

4 DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 Climate

Based on the Köppen classification⁴, the climate of the Logan/Albert catchment is humid sub-tropical. Winds predominate from the south to southwest in winter-spring and southeast to northeast in summer-autumn. The study area is affected by northern monsoons and, to a lesser degree, by winter weather patterns from the south. Summer rains are generally high intensity and associated with thunderstorms, monsoonal troughs or tropical cyclones.

Teviot Brook is a naturally intermittent stream. Most high flow events occur during the wetter months of December through to March, resulting in summer-dominant flow regimes. Rainfall shows considerable inter-annual variation, resulting in a high degree of natural streamflow variability (DNRMW, 2006b).

4.2 Landform, Geology and Soils

4.2.1 Geology and Landform

The study area (incorporating the dam site, inundation area and immediate catchment area) is located mainly on Jurassic Period sandstone and siltstone sediments of the Marburg Formation. The smaller central section of the study area comprises Triassic-Jurassic sediments of the Woogaroo Subgroup. Sediments of the Marburg Formation form a major landform feature of the southern Moreton Region and are characterised by undulating hills and rises to steep hills. Teviot Brook and the associated valley essentially separates the steep hills and mountains of the Dugandan Range to the south from the isolated peaks and ranges of the Flinders Peak complex to the north. Sediments of the both the Marburg Formation and Woogaroo Subgroup are also characterised by shallow texture contrast soils (refer **Section 4.2.2**) with outcrops of sandstone and siltstone being common. These sediments are stable in the geophysical context and the area is not subject to earthquakes or other landform stability problems.

Teviot Brook forms a relatively narrow and incised channel through these landforms. There is only minor development of Quaternary alluvium adjacent to the main channel, reflecting the confined nature of the valley within the study area.

The catchment of the proposed dam and up to the western limit of the study area is comprised mainly of sediments of the Jurassic Walloon Formation. This formation is characterised by undulating hills and rises with a lower elevation than the Marburg and Woogaroo Subgroup formations.

⁴ Köppen classification - the climate of each region based on temperature and rainfall, as indicated by the native vegetation.

4.2.2 Soils and Susceptibility to Degradation

The soils associated with the Marburg Formation and Woogaroo Subgroup comprise mainly shallow texture contrast soils (sandy and loamy solodics and soloths; Noble *et al* 1996) that are highly susceptible to sheet and gully erosion. Subsoils commonly have high levels of salinity and are strongly sodic. Significant erosion is evident in much of the grazing land within the immediate catchment of the Teviot Brook channel, reflecting the susceptibility of the soils to degradation and high stocking rates on mainly native or low quality improved pastures.

The soils associated with Quaternary alluvium on the terrace adjacent to the main stream channel are mainly fine-textured soils with medium clay subsoils. The alluvium and sediments within the main stream channel become sandier as the dam site is approached, reflecting the increasing dominance of the sandy Marburg Formation sediments within the catchment area.

Soils associated with the Jurassic Walloon Formation in the dam catchment upstream of the inundation area are comprised of grey and brown 'scrub' soils and loamy solodics. These soils also have high levels of salinity in the subsoil and are strongly sodic. Salinity outbreaks, albeit localised, are evident in some low lying areas near Teviot Brook, notably to the east/ north east of Boonah in the catchment area of the dam. High salinity levels in many of the subsoils are reflected in elevated conductivity levels in water quality monitoring (refer **Section 4.9.3**). The cause of this salinisation is discussed in Noble (1996). Salinity issues associated with agricultural activities in the Teviot Brook catchment have also been addressed in the study into the irrigation suitability of Teviot Brook (Christianos, *et al* 1986).

4.2.3 Good Quality Agricultural Land

A significant portion of the low sloping lands and alluvial terraces adjacent to Teviot Brook within the study area has been classified as Good Quality Agricultural Land (GQAL) (as per State Planning Policy 1/92: Development and Conservation of Agricultural Land) within the Boonah Shire Council Town Planning Scheme and Strategic Plan. All alluvial and colluvial lands of less than 5% slope have been classified as Class A Crop Land (i.e. GQAL). All remaining lands have been classified as Class C₂ Native Pastures and are not considered to be GQAL. No lands have been classified as GQAL within the Beaudesert Shire component of the study area. As noted in **Section 4.1**, there is only a small area of cropland within the study area.

4.3 Land Use and Tenure

4.3.1 Upstream Catchment Conditions

The catchment of Teviot Brook above the dam site has an area of 546 km². The upper parts of the catchment are bounded by the junction of the McPherson and Great Dividing Ranges. From here, the catchment and main watercourse head in a generally north-easterly direction for approximately 99 km to the dam site.

The upper parts of the long and narrow catchment are relatively steep and heavily timbered. The town of Boonah is the only major urban area in the catchment. The land use in the lower parts of the catchment is dominated by agricultural uses, primarily cattle grazing. However, there is more intensive usage including cropping and horticulture in the valley mainly upstream of Boonah.

