APPENDIX D-7 3D VEGETATION ASSESSMENT OF MARYLANDS ACCESS ROAD AND QUARRY SITES

3D Environmental
vegetation analysis and mapping specialists

Terrestrial Flora Assessment

Connors River Dam Project – Supplementary Survey

for the

Snowfields Quarry Sites, Marylands Access Road, Sarina-Marlborough Road Access Road Upgrade.

Prepared by 3d Environmental

for

SunWater

8 February 2011

Table of Contents

1.0 Introduction

This report provides an assessment of terrestrial floristic values potentially impacted by supplementary infrastructure to be developed in association with construction of the Connors River Dam. The information provided within complements the existing EIS study of the broader dam development site and as such, is provided in summary form. Areas of supplementary infrastructure assessed within are

- potential quarry sites on the Marylands and Doreen properties (Snowfields quarry development areas north, central and south);
- an access road from the Connors River Dam to Marylands property; and
- upgrade of the Marlborough-Sarina to dam wall access road.

1.1 Scope

The study scope as provided by SunWater is to provide a floristic assessment of all infrastructure components. The study extends to:

- review of data collected for the broader EIS and a determination of its relevance to the subject assessment areas;
- review and presentation of the current DERM mapping for REs (VMS and BDS), high value regrowth and essential habitat for subject areas;
- review of aerial photography and establishment of preliminary vegetation line work;
- completion of field survey in accordance with EIS methodology, in particular with respect to mapping of REs;
- specifically target the existence or otherwise of listed threatened species or communities (State or Federal);
- preparation of ground-truthed RE mapping and spatial distribution of any threatened species or communities found; and
- prepare tables listing the area of all REs, their Vegetation Management and Biodiversity status and the area of each within the respective assessment areas.

The last point, “the area of each within the respective assessment areas” was not completed because it was clear from investigations that minor realignment of road centrelines within the mapped 1 km wide area could substantially alter this result. Such realignment will require engineering investigations.

2. 0 Methods

2.1 Desktop Literature Review

Survey data and reports compiled during the EIS survey (3d Environmental, 2008) were reviewed a to determine their relevance to the existing study. Selected database search tools and were re-generated and reviewed to provide up to date information relevant to the current study area. Re-assessment of databases was limited to:

- the Commonwealth's EPBC Online Protected Matters Search Tool;
- the Queensland Herbarium's HerbRecs database;
- DERMs Wildnet database;
- DERMs Regional Ecosystem Description Database (DERM 2009a)
- the DERM Regional Ecosystem digital data (DERM 2009b); and
- DERMs High Value Regrowth Database (DERM 2009c).

2.2 Aerial Photograph Analysis

The most recent hard copy aerial photography was utilised for stereoscopic assessment, being 1:40 000-scale photography (Connors Range QAP6119, 2004). Stereoscopic review was completed in reference to available certified RE Mapping with recent satellite imagery derived from Google Earth (date not defined) utilised to .establish current vegetation/clearing boundaries. To be consistent with earlier studies, aerial photograph interpretation aimed to delineate polygons down to a minimum size of 0.25 ha, equating to a mapping scale of 1:25 000 for all components of the study.

2.3 Field Survey

Field survey utilised two ecologists over a 5-day period in January 2011 (3.5 field survey days). The potential Snowfields quarry sites and the Marylands to dam wall access road were surveyed on foot due to landowner concerns about the serviceability of site access points following recent heavy rains. The Marlborough – Sarina to dam wall access road was surveyed rapidly with the use of a vehicle. Conditions during the survey were hot (36ºC) and ground conditions in all flood plain locations were soggy. Grass covers were fertile and a large number of trees were in flower owing to favourability of seasonal conditions.

Survey sites were chosen from aerial photograph analysis to ensure that the field survey targeted a representative range of habitats within the study area and provided sufficient coverage to support revised regional ecosystem mapping. Sites were added opportunistically throughout the field survey to provide a more complete data coverage and allow verification of the mapping units. Field survey method followed Queensland Herbarium standards as identified in Neldner et al. (2005) with quaternary level sites utilised most frequently to ensure adequate site coverage. A total of 76 quaternary and 1 secondary site were completed over the various components of the study area. The location of survey sites is provided in Figure 1 with summary site descriptions provided at the rear of the report.

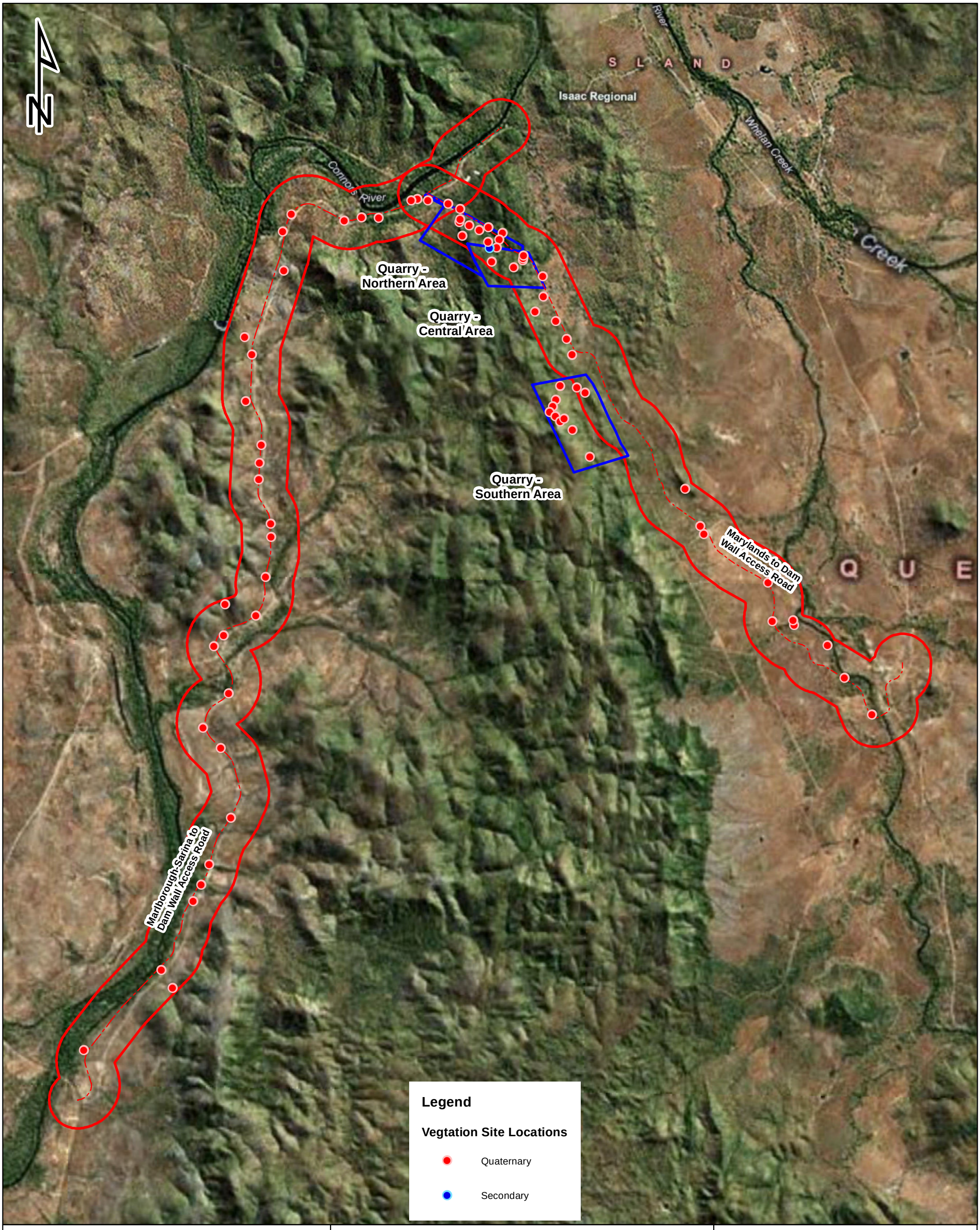

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Figure 1. Vegtation Site Locations

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0 1.5 3 4.5 6

Kilometres

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3. 0 Results

3.1 Database Searches

Summarised results derived from a range of database searches are provided in Table 1 with a brief overview provided below.

