Our Ref: 13033
Your Ref:

27 November, 2013

Daniel Banfai
Earth Systems
Suite 17, 79-83 High Street
Kew VIC 3101

Via email to: daniel.banfai@earthsystems.com.au

Dear Daniel,

Re: Interim Findings
Nowa Nowa Iron Project (5 Mile Deposit)
Terrestrial Vegetation Condition Assessment

Please find set out below our **Interim Findings** from the Terrestrial Vegetation Condition Assessment for the Nowa Nowa Iron Project (5 Mile Deposit) mine site.

This letter summarises the key findings which will be presented in the Nowa Nowa Iron Project (5 Mile Deposit) *Terrestrial Vegetation Condition Assessment* report currently being compiled by Ethos NRM. The *Terrestrial Vegetation Condition Assessment* report includes results of recently completed Spring vegetation condition surveys within the mine footprint, and will be combined with the findings of the *Preliminary Vegetation Quality Assessment and Ecological Vegetation Class Mapping* completed by Ethos NRM in October 2013 (Ethos NRM, 2013).

The following pages provide an overview of the results that will be presented in the pending report, including an outline of the objectives and methods, and a summary of the findings related to vegetation and flora values within the mine footprint. Map figures are included at the end of the document.

The *Terrestrial Vegetation Condition Assessment* report, including indicative offset requirements under the existing Framework, will be available late next week. We will continue to liaise with DEPI regarding vegetation offset requirements under the forthcoming Guidelines. Please contact either myself or Ms Amie Hill on 03-5153 0037 should you require any clarification.

Yours sincerely,

ERIC SJERP
Principal Consultant / Managing Director

Amie Hill
Environmental Consultant

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1 Objectives

The broad objectives of the Terrestrial Vegetation Condition Assessment are to:

- identify and map vegetation types across the mine site (Ecological Vegetation Class (EVC) and flora lists),
- assess vegetation condition (Habitat Hectare methodology, DSE (2004)),
- undertake targeted surveys for rare and threatened flora species and communities as required,
- quantify vegetation loss and offset requirements associated with the project in accordance with relevant legislative requirements, and
- discuss potential impacts on vegetation and flora values.

2 Methodology and Survey Effort Summary

Two stages of vegetation survey and assessment have been undertaken by Ethos NRM at the Nowa Nowa Iron Project (5 Mile Deposit) (the Project) mine site in 2013; preliminary broad-scale surveys, and detailed surveys within the mine footprint. Survey locations are indicated in **Figure 1**.

Preliminary, broad-scale vegetation surveys were conducted in early Autumn across a Vegetation Study Area of approximately 1100 hectares (ha) surrounding and including the proposed mine site. Seventeen vegetation condition (Habitat Hectare) sample sites and ground-truthing of EVC mapping across the diversity of vegetation types within the vegetation study area was undertaken. Preliminary surveys were conducted over 3 days on the 26th and 27th of March and 5th of April, 2013 (Ethos NRM, 2013).

Additional detailed surveys were conducted in Spring 2013 within the mine footprint (approximately 150 ha), comprising of a further 13 vegetation condition (Habitat Hectare) sample sites, EVC ground-truthing, and rare flora species searches (Slender Wire Lily *Laxmannia gracilis*). Surveys were conducted over 5 days; 11th, 13th, 15th, 18th and 21st of November, 2013. All field assessments were undertaken by two DEPI accredited Native Vegetation Assessors.

A targeted field survey for Colquhoun Grevillea (*Grevillea celata*) was undertaken by Ethos NRM within the mine footprint on the 16th of October, 2013, and comprised 9.37 km of transects (4.8km walking and 4.6km vehicle) covering an area of approximately 11.2 ha along roadsides and through native vegetation within the proposed mine footprint. Transects through vegetation traversed project components including the mine pit, waste rock dump and temporary low grade ore stockpile. Preliminary vegetation surveys undertaken by Ethos NRM covered an approximate area of 15 ha, and did not record this species within or immediately adjacent to the mine footprint.

3 Quantification of Native Vegetation Condition and Loss

3.1 Summary of native vegetation condition

The mine footprint is located within two different bioregions; the East Gippsland Uplands covers most of the site, with East Gippsland Lowlands in lower relief areas in the north-west and to the south of Five Mile Track.

