

**Table 4B.24**  
**Compliance with Suggested Flora Survey Effort**

| Method  | Suggested Minimum Effort <sup>1</sup>  |  | As Carried Out   |
|---|--|--|--|
| Transects (or Traverse)   | Community 1 <sup>2</sup>   | 20 traverses of 100m each<br>= 2200m total traverse length | 6 traverses of average 800m each<br>= 4800m total traverse length  |
|   | Community 2 <sup>2</sup>   | 3 traverses of 100m each<br>= 300m total traverse length   | 3 traverses of average 800m each<br>= 2400m total traverse length. |
|   | Community 3 <sup>2</sup>   | 2 traverses of 100m each<br>= 200m total traverse length   | 2 traverses of average 800m each<br>= 1600m total traverse length. |
|   | Community 4 <sup>2</sup>   | 1 traverse of 100m   | 1 traverse of approx. 800m   |
| Random Meander  | 30 minutes for each quadrat sampled within the same stratification unit as the quadrat |  | Done   |
| Plot-based (Quadrat) Survey   | Community 1 <sup>2</sup>   | 20 quadrats  | 6 quadrats <sup>3</sup>  |
|   | Community 2 <sup>2</sup>   | 3 quadrats   | 3 quadrats   |
|   | Community 3 <sup>2</sup>   | 2 quadrats   | 2 quadrats   |
|   | Community 4 <sup>2</sup>   | 1 quadrat  | 1 quadrat  |
| Note 1: Community = Stratification Unit   |  |  |  |
| Note 2: Distribution of identified Community types are presented on <b>Figures 4B.26</b> and <b>27</b>                  |  |  |  |
| Note 3: Due to uniformity of stratification, greater survey effort was allocated to transect length than quadrat number |  |  |  |
| Source: Modified after Ecotone (2009) – Table 5   |  |  |  |

#### **4B.4.2.2.3 Fauna Surveys**

##### **Mine Site**

Field surveys for fauna were undertaken between 19 and 23 of January 2009. A summary of the survey methods and strategies is provided as follows.

##### **Habitat Assessment**

The type and condition of potential habitat for fauna species was investigated and recorded. Habitat features identified included:

- topographic features;
- the dominant vegetation community composition, structure and condition at all strata levels, ie. from ground to canopy cover;
- groundcover type and percentage cover;
- presence, location and quality of water sources;
- type and size of tree hollows;
- presence, number and condition of unique habitat features (such as caves, crevices, loose tree bark, rocks on rock and mistletoe); and
- level of disturbance.

During the habitat assessment, all opportunistic observations of fauna or faunal activity were recorded, including visual and auditory recognition of fauna species and identification of evidence of faunal activity (eg. nests, diggings, scratch marks, droppings).

##### **Trapping Sites**

Three trapping sites were established in the woodland areas of the western half of the Mine Site (see **Figure 4B.24**). The trapping sites were selected to sample the representative woodland vegetation types present and to cover the area of the Mine Site.



At each of the three trapping sites, the following trapping effort was undertaken.

- 25 terrestrial Elliott A and 10 arboreal Elliott B traps.
- Five terrestrial cage traps.
- One 30m pitfall fence with three buckets.
- 20 terrestrial medium, 20 terrestrial small and 10 arboreal small hair tubes.

### **Bird Surveys**

Each survey comprised one person hour of survey, ie. either by a single observer for one hour or by two observers for 30 minutes with birds identified either visually or by call. Where possible, bird surveys were undertaken during early morning or late afternoon. Two bird surveys were completed at each of the trapping sites and three additional bird surveys were completed at opportunistic habitat locations (see **Figure 4B.24**). Bird sightings were also recorded opportunistically during all other survey activities.

### **Reptile and Amphibian Searches**

Each survey comprised one person hour of survey, ie. either by a single observer for one hour or by two observers for 30 minutes, both during the day and at night. The nocturnal searches included both terrestrial and aquatic habitats. Where possible, diurnal searches were undertaken during early to mid morning or mid to late afternoon and nocturnal searches between early and mid evening. Two diurnal and one nocturnal search were completed at each of the trapping sites and two additional diurnal searches were completed at opportunistic habitat locations (**Figure 4B.24**).

### **Spotlight Surveys**

Both walking and driving spotlight surveys were undertaken between dusk and 1:00am over a single person hour (two observers) on each occasion. Both walking and driving spotlight surveys were undertaken at each of the three trapping sites, with driving spotlight surveys also undertaken across most of the Mine Site while travelling to and from trapping or other survey sites (**Figure 4B.24**).

### **Call Playback**

Call playback for the following species was undertaken at dusk or during early evening at each of the trapping sites (see **Figure 4B.24**).