Herbrecs / Wildnet Database: An updated search of the Herbrecs database to account for more southerly location of proposed infrastructure (NE and SW corners defined as -21.8070/149.2554 and -22.1489/149.0086 respectively) aimed to capture all vouchered terrestrial flora specimens lodged at the Queensland Herbarium. The database included records submitted to the Queensland Herbarium through the course of previous EIS studies and returned 123 individual collections representing 117 species including two species of threatened flora (*Cerbera dumicola* and *Eucalyptus raveretiana*). The presence of these two threatened species was replicated in a search of DERMs Wildnet Database, although no other threatened species are indicated.

EPBC Act Online Data: Results of the online search of the EPBC Act database (NE and SW corners of an area defined by -22.0057/149.2317 and -22.1998/149.059N buffered to 1km) covering the study area revealed that four plant species listed as nationally Vulnerable, or their associated habitats, may occur in the vicinity of the inundation area. These taxa are:

- *Eucalyptus raveretiana* (Myrtaceae), Black Iron Box;
- *Cycas ophiolitica* (Cycadaceae);
- *Leucopogon cuspidatus* (Ericaceae); and
- *Taeniophyllum muelleri* (Orchidaceae) Minute Orchid or Ribbon-root Orchid. (This species should be discounted. Recent revisions have separated *T. muelleri* from *T. norfolkensis*. The former is widespread in Qld with the latter being restricted to Norfolk Island. The EPBC Act has not been updated to account for this taxonomic revision).

The EPBC search results for the study area indicates the potential presence of the following threatened ecological communities:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions; and
- Natural Grasslands of the Queensland Central Highlands.

Regional Ecosystems: Regional Ecosystem's according to DERM (Version 6.0, 2009a) within the proposed study area including a 500 m buffer around proposed road alignments (1km wide mapped easement), are identified in Table 2. Up-to-date descriptions of RE's are accessed through the REDD database (DERM, 2009b).

Table 1. Significant flora species - potential occurrences from datasets

Species Name	Conservation Status		H'BRECS records in search area	H'BRECS Records in Project area	C'VEG Records	W'Net Records	EPBC Online	Other Sources	Potential Essential Habitat	Comments
	NCA Status	EPBC Status								
Actephila sessiliflora	NT	-	0	0	0	0	0	Hyder (1999)	11.12.4 8.12.16 8.12.1a	A widespread species known from Paluma Range south to Yarool near Monto in understorey of dry rainforests where it may be locally common (Forster 2005). Hyder (1999) recorded the species from Araucarian vine thick*et a*lthough no locational data is provided.
Cerbera dumicola	NT	-	1	1	0	1	0			Recorded in surveys undertaken in conjunction with the Connors River Dam EIS. Known from a single locality within vine thicket at the location of the proposed dam wall (3d Environmental, 2009).
Cycas ophiolitica	E	E	0	0	0	0	1	REDD	-	No records from vicinity of project area.
Eucalyptus raveretiana	V	V	1	0	1	1	1	Hyder (1999)	11.3.4 11.3.25b 8.3.3a	Known from Funnel Creek catchment. Potential for occurrence in riparian open forests and woodlands. Single record within search area recorded during surveys undertaken in conjunction with the Connors River Dam EIS (3d Environmental, 2008).
Leucopogon cuspidatus	V	V	0	0	0	0	1	REDD	11.12.18	Not known from area (Qld Herbarium 2007) however with potential to occur on steep hillslopes within eastern margin of buffer area.

Spatial representation of REs and Vegetation Management Status in the project area is provided in Figure 2 with Biodiversity Status shown in Figure 3. DERMs RE mapping is presented at a scale of 1:100 000 which generally delineates polygons of >20ha and a minimum polygon size for remnant vegetation (isolated by non-remnant vegetation) of 5 hectares (ha).

High Value Regrowth: The location of High Value Regrowth (HVR) as mapped by DERM (2009c) is provided in Figure 2. This indicates regrowth derived from 'of concern' regional ecosystems located on floodplain areas of the Marylands to Dam Wall Access Road and the Marlborough Sarina to Dam Wall Access Road. It is inferred that these habitats are regrowth communities derived from regeneration of RE11.3.4.

Table 2. Regional ecosystems (as per DERM, 2009a) currently mapped within the supplementary study areas including a 500m buffer.

Regional Ecosystem	Short Description (DERM 2009a)	Areas Present	Vegetation Management Status	*Biodiversity Status*
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains.	1, 2a, 2c, 3	OC	OC
11.3.9	*Eucalyptus platyphylla*, *Corymbia* spp. woodland on alluvial plains.	1, 3	LC	NCAP
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.	1, 3	LC	NCAP
11.12.1	*Eucalyptus crebra* and/or *E. melanophloia* +/- *C. erythrophloia* shrubby woodland. Occurs on igneous rocks. Also includes localised areas dominated by *E. persistens*.	1, 2a, 2b, 2c, 3	LC	NCAP
11.12.2	*Eucalyptus melanophloia* woodland on igneous rocks	1	LC	NCAP
11.12.4	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	1, 2c	LC	NCAP

1. Marylands to dam wall access road; 2a. Snowfields Quarry Site – North; 2b. Snowfields Quarry Site - Central 2c; Snowfields Quarry Site – South; 3. Marlborough – Sarina to dam wall access road.

3.2 Field Survey

3.2.1 Vegetation Classification

Vegetation Communities of National Significance: No vegetation communities listed as significant under the EPBC Act (1999) were identified in the study area, inclusive of the 500 m buffer. Reference to DEWHA (2001b) indicates that the Regional Ecosystem 11.12.4, being on granitoid lithology, is not included under the EPBC classification.

Quarry - Northern Area

Quarry - Central Area

Quarry - Southern Area

Marylands to Dam Wall Access Road

Marlborough-Sarina to Dam Wall Access Road

Legend

High Value Regrowth

- Containing Endangered regional ecosystems
- Containing Of Concern regional ecosystems
- Is a Least Concern regional ecosystem

Vegetation Managment Status

- Endangered Dominant
- Endangered Sub-dominant
- Of Concern Dominant
- Of Concern Sub-dominant
- No Concern at Present
- non-rem

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Figure 2. Vegetation Managment Status and High Value Regrowth

Client

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Kilometres

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1:62,837	DG	DS	C:\3D Environmental\Connors River\3d_con_riv_A3P	02/02/11	A3

