion control structures such as diversion drains, rock check dams and silt fences or traps at key locations (swales, stormwater pit inlets, around stockpiles) to capture the suspended sediment.
- Conduct weekly inspections of all erosion control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Divert stormwater away from the exposed soil to reduce overland flow or channel flow on the vulnerable soils.
- Avoid disturbing highly erodible soils where possible.
- In areas where the risk of soil erosion is medium or high, the seeding of perennial grass may be required.

#### **EM1.2—Acid sulfate soils**

Acid sulfate soils (ASS) are soils predominantly occurring on coastal lowlands at elevations below 5 m Australian Height Datum. ASS are typically identified through borehole profiling carried out as part of geotechnical investigations.

Where ASS or potential ASS are identified, reference should be made to the SRWP ASS Management Plan developed in accordance with the Queensland EPA's *Instructions for the treatment and management of acid sulfate soils* (2001).

#### **EM1.3—Stockpiling**

At stockpiling sites the following sediment controls should be implemented:

- Provide bunding (mounded earth) around the stockpile to prevent the material from being washed away. The height of the bund depends on the site location, the volume and type of material being stockpiled, and the topography.
- Unvegetated stockpiles should not be exposed for more than 30 days. If stockpiling for more than 30 days is proposed, consider stabilising the stockpile with appropriate vegetation. Alternatively, if the stockpile is small, it may be covered instead.

- Stockpile topsoil and subsoil separately where possible. This will result in a more successful site restoration.
- Stockpile batter slopes should not exceed 1V:3H.
- Locate the stockpile away from watercourses.

#### **EM1.4—Stormwater drainage pit**

At drainage pits the following sediment controls should be implemented:

- Place erosion control structures such as sand bags, hay bales and trash racks at key locations to capture the suspended sediment and gross litter.
- Conduct weekly inspections of all erosion control structures to ensure that they are in place and operating efficiently. Additional inspections should be conducted after storm events.

On completion of works the following should be performed:

- Reinststate all drainage pits and clean out accumulated sediment or leaf litter in pits.
- Reinststate all existing erosion control structures.

#### **EM1.5—Drainage channel**

In drainage channels, whether concrete or earth, the following sediment controls should be implemented:

- Place erosion control structures such as silt fences, sand bags and hay bales in the channel to capture suspended sediment.
- Conduct weekly inspections of all erosion control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Divert stormwater away from disturbed channels or swales to minimise the flow of water and chance of erosion.
- Minimise disturbance to the existing drainage channel. This may involve constructing a temporary access bridge across small swales and channels.
- If flow modification is necessary during construction, reinststate the drainage channel on completion of works.
- Reinststate all existing erosion control structures on completion of works.

#### **EM1.6—Construction access**

Restrict the movement of construction vehicles to designated access routes.

Temporary construction roads and site access points should employ the following sediment controls:

- Erosion control structures should be placed in the channel to capture the suspended sediment.
- Conduct weekly inspections of all erosion control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Protect batters and disturbed areas from erosion by constructing small diversion/contour banks on the batter. This prevents sheet flow eroding the soil on the batter.

On completion of works the following should be performed:

- Reinststate all existing erosion control structures.
- Repair any damage caused directly or indirectly as a result of the proposed works (e.g. damage to roads, pipes, drains and gutters).
- Stabilise soils by revegetating exposed surfaces.

### EM1.7—Excavations

During excavation the following sediment controls should be implemented:

- Excavate during dry weather where possible.
- Erosion control structures such as silt fences, sand bags and hay bales should be placed in the channel to capture suspended sediment.
- Conduct weekly inspections of all erosion control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Protect batters and disturbed areas from erosion by constructing small diversion/contour banks on the batter. This prevents sheet flow eroding the soil on the batter.
- Keep the work area to a minimum so that the smallest possible ground area is disturbed. The erection of fences around the work site may be useful as it creates a physical barrier that discourages unnecessary 'sprawling'.
- Divert stormwater away from disturbed channels or swales to minimise the flow of water and chance of erosion.
- On completion of works, reseed the ground with the appropriate species.

### EM1.8—Existing erosion control structure

When working near existing erosion-control structures the following controls should be implemented:

- Reinstate all existing erosion control structures on completion of works.
- Repair any damage caused directly or indirectly as a result of the proposed works (e.g. damage to roads, pipes, drains and gutters).
- Remove temporary erosion-control structures.

### EM1.9—Sensitive land/aquatic area

When working near sensitive areas (terrestrial and aquatic) the following sediment controls should be implemented:

- Place erosion-control structures such as silt fences, sand bags and hay bales in drainage channels to capture suspended sediment.
- Conduct weekly inspections of erosion-control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Divert stormwater away from the sensitive area. If stormwater diversion will be necessary for an extended period of time, ensure the sensitive area is not deprived of fresh water.

### EM1.10—Topsoil stripping

When working near existing erosion control structures the following sediment controls should be implemented:

- Keep the work area to a minimum so that the smallest possible ground area is disturbed. The erection of fences around the work site may be useful as it creates a physical barrier that discourages unnecessary 'sprawling'.
- Strip topsoil and stockpile in accordance with EM1.3 (Sediment and erosion control—stockpiling)

### EM1.11—Trenching

When working near existing erosion control structures, the following sediment controls should be implemented:

- Where spoil is to be replaced, it should be stored on the upslope side of trench. If any sediment is washed away it will collect in the swale rather than be transported off-site.



- Trenching should be in accordance with EM1.7 (Sediment and erosion control—excavations).

#### **EM1.12—Dredging**

Where dredging works are required the following dredging controls are to be implemented:

- No dredged material shall be removed from the bed or foreshores outside the limits of the area marked on the approved plans.
- Batters of the excavation shall be left at slopes no greater than those shown on the approved plans.
- Acid sulfate soils will be managed according to EM1.2 Acid sulfate soils.
- Any dredging outside the boundaries of the authorised operating area, dredging from the bed below designated levels, or batters steeper than the designated grade shall be repaired by SRWP Alliance so that the shape of the removal excavation conforms to the relevant permit conditions. Only granular material of a quality and grading approved by the EPA Chief Executive shall be used to repair over dredged areas.
- If as a result of removing dredge material or through any other cause attributable to the dredge works any bank is displaced, then the bank shall be restored to its original condition. Any other actions as necessary will be taken to ensure the stability of the bank. All work will be completed to the satisfaction of the Chief Executive.
- Before dredging commences, and during the whole of the dredging operations, each dredge and each item of equipment carrying out the actual removal of the material shall display a sign which is clearly legible from either side of the dredge or equipment. This sign shall display the permit number and the Alliance name and logo. The lettering on the sign shall be at least 300 mm high and formed of strokes a minimum 50 mm wide.
- Upon completion of the dredging works, or as otherwise directed by the Chief Executive, the Alliance shall remove all dredge plant and equipment from the site.
- From the day the dredging activity commences, the Alliance shall within 20 days after the end of each month, submit to EPA's Chief Executive:
  - a monthly return of the quantity of dredging material removed, based on the measured volume of dredged material loose in the stockpiles, even if no material has been dredged during that month; and
  - payment of the fee of \$1.40 per cubic metre of dredged material removed, or such fee as prescribed in the *Coastal Protection and Management Regulation 2003*; or if any waivers have been subsequently granted, the amount stated in the royalty waiver.
- A copy of the permit conditions shall be available at the dredging site at all times and all members involved in the dredging works shall be made aware of the permit conditions during site induction.