4.3.2 Regional Land Use Patterns

The proportion of catchment area occupied by various types of land use in the Logan and Albert River catchments is summarised in **Table 4-1**.

Table 4-1 Major land uses (km²) in the Logan/Albert catchment
(Source: DNRMW, 2006b)

Land use	Logan	Albert	Total
Residential	114	19	1323
Commercial/Industrial	12	1.5	13.5
Rural	2325	572	2897
Forest	297	114	411
Other	252	43.5	295.5
Approximate total catchment area (km ²)	3000	750	3750

Rural

The dominant land use in the two catchments is rural. Grazing is the most widespread land use, although more intensive forms of agriculture such as including dairying, forage cropping, turf farming and horticulture, occur on river flats in the major valleys, including areas downstream of the proposed Wyaralong Dam, primarily on the alluvial flats of the Logan River. At local spatial scales, beef cattle pasture represents the dominant land use in the Teviot Brook sub-catchment, including the proposed dam impoundment area. The alluvial flats of Teviot Brook upstream of the inundation area and primarily to the south of Boonah are intensively used with irrigation water sourced from underground and surface supplies. Much of the uplands in the Coulson/Milbong/Boonah area were heavily utilised in past decades by intensive dairy farming, reflecting the presence of 'scrub' soils. However, the decline in the dairy industry has resulted in the establishment of permanent pasture over most of the cleared area. Most properties in the upland areas are too small to be commercially viable for full-time rural pursuits and 'hobby farming' or part time rural production has become prevalent.

Forests

Forests represent approximately 11% of the total Logan/Albert catchment area (refer **Table 4-1**). Most of this land is situated on steep slopes that are generally unsuitable for agriculture.

Residential

The most extensive urban development in the Logan/Albert catchment occurs at the northern end of the catchment around Logan, (i.e. the local catchment of the Logan/Albert estuary). Other major population centres include Beenleigh, Beaudesert, Boonah, Jimboomba, Rathdowney and Canungra. Rural-residential land use occurs around the major population centres, particularly in the northern part of the Logan catchment.

At a more local scale, the township of Beaudesert is located ~14.2 km southeast of the dam wall and ~12 km from the closest portion of the impoundment area. The township of Boonah is the closest major service town to the dam site, located approximately 8 km south west of the most upstream limit of the impoundment area. There are no other major service towns within a 10 km radius of the dam site. The village of Gleneagle is located ~8 km to the east of the proposed Wyaralong Dam site. Boonah and the small village of Mount Alford are the only population centres within the dam catchment. Rural residential type developments are found on the outskirts of Boonah. The Coulson area immediately upstream of the upper limits of the inundation area is a relatively concentrated area of small lot rural type settlement.

The Boonah sewage treatment plant (STP) is the only STP located upstream of the proposed impoundment area within the catchment. Effluent from the Boonah STP is re-used on land for irrigation purposes. The Beaudesert STP is situated downstream of the impoundment area on the Logan River.

4.3.3 Land Uses within Inundation area

Figure 3-1 illustrates land uses within the proposed inundation area of the dam. Uses comprise predominantly broadscale grazing of beef cattle on native and low-quality improved pasture with only small areas of forage cropping. Some relic extractive industry operations have been undertaken on the sandy alluvium in the lower sections of Teviot Brook and feeder streams while turf farming has been undertaken in the past. An extensive area of plantation forestry has been established in the immediate southern catchment area of the proposed storage.

4.3.4 Land Ownership

The proposed dam impoundment area is situated within two local government areas: Boonah Shire and Beaudesert Shire. Most of the impoundment area is situated in Boonah Shire, except for the eastern-most extent, which includes part of the dam wall.

The lots situated within the impoundment area are shown on **Figure 4-1**. The proposed dam impoundment area covers an area of approximately 1560 ha of land, the majority of which is currently freehold land.

The nearest residence to the dam wall is located on Lot 5 WD1110. Some 10 residences occur within the impoundment area and the 200 m buffer zone. Details are not available at this stage to determine haul road routes and numbers of residences potentially affected by the proposed works.

4.3.5 Conservation Estates and Other Protected Areas

There are no National Parks or State Forests within a 10 km radius of the impoundment area. The headwaters of the Logan-Albert River catchment, located in the southern sections of the catchment, contain two National Parks. The Moogerah Peaks National Park contains the headwaters of several tributaries of Teviot Brook near Boonah. The Lamington National Park contains headwaters streams of the Albert and Logan Rivers. The Lamington Plateau is listed as a World Heritage area.

The estuarine and lower reaches of the Logan-Albert system, and the receiving environment of Moreton Bay, have high ecological, conservation and fisheries values. Areas of high conservation value that are specifically protected in conservation estates include Moreton Bay Marine Park, Moreton Bay Ramsar and Jumpinpin–Broadwater Fish Habitat Area (refer **Section 4.12**).