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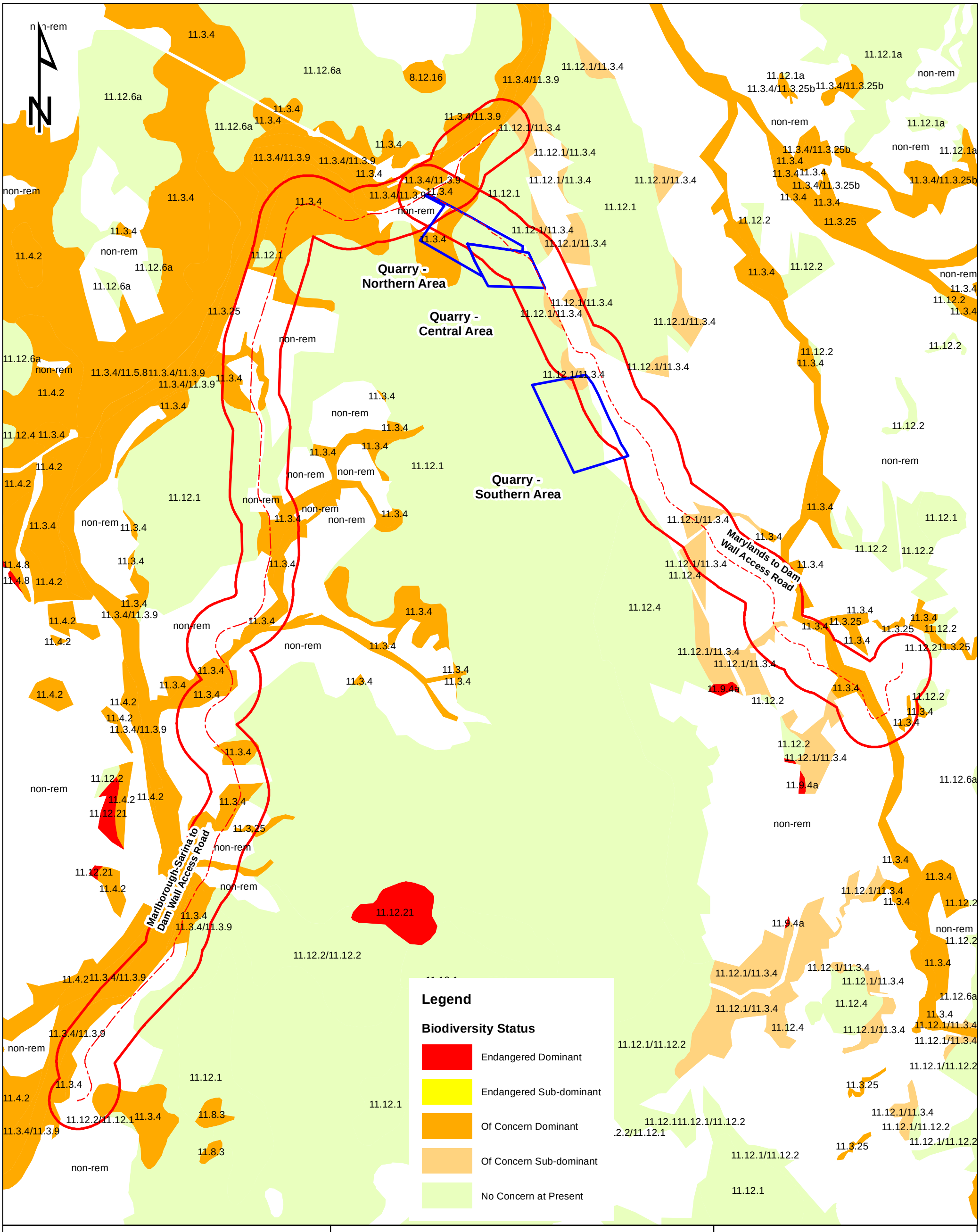

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Figure 3. Biodiversity Status

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Vegetation of State Significance: Observed Regional Ecosystems: Vegetation communities are classified into RE's based on landform association, bioregional affiliation, structural type and floristic assemblage. Table 3 identifies eight RE's within the study area (including proposed road locations and quarry sites). An additional three RE's (8.12.16, 11.12.8 and RE11.3.9) are represented in mapping although assessment of these has been included in earlier EIS investigations and they are not considered further in this report. The statewide significance based on Vegetation Management Status (VMS) and ecological sensitivity of these ecosystems (biodiversity status) is also indicated in Table 3 with the spatial distribution of these REs provided in Figure 4, Vegetation Management Status in Figure 5, and Biodiversity Status in Figure 6. Areas of regrowth and their inferred derivation is represented in Figure 7 and is intended to provide a more detailed assessment of the distribution of regrowth vegetation based on field survey than is provided by DERM (2009c).

Table 3. Regional ecosystems within supplementary study areas based on revised mapping.

Regional Ecosystem	Short Description (DERM 2009b)	Areas Present	Vegetation Management Status	Biodiversity Status
11.3.4/ 11.3.4a	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains.	1, 3	OC	OC
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	1, 3	OC	OC
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines. 11.3.25b: Riverine wetland or fringing riverine wetland. *Melaleuca leucadendra* and/or *M. fluviatilis, Nauclea orientalis* open forest.	1, 3	LC	OC
11.3.9	*Eucalyptus platyphylla*, *Corymbia* spp. woodland on alluvial plains.	1, 3	LC	NCAP
11.5.9	*Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains/remnant surfaces.	1, 3	LC	NCAP
11.12.1	*Eucalyptus crebra* and/or *E. melanophloia* +/- *C. erythrophloia* shrubby woodland. Occurs on igneous rocks. Also includes localised areas dominated by *E.*	1, 2a, 2b, 2c, 3	LC	NCAP

Regional Ecosystem	Short Description (DERM 2009b)	Areas Present	Vegetation Management Status	Biodiversity Status
	persistens.			
11.12.2	*Eucalyptus melanophloia* woodland on igneous rocks	3, 1, 2a, 2b, 2c	LC	NCAP
11.12.4	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	1, 2a, 2b, 2c	LC	NCAP

1. Marylands to dam wall access road 2a. Snowfields Quarry Site – North 2b. Snowfields Quarry Site - Central 2c. Snowfields Quarry Site - South 3. Marlborough – Sarina to dam wall access road

Notes on Vegetation Classification in the Study Area: Vine thicket in the vicinity of the dam wall is represented as RE8.12.16 in mapping produced in earlier EIS surveys, being classified as an outlier of the Central Queensland Coast Bioregion (CQCB). This classification is based on proximity to the CQCB which encompasses hills and escarpments north-east of the dam wall, as well as a floristic assemblage which is consistent with descriptions of CQCB vine thicket types. The often well developed tracts of vine thicket observed in this study (Photograph 1), particularly in the north and central Snowfields EIS areas, have been mapped as RE11.12.4 within the Brigalow Belt Bioregion (BBB). Justification for this classification is that these thickets are 4 km south of the CQCB boundary and are geographically linked to the much drier hillslopes and escarpments to the south and west of the study area. It should be noted however that floristic variation from habitats represented as RE8.12.6 in the vicinity of the dam wall and inundation area are subtle.

Eucalyptus shirleyi dominant habitat RE11.12.8 was recognised in proximity to the dam wall during earlier phases of the EIS study. In the absence of available fertile material (capsules and buds), floristic identification of *Eucalyptus shirleyi* was based on vegetative material, tree habit and herbrecs collections of *Eucalyptus shirleyi* located in the proximity. Fertile material collected during the current survey confirms the dominance of *Eucalyptus melanophloia* in similar habits within the Snowfields quarry areas (Photograph 2). This opens the possibility that those habitats classified as RE11.12.8 near the dam wall may be better represented as RE11.12.2 (a least concern RE), although reclassification will require collection of fertile plant material to confirm. The implications of should be considered in the context of requirements for *Vegetation Management A*ct Offsets.