Four Ecological Vegetation Classes (EVCs) were recorded within the mine footprint by Ethos NRM, including; Shrubby Dry Forest, Lowland Forest, Riparian Forest and Damp Forest.

Within the mine footprint, Shrubby Dry Forest is the dominant EVC covering more than half of the site, with Lowland Forest also widespread across about 40% of the site. Damp Forest and Riparian Forest are restricted to linear strips along creeks and drainage lines, comprising 3% and 2% of the mine footprint, respectively. All EVCs have a Bioregional Conservation Status (BCS) of Least Concern in both bioregions, except for Riparian Forest which is Depleted in the East Gippsland Lowlands.

Vegetation condition did not vary greatly across the site, and variations largely related to the density of large old trees (LOTs), eucalypt canopy cover and logs. Sites with the highest habitat scores were due to high diversity of understorey species and moderate to high density of LOTs. Vegetation condition (habitat scores) ranged from 0.66 to 0.82 across the mine footprint; the majority of the site scored between 0.70 and 0.76, almost one third of the site scored between 0.66 and 0.69, and only the small area of Damp Forest scored over 0.8.

3.2 Summary of native vegetation loss

A total of **146.24 Ha** of vegetation equating to **104.033 HHa** is proposed for removal within the mine footprint of the Nowa Nowa Iron Project (5 Mile Deposit). Refer to **Table 1** below, and **Figure 2**, for more detail.

Table 1. Summary of vegetation loss estimates.

	Mine Footprint Components		Totals within the Mine Footprint
	Mine area, access roads, infrastructure, fire management buffers	**Nowa Nowa-Buchan Rd Diversion**	
Area of vegetation removal (ha) [1]	138.71	7.53	**146.24**
Habitat Hectares (HHa) loss estimate	98.833	5.200	**104.033**
Large Old Trees (LOTs) loss estimate	427	21	**448**
Vegetation Site Condition (Habitat Score) range	0.64 – 0.82	0.66 – 0.73	**0.64 - 0.82**
EVCs present	Shrubby Dry Forest, Lowland Forest, Damp Forest, Riparian Forest	Shrubby Dry Forest, Lowland Forest	**4 EVCs**
Bioregions present	East Gippsland Uplands & East Gippsland Lowlands	East Gippsland Uplands	**2 Bioregions**
Non-vegetated areas (existing tracks, other disturbed areas) (ha) [2]	2.00	0.41	**2.41 ha**
Total area (ha) within Mine footprint [1+2]	**140.71**	**7.94**	**148.65 ha**

3.3 Indication of offset requirements under the *Framework*

Detailed calculation of offset requirements under Victoria's *Native Vegetation Management –A Framework for Action* (DNRE, 2002) has not been undertaken due to the impending amendments to the State native vegetation policy. These amendments were planned for September 2013, but have been delayed. As a point of reference, minimum and maximum likely offset requirements have been calculated in units of Habitat Hectares and Large Old Trees. Indicative offset requirements calculated below have been included a conservative (maximum) estimate of the likely Conservation Significance due to BCS, Habitat Scores of vegetation, and potential habitat for rare and threatened species. Full analysis of the Best and Remaining habitat for rare and threatened species has not been undertaken.

Due to the extent of historic timber harvesting activities across the mine site and the surrounding area, it has been considered unlikely that Very High Conservation Significance vegetation occurs within the mine footprint, and that High Conservation Significance vegetation will have limited distribution. Hence, minimum offset requirement estimates are based on determination of Conservation Significance from Habitat Scores x BCS (refer to **Table 2**), and likely maximum offset requirements have assumed a conservative Conservation Significance of High across the entire footprint due to potential presence for rare and threatened species habitat (refer to **Table 3**). It is expected that the actual offset requirement will be somewhere in between the two estimates.

For detail of methods for calculation of offsets, refer to Ethos NRM (2013).