#### **Monitoring and auditing**

During routine maintenance inspections, the Environmental Officer is to identify areas where erosion is occurring and where corrective action is required.

All remaining erosion control measures should be monitored for their effectiveness for at least 12 months. Remedial measures should be put in place should any controls fail.

#### **Reporting**

In the event of a failure of a control measure, it shall be recorded by the Environmental Officer, the reasons for failure identified and appropriate corrective actions undertaken.

## **Post-construction issues**

Any works during the post-construction period that may cause soil erosion will be treated as for the construction period.

Ongoing maintenance of the sewage pump station will involve soil stabilisation and revegetation. Any defects revealed by maintenance and inspection of erosion and sediment control structures must be rectified immediately and these works are to be cleaned, repaired and augmented as required, to ensure effective erosion and sedimentation control thereafter.

## **5.2 Water and stormwater management**

### **Objectives**

It is the objective of the Project to minimise environmental impact by maintaining water quality/quantity entering and discharging from project sites. In particular, the disposal of water used for commissioning and maintenance of the SRWP is addressed.

### **Performance criterion**

There shall be no deterioration in water quality in creeks or drainage lines adjacent to the proposed development caused by erosion from construction activities associated with the works.

### **Environmental work methods**

Environmental work methods have been developed that provide water and stormwater management techniques. A list of the work methods follows:

- EM2.1—Water use
- EM2.2—Stormwater drainage pit
- EM2.3—Drainage channel
- EM2.4—Water disposal
- EM2.5—Sensitive land/aquatic areas.

Each environmental work method is described in detail below.

#### **EM2.1—Water use**

This work method is intended to minimise the demand for potable water. All activities that require a supply of potable water should implement the following strategies:

- Minimise water consumption through the use of water saving devices - for example the adoption of water-efficient irrigation practices and equipment during site rehabilitation.
- Management shall encourage water minimisation construction practices (e.g. turning off water when not specifically required).

#### **EM2.2—Stormwater drainage pit**

Stormwater drainage pits tend to accumulate sediments and gross pollutants. When working near stormwater drainage pits the following controls should be implemented:

- Keep the site free from litter. Encourage workers to dispose of litter in bins that are regularly emptied.
- Provide trash racks in stormwater drainage pits to collect gross litter. Ensure that the trash racks are regularly inspected (at least weekly) and emptied when necessary.
- Where drainage pits have been modified, or where flow is diverted away from the drain, reinstate the pit upon completion of works.
- Provide sediment control measures in accordance with EM1 (Sediment and erosion control).

### EM2.3—Drainage channel

When an existing drainage channel is close to the work site, or is directly modified by the works, the following controls should be implemented:

- Provide and maintain vegetated swale drains and filter strips.
- Erosion control structures should be placed where appropriate within the channel to capture suspended sediment.
- Conduct weekly inspections of all erosion control structures to ensure they are in place and operating efficiently. Additional inspections should be conducted after storm events.
- Minimise disturbance to existing drainage channels by organising works away from the channel where possible.
- Provide sediment control measures in accordance with 5.1 Sediment and erosion control.

### EM2.4—Water disposal

Water may need to be disposed from the following sources:

- groundwater infiltration during excavations
- wash water from machinery and personnel cleaning
- machinery cooling water
- wastewater from pipe pigging ('blackwater')
- wastewater from commissioning and maintenance.

In situations where it is necessary to dispose of water the following practices should be employed:

- Do not dispose of water unless it is uncontaminated. If uncertain of contamination, testing may be necessary to determine the most suitable method of disposal.
- When releasing uncontaminated waters, spread flows over a large area rather than concentrating in channels, which tends to induce erosion.

Generally, open parkland areas, grassed swales and public open spaces would provide the best opportunity to release chlorinated potable water. This type of water is suitable for general irrigation and watering of vegetated areas. Under some circumstances, the concentration of chlorine in the water would be too high to allow this type of release.

Options for the management and disposal of the flush sodium hypochlorite water include land evaporation, water dilution/reuse and storage. Issues to be considered for each of these three options are as follows:

#### *A. Land disposal*

- availability of gravelled area(s) for dispersal of the flush sodium hypochlorite water
- existence of gravelled areas within a feasible distance of the corridor
- transport of water to the dispersal gravel sites for further dilution

#### *B. Water disposal*

- treatment location—pipe release points and/or storage
- required dilution/treatment
- the transport and release of diluted flush sodium hypochlorite water into existing waterways/ water sources
- stage of the tide (assuming major river)

### *C. Storage*

- volume
- storage vessels—whether built, assembled, tanker or combination
- transport and/or suitable storage sites
- time of required storage prior to release-breakdown/loss in concentration of the flush sodium hypochlorite water
- ensure that the stored water will not contain excess algae and micro-organisms prior to reuse.

The disposal of the flush sodium hypochlorite water will need to take into consideration any environmental (see EM2.5 below), financial and engineering constraints.

The World Health Organisation international guidelines for drinking water quality published in 1993 established a provisional health based guideline of 0.2 mg/L for chlorite in drinking water. The guideline value was provisional because the use of the chemical as a disinfectant may result in the value being exceeded.

### **Treatment**

An effort will be made to maintain clean pipe lengths to prevent the entrance of foreign materials during repairs, replacement and construction. Pigging is the cleaning out of pipelines between processes using a special contoured plug or 'pig'. The pig is driven down the pipeline by compressed gas, fluid or cleaning product to give a clean line ready for reuse. The SRWP will be flushed with at least two line volumes of water prior to chlorination. Where contamination with soil and debris is of such a degree that disinfection is likely to be ineffective, workers will flush and swab the affected section of the pipeline prior to disinfection.

