

Phillips River Gold Project, Ravensthorpe

Tectonic Resources NL

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
17/06/05	Referral received	
27/06/05	Intention to set EPS Level of Assessment advertised (no appeals)	2
25/11/05	Proponent's Final Draft EPS document received by EPA	21
19/12/05	Proponent's Final EPS document received by EPA	3
05/01/06	EPA report to the Minister for the Environment; Science	2

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1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to a proposal by Tectonic Resources NL to undertake mining in the areas of Trilogy on mining lease M74/176 and Kundip on mining leases M74/41, M74/51, M74/53, M74/135, M74/121, P74/153 and L74/34, construct a haul road within M74/176, M74/51 and Gazetted Road No. 8432, upgrade the processing plant situated east of Ravensthorpe on M74/13, and discharge process tailings to the existing pit on M74/13.

The EPA was advised of the proposal in June, 2005. Based on the information provided, the EPA considered that while the proposal had the potential to have an effect on the environment, the proposal could be readily managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 27 June 2005 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set the level of assessment at EPS.

The proponent has prepared the EPS which accompanies this report (*Phillips River Gold Project, Tectonic Resources NL, Outback Ecology, December 2005*). The EPA considers that the proposal described can be managed in an acceptable manner subject to the recommended conditions and commitments to the proposal being legally binding.

The EPA therefore has determined under Section 40 (1) that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 (1).

2. The proposal

The proposal is described in detail in Section 3 of the proponent's document "*Phillips River Gold Project, Tectonic Resources NL, Outback Ecology, December 2005*"(EPS). The proposal involves the development of an open cut pit and associated mining infrastructure on the Trilogy site, development of open cut pits at nine locations and underground mining from three of the pits on the Kundip site and associated mining infrastructure, the construction of a haul road in gazetted road reserve 8432 through a proposed Nature Reserve, upgrade of the existing RAV 8 process plant situated 25 km east of Ravensthorpe on M74/13 and disposal of tailings into the existing pit at the RAV 8 site. Figure 1 shows the location of the proposal, Figure 2 shows the proposed layout of Trilogy mining site, Figure 3 shows the proposed layout of the Kundip mining site, Figure 4 shows the proposed haul road route and Figure 5 the proposed plant and tailings layout at the RAV 8 site.

The key components of the proposal are summarised in Table 1 below:

Table 1: Summary of key proposal characteristics

Element	Mining and development of the Trilogy ore body	Mining and development of the Kundip ore body	RAV 8 ore processing and tailings disposal
Life of project (mine production)	5-6 months	4.3 years	4.3 years
Size of Resource (tonnes)	4,200,000	3,700,000	-
Number of open pits	1	9	-
Number of underground operations	0	3	-
Depth of mine pits (metres)	44	20 to 85	-
Total mined ore (tonnes)	350 000	1 200 000	-
Total waste (tonnes)	1 500 000	8 200 000	-
Ore mining rate (maximum tonnes)	75 000 per month	62 000 per month	-
Water table depth (metres)	33.5	37	-
Area of disturbance (including access) (hectares)	29.2	109.7	-
Native vegetation to be cleared (hectares)	0	69.73 – Kundip 15.07 – Haul Road	-
Operating hours (hours/day)	24	24	24
List of major components • pit • waste dump • treatment plant • infrastructure	See Figure 2	See Figure 3 & 4	See Figure 5
Water supply source	Groundwater	Run-off / Ground water	Tails return/ groundwater
Water usage - maximum annual requirement (cubic metres)	10 000	30 000	630 000
Fuel storage (kilolitres)	55 000	110 000	165 000
Fuel usage (litres)	90 000 -life of mine	10 500 000-life of mine	580 per hour
Power supply	Hopetoun Grid	Diesel generators	Diesel generators
Haulage times	1 truck/hour 7 days/week	1 truck/hour 7 days/week	-