Table 2. Minimum estimate of offset (Habitat Score x Bioregional Conservation Status)

Conservation Significance of vegetation	Mine Footprint loss	Nowa Nowa-Buchan Rd Diversion loss	Total Estimated Loss	Offset Multiplier	Estimated Offset Totals
HIGH	0.911 HHa of Riparian Forest in EG Lowlands	Nil	0.911 HHa	1.5	**1.367 HHa**
	7 LOTs	Nil	7 LOTs	4	**28 LOTs**
MEDIUM	97.922 HHa	5.200 HHa	103.122 HHa	1	**103.122 HHa**
	420 LOTs	21 LOTs	441 LOTs	2	**882 LOTs**
TOTALS					**104.489 HHa**
					910 LOTS

Table 3. Maximum estimate of offset (potential habitat for rare and threatened species)

Conservation Significance of vegetation	Mine Footprint loss	Nowa Nowa-Buchan Rd Diversion loss	Total Estimated Loss	Offset Multiplier	Estimated Offset Totals
HIGH	98.833 HHa	5.200 HHa	**104.033 HHa**	1.5	**156.050 HHa**
	427 LOTs	21 LOTs	**448 LOTs**	4	**1792 LOTs**

The loss of **146 hectares** equating to **104.033 HHa** of native vegetation removal associated with the Nowa Nowa Iron Project (5 Mile Deposit) mine footprint, will require an offset ranging between **104.489 and 156.050 Habitat Hectares (HHa).**

An **estimated minimum** combined net gain target of **104.489 Habitat Hectares (HHa)** comprised of:

- **1.367 HHa** of **High Conservation Significance** vegetation, and
- **103.122 HHa** of **Medium Conservation Significance** vegetation

An **estimated maximum** combined net gain target of:

- **156.050 HHa of High Conservation Significance** vegetation.

An **estimated** Large Old Tree (LOT) protection target of between **910** and **1792 LOTs** will be required to offset the estimated loss of 448 LOTs.

3.4 Forthcoming changes to Victoria's Native Vegetation Policy

Offset estimates under the existing Framework are provided in Table 2 and 3. It is however expected that consideration of an application to remove native vegetation associated with the Nowa Nowa Iron Project mine site will be completed under the forthcoming *Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines* (DEPI, 2013a; referred to as the Guidelines). Interrogation of the Native Vegetation Information Management tool that supports the Guidelines indicates that the Project will be required to follow the High-risk Pathway for applications to remove native vegetation.

In anticipation of the forthcoming Guidelines, Ethos NRM have sent the relevant vegetation condition data to DEPI in order to obtain a statement of the offset requirement under the Guidelines. Recent advice from DEPI indicates that a response will be provided to Ethos NRM in mid-December, 2013.

4 Rare and threatened flora values

No vegetation communities or flora species listed as threatened under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* or the *Flora and Fauna Guarantee (FFG) Act 1988* have been recorded by Ethos NRM within the mine footprint, nor are expected to occur within the mine footprint.

4.1 *Environment Protection and Biodiversity Conservation Act 1999*

An online EPBC Protected Matters Search was undertaken within a 5km radius of the centre of the mine footprint, which identified 2 flora species and 1 ecological community as having potential to occur at the mine site; Leafless Tongue-orchid (*Cryptostylis hunteriana*), Maroon Leek-orchid (*Prasophyllum frenchii*) and the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Community (Department of the Environment, 2013). Based on vegetation surveys by Ethos NRM within and surrounding the mine site, neither of these 2 species or the ecological community are expected to be present within the mine footprint due to lack of suitable habitat.

Colquhoun Grevillea (EPBC and FFG listed) has been recorded 5km to the south west of the mine footprint, although the closest record on Lyles Break represents the eastern extent of the known range of the species. The species has not been recorded at the mine site by targeted and general vegetation surveys conducted by Ethos NRM. There are no historic records within 5km of the mine footprint. It is unlikely that a substantial population of Colquhoun Grevillea is present within or immediately surrounding the mine footprint.

4.2 *Flora and Fauna Guarantee Act 1988*

The EVC Warm Temperate Rainforest was recorded outside the mine footprint, but within the broader Vegetation Study Area to the south east of Five Mile Road / Telephone Track intersection. The EVC is listed under the FFG Act. There will be no direct impact on this community from the current mine configuration.