The pipeline will be disinfected using the preferred chlorinating agent, sodium hypochlorite solution. The chlorite solution will be pumped into the pipeline after it has been filled with water. The pipeline will be chlorinated so that a free chlorine residual of 10 mg/L exists in all affected sections of the water pipeline after 24 hours of contact time (Specification No. 95-092.1).

Measurement of the chlorine concentration will be carried out at the furthest downstream point to verify this. Consideration will need to be given to minimising any sections of the pipe that cannot be easily disinfected (for example, dead ends), situations resulting from air entrapment and variations in elevation and pressure. All valves and fittings along the new main will be operated to ensure disinfection of all off-line fittings.

The sodium hypochlorite flush waste must be disposed of in a manner best suited for the protection of the general public, the environment and property. After disinfection, water delivered by pipelines must be proved to be bacteriologically safe prior to operation. Many positive tests indicating unsatisfactory disinfection are simply due to improper sample collection.

The flushing of the sodium hypochlorite water will use and be refilled by clean potable water. The water main shall be deemed acceptable for services when bacteriological test results certify that the quality of the water supplied from the treated main is of equal quality to that of the upstream water supply. In the state of Queensland, the superintendent must be included in the independently certified biological test in accordance with the Water Reticulation Code of Australia (WSA 03-1999).

Sodium hypochlorite is a corrosive bleach substance and the provisions of the *Dangerous Goods Safety Management Act 2001* and the *Workplace Health and Safety Act 1995* concerning its handling must be complied with. Water companies have changed disinfection systems from chlorine gas to sodium hypochlorite because of the safety benefits.

### **Management approach**

The recommended upper limit ranges for physical, chemical and biological characteristics in drinking water for chloride is 0.2 mg/L. The preferred management and disposal of the flush sodium hypochlorite

water for the SWRP is storage, followed by release into the pipeline water and/or dam water storage once the concentration has decreased to within acceptable levels.

Management options are yet to be finalised in conjunction with the pipeline construction detailed design. However, at least five or six collection points will be expected along the pipeline.

The disinfect flush and the biological testing will occur in a 'leap frog' fashion along sections of the pipeline (5-20 ML per flush). The water volume of the pipeline is estimated at 0.8 ML/km. Dechlorination levels safe for release into the environment with written approval from the relevant agency is less than 1 mg/L (PowerWater, accessed 15 March 2006; WHO 1993). The EPA has been consulted to provide guidance on the preferred method of management once detailed design is completed.

#### **EM2.5—Sensitive land/aquatic areas**

In situations where a sensitive land or aquatic area is identified in close proximity to the work site, the following practices should be employed:

- Water quality should not be decreased.
- Stormwater runoff should be kept free of gross pollutants and contaminants.

#### **Monitoring and auditing**

The Environmental Officer should complete a weekly check.

Prior to discharge of waters, the Environmental Officer should be satisfied that water is not contaminated.

#### **Reporting**

A Weekly checklist is to be completed. Results of any water testing are to be recorded and made available to relevant authorities if requested.

#### **Post-construction issues**

Any activities during the post-construction period that may effect either water consumption or stormwater quality should employ the same techniques as those employed during the construction period.

### **5.3 Air quality and dust suppression**

#### **Objectives**

To prevent dust and other atmospheric emissions generated by construction activities from causing a hazard or nuisance, and to comply with the *Environmental Protection Act 1994* and the *Environmental Protection (Air) Policy 1997*.

#### **Performance criteria**

Performance will be guided by the results of an Air Quality study to be conducted as part of the Blast Management Plan and subsequent recommendations. Additional studies may be required prior to construction to ensure dust and air emissions are managed appropriately. This could include studies to detect impacts on particular vertebrate species or populations.

No complaints from nearby residences.

#### **Environmental work methods**

Environmental work methods have been developed that provide dust management techniques. A list of the work methods follow:

- EM3.1—Stockpiling

- EM3.2—Construction access
- EM3.3—Work area
- EM3.4—Dusty soils.

These will be included where necessary on the appropriate construction drawings. Each environmental work method is described in detail below.

#### **EM3.1—Stockpiling**

When stockpiling soils or other dusty materials, the following controls should be implemented:

- Do not introduce spoil derived from Fire Ant Declared Areas to sites currently free from this pest incursion.
- Cover stockpiles of dusty material when not being used, for example during work hours when no materials are being added or removed from the stockpile. The stockpile should always be covered outside work hours.
- When activities are adding or removing material from the stockpile and dust generation is a problem, the stockpile should be kept damp by irrigation.
- Ensure that stockpiling is in accordance with EM1.3 (Sediment and erosion control—stockpiling)

#### **EM3.2—Construction access**

On unsealed temporary and permanent construction access routes the following environmental controls should be implemented:

- Limit traffic movement over disturbed areas.
- When dust generation is a problem it may be necessary to keep the ground surface damp (not wet) through irrigation. Any water spraying to suppress dust must be conducted in a manner that does not result in runoff or erosion problems.
- Provide vegetative cover at completion of works to stabilise the soils.
- Avoid the use of dirt access roads where possible as this creates environmental problems in terms of dust generation and sediment and erosion control.
- Maintain internal road surfaces.

#### **EM3.3—Work area**

At the work site the following controls should be implemented:

- Keep the work area to a minimum so that the smallest possible ground area is disturbed. The erection of fences around the work site may be useful as it creates a physical barrier that discourages unnecessary 'sprawling'.
- Provide vegetative cover upon completion of works to stabilise the soils.
- Maintain and protect vegetated areas.

#### **EM3.4—Dusty soils**

Dusty soils may be identified either through field observations, on-site experience or through previous reports. Where these soils are present a number of additional actions are required to minimise the environmental consequences. These include:

- Install appropriate windbreaks to reduce the generation of dust. Suitable windbreaks may include rows of trees, temporary fencing or permanent fencing.
- Implementing use of a dust retarding agent, such as *Polycom*, in urban areas.
- Schedule work in dusty soils during low wind times, such as early morning.

- Covered or dampen truck loads that have the potential to create dust, prior to transportation.
- Avoid disturbance to potentially dusty soils where possible.
- Vegetate dusty soils as soon as possible.

#### **Monitoring and auditing**

The Construction Manager and Environmental Officer shall visually monitor dust dispersal.

#### **Reporting**

The Community Liaison Officer will maintain a register of complaints received. In the event of a complaint associated with the generation of excessive dust, a report should be prepared detailing the complaint, corrective action, and further monitoring required to minimise the potential for further complaints.

#### **Post-construction issues**

Any activities during the post-construction period that generate dust should employ the same controls as those employed during the construction period.