4.4 Historic and Cultural Heritage

The Mulanjali People and the Jagera People are the Aboriginal Traditional Owners of the Wyaralong Dam site (DNRMW 2006c). As a large proportion of this land is under private ownership, it has not been routinely accessed by Aboriginal Traditional Owners for some time, and there are no recorded cultural heritage sites in this area. The southern side of Teviot Brook was identified by DNRMW (2006c) as important to the Mulanjali people for many reasons, including the collection and use of cultural resources (such as food), and activities (social and spiritual ceremonies). As rivers and streams were traditionally well used by Aboriginal Traditional Owners, DNRMW (2006c) suggests that there is some potential for artefacts to be found both before and during construction. Further engagement with the Mulanjali and Jagera people will be required as part of the planning and impact assessment process.

No items were identified on the Register of the National Estate or the Queensland Heritage Register within or directly adjacent to the dam site.

4.5 Social, Economic and Planning Environment

The area of inundation of the dam plus the associated buffer zone is essentially a rural environment with a low settlement density. Most landholders would be expected to gain at least part of their income from rural activities. As noted earlier, the region in proximity to the dam including the catchment is also strongly dependant on rural activities although a growing proportion of the population commute to the major employment centres of Ipswich and Brisbane as well as Beaudesert and Boonah. Beaudesert and Boonah serve as the primary service centres to the region and most community facilities, including hospitals, medical facilities and educational facilities are present in both towns. The water supply for Boonah is sourced from the Boonah-Kalbar Water Supply Scheme (on Reynolds Creek in the Bremer River catchment) while Beaudesert town water is derived from the Logan River.

The Boonah and Beaudesert Shires Town Planning Schemes and Strategic Plans zone the general area of the dam as Rural with a 200 ha minimum lot size for subdivision purposes.

The Boonah Town Planning Scheme (gazetted 1995) identifies the prospective presence of the Wyaralong dam site, inundation area and buffer zone. Lower sloping land within the inundation area is identified as GQAL (refer **Section 4.2.3**) while all forested land is identified in the scheme as having either Regional or State conservation values. No extractive industry Key Resource Areas (KRA's) have been identified in the inundation area although the Boonah Shire Strategic Plan has identified an extractive industry site near the central area of the potential impoundment. The Draft Beaudesert Scheme (2005) identifies the Wayarlong dam site and adjacent lands as a 'Rural Production, Conservation, Recreation Area'.

The Bromelton Industrial Area to the east is a significant agglomeration of existing (and potential) industrial activity in the region.

4.6 Existing Infrastructure

4.6.1 Road and Rail

The study area is traversed by one main road (the Boonah – Beaudesert Road) and a number of minor unsealed roads and tracks that mainly provide access to individual farm residences. The Boonah-Beaudesert Road is classified by the Main Roads Department as a Regional Road and provides an important southern linkage between the New England Highway and the Beaudesert/Gold Coast regional transport network. This road passes close to the channel of Teviot Brook at a number of points and traverses two main tributary streams that flow into Teviot Brook i.e. Crows Creek and Lower Sandy Creek. The western end of the Boonah Beaudesert Road terminates at the Ipswich Boonah Road approximately 1 km to the west of the FSL of the dam.

There are four bridge crossings over Teviot Brook within the potential impoundment area. Such bridges are timber structures designed for local traffic only and would have a low flood immunity.

4.6.2 Power and Telecommunications

No significant transmission lines pass through the study area. Local residents are connected to the external grid by low voltage lines used for domestic purposes only. A Telstra optical fibre cable passes through the study area.

4.6.3 Shire Facilities

No significant shire facilities were identified within the study area.

4.6.4 Private Infrastructure

Most forms of private infrastructure are limited to facilities for on-farm operations. These include farm storages, windmills/bores and stockyards.

As noted above, the built environment comprises predominantly individual homesteads/ residences within a rural environment. It is estimated that there are some 10 residences within the potential impoundment area and associated buffer zone. All residences are located within 1 km of Teviot Brook or Crows Creek.

4.7 Air and Noise

Little information on the air quality and noise environment within the study area is available. The area surrounding the proposed Wyaralong dam site is largely rural grazing lands with the closest built-up residential area is Boonah, located 8 km to the west of the proposed dam. Isolated single residences occur along the length of the impoundment area. The nearest single residence to the dam wall is located approximately 4 km to the south of the wall.

The surrounding area contains several noise sources, including factories at Bromelton, quarry operations (including sand extraction activities on Teviot Brook approx 6 km to the north and other operations on Allan and Woollaman Creeks), light industry and agricultural activities (i.e. grazing, turf farming, cropping). The Boonah-Beaudesert Road (which is a sealed dual lane local access road carrying low levels of private and commercial traffic) passes to the south of the inundation area. Due to the proximity to a road and grazing paddocks, the site would experience low background noise levels. Noise sources would include cars, trucks, agricultural equipment, heavy plant equipment and barking dogs. The potential for noise related disturbance during the construction of the dam will require assessment in the EIS.