4.3 DEPI Rare and Threatened Flora Species

Eleven flora species listed on DEPI's *Advisory List of Rare or Threatened Plants in Victoria* (DSE, 2005) have been previously recorded on the Victorian Biodiversity Atlas (VBA, 2013) within 5km of the proposed mine site. The species listed in **Table 4** below include 1 vulnerable (Colquhoun Grevillea), 8 rare, and 2 poorly known species. None of these species were recorded by Ethos NRM within the mine footprint or surrounding area.

A single rare or threatened taxa has been historically recorded within the mine footprint, the rare Slender Wire-lily (VBA, 2013), in 1980. The species was not detected by Ethos NRM during a targeted search within a 1 hectare area surrounding the record.

Table 4. DEPI Threatened Flora records (VBA database)

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS			No. records
		FFG	Vic. Adv.	EPBC	
Eupomatia laurina	Bolwarra		r		1
Glossodia minor	Small Wax-lip Orchid		r		1
Grevillea celata	Colquhoun Grevillea	L	v	VU	2
Laxmannia gracilis	Slender Wire-lily		r		2
Leptospernum emarginatum	Twin-flower Tea-tree		r		1
Leucopogon juniperinus	Long-flower Beard-heath		k		2
Pittosporum revolutum	Rough-fruit Pittosporum		r		5
Pomaderris aurea	Golden Pomaderris		r		1
Pomaderris betulina subsp. betulina	Birch Pomaderris		r		1
Pomaderris eriocephala	Woolly-head Pomaderris		r		1
Sparganium subglobosum	Floating Bur-reed		k		4

L = listed as threatened under the *FFG Act 1988*; v = vulnerable in Victoria, r = rare in Victoria, k=poorly known (DSE, 2005); VU = vulnerable nationally (listed under EPBC Act).

Five taxa listed as rare on DEPI's *Advisory list* (DSE, 2005) were recorded by Ethos NRM within or near the mine footprint during vegetation surveys, including;

- Forest Red Box *(Eucalyptus polyanthemos subsp. longior)* – within footprint,
- Gippsland Stringybark *(Eucalyptus mackintii)* – within footprint,
- Wallaby-bush *(Beyeria lasiocarpa)* – near footprint,
- Austral Tobacco *(Nicotiana suaveolens)* – near footprint,
- Paperbark Tea-tree *(Leptospermum trinervium)* – within footprint.

4.4 Removal of Significant Flora Species

Species which have been recorded within close proximity to a proposed vegetation removal site have been assumed to occur where habitat for the species is suitable even if current survey efforts by Ethos NRM have not recorded them. A precautionary approach also indicates that impacts will occur to a small population of the **rare** Slender Wire-lily (*Laxmannia gracilis*) which has been previously recorded within the mine footprint, although Ethos NRM have not recorded this species in recent general and targeted surveys.

The proposed Nowa Nowa Iron Project (5 Mile Deposit) mine footprint will remove small populations of 4 rare flora species *(Eucalyptus mackintii, Eucalyptus polyanthemos* subsp. *longior, Leptospermum trinervium and Laxmannia gracilis)* within the mine footprint. Impacts to these four rare plants are not likely to cause a detrimental impact to the viability of the species, as they are locally common across East Gippsland and within the larger area immediately outside the mine footprint.

In addition, potential impacts could occur to a small population of the **rare** *Pomaderris betulina subbp. betulina* within the mine footprint. Field surveys recorded several Pomaderris shrub species, of which one could potentially be the rare *Pomaderris betulina subbp. betulina*. However flowering material is required to confirm the correct Pomaderris species, which was not present at the time of survey. It is anticipated that this species will be flowering in late December, early January and confirmation of the species occurrence can be made then.

Negligible impacts are expected on other rare plants (Bolwarra, Small Wax-lip Orchid, Twin-flower Tea-tree, Rough-fruit Pittosporum, Golden Pomaderris, Birch Pomaderris, Woolly-headed

Pomaderris, Austral Tobacco and Wallaby bush), which may occur in suitable habitat within the mine footprint, however these species have not been recorded during vegetation surveys by Ethos NRM.