### **5.4 Traffic control**

#### **Objectives**

At some upgrade locations it is inevitable that traffic will be impacted by the works. It is therefore SRWP's objective to minimise any potential traffic impacts.

#### **Performance criteria**

Minimal disruption to traffic and no traffic accidents as a result of project activities. No public complaints.

#### **Environmental work methods**

Environmental work methods have been developed in relation to traffic management. A list of work methods follow:

- EM4.1—Road diversions and closures
- EM4.2—Parking.

These will be included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

#### **EM4.1—Road diversions and closures**

When road diversions or closures are required, the following controls should be implemented:

- Avoid road changes during peak times. Seek permission from the relevant authority when road conditions are changed.
- Use traffic control devices to warn, guide and instruct drivers and pedestrians.
- Ensure traffic management techniques conform to the relevant standards.

#### **EM4.2—Parking**

Where parking facilities are provided either on site or off site the following controls should be implemented:

- Monitor adequacy for visitor and worker parking.

- Ensure surrounding community parking is not affected. Feedback from residents should be sought and monitored.

#### **Monitoring and auditing**

The Safety Officer is to monitor traffic management and ensure that Traffic Management Plans are being implemented.

The Community Liaison Officer will maintain a complaints register.

#### **Reporting**

Monthly reports on traffic and complaints are to be submitted to Alliance Project Management Team (APMT).

#### **Post-construction issues**

Any activities during the post-construction period that are likely to have an effect on traffic should employ the same controls as those employed during the construction period.

### **5.5 Flora and fauna**

A specific Vegetation Management Plan is being developed concurrently with an application to the Department of Natural Resources, Mines & Water for vegetation clearing permits.

A detailed Fauna Management Plan is also being developed for use during construction.

#### **Objectives**

It is SRWP's objective to minimise the impact of works on native vegetation and fauna, while ensuring the upgrade works are completed effectively and efficiently.

#### **Performance criteria**

No significant long-term disturbance to flora and fauna outside the required corridor except where deemed unavoidable for construction access.

Successful rehabilitation as measured against pre-construction assessment.

#### **Environmental work methods**

Environmental work methods have been developed that provide flora and fauna management techniques. A list of work methods follow:

- EM5.1—Sensitive species
- EM5.2—Material handling
- EM5.3—Vegetation removal
- EM5.4—Activities around vegetation
- EM5.5—Revegetation
- EM5.6—Trenching and excavations.

These will be included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

#### **EM5.1—Sensitive species**

Sensitive species include mapped regional ecosystems, threatened flora and fauna and other communities identified under relevant legislation. Sensitive species have been identified in previous reports and the EIS (see Section 4.7 Terrestrial environment and Section 4.8 Aquatic environment).



Measures to minimise the effects of works on sensitive species include the following:

- Fence off areas around sensitive vegetation communities and plant species.
- Avoid impacting sensitive species by locating works away from the sensitive area, where possible.
- Manage any adverse impacts on threatened species with input from relevant state agencies.
- Divert any stormwater away from sensitive areas.

#### **EM5.2—Material handling**

Material handling has the potential to adversely impact on surrounding flora and fauna. Measures to minimise the effects of material handling include:

- Avoid compacting soil in the work area, especially around the drip zone of mature trees.
- Keep fill material, stockpiles, vehicle parking and access tracks clear of the drip-line of trees and shrubs.
- Do not introduce spoil derived from Fire Ant Declared Areas to sites currently free from this pest incursion (see EM6.3).
- Select areas that are already degraded for site access and storage, where possible.
- Avoid mechanical injury to trees. Tree guards that protect the trunk of the tree can be effective.

#### **EM5.3—Vegetation removal**

If vegetation to be removed requires approval under the *Vegetation Management Act 1999*, *Water Act 2000*, *Land Act 1994* or *Fisheries Act 1994*, then the authority should apply for approval before construction begins.

The effects of vegetation removal can be minimised by the following practices:

- Avoid clearing vegetation where possible (especially native trees).
- All site workers are to attend an on-site briefing session regarding the approved clearing process prior to the commencement of clearing activities.
- Areas not to be cleared should be clearly delineated or temporarily fenced off prior to any commencement of clearing works or construction activities.
- Ensure that no tree dwelling animals are present in trees to be cleared. In the event of sick, injured or orphaned native animals being located during clearing activities, contact the Queensland Parks and Wildlife Service on: (07) 3202 0200.
- A professional spotter/catcher is to be used to catch and relocate animals.

#### **EM5.4—Activities around vegetation**

Measures to minimise the effects on flora and fauna when conducting activities in close proximity to trees include the following:

- Only designated access tracks are to be used by contractors when entering or exiting the site.
- If surface sealing around tree is required, use materials that will allow some aeration, such as, in decreasing order of permeability, gravel, unit pavers, coarse sand (no mortar), asphalt and concrete.
- Avoid mechanical injury to trees. Tree guards that protect the trunk of the tree can be effective.
- Avoid damage to roots. If trenching near trees is unavoidable then it is best to trench below the centre of the tree where there are fewer roots.
- Avoid compaction of soil, particularly close to trees.

- Replant and landscape all disturbed areas to their original condition. Revegetation with native flora is preferable. However, particular land owners may require replanting with species of agricultural importance.

#### **EM5.5—Revegetation**

When revegetating, the following measures should be followed:

- Species selection and densities should be appropriate for the habitat being revegetated.
- Native species, preferably those endemic to the area, should be used.
- Fence off turfed area to prevent access until the site is fully established.
- Ensure the necessary maintenance is provided (e.g. watering, fertilising, weeding) until the plants are self-maintaining.

#### **EM5.6—Trenching and excavations**

Pipeline trenches and excavations serve as pitfall traps for small mammals, lizards and snakes. Impacts can be minimised by the following:

- Maintaining open trenches for a maximum of 24 hours only. During times when the trench is unattended, exclusion fencing will be used on either side of the trench to discourage entry of animals.
- Placement of trench plugs and ramps to encourage animals to leave trenches on their own. Ramps and plugs can include sticks, branches etc. wrapped in hessian sacks.
- Placement of shade shelters to protect trapped animals from extreme temperatures and stress until they can be removed.
- Monitoring open trenches twice-daily to remove any captured animals.

#### **Monitoring and auditing**

Revegetation work should be periodically assessed (weekly until plants are established and then three-monthly) to determine if vegetation is re-establishing or if remedial action is required.

The Environmental Officer is to record any discernible evidence of fauna activity.

#### **Reporting**

Compliance with vegetation removal plans are to be documented by contractors. A Vegetation Management Plan for the Project has been drafted and will be updated upon receipt of statutory approvals for vegetation clearing.