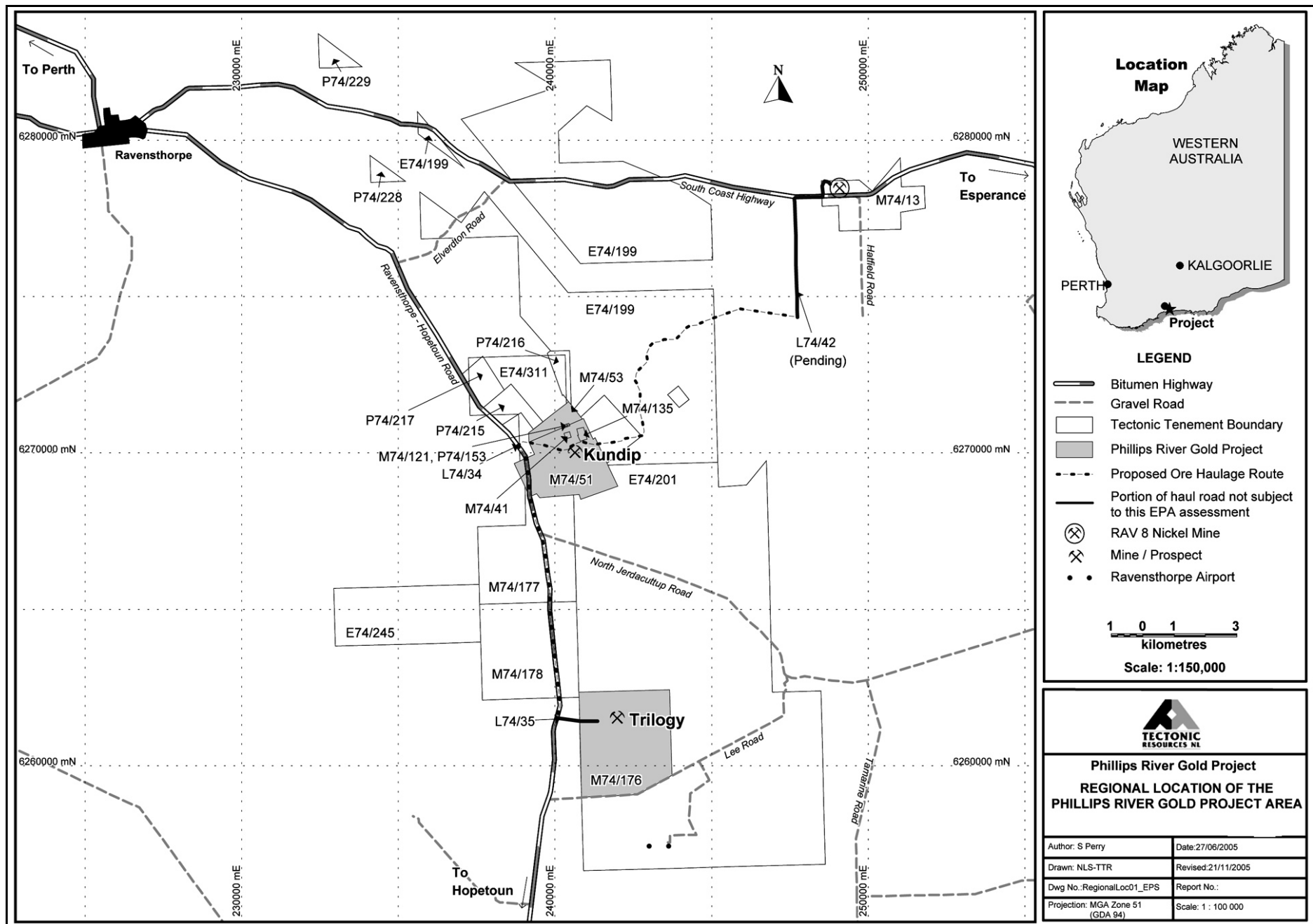


Figure 1: Proposal location



Figure 2: Trilogy mining site

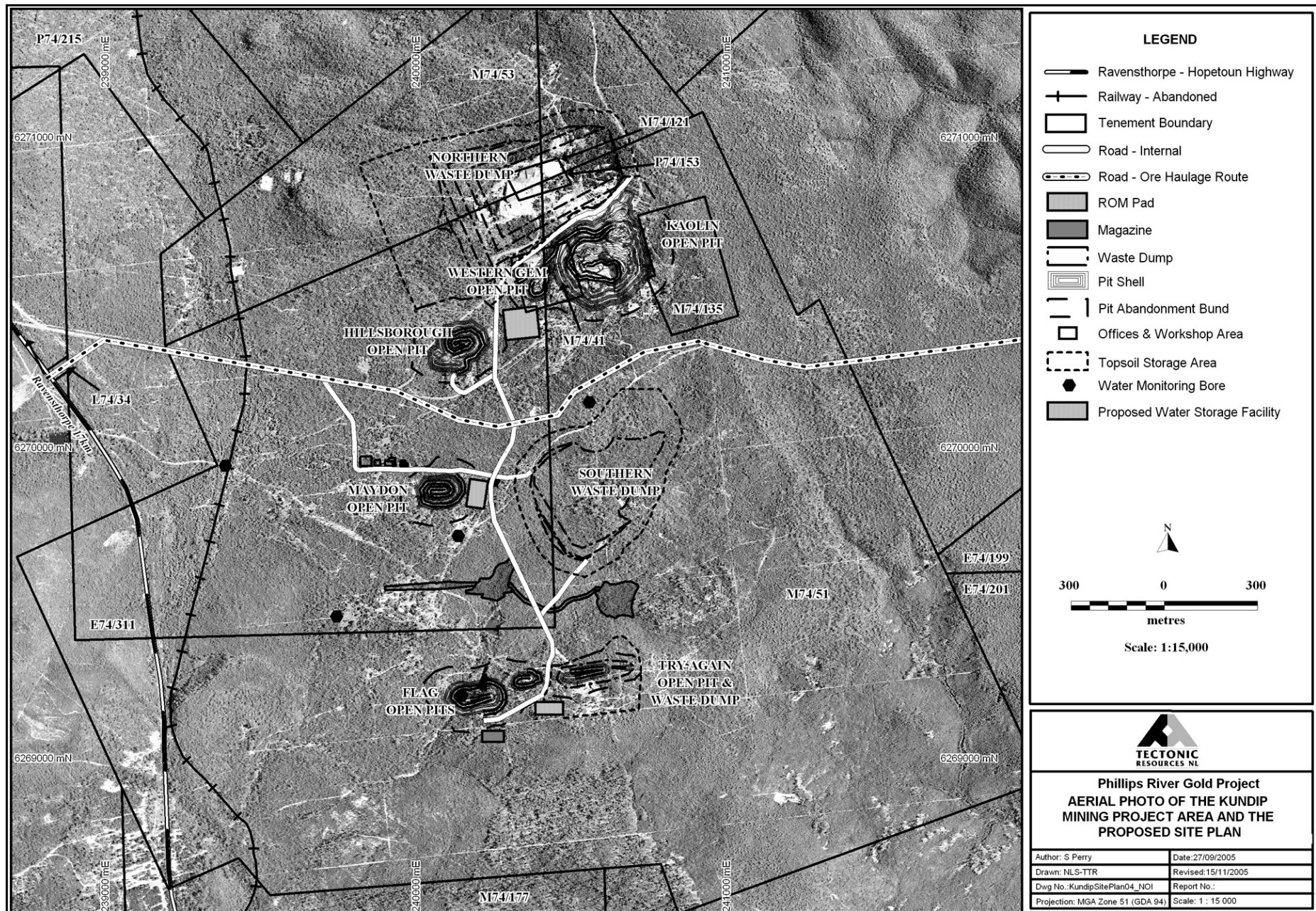


Figure 3: Kundip mining site

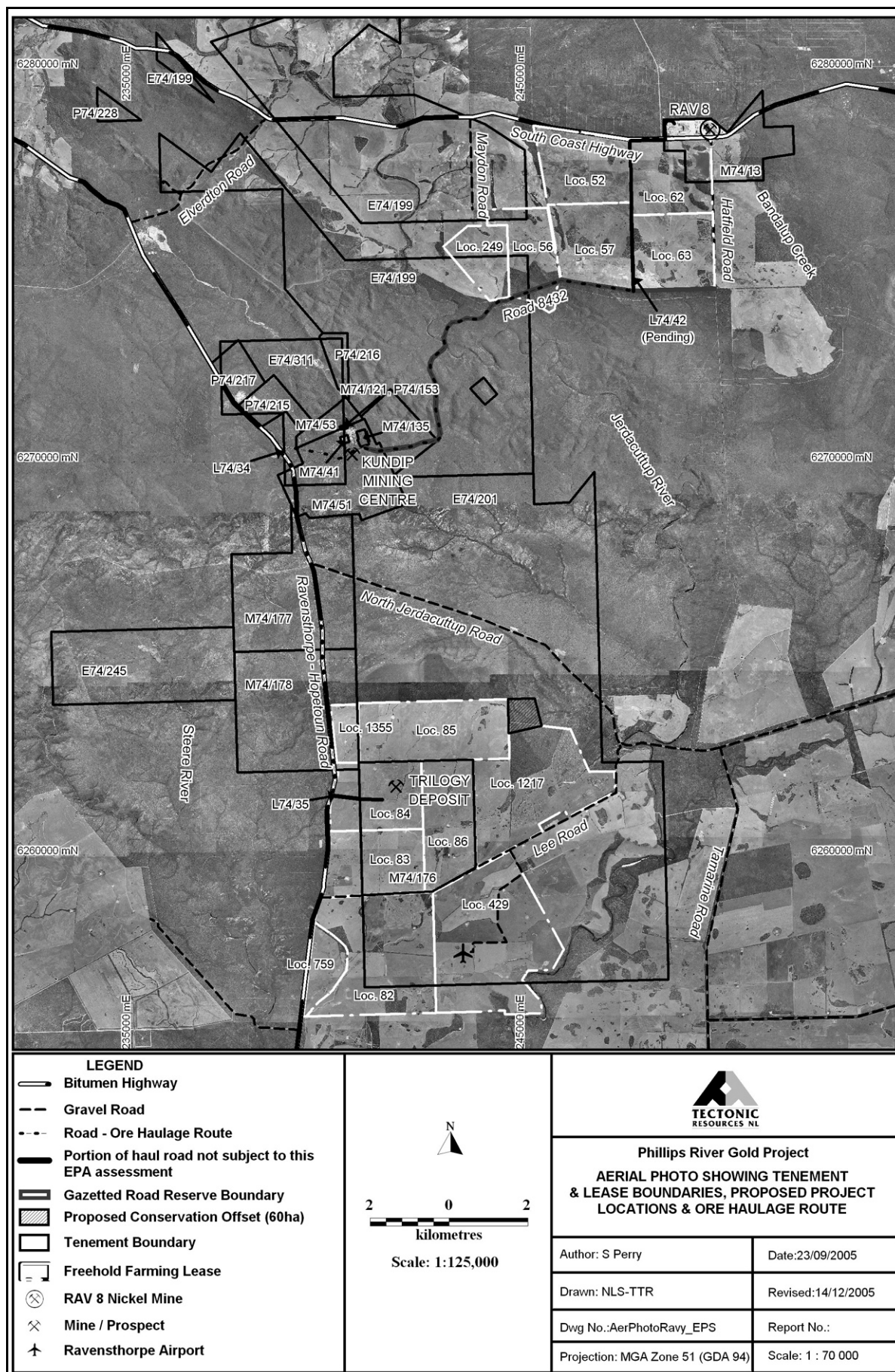


Figure 4: Haul road routes and proposed conservation area

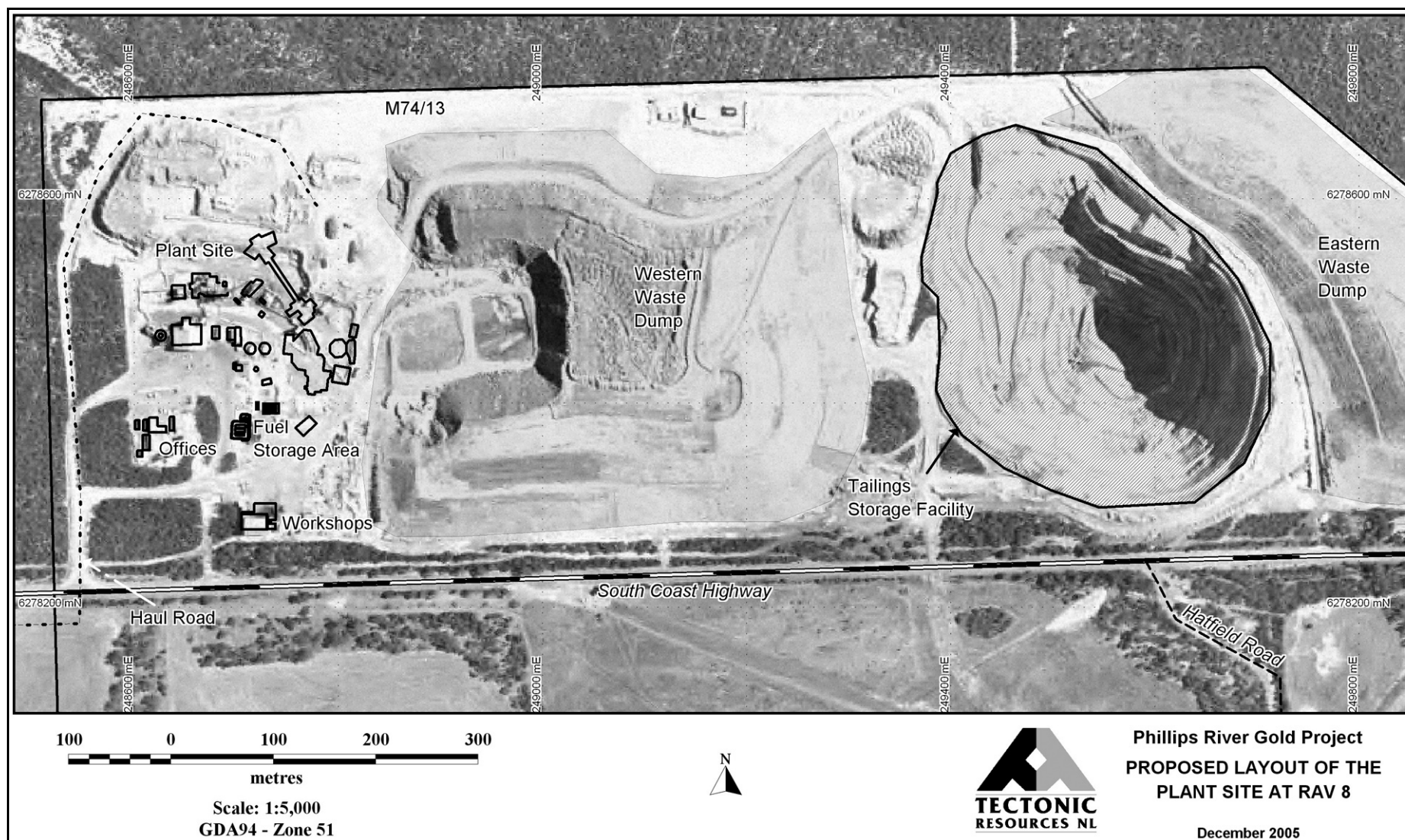


Figure 5: RAV 8 plant site and tailings disposal site

3. Consultation

During the preparation of the EPS, the proponent has undertaken consultation with government agencies and others with a direct interest in the project as well as local interest groups. Consultation was also undertaken with the local community via presentation evenings in Hopetoun and Ravensthorpe. The list of organisations and agencies consulted, the comments received and the proponent's responses are included in Section 5 of the EPS.

4. Relevant environmental factors

The summary of all of the environmental factors and their management is outlined in Table B of the EPS (Executive Summary, EPS).

In the EPA's opinion the following are the environmental factors relevant to the proposal:

- a) Flora and vegetation communities;