As with noise, the relative isolation of the site means that there would be limited existing adverse impacts on air quality within the impoundment area. With the possible exception of dust releases during construction, the proposed dam is unlikely to have any adverse impacts on air quality.

4.8 Landscape and Visual Character

The landscape character of the Teviot Brook area is typical of a rural area, with steep slope areas relatively well vegetated, and lowland areas predominantly pasture lands. Dams and associated infrastructure are typical features of rural landscapes, and tend to merge with the rural character.

4.9 Surface Water

4.9.1 Hydrology

The mean annual rainfall for the catchment is approximately 970 mm/annum. However, the southern, steeper upstream parts of the catchment experience higher mean annual rainfalls in the order of 1100 mm/annum.

The mean annual flow from the catchment is estimated to be 42,500 ML/annum at the proposed dam site which represents approximately 95% of the estimated pre-development mean annual flow. The median annual flow is estimated to be 23,000 ML/annum representing approximately 90% of the estimated pre-development median annual flow.

Peak 1% Annual Exceedance Probability (AEP) flood flows are estimated to be 1350 m³/s occurring in a critical rainfall event of 18 hours duration. The total volume of flow from this event is estimated to be 107,000 ML (more than twice the mean annual flow).

4.9.2 Water Uses/Logan Basin Draft WRP

The Logan Basin Draft WRP (DNRMW, 2006b) describes the water usage in the catchment as follows:

“Water resource development in the catchment of Teviot Brook consists of unsupplemented extraction for stock, domestic and irrigation, which has led to reductions in depths and durations of low flows, and increased the duration of zero flows and incidence of dry spells.”

Water supplies for agricultural purposes within the dam catchment comprise in-stream and off-stream surface supplies and some groundwater usage. Potential for increased irrigation development in Teviot Brook is limited due to risks of salinisation and small yields in upper catchment areas (Christianos *et al*, 1986). There is some potential for expansion of irrigation on the alluvial flats of the Logan River to the west and north-west of Beaudesert and /or supplementation of existing supplies. These existing supplies comprise extraction from the Logan River (flows supplemented by regulated flows from Maroon Dam) and groundwater sources. Water from Wyaralong Dam will largely enter the potable supply system but some will be available as supply to allocation holders in conformance with the Logan Basin Draft WRP. No significant new irrigation development is envisaged for the area.

4.9.3 Water Quality

Land use in the surrounding Teviot Brook catchment area is predominantly rural, with livestock grazing (cattle) as the most widespread use (DNRMW, 2006b). Surrounding catchment land uses including livestock grazing, cropping, sand/gravel extraction and urban influences (including stormwater runoff and wastewater treatment plant discharges from Boonah) have largely contributed to the degradation of existing water quality. The Bromelton area has a number of industries that produce effluent, including an abattoir, rendering plant, gelatine plant, stock feed plant, pet food manufacturing plant, feedlots, saw mills, sugar mill, a dairy cooperative, a concrete plant and fertiliser plant (Horn and Wong, 1998).

Unsupplemented extraction of water from Teviot Brook is also identified to have affected water quality by reducing flows and hence effectively reducing flushing and concentrating pollutants (DNRMW 2006b). Existing water quality during low flows is characterised by high conductivity due to the influence of saline groundwater and elevated salinity levels in soils of the Walloon and Marburg sediments. Also of note is that unusually high levels of copper have been recorded in the catchment, however the source is unknown (DNRMW, 2006b).

The Logan Basin Draft WRP Environmental Investigations Report: Volume I – Summary Report (July 2006) identifies that existing water quality in Teviot Brook has undergone moderate change from reference conditions. This is generally consistent with Ecosystem Health Monitoring Program (EHMP) studies for the Logan River Catchment, which identified that freshwater streams in the catchment for the year 2005 were generally in very poor condition, with an overall report card rating of “D”.

Under the Environmental Protection (Water) Amendment Policy (No. 1), 2006, environmental values (EVs) and water quality objectives (WQOs) have been established to protect Queensland's waterways. However, EVs and WQOs have not yet been scheduled under the *Environmental Protection (Water) Policy 1997* (EPP Water) for freshwater reaches or tributaries of the Logan River. Thus, under the EPP Water the WQOs for a waterway not defined in Schedule 1 are the set of WQOs that will protect all EVs for the water (s11[2]). The following lists EVs for Queensland waters that may be applied to the project site:

- Aquatic Ecosystem (slightly-moderately disturbed);
- Human Consumers of Aquatic Foods;
- Primary Recreation;
- Secondary Recreation;
- Visual Recreation;
- Cultural and Spiritual Values;
- Industrial Use;
- Aquaculture; and
- Drinking Water Supply.

Existing environmental values for the project site should be determined during the EIS to enable a more thorough assessment to be undertaken on the impacts of the proposed project.