The Environmental Officer is to report monthly on flora and fauna activities and any relevant incidents. Any animal captures and/or deaths will be reported to relevant suitable state agencies.

#### **Post-construction issues**

Any activities during the post-construction period that are likely to have an effect on flora and fauna should employ the same controls as those employed during the construction period.

### **5.6 Weed and pest species control**

#### **Objectives**

Some of the project locations may be in areas affected by weed infestation or potential weed infestation. It is SRWP's objective to minimise the environmental impact of weed infestation and to avoid the spread of otherwise pestiferous species.

### **Performance criteria**

No new weeds or introduced species should be introduced to the pipeline easement.

No increase in distribution of weeds currently existing within the easement should occur. Wherever possible, eradication of these plants should occur.

No increase in the current distribution of pestiferous species will occur and no new sources of pestiferous species will occur as a result of pipeline construction.

### **Environmental work methods**

Environmental work methods have been developed for situations when working in weed infested and Fire Ant Declared areas. Relevant work methods include:

- EM6.1—Minimising weed and pest invasion
- EM6.2—Removal of weeds
- EM6.3—Weed infested and Fire Ant Declared areas
- EM6.4—Herbicide or pesticide application area.

These work methods will be included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

#### **EM6.1—Minimising weed and pest invasion**

Preventing weed and pest invasion and migration is preferable to managing weeds and pests once they become established. The following will reduce the introduction of weeds and pests to construction areas:

- Construction works and the associated soil disturbance should be limited to the work area and access tracks.
- Construction materials should be sourced from sites that are free from weed infestation. Spoil derived from Fire Ant Declared areas will not be introduced to fire ant-free sites.
- Prior to entry into the sensitive areas, construction equipment should be washed down and cleaned to avoid intrusion of weed species into these areas. A wash down policy will be developed and implemented prior to construction.
- Sites suitable for the establishment and development of pestiferous species, such as vector mosquitoes and fire ants, will not be created during or following construction of the pipeline.

#### **EM6.2—Removal of weeds**

Control of weeds and undesirable introduced plant species should be undertaken prior to construction activities to minimise their further spread.

During weed removal operations the following controls should be implemented:

- Dig out and remove weeds by hand or with suitable machinery. This ensures that the entire weed (including the root structure) is removed.
- Dispose of weeds in an approved manner that will ensure weeds are not spread elsewhere.
- Undertake rehabilitation and replanting after weed removal. Preference should be given to native species.

#### **EM6.3—Weed-infested and Fire Ant Declared areas**

A Fire Ant Management Plan has been developed for the SRWP and approved by the Department of Primary Industries & Fisheries.

When working in weed-infested and Fire Ant Declared areas the following controls should be implemented:

- Declared weeds should be removed from the site and the material disposed of such that reinfestation does not occur.
- Use herbicides selectively.
- Avoid transporting weeds by cleaning vehicles, equipment and personnel before leaving the infested area.
- Transport of all spoil will be handled according to the approved Fire Ant Management Plan.
- No spoil will be transported from Fire Ant Declared areas, other than to sites listed in the approved Fire Ant Management Plan.

#### **EM6.4—Herbicide or pesticide application area**

Where herbicides or pesticides are required the following measures should be implemented:

- In accordance with the *Agricultural Chemicals Distribution Control Act 1966*, any ground distribution of herbicides is to be undertaken by or under the direct supervision of a licensed commercial operator. Distribution of herbicides is also only to be undertaken using equipment approved for weed-spraying operations.
- Pesticides or herbicides must not be used in areas where they may enter a waterway or drain.
- Do not use herbicides near trees (within a 3 m radius of the trunk).
- Do not use herbicides when the application could adversely impact on non-targeted species. This is particularly important on windy days.
- Store all chemicals safely in accordance with EM11.1 (Safety—storage compound).

#### **Monitoring and auditing**

Any new weeds or undesirable introduced species of flora or fauna should be reported to the Environmental Officer.

The Environmental Officer should monitor the site for weeds and pest species and ensure that weed management and/or vector control is undertaken in the appropriate manner.

#### **Reporting**

The Environmental Officer is to report monthly on weed management activities and any pest incursions. A Pest Management Plan will be developed in conjunction with local authorities and associated stakeholders, such as Powerlink and Energex.

A Fire Ant Management Plan will be produced for approval by officers of the DPI&F. The approved plan will be implemented prior to the commencement of construction activities in Fire Ant Declared areas.

#### **Post-construction issues**

Any activities during the post-construction period that occur in weed or pest infested areas should employ the same controls as those employed during the construction period.

### **5.7 Noise and vibration**

#### **Objectives**

In some situations the construction activities could result in an increase in background noise or vibration levels. It is SRWP's objective to minimise the environmental impact by minimising noise levels and to comply with the *Environmental Protection Act 1994*, Environmental Protection Regulation 1998 and the Environmental Protection (Noise) Policy 1997. Similarly, construction work methods that include blasting will be in accordance with AS 2187.2-1993, *Explosives - storage, transport and use* and with reference

to ANZECC's *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration, September 1990*.

#### **Performance criteria**

No noise complaints from nearby residences.

No significant negative or long-term impacts from noise or vibration on sensitive receptors (such as urban residences or listed native flora or fauna).

Implement and employ a blast monitoring program.

#### **Environmental work methods**

Environmental work methods have been developed to assist in noise management. Following is a list of appropriate work methods:

- EM7.1—Noise-sensitive area
- EM7.2—Noisy equipment required
- EM7.3—Blasting.

These will be included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

##### **EM7.1—Noise sensitive area**

In areas that are either highly sensitive to noise (e.g. schools and hospitals) or where the noise-generating works are very close to a receiver, the following measures should be implemented:

- Limit construction work on the site as follows:
  - standard hours are Monday to Saturday from 7.00 am – 6.30 pm
  - work outside these hours will only be undertaken if separately authorised by appropriate statutory authorities.
- Advise nearby affected residents about construction activities and the expected duration of works.
- Ensure that construction equipment and vehicles are properly noise attenuated and maintained in good working order.
- Increase the distance from the noise generator to the sensitive receiver.
- Direct noise away from the sensitive area by adjusting the orientation of the equipment.
- Dampen or line metal trays and bins.
- Schedule operations so that noisy equipment is used separately, rather than concurrently.
- Operate machinery as quietly as possible. For example, avoid the use of air brakes in trucks.
- Substitute noisy equipment for quieter equipment where possible. For example, substitute an electric engine for a combustion engine.