5 East Gippsland Forest Management Plan values

Forest Management Plans identify priorities for State forest use within specific regional areas through the delineation of Forest Management Zones. The Zoning Scheme defines a number of categories for forest management areas including:

- **Special Protection Zone (SPZ) -** to be managed for conservation. Timber harvesting is excluded. It forms a network designed to complement conservation reserves
- **Special Management Zone (SMZ)-** to be managed to conserve specific features, while catering for timber production under certain conditions
- **General Management Zone (GMZ)-** to be managed for a range of uses, but timber production has a high priority.

The Project mine site is located within the area covered by the East Gippsland Forest Management Plan (DEPI, 2013b). The majority of the mine footprint is within Special Management Zones which are managed for apiary, road landscape and fire management values. The south-east portion (c. 30 ha) of the mine footprint, and the proposed Nowa Nowa-Buchan Road diversion will impact directly on one SPZ (P-805-02). The DEPI Interactive Maps (DEPI, 2013c) record the following values within SPZ (P-805-02); Powerful Owl Management Area (POMA), National Estate Biodiversity, Old Growth (OG) (29, 4000).

- **OG (29, 4000)** refers to Old Growth values for Damp Forest (EVC 29). However DEPI EVC Mapping does not identify any Damp Forest within the SPZ, and Ethos NRM have not observed any Damp Forest within the area of the SPZ overlapping with the mine footprint, and hence conclude no impact will occur on this value.
- **National Estate Biodiversity** values refer to a Commonwealth government policy which no longer exists, National Estate values were incorporated into the Environmental Protection and Biodiversity Act. No old growth forest was observed during field surveys by Ethos NRM within the Vegetation Study Area. The area has been subject to extensive timber harvesting activities, and fire has been introduced through most of the site. Large, senescent trees were observed infrequently across the site.
- **POMA** refers to a Powerful Owl Management Area. The Department of Environment and Primary Industries (DEPI) have confirmed that the POMA is related to a Powerful Owl roost site record in a drainage line to the south of Five Mile Road/Telephone Road intersection (SPZ P-805-01), which is outside of the SPZ (P-805-02) overlapping the mine footprint. POMAs are required to be created within the area surrounding a confirmed Powerful Owl record, and may be generated from desktop data rather than on-ground habitat assessment. Powerful Owls have been recorded previously within the general area surrounding the Project site, but were not recorded within the Project site during fauna surveys conducted by Earth Systems. Availability of suitable habitat for Powerful Owl is limited within the mine footprint.

6 References

Department of the Environment, 2013. *Matters of National Environmental Significance*, viewed 04/11/13 http://www.environment.gov.au/epbc/protect/index.html. Australian Government Department of Sustainability, Environment, Water, Population and Communities.

DEPI, 2013a. *Permitted clearing of native vegetation Biodiversity Assessment Guidelines.* Victorian Government Department of Environment and Primary Industries, Melbourne, May 2013.