- Squirrel glider (*Petaurus norfolcensis*).
- Koala (*Phascolarctos cinereus*).
- Barking owl (*Ninox connivens*).
- Masked owl (*Ninox novaehollandiae*).
- Powerful owl (*Ninox strenua*).



### Anabat Survey

Anabat detectors were used to record the echolocation calls of micro-bats at the three trapping sites for two nights and an additional opportunistic location for an additional night (see **Figure 4B.24**).

### Brine Storage Area and Water Pipeline Route

A supplementary fauna survey was undertaken over the Brine Storage Area (not included in the original field surveys) and proposed water pipeline route between the Mine Site and Namoi River on 6 and 7 August 2009. The survey involved opportunistic fauna survey over the entire footprint of the proposed Brine Storage Area and water pipeline route including:

- recording of species sighted or heard;
- koala scat searches at the base of trees (1m radius);
- the opportunistic rolling of rocks and logs; and
- the identification of species presence from signs and traces such as scats and scratch marks.

Ecotone (2009) reports that the survey effort complied with that recommended by DEC (2004). The survey area for the supplementary survey is depicted on **Figure 4B.25**.

## 4B.4.3 Results of the Flora Surveys

### 4B.4.3.1 Regional Threatened Flora

Ecotone (2009) identified 17 threatened flora species as being known to occur within the region. Of these, only two have been recorded within the study locality (see **Table 4B.25**).

**Table 4B.25**  
**Rare or Threatened Flora Previously Recorded Within the Study Locality**

| Scientific Name  | Status  |          | Records (Region) | Records (Locality) |
|--|---------|----------|------------------|--------------------|
|  | TSC Act | EPBC Act |                  |                    |
| <i>Bertya opposens</i> <sup>1</sup>  | V       | V        | 5                | 4                  |
| <i>Boronia ruppia</i>  | E1      | ~        | 1                | 0                  |
| <i>Bothriochloa biloba</i>   | U       | V        | 3                | 0                  |
| <i>Cadellia pentastylis</i>  | V       | V        | 41               | 9                  |
| <i>Cyperus conicus</i>   | E1      | ~        | 2                | 0                  |
| <i>Dichanthium setosum</i>   | V       | ~        | 1                | 0                  |
| <i>Digitaria porrecta</i>  | E1      | E        | 3                | 0                  |
| <i>Hakea pulvinifera</i>   | E1      | E        | 9                | 0                  |
| <i>Haloragis exalata</i>   | V       | V        | 2                | 0                  |
| <i>Homopholis belsonii</i>   | U       | V        | 4                | 0                  |
| <i>Lepidium aschersonii</i>  | V       | V        | 28               | 0                  |
| <i>Philothea ericifolia</i>  | V       | V        | 2                | 0                  |
| <i>Polygala linariifolia</i>   | E1      | ~        | 1                | 0                  |
| <i>Pomaderris queenslandica</i>  | E1      | ~        | 1                | 0                  |
| <i>Pterostylis cobarensis</i>  | V       | V        | 1                | 0                  |
| <i>Rulingia procumbens</i>   | V       | V        | 3                | 0                  |
| <i>Swainsona murrayana</i>   | V       | V        | 1                | 0                  |
| Note 1: = <i>Bertya</i> sp. A Cobar-Coolabah   |         |          |                  |                    |
| <b>Status (TSC Act):</b> refers to the NSW <i>Threatened Species Conservation Act</i> 1995 (TSC)                                 |         |          |                  |                    |
| E1 Schedule 1, Part 1: Endangered Species  |         |          |                  |                    |
| V Schedule 2: Vulnerable Species   |         |          |                  |                    |
| U Unprotected (not listed in Schedule 13 of the NPW Act 1974 or in the TSC Act 1995)   |         |          |                  |                    |
| <b>Status (EPBC Act):</b> refers to the Commonwealth <i>Environment Protection and Biodiversity Conservation Act</i> 1999 (EPBC) |         |          |                  |                    |
| E Endangered Species   |         |          |                  |                    |
| V Vulnerable Species   |         |          |                  |                    |
| Source: Modified after Ecotone (2009) – Table 2  |         |          |                  |                    |



One NSW Wildlife Atlas record of *Bertya opposens* occurs within the Mine Site, although it is noted that its position was only given to an accuracy of 1 000m. In recognition of this record, the noted location was used as the basis for the location of Flora Quadrat 1 (see **Figure 4B.24**), and this species was particularly targeted during the survey at this site.

A total of 27 additional species previously recorded in the region are listed on the ROTAP database but are not protected under either the TSC Act or EPBC Act.