##### **EM7.2—Noisy equipment required**

Where it is not possible to substitute noisy equipment for quieter equipment, noisy equipment should be operated in the most unobtrusive manner possible. The following measures should be implemented when using loud equipment:

- Schedule operation so that noisy equipment is used separately, rather than concurrently.
- Keep equipment well maintained.
- If possible, operate machinery during hours when the number of people in the area is minimal.

- Where possible, use hoarding stockpiles and site sheds/buildings as noise barriers between equipment and sensitive areas.

### **EM7.3—Blasting**

A Blast Management Plan is being developed for the SRWP.

Blasting construction methods will be limited to areas where no other viable option is available. In order to mitigate the impacts of noise and vibration generated by blasting, the following measures should be implemented.

- Reduce the maximum instantaneous charge (MIC) by using delays, reduced hole diameter and/or deck loading.
- Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination.
- Exercise strict control over spacing and orienting all blast drill holes.
- Use minimum practicable sub-drilling which gives satisfactory toe conditions.
- Investigate alternative rock breaking techniques.
- Establish times of blasting to suit local conditions.
- Direct detonator initiation away from near residences.
- Use optimum type and depth of stemming.
- Initiate explosive column from bottom.

### **Monitoring and auditing**

The complaints register should be used to determine whether an activity is a source of nuisance to local residents.

If a noise complaint is received, the Environmental Officer will immediately assess the complaint and take steps to reduce the impact.

In addition, a Blast Monitoring Program will be required to be implemented to adequately assess the impacts of the construction method. A draft Blast Monitoring Program is provided below.

### **Blast Monitoring Program**

#### *General procedure*

The Monitoring Program will be developed with reference to the procedures described in AS 2187.2-1993, *Explosives - storage, transport and use* and with reference to the ANZECC's *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*, September 1990.

The blast emissions will be quantified for all blast events conducted at the pipeline excavation works.

#### *Predicted blast emission levels*

Blast emission (ground vibration and airblast) data from every blast will be used (via the site specific blast emissions site laws) to refine subsequent blast designs in order to control blast emission levels, particularly when blasting close to residences and other vibration-sensitive structures.

It is anticipated that, following the first 10 blasts, sufficient blast emission data will be available to determine the allowable range of maximum instantaneous charge (MIC) for a given offset distance. All subsequent blast emission levels will be predicted using the continually refined site laws.

#### *Blast monitoring*

The vibration and airblast monitoring for all blasts will be conducted at the closest residence(s) and other structures to the pipeline excavation works, using InstanTel vibration monitors.

These blast monitors are dedicated battery-powered units capable of measuring vibration in the frequency range 2-250 Hz down to 0.2 mm/s in the absence of an amplifier or 0.02 mm/s using a 10 times amplifier. The units can be set up to operate unattended, triggered by vibrations above a preset vibration threshold. In terms of vibration, the output from the unit gives the respective vibration levels in the three orthogonal directions in velocity, amplitude and acceleration.

Time history waveform data from the vibration and airblast source can also be printed out on site. Further detailed analysis can be conducted via the InstanTel software on a PC. Via this software, the blast reports for each blast can be generated, including the Fast Fourier Transform (FFT) frequency analysis data for vibration (in the three orthogonal directions), calibration and sensor-check data and the time history waveforms.

The InstanTel units that will be utilised for the blast monitoring include the MiniMate Plus units. The description of capability and technical information for these units is available upon request. Each unit carries a traceable calibration to a National Association of Testing Authorities laboratory and also conducts a self calibration of the unit and its transducers following each recorded vibration and airblast event.

#### *Monitoring locations*

At each nominated location/structure, the triaxial vibration velocity transducers will be attached to a 'stiff' part of the structure, in accordance with the procedures nominated in various international standards in relation to the assessment of structural damage from vibration. Airblast will be measured at a location adjacent to the structure.

Unless specific locations are nominated at the respective structures or equipment items, an aluminium plate will be adhered (using Araldite) to a stiff part of the structure or equipment either in the horizontal or vertical plane, to which the triaxial transducer can be bolted.

#### *Site law development*

The measured levels of vibration and airblast from the blasts will then be used to progressively compile prediction 'site laws' for blasting on the proposed site. These will aid the design of subsequent blasting.

In the site law plots, a line will be generated for the mean (50% exceedance) and the 20% exceedance (or one blast in five) for the measured vibration and airblast data.

As the initial blasting progresses, the vibration site laws will be used to verify, or determine, the allowable maximum weight of explosive to be used in the subsequent blasting based on the 20% exceedance prediction equations.

#### *Reporting on blasts*

Upon completion of the blasting exercise, a report on the results of the blasting will be compiled. This will include the background information to the blasting, description of the monitoring locations and instrumentation, monitoring results and the final site laws for vibration.

#### *Meteorological considerations*

Blasting will be avoided, where possible, under the following meteorological conditions:

- when winds are blowing from the blast site to the nearest receiver at a strength likely to enhance blasting impacts
- where there is heavy low level cloud
- where a temperature inversion is present.

#### *Notifying landowners or occupiers of blast events*

The closest residence(s) on the top of the Northbound Cutting will be contacted by telephone on the morning of blasting indicating an expected time of firing.

Wherever possible, the blasts will be conducted at the same time (nominated) time of day.

#### *Non compliance and corrective action*

Where the vibration and/or airblast monitoring identifies non-compliance with the relevant criteria, the contractor will plan and carry out corrective action.

The corrective action may involve supplementary monitoring in order to identify the source of the non-conformance and/or may involve modification of the blasting techniques or programme in order to avoid any recurrence or minimise its adverse effects.

#### **Complaint reporting**

In the event of a complaint associated with the generation of excessive noise, a report should be prepared detailing the complaint, corrective action and further monitoring required to minimise the potential for further complaints.

#### **Post-construction issues**

Any activities during the post-construction period that may generate excess noise should employ the same controls as those employed during the construction period.

### **5.8 Heritage**

At the time of writing, SRWP Alliance was in the process of obtaining endorsement of three Cultural Heritage Management Plans (CHMPs) by local Aboriginal groups.

#### **Objectives**

It is SRWP's objective to conduct all activities in a manner that will minimise the effect on heritage items. SRWP aims to:

- Protect Aboriginal sites, artefacts and areas of high cultural and heritage value.
- Develop and adhere to the requirements of the Cultural Heritage Management Plans (CHMP).

#### **Performance criteria**

There shall be no destruction of cultural or heritage sites or artefacts of high conservation value.