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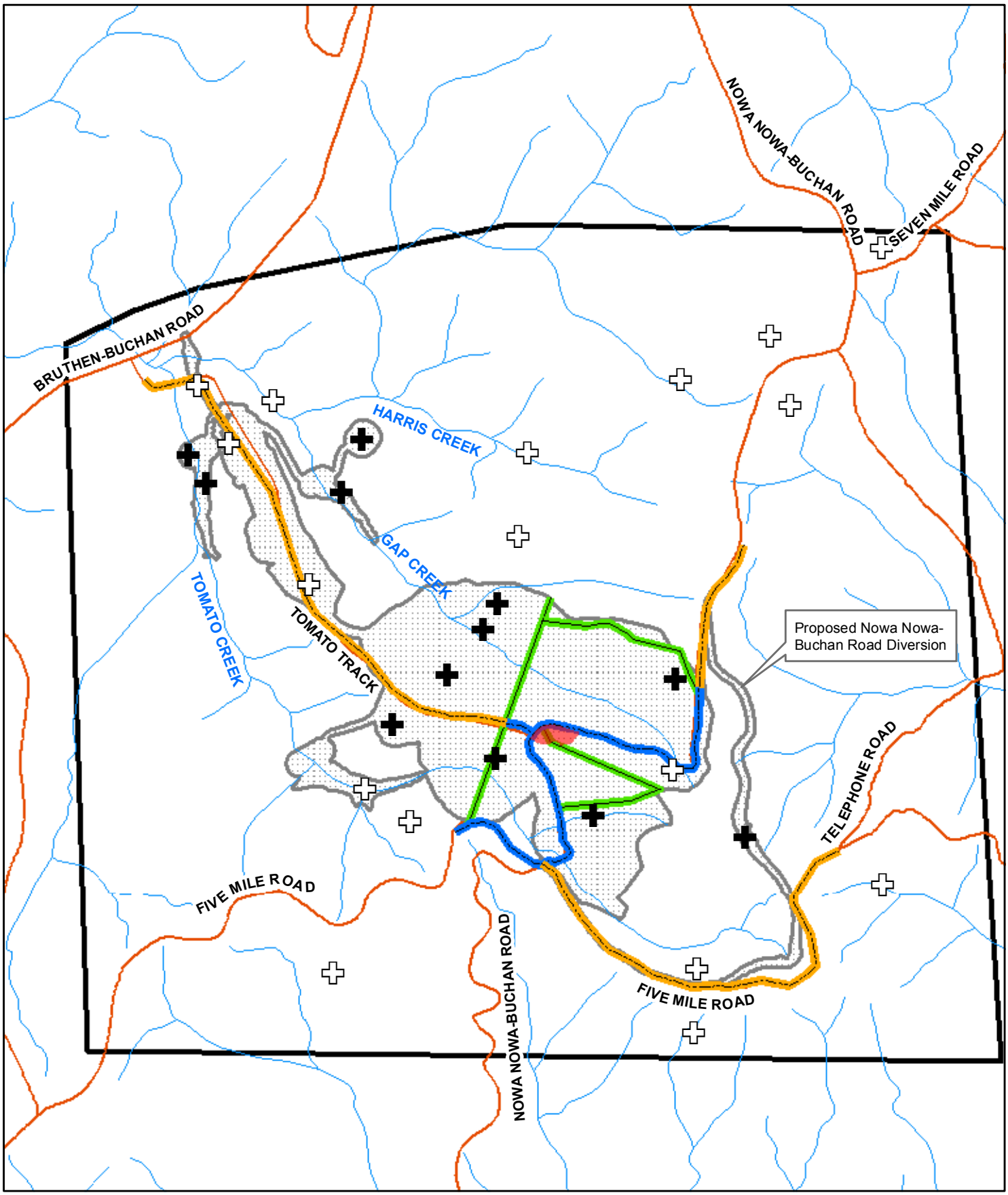
DSE, 2004. *Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3.* Victorian Government Department of Sustainability and Environment, Melbourne.

DSE, 2005. *Advisory List of Rare or Threatened Plants in Victoria - 2005*. Victorian Department of Sustainability and Environment, East Melbourne, Victoria.

Ethos NRM, 2013. *Preliminary Vegetation Quality Assessment and Ecological Vegetation Class Mapping: Nowa Nowa Iron Project.* Report prepared for Earth Systems, October, 2013 by Ethos NRM Pty Ltd, Victoria.

VBA, 2013 Data Source (DEPI)

Data Source: 'Victorian Biodiversity Atlas', © The State of Victoria, Department of Environment and Primary Industries (Version 3.0.6., accessed 4th November, 2013).



Terrestrial Vegetation Condition Assessment
Nowa Nowa Iron Project (5 Mile Deposit)
Figure 1. Overview of Survey Effort

- Roads and Tracks
- Creeks
- Preliminary Vegetation Survey Area
- Mine footprint

Vegetation Sample Locations

- Autumn
- Spring

Targeted Grevillea celata survey Transects

- Transect - Walking
- Roadside - Walking
- Roadside - Vehicle

Targeted Laxmannia gracilis survey area

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0 0.1 0.2 0.4 0.6 Km

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Version 1
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Date: 27/11/2013