- b) Neighbouring conservation areas;
- c) Fauna;
- d) Surface water quality; and
- e) Groundwater quality.

Appendix 2 of this report outlines all the environmental factors considered in this assessment and the reasons for selection of the above factors for further consideration.

4.1 Flora and vegetation communities

Description

Kundip mining site

The Kundip site is located in one of the peak areas of biodiversity in the South West of Western Australia and is centred in one of the three areas of highest endemism in Western Australia (Craig, April 2004). Mining on the site will lead to the clearing of approximately 70 hectares (ha) of native vegetation and the use of another 35 ha of already disturbed land.

Three flora surveys have been undertaken on the site, the first two in April and December 2004 and a spring survey of the areas to be disturbed in October 2005 (EPS Appendix F). The declared rare flora (DRF) *Marianthus mollis* (previously *villosus*), priority one species *Melaleuca stramentosa*, priority two species *Acacia disticha*, *Acacia laricina* var. *crassifolia*, *Hydrocotyle decipiens*, priority three species *Acacia durabilis*, *Boronia oxyantha* var. *brevicalyx*, *Dodonaea trifida*, *Spyridium glaucum* and priority four species *Acacia pinguiculosa* and *Siegfriedia darwinoides* have been found on the Kundip site. (Craig, Apr & Dec 2004, Oct 2005, EPS Appendix F)

In addition, two previously undescribed species *Pultenaea* sp. Kundip and *Melaleuca* sp. Kundip have been found on the Kundip site (Craig, April 2004). The *Melaleuca* sp. Kundip is listed as a priority one species and the *Pultenaea* sp. Kundip will be listed on the next listing as priority one. The two undescribed species occur in conjunction and may be nominated for Threatened Ecological Community status. The known extent of this community is currently approximately 100 ha (Craig, November 2004).

All communities on the site lie within Beard's Ravensthorpe System (1979), which has been proposed for inclusion in the Department of Conservation and Land Management's (CALM) Threatened Ecological Community database.

Vegetation surveys of the Kundip site (Appendix F of EPS document) identified eighteen vegetation units based on their vegetation formations and plant associations. The majority of the communities are well represented in the region except those dominated by the priority one species *Melaleuca stramentosa*, identified as types Ms and Mb, and the two newly discovered species, type Mx. Only 14.2% of the Ms community will be cleared.

Haul Road

Several alternative routes were considered for the transportation of ore from the mining areas to the processing plant at RAV 8. The selected route is along the Ravensthorpe/Hopetoun road, through the Kundip site and along gazetted road reserve No 8432, through farming land adjacent to a paddock fence, crossing the road reserve and South Coast Highway opposite the entrance to the RAV 8 site. In this assessment, the EPA has considered only the portion of the road on the Kundip site and in road reserve No 8432. There is no protected vegetation on or near other portions of the road and they fall in the category of farm roads for clearing purposes. The main considerations in the selection of the route were road safety issues and economical advantage.