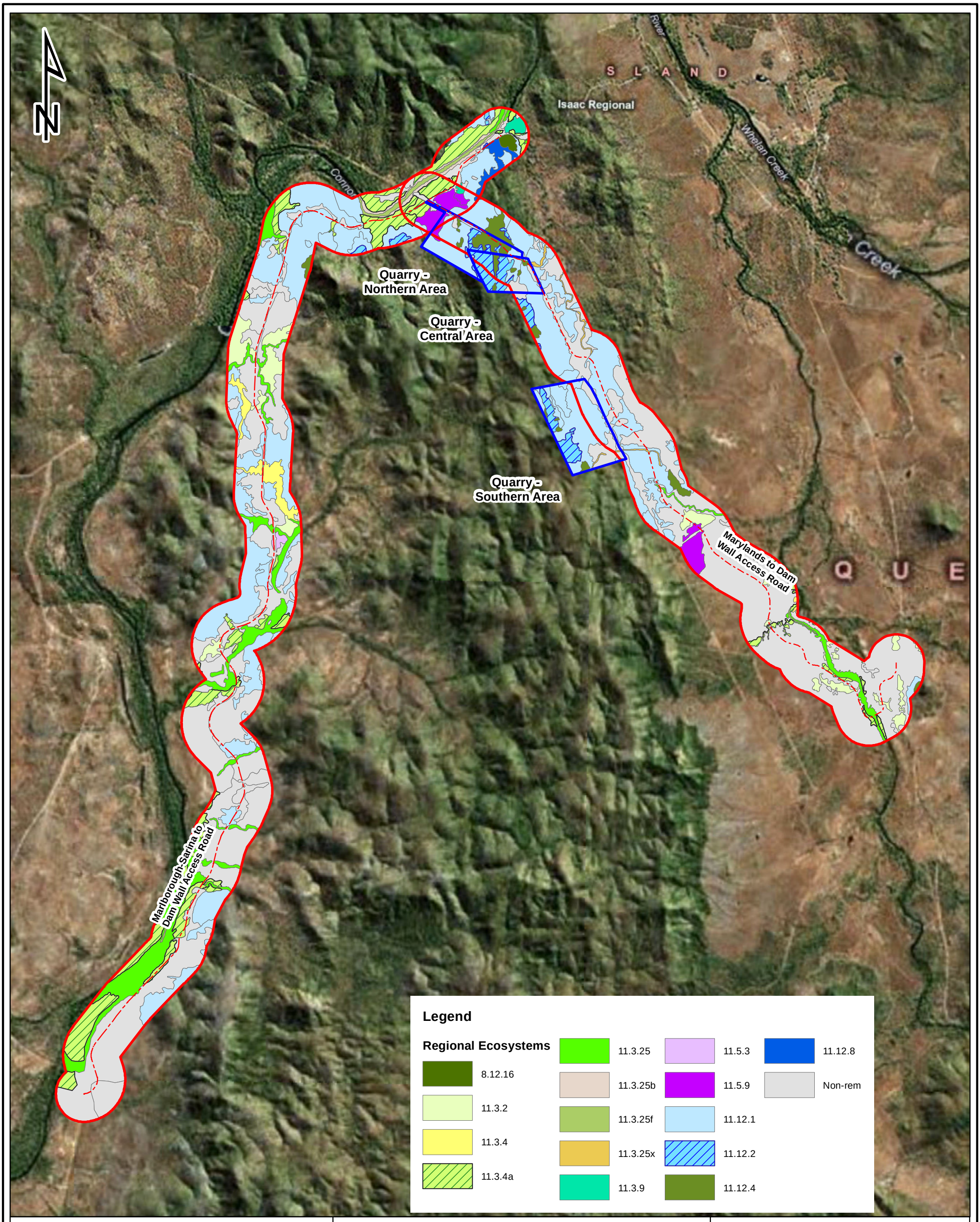

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Figure 4. Regional Ecosystems (Revised)

Client

Sun Water

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Kilometres

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1:62,837	DG	DS	C:\3D Environmental\Connors River\3d_con_riv_A3P	02/02/11	A3

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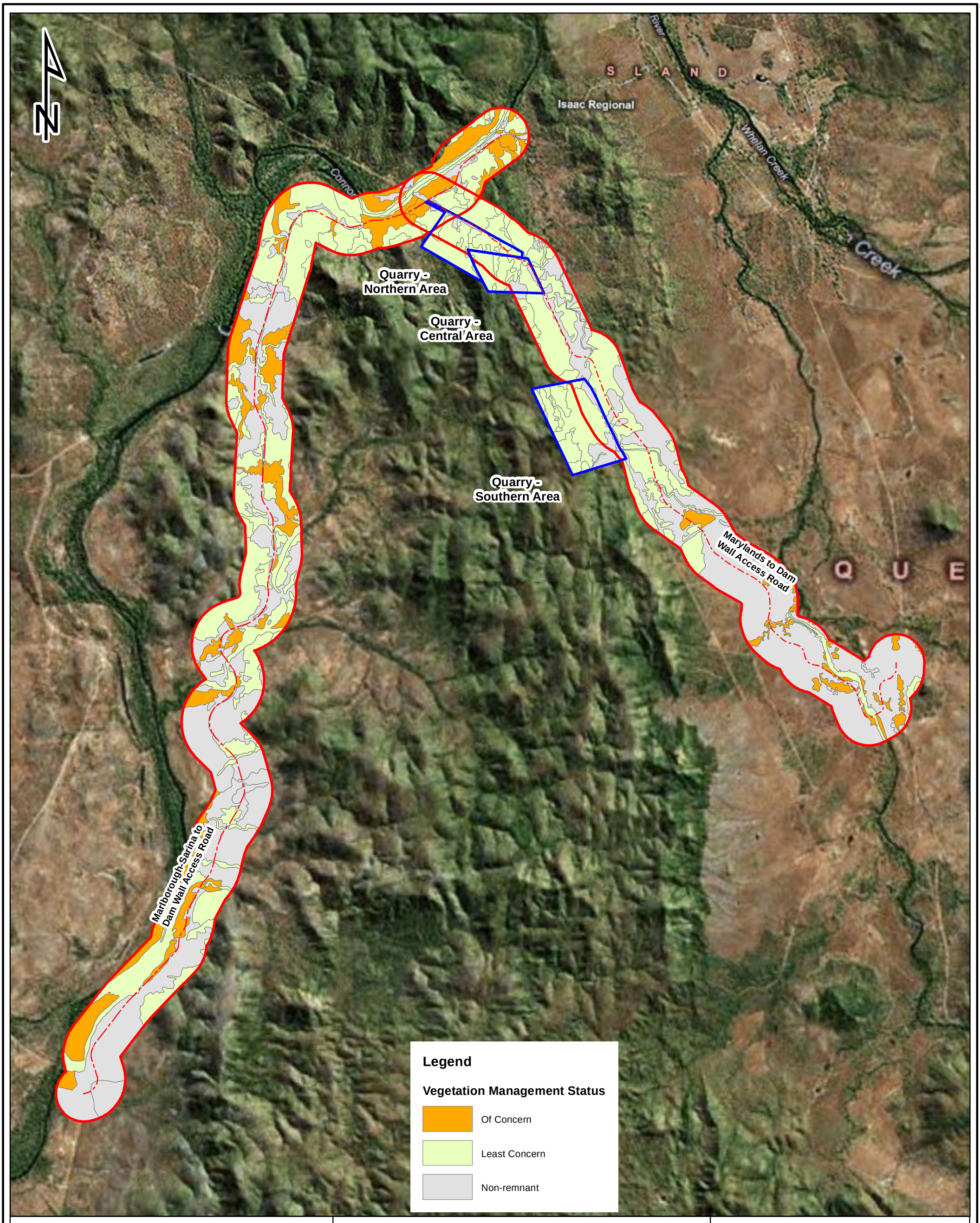

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Figure 5. Vegetation Management Status