4.10 Groundwater

The Logan Basin Draft WRP Environmental Investigations Report: Volume I – Summary Report describes the groundwater resources in the Logan Basin as follows:

“Most of the groundwater resources in the study area are found in the alluvial aquifers of the Logan and Albert Rivers. The groundwater baseflow component is likely to be chemically variable, depending on local aquifer material. Long and Lloyd (1996) established that the Logan/Albert system follows a relatively simple model of recharge in the southern sector, with regional groundwater flowing northward with an associated increase in total dissolved salts, which is partly the result of evaporative concentration. As reported by Please et al. (1996), to the north the water gets ‘older’, suggesting that direct recharge to the aquifer in this region is either a very slow process through the unsaturated zone or it is negligible. Horn and Wong (1998) reported almost all groundwater in the catchment is abstracted from depths of between 5m and 25m. The primary use for this groundwater is for irrigation and private supplies on farms (Please et al., 1996).”

Groundwater conditions within the potential inundation area and immediate catchment area of the dam are understood to be mainly of low volume and/or with elevated conductivity levels. Some groundwater may be used for stock watering and limited irrigation.

4.11 Terrestrial Ecology

This assessment involved a review of ecological data to identify any known or likely flora and fauna species and/or areas and communities of conservation significance within or directly adjacent to the study area (i.e. the dam site, inundation area and immediate environs). The following datasets were used in this assessment:

- aerial photography;
- 2003 Remnant regional ecosystem (RE) mapping prepared by the Queensland Herbarium (QH) (V5.0);
- SEQ Biodiversity Planning Assessment Mapping prepared by the EPA (V3.4) (March, 2005);
- online RE maps produced by the Queensland Environmental Protection Agency (EPA); and
- threatened species records from the EPA's Wildlife Online database and the EPBC Act database.

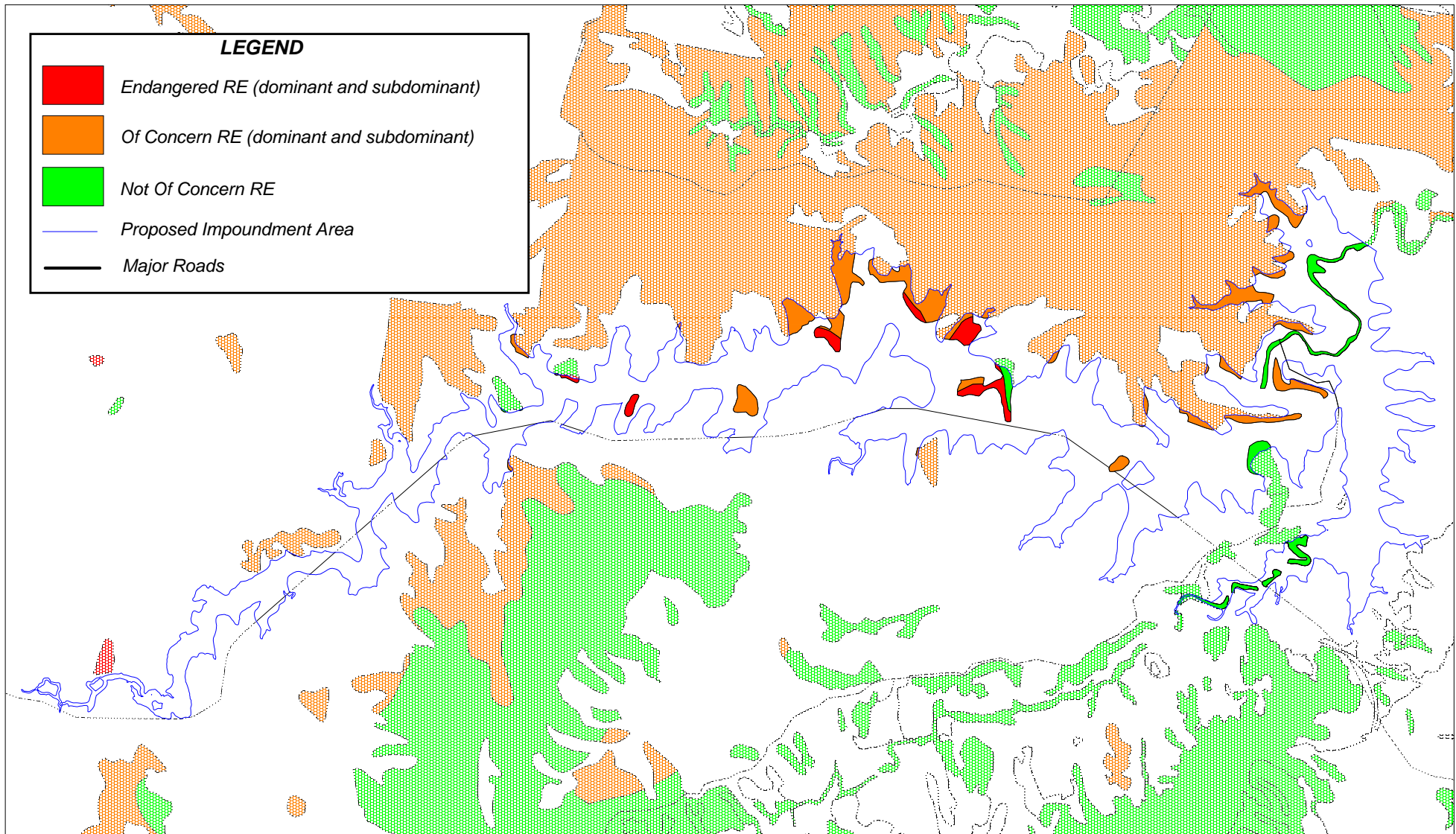
Appendix A presents the outputs of the data search.