The proposed haul road route is within the gazetted road reserve No. 8432. This road is currently little more than a track. The gazetted Road is included within an area of the Ravensthorpe Range recommended by the EPA Red Book [Recommendation 3.8 (Figure 3.19)] to become a nature reserve. The road will transect the proposed nature reserve. The proposed nature reserve forms part of the Fitzgerald National Park to southern Goldfields vegetation link.

The DRF *Marianthus mollis* (previously *villosus*), priority one species *Melaleuca stramentosa*, *Beyeria* sp A Ravensthorpe, and *Pultenaea calycina* subsp *proxima*, priority two species *Acacia larinia* var. *crassifolia* priority three species *Spyridium glaucum* and *Allocasuarina sclerocada* spp Bandalup and a species of conservation significance *Phebalium tuberosum* 'Maydon form' have been found in the road reserve. (Craig, May 2004). CALM have advised that the priority status of *Allocasuarina sclerocada* spp Bandalup is being reviewed and may be increased in priority.

Trilogy mining site

A flora survey at the Trilogy site was undertaken in October 2002 (EPS Appendix G). The pit and associated mining elements will be situated on cleared farming land. No vegetation other than 0.038ha of vegetation consisting of remnant *Eucalyptus* mallee species will be cleared. The impact on vegetation at this site is therefore minimal and does not require further assessment.

Secondary impacts to vegetation

Secondary impacts to vegetation that will require management are the potential impact of creek diversion and water storage at Kundip to downstream vegetation, dust impact on vegetation from construction and operational activities and road traffic, impact of surface drainage water and impact from saline water used for dust suppression.

Assessment

The EPA's environmental objective for this factor is to:

- a) protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- b) maintain the abundance, species diversity, and geographic distribution of vegetation communities.

Kundip mining site

The EPA notes that in planning the site layout the proponent has sought to avoid areas of DRF and Priority vegetation as far as possible. The proponent has sought to use areas already disturbed in preference to undisturbed areas. Nevertheless 70 ha of native vegetation will need to be cleared in addition to the 35 ha of already disturbed land that will be utilised. Some vegetation to be cleared is mature woodland up to 100 years old. Disturbed vegetation includes four plants of the DRF *Marianthus mollis*, 14.2% of the population on the site of the Priority 1 species, *Melaleuca stramentosa*, which is poorly known and may have a restricted range, as well as plants of eight other Priority 2, 3 and 4 species. Ten plants of the Priority 2 species *Hydrocotyle decipiens*, which is only known from two other locations within the region, will be impacted. The northern waste dump has been repositioned to avoid two other more numerous populations of the plant. The newly discovered *Pultenaea* sp. Kundip and *Melaleuca* sp. Kundip community will not be disturbed.

The percentage of vegetation communities to be cleared will not cause these communities to become endangered.

Rehabilitation of disturbed areas will be undertaken at the conclusion of mining except for the area of mine voids that will remain. The EPA notes that the proponent will backfill the Try Again, Flag Central and the Western Gem open pits and partially fill the Hillsborough open pit. Other pits will remain open for underground mining. Hillsborough will also be used for storage of underground mine dewatering.

Haul Road

The width of the gazetted road reserve is 20 m or 40 m in places. The planned road width is 15–18 m with an 11 m running surface. The EPA notes that the proponent will demarcate the extent of populations of DRF and Priority flora prior to selecting the alignment of the road in the corridor in order to minimise impact to these flora. Nevertheless it is expected that a population of the DRF *Marianthus mollis* will be impacted, as well as seven priority species and one species of conservation significance.

The EPA notes that the possibility of reducing the width of the road through the population of *Allocasuarina sclerocada* spp Bandalup, where the road bisects the population, was investigated but rejected owing to safety considerations. Re-alignment of this section to avoid the population of *Allocasuarina sclerocada* spp Bandalup was also considered but this would raise Native Title issues. The population of *Allocasuarina sclerocada* spp Bandalup is the largest known population of the species covering 0.44 ha and estimated to include approximately 600 plants. The gazetted road reserve goes through the middle of the population. As this species may be reclassified to higher conservation value, the EPA advises the proponent to further investigate means by which the impact on the population can be minimised, including re-alignment of the haul road outside of the gazetted road reserve. This advice is included in recommended condition 6 (Appendix 3).

The EPA notes that use of the haul road would be restricted to mine traffic and that post-mining it would be possible with agreement of the Shire of Ravensthorpe and CALM to close and rehabilitate the road. The EPA recommends the closure of the haul road section through the proposed nature reserve at the conclusion of mining if CALM does not wish to use it (see Section 4.2).