Client

Sun Water

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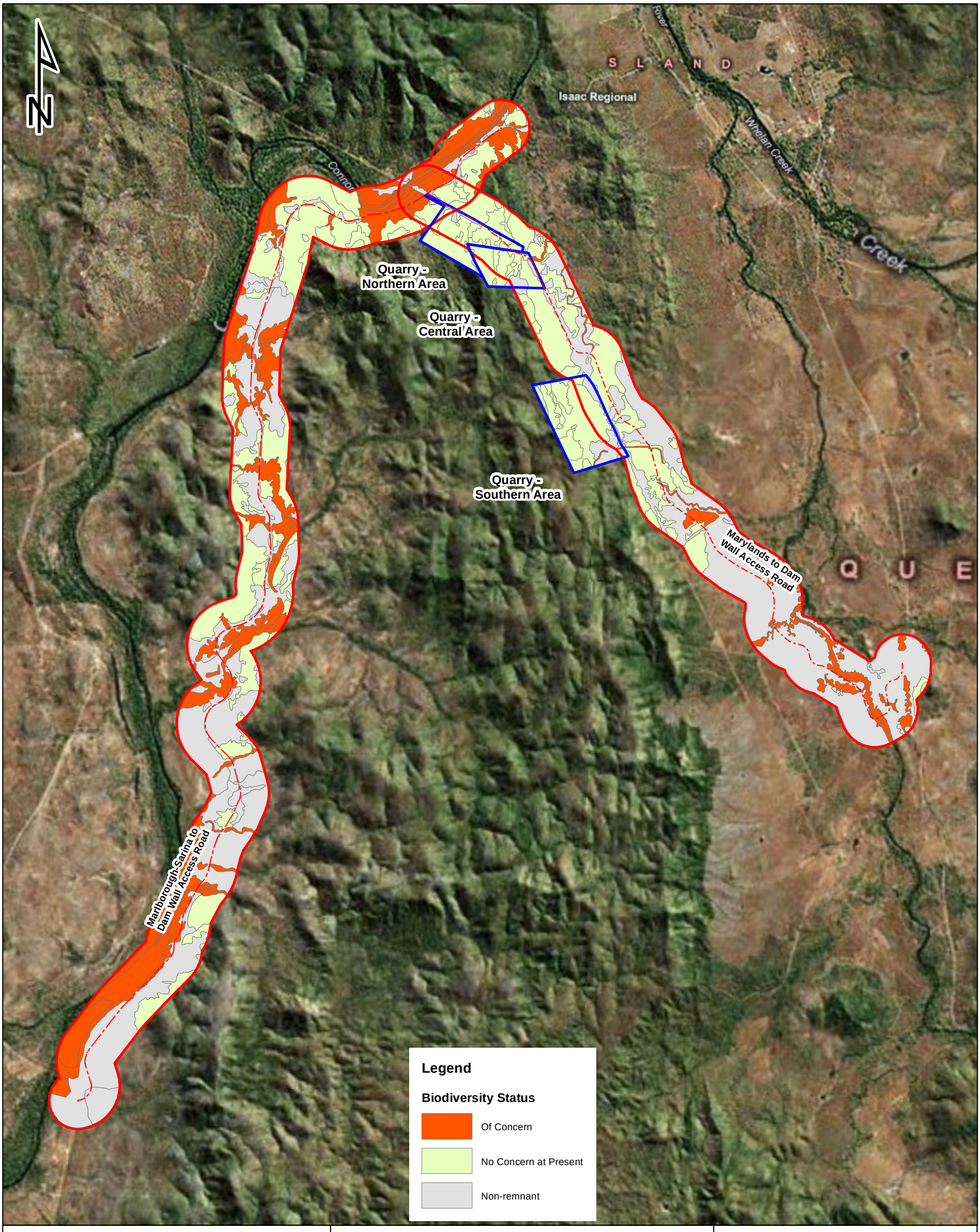

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Figure 6. Biodiversity Status

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Sun Water

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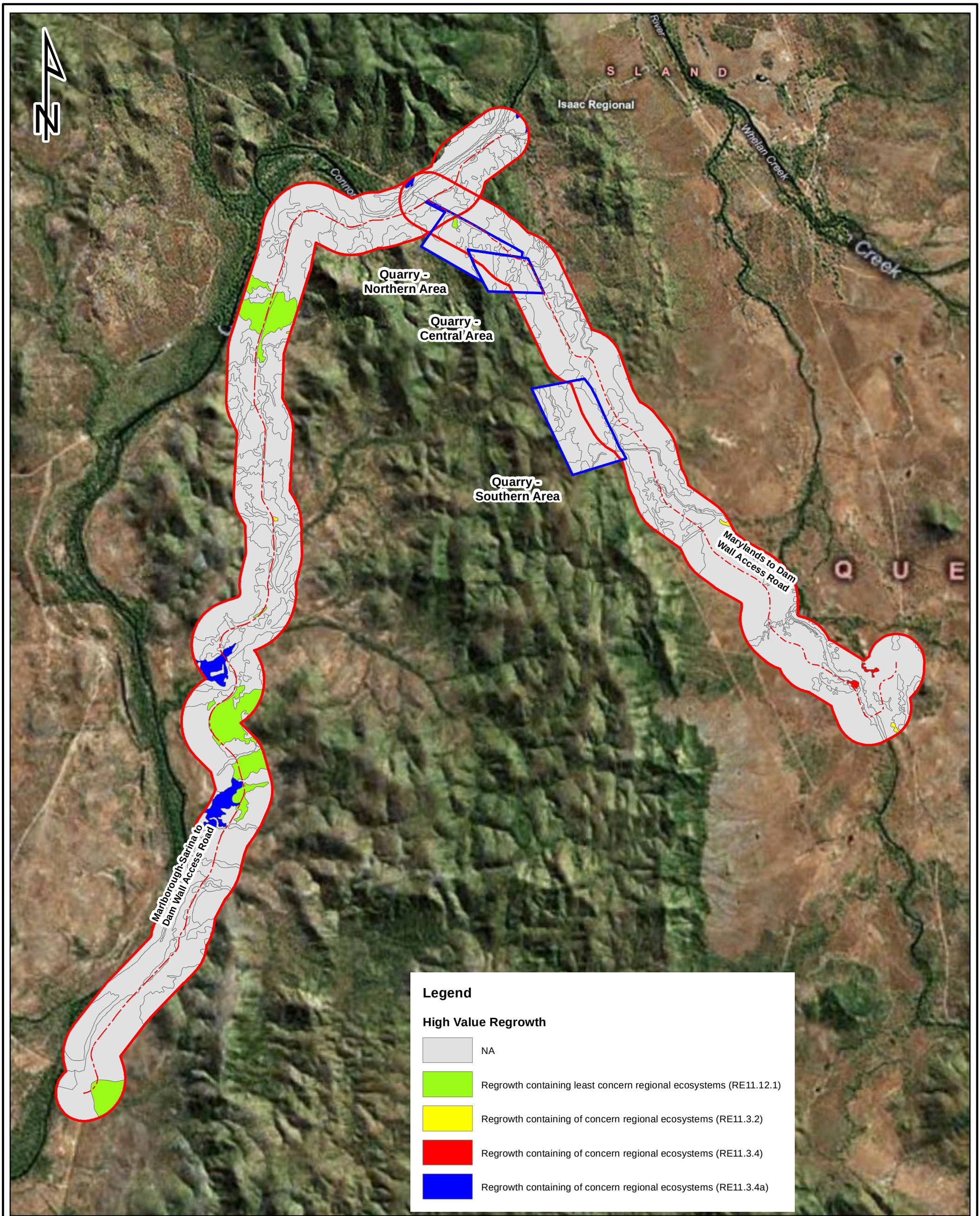

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Figure 7. High Value Regrowth

Client

Sun Water

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Kilometres

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Photograph 1 (Left). Sparse woodland with *Eucalyptus melanophloia* and mixed vine forest species (RE11.12.2) and; Photograph 2. Extensive tracts of notophyll/microphyll vine thicket (RE11.12.4) in the Snowfields quarry areas (North and Central).