4.11.1 Terrestrial Flora

Based on the certified 2003 remnant RE mapping produced by the QH (refer **Figure 4-2**), approximately 90% of the study area has been cleared and currently supports non-remnant vegetation dominated by grazing pasture.

The remainder of the study area supports remnant vegetation comprised of:

- mixed eucalypt woodland to open-forest on undulating hills (approx. 100 ha);
- fringing riparian communities (approx. 23 ha);
- *Eucalyptus tereticornis* open forest/woodland on alluvial plains (approx. 22 ha); and
- freshwater swamps on floodplains (approx. 6 ha).



2003 Remnant Regional Ecosystems (Qld Herbarium, 2006)

Figure 4-2

Remnant vegetation in the study area occurs mainly on the edges of large, contiguous remnant patches and remnant riparian vegetation is mainly confined to the eastern section of Teviot Brook. Details are as follows:

- five RE's have been mapped in the study area. The majority, i.e. 96 ha, is classified as *Not Of Concern* under the VMA;
- 32 ha of *Of Concern* remnant vegetation has been mapped in the study area;
- 22 ha of Endangered RE has also been mapped in the study area. RE 12.3.3 is comprised of *Eucalyptus tereticornis* open-forest to woodland on alluvium. This community provides potential habitat for rare and threatened flora species and *E. tereticornis* grow into very large hollow-forming trees, which have high habitat value for fauna. (Refer **Table A, Appendix A**)

A search of the EPBC Act database indicates that the study area potentially supports three Commonwealth listed endangered ecological communities including Brigalow (*Acacia harpophylla* dominant and co-dominant), Swamp Tea-tree (*Melaleuca irbyana*) Forest of Southeast Queensland (Critically Endangered) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered). However, none of these communities have been mapped within or directly adjacent to the study area on RE maps, and they are not expected to occur.

A search of the EPBC Act database and EPA's online database, WildNet, indicate that the study area potentially supports 37 rare or threatened plant species (refer **Table B, Appendix A**). Potential habitats for such species will be the subject of future survey and investigations for the EIS.

4.11.2 Terrestrial Fauna

A search of the EPBC Act database and EPA database, WildNet, indicates that the study area potentially supports 48 fauna species of conservation significance, including 10 bird species; 1 frog species; 1 insect species; 7 mammal species; 3 reptile species; 8 migratory terrestrial species; 3 migratory wetland species; and 15 marine species (species which may utilise the study area periodically as fly-over and/or breeding) (refer **Table C, Appendix A**).

No essential habitat for threatened fauna species have been mapped in the study area on the EPA's online RE mapping (accessed June 2006). However, based on the vegetation types mapped in the study area the following species may occur within the following habitats within the impoundment area. Such habitats will be the subject of future survey and investigations.