Coordinate System:
GDA 94 MGA Zone 55

ETHOS NRM

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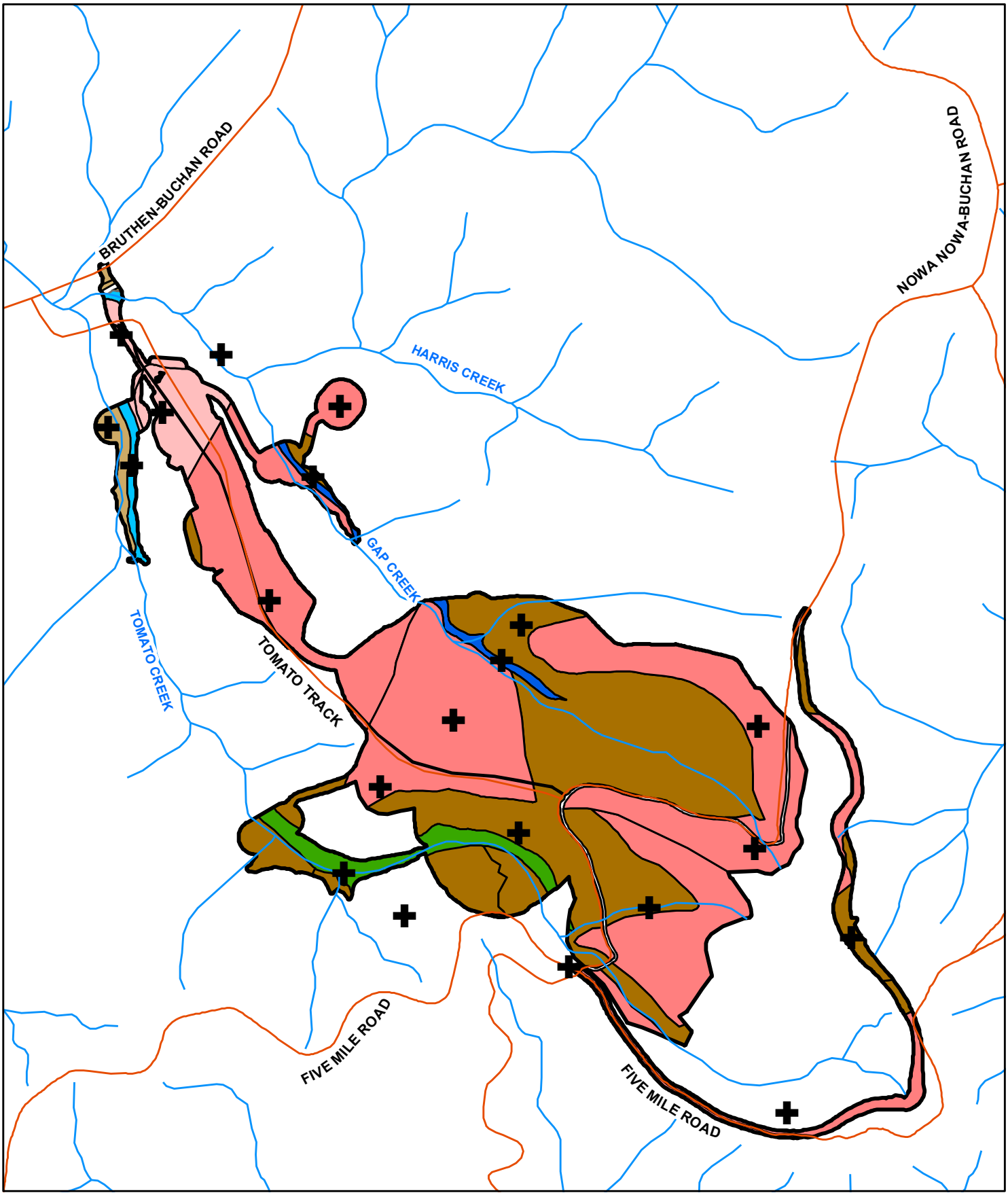

Terrestrial Vegetation Condition Assessment
Nowa Nowa Iron Project (5 Mile Deposit)
Figure 2. Ecological Vegetation Classes

- Vegetation Sample Locations
- Roads and Tracks
- Creeks
- Mine footprint boundary

Ecological Vegetation Class, Bioregion

- Damp Forest, East Gippsland Uplands
- Lowland Forest, East Gippsland Lowlands
- Lowland Forest, East Gippsland Uplands
- Riparian Forest, East Gippsland Lowlands
- Riparian Forest, East Gippsland Uplands
- Shrubby Dry Forest, East Gippsland Lowlands
- Shrubby Dry Forest, East Gippsland Uplands

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Version 1
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Date: 27/11/2013

Coordinate System:
GDA 94 MGA Zone 55

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