To offset the disturbance and loss of vegetation at Kundip and on the haul road, the proponent has offered an offset package consisting of:

Direct offset:

18.91 ha of rehabilitation of historically disturbed areas. (Note that this area has been calculate on the basis of what is currently disturbed and would not be vegetated if the project did not go ahead compare to disturbed area after conclusion of the project.)

Contributing offset

Purchase of 60 ha of land with native vegetation to add to conservation estate. The location of the proposed area is shown in Figure 4;

\$10 000 for targeted survey of *Melaleuca stramentosa*, a Priority one species;

\$10 000 for survey of proposed *Melaleuca-over-mallee* potential TEC;

Contribution of funds to allow fox baiting of the entire Ravensthorpe Range for five years (\$10,000/yr);

Donation of seed to CALM for Seed Banking.

In addition the proponent will vegetate a 15 m wide corridor along the northern section of the haul road where it transverses farming land. The EPA considers that this corridor will serve an aesthetic purpose as it is not wide enough to be considered as an ecological linkage.

The EPA has been advised by CALM that, in terms of the values and condition of the vegetation and ease of management, the area proposed for contribution to the conservation estate is appropriate. The proponent has additionally committed not to explore or mine in the area set aside for conservation, while the company holds the mining leases over the area. The EPA supports the offset package as offered by the proponent.

Secondary impacts

The EPA notes that vegetation downstream of the creek diversion at Kundip will be monitored photographically. Should impacts be observed, it is necessary for the proponent to have contingency plans to remedy these. A condition requiring a flora and vegetation monitoring and management plan is recommended, to include contingency plans to mitigate any impacts observed.

It is inferred that, due to the depth to groundwater on the site and the salinity of the groundwater, much of the flora is unlikely to have either the root system or salt tolerance to utilise this groundwater and therefore dewatering activities are not likely to impact vegetation.

The proponent intends to undertake baseline dust monitoring prior to operations and to continue dust monitoring during operations at the Trilogy and Kundip sites. The EPA advises that provision should be made for vegetation adjacent to mining areas and haul roads to be monitored for dust impacts in the flora and vegetation management and monitoring plan for the proposal.

The EPA notes that saline water will not be used for dust suppression on the haul road. Instead vehicle speeds will be controlled to minimise generation of dust. Should impacts be detected, fresh water or other suppressants will be used to reduce dust.

The proponent proposes to manage surface drainage at Trilogy and Kundip to prevent sediment being carried into stream lines. On the haul road V-drains and sediment traps will be installed to direct surface water to natural drainage lines. Construction of drains into the DRF *Marianthus mollis* and priority species *Allocasuarina sclerocada* spp Bandalup will be avoided. The EPA advises that these measures should be implemented.

Summary

The EPA acknowledges that the proponent has made a commitment to prepare and implement a flora and vegetation management plan for the proposal. In view of the significance of the vegetation to be cleared, the EPA considers that the proponent's commitment should be replaced with a Ministerial condition with specific management requirements (Appendix 3, recommended condition 6).

The EPA considers the issue of flora and vegetation communities has been adequately addressed and can meet the EPA's objectives for this factor provided that the recommended condition for a flora and vegetation management and monitoring plan is imposed.

4.2 Neighbouring conservation areas

Description

The proposal area is within the Fitzgerald Biosphere, one of only two biospheres in Western Australia. The Fitzgerald Biosphere has been recognised for its floral diversity internationally since 1978 as part of the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) Man and the Biosphere Program. More than 1800 species of flowering plants, as well as a many lichens, mosses and fungi, have been recorded in Fitzgerald River National Park. This represents nearly 20 per cent of the total number of plant species in Western Australia. The Fitzgerald Biosphere consists of an undisturbed core which is the majority of the Fitzgerald River National Park. Surrounding this area is a buffer area of uncleared bush and beyond this is the zone of co-operation consisting of cleared and uncleared areas. Within the zone of co-operation a variety of agricultural activities, human settlements and other uses may be undertaken for the community's benefit. The proposal area is within the zone of co-operation.

The proposal also falls within an area recognised by the Australian Government as one of fifteen National biodiversity hotspots. Figure 6 shows the position of the project in relation to existing conservation reserves and reserves proposed in Recommendation 3.8 of the EPA's "Red Book".

The proposal has the potential to introduce dieback to the Kundip site and into the haul road reserve. This could spread further into conservation areas through carriage in water or by human activities. Some vegetation communities contain proteaceous species, which are particularly susceptible to dieback. Control of drainage from the haul road is an important aspect of preventing the introduction of dieback to the proposed nature reserve.