Two additional known or predicted flora species were identified following a review of the BIOCLIM database, namely:

- *Thesium australe* (Austral Toadflax): known from Liverpool Plains (Part B) subregion; and
- *Tylophora linearis*: Predicted to occur in Pilliga (Part A) and Pilliga Outwash subregions

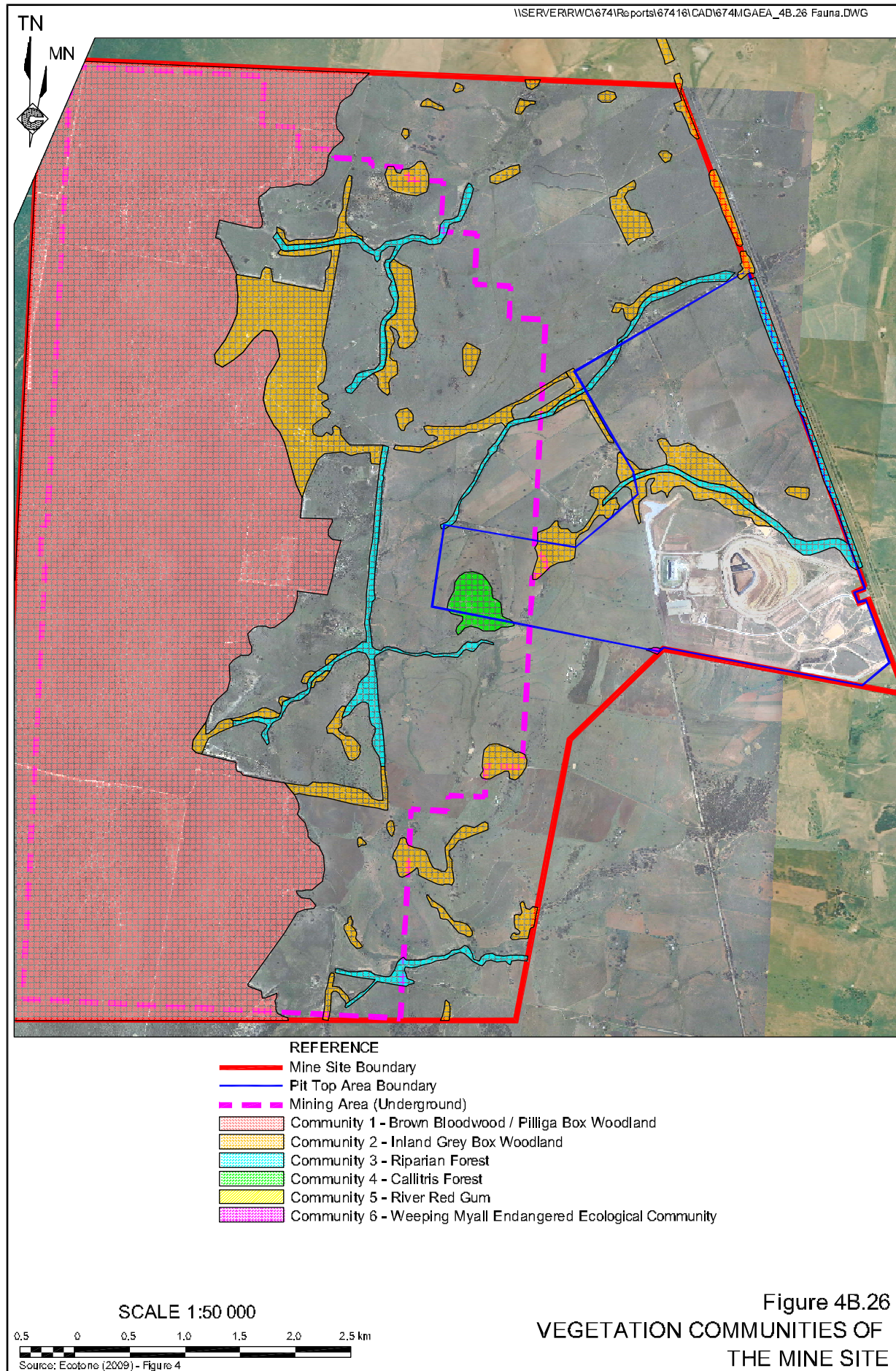
#### 4B.4.3.2 Existing Vegetation

##### 4B.4.3.2.1 Vegetation Communities of the Mine Site

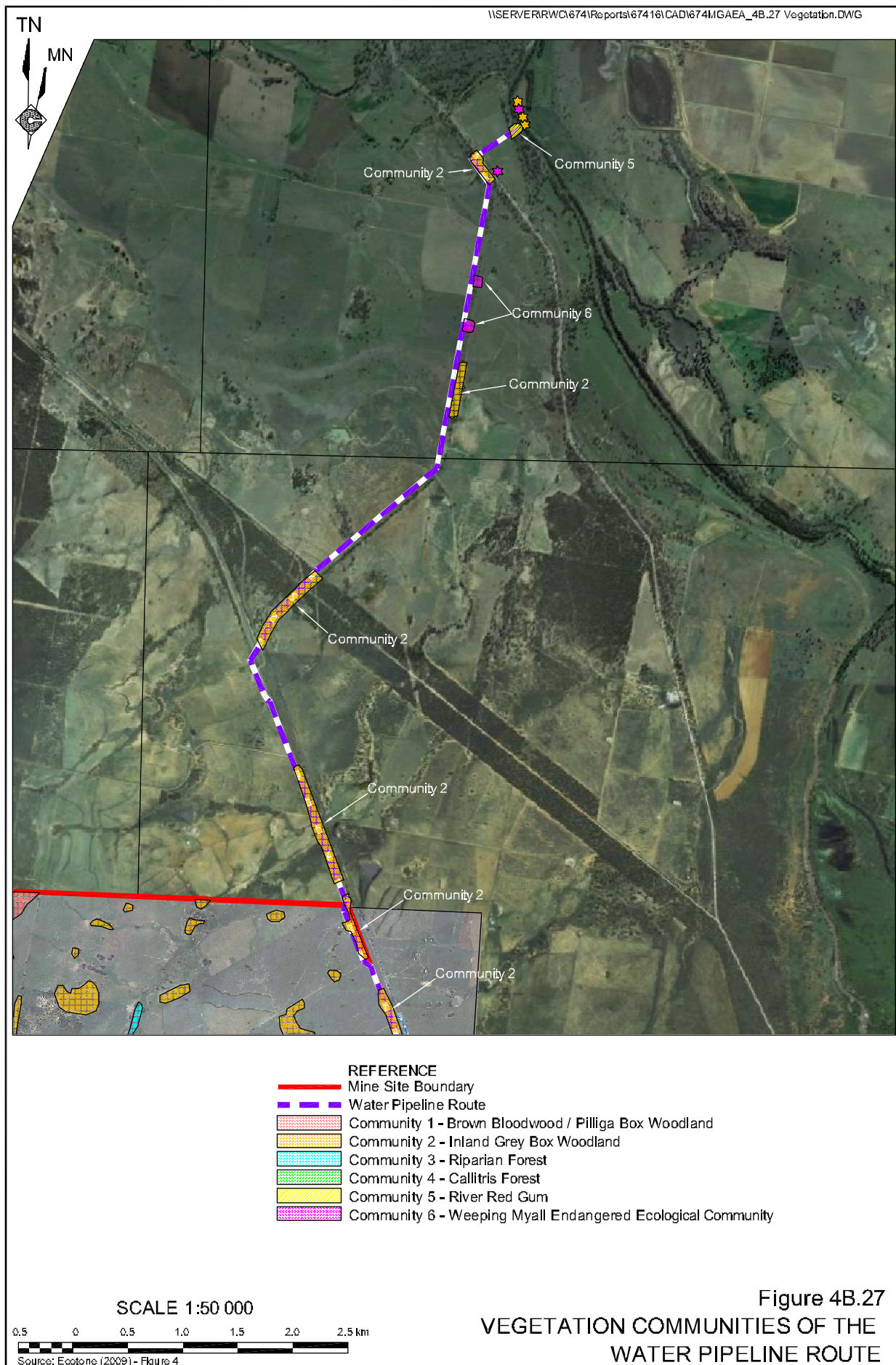
Six broad natural or predominantly native vegetation community types occur within the Mine Site and water pipeline route (see **Figures 4B.25** and **4B.26**). These communities also reflect types of faunal habitat, with both listed as follows.

- Community 1 - Brown Bloodwood / Pilliga Grey Box / Red Ironbark Woodland (Sandstone Slopes Woodland).  
Occurring on the undulating sandstone slopes and ridgetops of the Mine Site on sandy / sandy loam or rocky soil, this community ranges from low mallee woodland with dense shrub layer to open forest with sparse shrub layer. The tree layer is mostly sparse and dominated by Brown Bloodwood, Pilliga Grey Box and Red Ironbark. A dense shrub layer of tall wattles is often present.
- Community 2 – Inland Grey Box / Bimble Box / Blakely's Red Gum Woodland (Lower Flats and Floodplain Woodland).  
This modified, partially cleared and disturbed woodland community is dominated by adapted to or tolerant of drier conditions, with occasional inundation due to flooding. Tree species include Bimble Box, Western Grey Box and Blakely's Red Gum. Most areas of this community have been modified by agricultural activities with partial clearing of the shrub layer and at least occasional grazing of the groundcover.
- Community 3 – River She Oak / Belah / Inland Grey Box Forest (Riparian Forest).  
This community has been partially cleared but remains a relatively intact open forest to woodland dominated by casuarinas and species adapted to higher water availability including River She Oak, Belah, Blakely's Red Gum, Spiny Mat Rush over very dense shrub and sparse ground cover.









**Figure 4B.27**  
**VEGETATION COMMUNITIES OF THE**  
**WATER PIPELINE ROUTE**