#### **Environmental work methods**

Environmental work methods will be developed as part of the CHMPs. The CHMPs are being developed in conjunction with the Aboriginal parties for the pipeline areas. Management techniques will only be finalised once the CHMPs have been approved. However, the CHMPs are likely to include work methods such as:

- EM8.1—Inductions
- EM8.2—Monitoring of works
- EM8.2—Heritage item not disturbed or destroyed
- EM8.3—Heritage item disturbed or destroyed
- EM8.4—Unexpected significant find

#### **EM8.1—Inductions**

All reasonable precautions are to be taken to protect cultural places from damage caused by construction and associated activities.

To assist in minimising unforeseen impacts to cultural heritage items, SRWP will ensure that relevant contractors and staff are provided with a cultural heritage induction.



#### **EM8.2—Monitoring of works**

The CHMP will identify where Aboriginal monitors are required on-site to observe construction activities. Monitors will alert construction crews to any heritage items discovered.

#### **EM8.2—Heritage item not disturbed or destroyed**

Where a heritage item has been identified and will be preserved during and after the upgrade works, the following measures should be implemented:

- Barricade the heritage item to prevent machinery movement near the item.
- Avoid construction activity near the heritage item where possible.
- The material will be moved to an agreed distance from the activity or collected by the traditional owners before construction. Such material will be stored and dealt with subject to the *Aboriginal Cultural Heritage Act 2003*, in accordance with the wishes of the traditional owners.
- Access to cultural item locations should be restricted to required personnel only, and contractors should adjust activities to ensure avoidance of any culturally significant sites during their activities.

#### **EM8.3—Heritage disturbed or destroyed**

Where a heritage item has been identified and will be disturbed or destroyed during the works, the following measures should be implemented:

- Assessment of significance by Aboriginal party or nominated archaeologist.
- Agreement on management treatment.
- Approval to disturb or destroy prior to work commencing.
- A tree guard should be used to protect the trunk of the tree against mechanical injury.
- Activities must be in accordance with EM5.4 (Flora and fauna—activities around vegetation).
- Avoid construction activity near a heritage tree where possible.

#### **EM8.4—Unexpected significant find**

During the Project, unexpected cultural heritage material or sites may be discovered. The CHMP will detail measures, which may include the following:

- All work at the location must cease and reasonable efforts to secure the site should be made. Work can continue at an agreed distance from the site. Note that the material should not be removed or disturbed further but barriers or temporary fences may be erected as a buffer around the remains if required.
- The Cultural Heritage Manager and Construction Manager should be notified. They will then notify the relevant parties.
- If material involves human remains then the police must be immediately notified.

#### **Monitoring and auditing**

The Construction Manager will check that the CHMPs are being implemented.

#### **Reporting**

A detailed report of any artefacts located during construction should be provided to the Cultural Heritage Coordination Unit of the Department of Natural Resources and Mines (NR&M).

## Post-construction issues

Any activities during the post-construction period that occur near, or may have an effect on heritage items, should employ the same controls as those used during the construction period.

## 5.9 Waste management

### Objectives

Waste of various forms will be produced during the Project. It is SRWP's objective to minimise the environmental impact by minimising waste generation and disposing of waste in the most appropriate manner.

Where waste is generated, SRWP will use sound management practices.

### Performance criteria

- Minimal waste generated by the project.
- No spillage or leaks of hazardous materials.
- No contamination of soil, air or water as a result of any spillages.

### Environmental work methods

Environmental work methods have been developed that provide a set of waste management techniques. The work methods include:

- EM9.1—Waste minimisation
- EM9.2—Off-site disposal
- EM9.3—Disposal bin
- EM9.4—Drainage pit/channel
- EM9.5—Hazardous materials.

These will be included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

#### EM9.1—Waste minimisation

The waste management hierarchy of 'avoid, reduce, reuse, recycle and dispose' should be used to determine appropriate materials for construction of the infrastructure:

- Avoid waste through optimising construction methods.
- Reduce waste through optimising construction methods and purchasing specifications.
- Reuse waste by actively seeking out sources that can reuse the waste generated.
- Recycle waste by actively seeking out sources that can recycle the waste generated.
- Burning of cleared vegetative matter is not allowed. Cleared vegetation shall be mulched on site and used as mulch during site rehabilitation. Use will be made of the Council's 'green waste' disposal area if required.

#### EM9.2—Off-site disposal

Where waste has been classified and is to be removed from site in an appropriate manner, commensurate with its classification, the following measures should be implemented:

- Any spoil that cannot be utilised on site is to be disposed at an approved location.
- Recycling is to be undertaken where possible. It may also be useful to separate the recyclable materials into separate piles on the site.

- All waste including hazardous materials removed from the site must be disposed of in a manner that minimises the risk to the environment or human health, and complies with the appropriate regulatory requirements.

#### **EM9.3—Disposal bin**

Where disposal of waste is necessary, the following measures should be implemented:

- A bin must be provided at the site construction that is suitable for the type of waste that will be disposed. For example a large dumpster would be suitable for standard construction waste, but not for liquid waste. Liquid waste may be generated from drilling in contaminated soils.
- The disposal bin must not be overfilled.
- Waste should be compacted as much as possible before disposal.
- Bins should be accessible to both visitors and staff.
- Waste minimisation should be encouraged both during construction and operation of the site.
- Prevent animals from accessing bins. This may require special lids or relocating the bin.

#### **EM9.4—Drainage pit/channel**

To prevent the pollution of waterways, the following measures should be implemented:

- Install litter traps at runoff sites from the site.
- Regularly inspect litter traps to ensure that they are working efficiently.
- Keep site free from litter. Regular (daily) ground inspections should be undertaken.

#### **EM9.5—Hazardous materials**

At the construction sites, herbicides may be used to control vegetation regrowth. Additional sources of hazardous materials include construction machinery fuels and oils.

- All contractors are to clean down their vehicles before commencement of the works. Compliance with this requirement is to be supervised by the Environmental Officer.
- Storage, safeguarding and warning signs shall be in accordance with regulations.
- Fuel storage shall be in accordance with AS 1940.
- An Emergency Response Contingency Plan is to be formulated for containment and rehabilitation of contaminated area and for the correct disposal of contaminated material.
- Contractors and other personnel shall be trained with regards to the Emergency Response Contingency Plan.
- Clean-up facilities, contaminated material and protective clothing are to be provided on site for use in the event of any spillages or leaks.
- Any ground distribution of herbicides is to be undertaken by, or under the direct supervision of, a licensed commercial operator.
- Distribution of herbicides is only to be undertaken using equipment approved for weed-spraying operations.
- All contractors are to clean down their vehicles before commencement of the works. Compliance with this requirement is to be supervised by the Environmental Officer.
- Vehicles and equipment may undergo daily field servicing, safety checks and refuelling in the field. Normal refuelling is not considered a great risk due to the equipment and fuel used, but spillage of any kind will be treated as a non-conformance and remedial action taken. Other routine and major servicing of vehicles will not be undertaken within the easement.