3.2.2 Occurrence of EVR flora

No significant species under either national or state legislation were identified during the field survey. The potential for significant species to occur is summarised within Table 4.

Flora Species Potentially Occurring

Actephila sessiliflora (Near Threatened NC Act): The rainforest shrub *Actephila sessiliflora* was not recorded during the field survey however it is considered as possibly occurring within the vine thicket RE11.12.4. Extensive searches of vine thicket habitats, particularly the Snowfields quarry areas did not locate the species. It has been previously recorded at an unspecified location in Araucarian vine forest habitat near to the Project area (Hyder 1999).

Cerbera dumicola (Near Threatened NC Act): *Cerbera dumicola* was recorded in Project area as an occasional shrub in semi deciduous vine thicket dominated by *Brachychiton australis, Gyrocarpus americanus, Pleiogynium timorense, Flindersia australis, Sterculia quadrifida* and *Paraserianthes toona* on steep rocky rhyolite slopes at the dam wall during previous EIS survey. Extensive searches of vine thicket habitats (RE 11.12.4), particularly the Snowfields quarry areas did not locate the species. While it is known from one site only near the dam wall, all vine thicket habitats in the vicinity should be considered potential habitat.

Summary assessment of likelihood for EPBC and NC Act listed flora

The following table presents a summary of the likelihood of occurrence of significant flora species based on the following hierarchy:

- Known - Remnant vegetation or sites are known to support the species because there are a significant number of individuals present that are self-maintaining.

- Likely - Remnant vegetation or sites likely to support the species because there is habitat containing essential resources of a size capable of supporting a significant number of individuals. Available habitat which is proximal to and buffering a known occurrence of a population.
- Possible - Remnant vegetation may provide suitable habitat which is potentially important however may be known to be suboptimal and there have been no reported records or sightings.
- Unlikely - Remnant vegetation is unlikely to support the species because there have been no reported sightings of individuals and/or the habitat is considered unsuitable based on consideration of literature and field knowledge.
- Absence Known or Suspected - Absences consistently recorded based on intensive targeted survey and consideration of habitat and distribution from literature.

An index of confidence is applied to the assessment being:

- High – personal observations or records from other reputable sources (for example, 90% certainty);
- Medium – information from sources of reasonable/mixed reliability (location accuracy / taxa identification) (for example, 70% certainty); and
- Low – information from sources of unknown reliability (for example, 50% certainty).

Table 4. Likelihood of EPBC and NC Act listed species within the water storage area

Species Name	Conservation Status		Index of Confidence	Likelihood of Occurrence
	NC Act	EPBC		
Likely				
Cerbera dumicola	R	-	High	Recorded from vine thicket (RE8.12.16) on rhyolite at dam wall site.
Possible				
Eucalyptus raveretiana	V	V	High	Not observed anywhere in the Project area despite potentially suitable habitat in riparian open forests and woodlands of RE11.3.25. Record from Funnel Creek catchment (approx. 40km NNW of dam wall) represents the nearest occurrence.
Actephila sessiliflora	R	-	Medium	Possibly occurring in vine thickets (RE11.12.4) on steep hillslopes within Snowfields quarry development sites.
Unlikely				
Leucopogon cuspidatus	V	V	High	No survey records. Not known from the area (see Qld Herbarium 2007). Unlikely to occur on hillslopes formed on acid volcanic rocks which dominate the study area.
Absence Known or Suspected				
Cycas ophiolitica	E	E	High	No survey records. Cycad populations immediately east of the dam inundation area have been identified as *Cycas media subsp. media.*

3.2.3 Weeds

Database search results indicate 25 introduced plant species likely to be present, of which white thunbergia (*Thunbergia fragrans*) is declared under the LP Act as a Class 1 invasive species. This species was found on the Marylands property at Whelan Creek during EIS surveys of the dam inundation area. No other declared species are indicated in database searches. Ground surveys however confirmed sporadic occurrences of:

- parthenium (*Parthenium hysterophorus*) (Class 2 LPA, WONS) on areas of deeper soil;
- lantana (*Lantana camara*) (Class 2 LPA, WONS) invading riparian fringes (RE11.3.25), flood plain vegetation (RE11.3.4) and vine thicket communities (RE11.12.4); and
- prickly pear (*Opuntia tomentosa*) occurring as scattered individuals throughout all habitat types with larger specimens dispersed throughout vine thicket habitats (RE11.12.4).

The presence of giant rat's tail grass (*Sprorobolus pyramidalis*) on the Undercliff property in the northern portion of the dam inundation area poses a considerable threat to pastoral productivity in the project area, whilst a recorded specimen of rubber vine on the Marylands property should also be considered a threat to biodiversity. A summary of significant weeds known to occur in the vicinity of the project area is provided in Table 5.

Table 5. Summary of Declared Weeds Known to Occur in Project Area

Pest Class	Common Name	Species Name	RE	Comments
Class 1	White Thunbergia	*Thunbergia fragrans*	11.2.25	A twining invasive vine recorded at 3 locations on Whelan Creek (Marylands).
Class 2	Rubber Vine	*Cryptostegia grandiflora*	11.2.25	Single record reported by landowner on Marylands.
Class 2	Prickly Pear	*Opuntia tomentosa*		Scattered occurrences. Most typically associated with vine thicket communities (RE11.3.4).
Class 2 WONS	Parthenium Weed	*Parthenium hysterophorus*	11.3.25	Occurs throughout alluvial landscapes and along fencelines, tracks and roadsides.
Class 2	Giant Rats Tail Grass	*Sporobolus pyramidalis*	Non-Remnant	Remnant and non-remnant woodlands and along fencelines, access tracks and roadsides. Infestations on Undercliff and Ridgelands.
Class 3 WONS	Lantana	*Lantana camara*	11.3.4 11.3.25	Particularly abundant on alluvial terraces however scattered throughout area.

4.0 References

Department of Environmental Resource Management (DERM) (2009a). Regional Ecosystem Digital Data, Version 6.0. Queensland Herbarium, Brisbane.

Department of Environmental Resource Management (DERM) (2009b). Regional Ecosystem Description Database (REDD). Version 6.0. Updated November 2009.