Birds

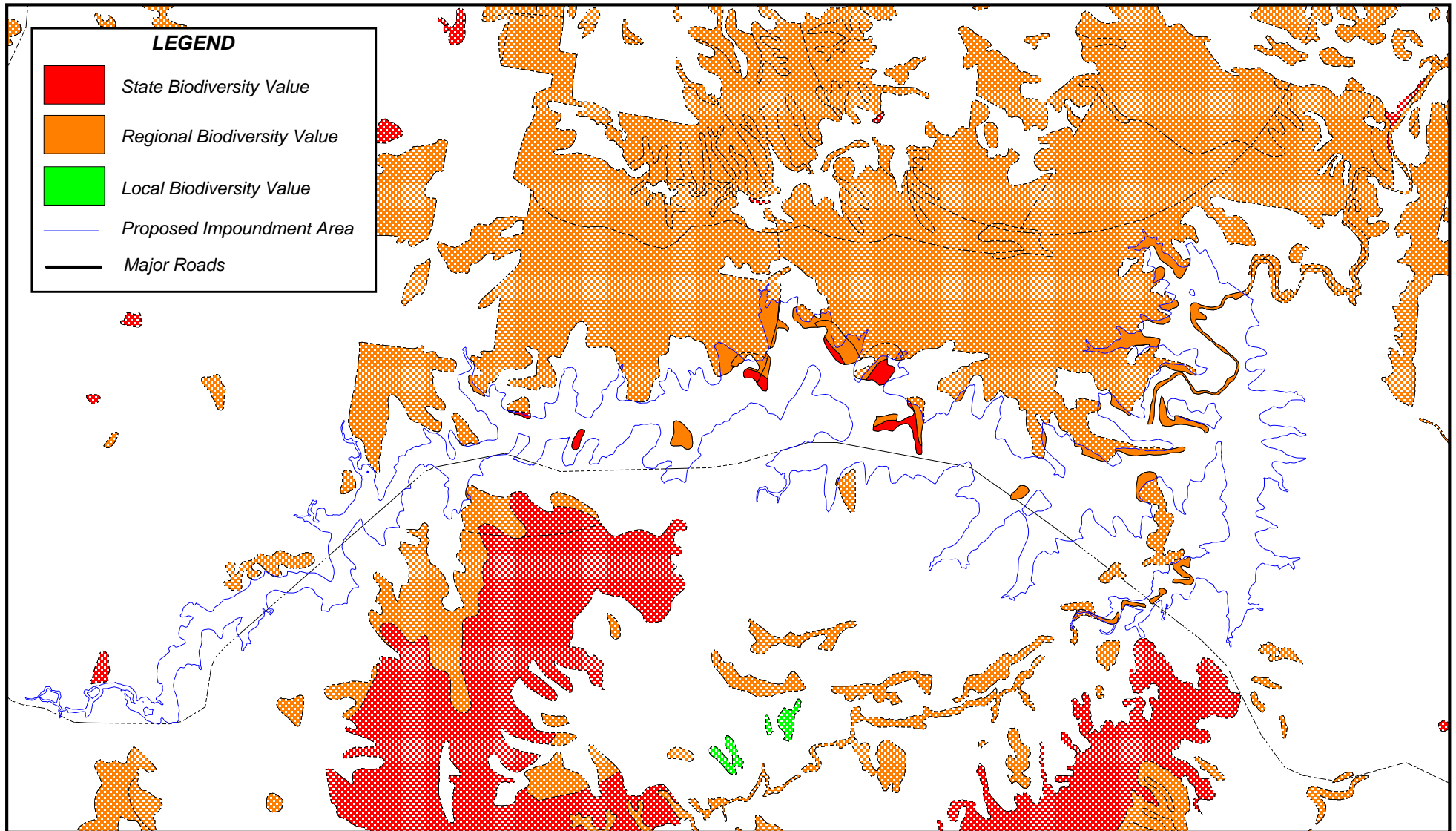
- Black-necked Stork (*Ephippiorhynchus asiaticus*). Permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands.
- Red Goshawk (*Erythrotriorchis radiatus*). Mainly found along or near watercourses, in swamp forest and woodlands on the coastal plain. Favours patches of dense forest interspersed with open woodland or cleared land.
- Squatter Pigeon (*Geophaps scripta scripta*). Grassy woodlands and plains, prefers sandy areas usually close to water.
- Swift Parrot (*Lathamus discolor*). Eucalypt communities.

- Black-throated Finch (*Poephila cincta cincta*). Eucalypt woodland and riverside vegetation, including paperbark and acacia shrubland.
- Australian Painted Snipe (*Rostratula australis*). Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, low scrub or open woodland.
- Regent Honeyeater (*Xanthomyza phrygia*). Inhabits dry open forest and woodland and riparian forests of River She Oak. Habitats generally have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.

Mammals

- Large-eared Pied Bat (*Chalinolobus dwyeri*). Roosts in caves, crevices in cliffs, frequenting low to mid-elevation dry open forest and woodland.
- Spotted tail Quoll, SE mainland population (*Dasyurus maculatus maculatus*). A range of habitat types, including rainforest, open forest, woodland and inland riparian forest. Use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces.
- Koala, SEQ bioregion (*Phascolarctos cinereus*). Inhabit eucalypt woodlands and forests.
- Grey-headed flying fox (*Pteropus poliocephalus*). Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands and swamps.

No areas of essential habitat for threatened species or State Wildlife Corridors have been mapped in the study area. However, the majority of habitats in the study area are considered to have regional biodiversity value because they contribute to north-west bioregional corridors along Teviot Brook (refer **Figure 4-3**).



Biodiversity Planning Assessment Mapping (Qld EPA, 2005)

Figure 4-3

4.12 Aquatic Ecology

4.12.1 Flora

Riverine habitats occur within and/or adjacent to the impoundment area. DNRMW (2006b) recorded 47 freshwater aquatic macrophyte taxa from stream reaches potentially affected by the proposed Wyaralong, Tilleys Bridge and Glendower Dam sites. Exotic or naturalised taxa comprised >20% known to occur within the assessment reaches, including two declared weeds, water hyacinth (*Eichhornia crassipes*) and salvinia (*Salvinia molesta*). Significant infestations of these two species were not observed during site inspections of the impoundment area in August 2006.