- In accordance with the *Agricultural Chemicals Distribution Control Act 1966*, any ground distribution of herbicides is to be undertaken by, or under the direct supervision of, a licensed commercial operator.
- Other routine and major servicing of vehicles will not be undertaken within the easement.

#### **Monitoring and auditing**

Monitoring of waste materials and their potential for reuse should be undertaken regularly.

In the event of a spill, the environmental impacts on the local ecology are to be assessed.

#### **Reporting**

- A report of materials used, recycled and reused should be prepared monthly, detailing where further reductions in waste generation can occur.
- The EPA is to be immediately alerted in the event of any significant environmental harm.
- The Environmental Officer is to report to the EPA the extent and nature of any spills or leaks and the proposed clean-up operations.

#### **Post-construction issues**

Any activities during the post-construction period that may generate waste should employ the same controls as those employed during the construction period.

### **5.10 Utilities and services**

#### **Objectives**

At some project sites, utility cables and services are close to the work site. It is SRWP's objective to maintain the integrity of any utility line or service in the vicinity of the pump station during construction and post construction activities.

#### **Environmental work methods**

Environmental work methods have been developed to ensure that the works do not adversely impact on existing services. Work methods include:

- EM10.1—Work near underground services
- EM10.2—Work near overhead services
- EM10.3—Clearing of trees.

These have been included where necessary on the appropriate construction drawings. Environmental work methods are described in detail below.

#### **EM10.1—Work near underground services**

Where an easement is located in close proximity to the work site, the following measures to prevent damage to the services should be implemented:

- Delineate the location of services.
- Avoid compaction of soil over an easement. It may be necessary to barricade the easement to prevent accidental vehicle movement over it.
- Avoid stockpiling of spoil upon an easement where possible.
- Minimise runoff along pipeline trench lines and the pipeline easements. Refer to 5.2 Water and stormwater management, on methods of redirecting runoff.

#### **EM10.2—Work near overhead services**

Overhead services, particularly powerlines, can constitute a safety threat. Prior to work commencing the following will be required:

- approval from utility owner
- approved Safety Plan
- appropriate training/induction of work crew
- traffic management measures in place.

#### **EM10.3—Clearing of trees**

When trees are to be cleared in close proximity to an easement, the trees shall not be felled onto the easement.

#### **Monitoring and auditing**

The Construction Manager is to regularly check compliance with utility owner requirements.

#### **Reporting**

The Construction Manager is to report to the SRWP Alliance on any incidents involving utilities and services.

#### **Post-construction issues**

Any activities during the post-construction period that may affect nearby services should employ the same controls as those employed during the construction period.

### **5.11 Safety**

#### **Objectives**

SRWP's objective is to create a safe working environment. This is to be done through the formulation, implementation and continuous improvement of Occupational Health and Safety procedures.

#### **Performance criteria**

No injuries to the public or workforce.

#### **Environmental work methods**

Accidents and incidents may occur during construction and operation. The nature of incidents is sufficiently predictable that prior preparation in the form of a Safety Plan and an Emergency Response Contingency Plan is warranted. These plans will be included in an overriding Crisis Management Plan for the project.

Site inductions for all personnel should include both safety and environmental aspects of all activities being undertaken on site.

Environmental work methods have been developed to encourage the use of safe work practices. A list of work methods follows:

- EM11.1—Storage compound
- EM11.2—Open excavation
- EM11.3—Emergency evacuation route.

These have been included on the relevant construction drawings where appropriate and are described in detail below.

#### **EM11.1—Storage compound**

Where a storage compound is to be located on site, the following measures should be implemented to promote health and safety:

- Provide adequate signage internally and externally. Signage should warn of hazards and dangers in accordance with the Australian Standards applicable to the hazard.
- The storage compound should be adequately fenced to prevent access.

#### **EM11.2—Open excavation**

Where an open excavation is required, the following measures should to be implemented:

- Secure the excavation site outside work hours. This may require fencing around the excavation, covering the excavation, or both.
- Provide adequate signage warning of the excavation hazard.

#### **EM11.3—Emergency evacuation route**

During all work on site the following OH&S measures should be implemented:

- Identify emergency procedures and communicate these to all personnel on site.
- Provide these emergency procedures and arrangements to the Department of Emergency Services.
- Identify fire fighting and fire safety arrangements.
- Provide adequate staff training.

#### **Monitoring and auditing**

Complete attendance records for staff training sessions and workshops.

The Construction Manager will provide regular and ongoing monitoring of health and safety issues at the site. The Safety Officer will carry out regular audits.

#### **Reporting**

The Construction Manager will report all incidents as required by the *Workplace Health and Safety Act 1995*.

#### **Post-construction issues**

Any activities during the post-construction period that occur on the site should employ the same OH&S controls as those employed during the construction period.

### **5.12 Visual amenity**

#### **Objectives**

To minimise the visual impacts of permanent structures on sensitive locations through strategic placement of the structures and appropriate revegetation.

#### **Performance criteria**

Any deterioration of the visual aesthetics at sensitive locations adjacent to the structures should be minimised.

## **Environmental work methods**

### **EM12.1—Design**

- Structural design should incorporate strategic placement of structures to minimise impacts on visual amenity.
- Designers should prepare an Environmental Enhancement Plan to establish aesthetically suitable treatments at sensitive locations. The plan should be prepared after consultation with affected property owners.

### **EM12.2—Housekeeping**

Ensure that construction laydown and stockpile areas are maintained in a tidy state and are located in an area of the site not visually intrusive off-site.

### **EM12.3—Vegetation and screening**

- Locate structures so that a vegetated buffer zone is retained on the authority property boundary. On a plan, clearly mark the structure site and the trees to be felled as a result.
- Where practicable, incorporate grass mounding and planting with dense screening vegetation to road frontages and to residential property boundaries.

## **Monitoring and auditing**

During the construction phase, the visual amenity of the Project shall be monitored regularly by the Environmental Officer.

Through the use of a complaints register, evaluate the impacts from the construction of the structures on the visual amenity of adjacent residents.

## **Reporting**

Visual assessments and enhancement reports will be prepared for sensitive locations.

In the event of a complaint from the community or other sensitive receptor concerning deterioration of visual amenity, a report should be prepared detailing the complaint, corrective action and further monitoring required to attend to the matter.

Reports on the success of environmental enhancement and revegetation shall be prepared following maintenance patrols.