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5.0 Summary Survey Data

Site No.	Intensity	South	East	Description	Landform	RE
CQQ1	Quat.	-22.0699	149.1467	Woodland (12-18m) with E. *crebra, C. erythrophloia*. Ground cover of *Heteropogon triticeus, H. contortus, Bothriochloa sp., Themeda triandra*	Footslope of acid volcanics	11.12.1
CQQ2	Quat.	-22.0749	149.1447	Woodland (12-18m) with *E. crebra, C. dalllachiana, C. erythrophloia*. Ground cover of with abundant *Melinus repens*, H. contortus, Cymbopogon refractus.* Severe canopy dieback.	Footslope of acid volcanics	11.12.1
CQQ3	Quat.	-22.0771	149.144	Woodland (12-18m) with *E. crebra, C. dallachiana, C. erythrophloia*. Ground cover of with abundant *Melinus repens*, H. contortus, Passiflora suberosa** .	Basalt rubble	11.12.1
CQQ4	Quat.	-22.0782	149.1435	Low sparse woodland and shrubland with *E. melanophloia.* Scattered emergent *E. crebra, C. dallachiana.* Shrub layer of *Hibiscus diversifolius., Alphitonia excelsa, Drypetes deplanchei, Pogonolobus reticulatus.* Degraded ground cover dominated by *Melinus repens.*	Acid volcanic ridgeline	11.12.2
CQQ5	Quat.	-22.0791	149.143	Notophyll / microphyll vine thicket with *Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus, Bridelia tomentosa.* Thickets of *Lantana camara*.*	Acid volcanic ridgeline	11.12.4
CQQ6	Quat.	-22.0797	149.1439	Low sparse woodland (to 6m) and shrubland with *E. melanophloia.* Scattered emergent *E. crebra, C. dallachiana. Shrub layer of Hibiscus sp., Alphitonia excelsa, Drypetes deplanchei.* Degraded ground cover dominated by *Melinus repens*.*	Acid volcanic ridgeline	11.12.2
CQQ7	Quat.	-22.0806	149.1448	Notophyll / microphyll vine thicket with *Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.* Interspersed with *E. crebra* woodland.	Acid volcanic talus slope	11.12.4
CQQ7a	Quat.	-22.0818	149.1452	Notophyll / microphyll vine thicket with dominant *Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus* woodland.	Acid volcanic talus slope	11.12.4
CQQ8	Quat.	-22.0801	149.1454	Woodland (12-18m) with E. *crebra, C. erythrophloia*. Ground cover of *Sarga plumosa, H. triticeus, H. contortus*	Footslope of acid volcanics	11.12.1
CQQ8a	Quat.	-22.0867	149.1491	Notophyll / microphyll vine thicket woodland.	Acid volcanic talus slope	11.12.4
CQQ9	Quat.	-22.0759	149.1489	Open grassland with emergent trees and shrubs (secondary)	Footslope of acid volcanics	Non-remnant (derived RE11.12.1)
CQQ10	Quat.	-22.0751	149.1475	Woodland (12-21m) with E. *crebra, C. erythrophloia* with scattered *E. tereticornis.* Ground cover of *H. triticeus, H. contortus.*	Incised colluvial slope	11.12.1
CQQ11	Quat.	-22.0674	149.1457	Woodland (12-18m) with E. *crebra, C. erythrophloia, C. dallachiana*. Ground cover of *Themeda triandra, H. contortus.*	Colluvium from rhyolite	11.12.1
CQQ12	Quat.	-22.0646	149.1438	Woodland (12-18m) with E. *crebra.* Scattered *C. clarksoniana, E. platyphylla.* Severe canopy dieback.	Footslope of acid volcanics	11.12.1
CQQ13	Quat.	-22.0631	149.1402	Woodland (12-18m) with *E. crebra, C. dallachiana* with dense vine thicket	Rock talus from rhyolite	11.12.1

Site No.	Intensity	South	East	Description	Landform	RE
				sub-canopy comprising *Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus*		
CQQ14	Quat.	-22.0607	149.1416	Woodland (12-18m) with *E. crebra, C. dallachiana*. Ground cover of *H. contortus*. Severe canopy dieback.	Footslope of acid volcanics	11.12.1
CQQ15	Quat.	-22.0575	149.1415	Woodland (12-18m) with *E. crebra, C. dallachiana, C. erythrophloia*.	Footslope of acid volcanics	11.12.1
CQQ16	Quat.	-22.055	149.138	Woodland (12-18m) with *E. crebra, C. dallachiana, C. erythrophloia*.	Footslope of acid volcanics	11.12.1
CQQ17	Quat.	-22.0547	149.1381	Notophyll/ Microphyll vine thicket	Colluvium from rhyolite	11.12.4
CQQ18	Quat.	-22.0542	149.1381	Shrubby woodland (to 18m) with *E. crebra, C. erythrophloia.* Sub-canopy of *Alphitonia excelsa, Hibiscus sp., Geijera salicifolia, Lantana camara**	Colluvium from rhyolite	11.12.1
CQQ19	Quat.	-22.1156	149.1909	Riparian open forest to 30m. Canopy with *E. tereticornis, C. cunninghamiana.* Sub-canopy of *Lantana camara*, Callistemon viminalis, Lophostemon grandiflorus.*	Incised alluvial channel	11.3.25
CQQ19a	Quat.	-22.1125	149.1852	Regrowth woodland with *C. tessellaris, E. tereticornis* . Canopy to 18m.	T2 alluvial terrace	11.3.4
CQQ20	Quat.	-22.1117	149.185	Riparian open forest to 30m. Canopy with *E. tereticornis, C. cunninghamiana.* Sub-canopy of *Lantana camara*, Callistemon viminalis, Lophostemon grandiflorus.*	Incised alluvial channel	11.3.25
CQQ21	Quat.	-22.1058	149.1807	Woodland with *E. populnea* (canopy 18 - 23m). Native ground cover dominant.	T2 alluvial terrace	11.3.2
CQQ22	Quat.	-22.0982	149.1696	Woodland with *E. populnea* (canopy 18 - 23m). Native ground cover dominant.	T2 alluvial terrace	11.3.2
CQQ23	Quat.	-22.0911	149.1663	Vine thicket with *Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*	Acid volcanic knoll	11.12.4
CQQ24	Quat.	-22.0969	149.1689	Woodland with E. *populnea, E. crebra* (canopy 18 - 23m). Suffering major dieback.	Broad colluvial outwash plain	11.5.9
CQQ25	Quat.	-22.1118	149.1815	Woodland with *E. populnea* (canopy 18 - 23m). Exotic ground cover.	T2 alluvial terrace	11.3.2
CQQ26	Quat.	-22.1208	149.1939	Tall open forest / woodland (23- 30m) dominated by *Eucalyptus tereticornis* with scattered *Angophora floribunda.*	T2 alluvial terrace	11.3.4a
CQQ26a	Quat.	-22.1265	149.1987	Riparian open forest to 30m. Canopy with *E. tereticornis, C. cunninghamiana.* Sub-canopy of *Lantana camara*, Callistemon viminalis, Lophostemon grandiflorus.*	Incised alluvial channel	11.3.25
CQQ27	Quat.	-22.0455	149.1199	Woodland (canopy to 23m) with *E. platyphylla, C. tessellaris, C. clarksoniana.* Copses of *Lantana camara**	T2 alluvial terrace	11.3.9
CQQ28	Quat.	-22.0457	149.1188	Woodland with *E. platyphylla, C. tessellaris, C. clarksoniana.* Copses of *Lantana camara**	T2 alluvial terrace	11.3.9
CQQ29	Quat.	-22.0486	149.1133	Open forest / woodland (23-25m) dominated by *Corymbia tessellaris, Corymbia clarksonia* with scattered *Angophora floribunda.*	T2 alluvial terrace	11.3.4a
CQQ30	Quat.	-22.0485	149.1104	Riparian open forest to 30m. Canopy with *E. tereticornis, C. cunninghamiana.* Sub-canopy of *Lantana camara*, Callistemon viminalis.*	Incised alluvial channel	11.3.25
CQQ31	Quat.	-22.049	149.1074	Woodland with *E. crebra, C. dallachiana.*	Colluvium footslope	11.12.1