Ribbon weed (*Vallisneria spiralis*) is the only listed aquatic macrophyte species known to occur in the study area examined by DNRMW (2006b). This species is listed as Rare under the Queensland *Nature Conservation (Wildlife) Regulation 1994* (NCWR), but is reportedly widely distributed and abundant in Southeast Queensland (DNRMW, 2006b).

Approximately 6 ha of floodplain wetlands (RE 12.3.8) have been mapped in the study area (refer **Figure 4-2**). Characteristic species include *Cyperus* spp., *Schoenoplectus* spp., *Philydrum lanuginosum*, *Eleocharis* spp., *Leersia hexandra*, *Triglochin procerum*, *Nymphaea* spp., *Nymphoides indica*, *Persicaria* spp., *Typha* spp., and *Pennisetum alopecuroides*.

4.12.2 Fauna

Few aquatic invertebrate species are listed under Australian nature conservation legislation (Dunn, 2003), and of those none occur in the Logan River catchment. The iconic Lamington spiny crayfish (*Euastacus sulcatus*) is present in the upper reaches of the Logan/Albert River system, although this species is not considered threatened under Commonwealth or State legislation.

The Australian Lungfish (*Neoceratodus forsteri*) has been stocked in the Albert River catchment, but has not been recorded in catchment waterways despite extensive sampling (reviewed by Pusey *et al.* 2004). The Australian Lungfish is listed as a vulnerable species under the EPBC Act, and is specifically protected under the Queensland *Fisheries Act 1994*. Two other non-indigenous native fish of conservation significance have been stocked in Logan/Albert catchment: Southern Saratoga (*Scleropages leichardti*) and the Silver perch (*Bidyanus bidyanus*). The Australian Society of Fish Biology lists Southern Saratoga as Lower Risk–Near Threatened, and Silver perch as Vulnerable.

Native populations of a cod (*Maccullochella* sp.), possibly Mary River Cod (*Maccullochella peelii mariensis*), were recorded in the Logan and Albert River catchments prior to the 1940's. This species is thought to be extinct in the catchment, and its identity remains unknown (Pusey *et al.*, 2004). Inland and southern Australian populations of Purple-spotted gudgeon (*Mogurnda adspersa*) and Agassiz's glassfish (*Ambassis agassizii*) have suffered large declines, and in these areas they are considered threatened. The population status in southern Queensland coastal streams remains secure (Pusey *et al.*, 2004), and both are likely to occur in the Teviot Brook system.

Four species of freshwater turtles belonging to the family Chelidae, all of which are indigenous, have been recorded from the Logan/Albert catchment (*Elseya latisternum*, *Chelodina expansa*, *Chelodina longicollis*, *Emydura krefftii*). None of these species are listed as threatened under the NCWR. These species have varying tolerances to habitat modifications associated with water infrastructure.

Platypus (*Ornithorhynchus anatinus*) may utilise pool habitats that occur in the upper sections of the study area. A range of other riverine dependent frog, bird and other reptile species are known or likely to occur in the study area, as discussed in **Section 4.11.2**.

4.13 Coastal and Near-shore Environments

Teviot Brook flows into the Logan River which ultimately discharges into southern Moreton Bay approximately 100 km downstream of the proposed Wyaralong Dam wall. The estuarine reaches of the Logan-Albert River system supports habitats of high ecological, conservation and fisheries values. Particularly notable areas of high environmental value include:

- Moreton Bay wetland, which is listed as an internationally significant wetland under the Ramsar convention. This wetland contains important habitats for local and migratory waterbirds, many of which are listed under the NCWR and/or JAMBA and/or CAMBA international agreements. Furthermore, the wetland contains important habitats for marine and estuarine fisheries species, and megafauna of conservation significance (e.g. dugongs, turtles, dolphins etc.);
- Jumpinpin–Broadwater Fish Habitat Area, which extends from the mouth of the Logan River into southern Moreton Bay and the Broadwater;
- Carbrook Wetland Aggregation in the lower Logan River, which is listed as a wetland of national significance in the Directory of Important Wetlands in Australia (Environment Australia⁵, 2001); and
- Queensland EPA has assessed the northern section of the study area (including the estuarine reaches only of the Logan/Albert Rivers) as part of its Environmental Values Projects and identified parts of southern Moreton Bay as being High Ecological Value waters (EPA, 2006).

The EIS should consider the effects of the proposed water infrastructure development on hydraulic, geomorphic, water quality and ecological processes operating in these downstream environments, and impacts to environmental values. Consideration of the effects of reduced freshwater flows and sediment loads, as well as barrier effects, need to be considered. Such an assessment will need to take into account the effects of other proposed water infrastructure, most notably the recently approved Cedar Grove Weir on the Logan River, approximately 12 km downstream of the Wyaralong Dam. An EIS for that project was undertaken in 1998.

⁵ Now known as Commonwealth Department of Environment and Heritage