Site No.	Intensity	South	East	Description	Landform	RE
CQQ32	Quat.	-22.0481	149.0984	Low woodland (6 -12m) with *E. melanophloia.*	Acid volcanic knoll	11.12.2
CQQ33	Quat.	-22.051	149.097	Woodland with dominant *C. tessellaris, E. tereticornis.*	Narrow alluvial flat	11.3.4
CQQ34	Quat.	-22.0571	149.0972	Woodland with *E. crebra, C. dallachiana.* Severe canopy dieback.	Acid volcanic hillslope	11.12.1
CQQ35	Quat.	-22.0678	149.0907	Woodland of *E. populnea* with scattered *C. tessellaris.*	Narrow alluvial flat	11.3.2
CQQ36	Quat.	-22.0705	149.092	Riparian open forest with *C. tessellaris* with sub-canopy of *M. bracteata, Lophostemon grandiflorus.*	Minor gully line	11.3.25
CQQ37	Quat.	-22.078	149.0911	Woodland (15-18m) with dominant *E. crebra*	Shallow alluvial mantle	11.3.4
CQQ38	Quat.	-22.0849	149.0938	Woodland with *E. crebra.* Severe canopy dieback.	Acid volcanic knoll	11.12.1
CQQ39	Quat.	-22.0878	149.0936	Woodland with *E. populnea, E. crebra.*	Colluvial outwash slope	11.5.3
CQQ40	Quat.	-22.0905	149.0934	Woodland with *E. populnea, E. crebra.*	Colluvial outwash slope	11.5.3
CQQ41	Quat.	-22.0975	149.0956	Woodland of *E. populnea*	T2 alluvial terrace	11.3.2
CQQ42	Quat.	-22.0995	149.0957	Woodland with dominant *C. tessellaris, E. tereticornis.*	Older alluvial flat	11.3.4
CQQ43	Quat.	-22.1059	149.0949	Shrubby woodland (to 18m) with *E. crebra, C. erythrophloia.*	Footslope of acid volcanics	11.12.1
CQQ44	Quat.	-22.1122	149.0933	Woodland (15-23m) with *C. tessellaris, E. crebra, E. tereticornis*	T2 alluvial terrace	11.3.4
CQQ45	Quat.	-22.1154	149.0878	Woodland dominated by *C. tessellaris, E. crebra*	T2 alluvial terrace	11.3.4
CQQ46	Quat.	-22.1172	149.0861	Woodland of *E. populnea*	T2 alluvial terrace	11.3.2
CQQ47	Quat.	-22.1105	149.088	Riparian woodland with *M. fluviatilis, Casuarina cunninghamiana, E. tereticornis.* Sub-canopy of *Lophostemon grandiflorus, Lysiphyllum carrroni*		11.3.25
CQQ48	Quat.	-22.1246	149.0888	Woodland of *E. populnea*	T2 alluvial terrace	11.3.2
CQQ49	Quat.	-22.1301	149.0845	Woodland of *C. erythrophloia, E. tereticornis* (occasional).	Footslope of acid volcanics	11.12.1
CQQ50	Quat.	-22.1334	149.0876	Woodland of *E. populnea.*	T2 alluvial terrace	11.3.2
CQQ51	Quat.	-22.1444	149.0895	Woodland of *E. populnea.*	T2 alluvial terrace	11.3.2
CQQ52	Quat.	-22.1519	149.0859	Riparian woodland with *M. fluviatilis, Casuarina cunninghamiana, E. tereticornis.* Sub-canopy of *Lophostemon grandiflorus, Lysiphyllum carroni*		11.3.25
CQQ53	Quat.	-22.1552	149.0846	Riparian woodland with *E. tereticornis.* Abundant parthenium in ground cover.	Incised alluvial channel	11.3.25
CQQ54	Quat.	-22.1578	149.0833	Woodland with *E. crebra, C. tessellaris, E. tereticornis* (canopy to 25m).	T2 alluvial terrace	11.3.4
CQQ55	Quat.	-22.1716	149.0799	Notophyll vine thicket	Rocky knoll	11.12.4
CQQ56	Quat.	-22.1688	149.0779	Woodland with *E. crebra, C. tessellaris, E. tereticornis* (canopy to 22m).	T2 alluvial terrace	11.3.4
CQQ57	Quat.	-22.1817	149.0649	Secondary woodland with dominant *C. tessellaris* and T2 of *Cassia brewsteri*	Alluvial flat	Non-remnant (derived from RE11.3.4)
CQQ58	Quat.	-22.0498	149.1321	Notophyll / microphyll vine thicket with *Gyrocarpus americanus, Brachychiton australis, Pleiogynium timorense, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*	Rock talus from rhyolite	11.12.4
CQQ59	Quat.	-22.0507	149.1345	Low sparse woodland and shrubland with *E. melanophloia.* Scattered	Rock talus from rhyolite	11.12.2

Site No.	Intensity	South	East	Description	Landform	RE
				emergent *E. crebra, C. dallachiana. Shrub layer of Hibiscus sp., Alphitonia excelsa, Drypetes deplancheii, Alyxia spicata.* Degraded ground cover dominated by *Melinus repens.*		
CQQ59a	Quat.	-22.0546	149.1337	Notophyll / microphyll vine thicket.	Rock talus from rhyolite	11.12.4
CQQ60	Quat.	-22.0517	149.1339	Notophyll / microphyll vine thicket with *Gyrocarpus americanus, Polyscias elegans, Pleiogynium timorense, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*	Rock talus from rhyolite	11.12.4
CQQ61	Quat.	-22.053	149.1335	Low sparse woodland and shrubland with *E. melanophloia.* Scattered emergent *Euroschinus falcatus, E. crebra, C. dallachiana. Shrub layer of Hibiscus sp., Alphitonia excelsa, Drypetes deplanchei, Alyxia spicata.*	Rock talus from rhyolite	11.12.2
CQQ62	Secondary	-22.0531	149.1323	Low sparse woodland and shrubland with *E. melanophloia.* Scattered emergent *Euroschinus falcatus, Brachychiton australis, E. exserta.* Shrub layer of *Hibiscus sp., Alphitonia excelsa, Drypetes deplanchei, Alyxia spicata, Notelaea microcarpa.*	Rock talus from rhyolite	11.12.2
CQQ62a	Quat.	-22.0531	149.1307	Low sparse woodland and shrubland with *E. melanophloia.* Understorey dominated by shrubs.	Rocky pavement and rock rubble	11.12.2
CQQ63	Quat.	-22.0521	149.132	Notophyll / microphyll vine thicket with *Gyrocarpus americanus, Brachychiton australis, Flindersia australis, Gossia acmenoides, Pleiogynium timorense, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*	Rock talus from rhyolite	11.12.4
CQQ64	Quat.	-22.0539	149.1305	Notophyll / microphyll vine thicket with *Gyrocarpus americanus, Brachychiton australis, Flindersia australis, Gossia acmenoides, Pleiogynium timorense, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*		11.12.2
CQQ65	Quat.	-22.0495	149.1288	Low sparse woodland and shrubland with *E. melanophloia.* Scattered emergent *Euroschinus falcatus, Brachychiton australis.* Shrub layer of *Hibiscus sp., Alphitonia excelsa, Alyxia spicata.*	Footslope of acid volcanics	11.12.2
CQQ66	Quat.	-22.049	149.1271	Notophyll / microphyll vine thicket with *Gyrocarpus americanus, Sterculia quadrifida, Brachychiton australis, Gossia acmenoides, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus.*	Acid volcanic talus slope	11.12.4
CQQ66a	Quat.	-22.0512	149.1273	Notophyll / microphyll vine thicket and forest with *Gyrocarpus americanus, Brachychiton australis, Gossia acmenoides, Paraserianthes toona, Drypetes deplanchei, Euroschinus falcatus, Pleiogynium timorense*	Acid volcanic ridgeline	11.12.4
CQQ67	Quat.	-22.0486	149.1272	Woodland of *E. crebra (*canopy 18 - 23m) with associated *Brachychiton australis, Euroschinus falcatus, Pleiogynium timorense*	Acid volcanic footslope	11.12.1
CQQ68	Quat.	-22.0469	149.1272	Well developed woodland (canopy 18-23m) with dominant *E. crebra.*	Colluvial footslope on rhyolite	11.12.1
CQQ69	Quat.	-22.0461	149.1251	Woodland of *E. crebra.*	Lower colluvial footslope	11.12.1
CQQ70	Quat.	-22.0457	149.1216	Woodland of *C. tessellaris, E.*	Alluvial flat/	11.3.4

Site No.	Intensity	South	East	Description	Landform	RE
				platyphylla.	flood plain	