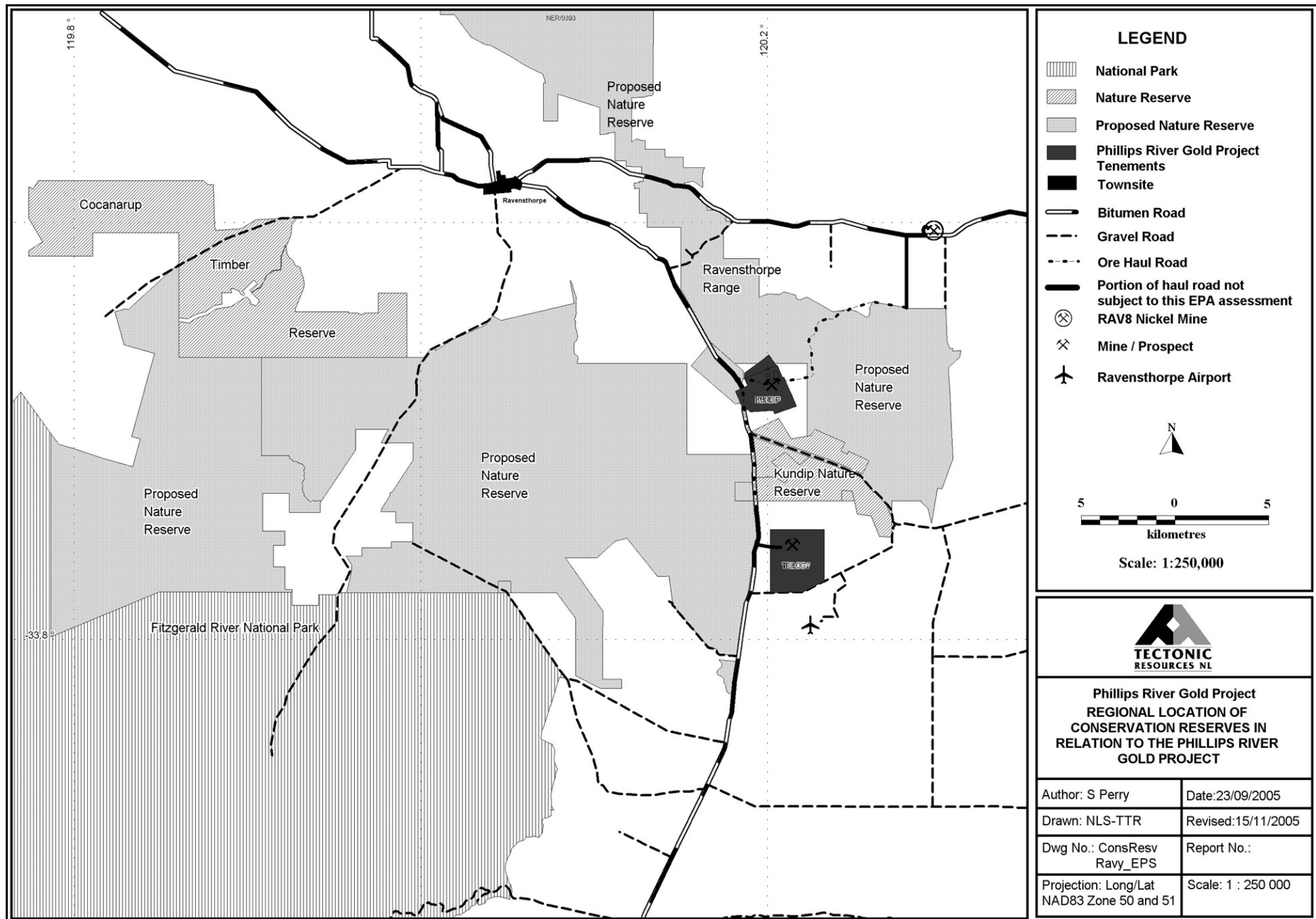


Figure 6: Location of existing and proposed conservation reserves

Mining and transport activities can also introduce weeds to the Kundip site and into the haul road reserve, which could spread into conservation areas. Existing weed species on the Kundip site could facilitate this spread.

Activities at the Kundip site and traffic along the haul road could also be a source of ignition for fire which could destroy conservation area vegetation. Some vegetation in this area is extremely old, possibly older than 100 years. Much of the vegetation is in excellent condition. Fire would also impact fauna.

The construction of the haul road through an area proposed for nature reserve also allows easier access to the area for feral predators such as cats and foxes which prey on native animals.

Assessment

The EPA's environmental objective for this factor is to ensure that the conservation values of the surrounding existing and proposed Nature Reserves are not compromised.

The high value of the Fitzgerald biosphere has been internationally established. The EPA considers that it is of great importance that the vegetation of the surrounding area is protected from the introduction of dieback and weeds and from impact of wild fires.

The proponent has made commitments to environmental management and monitoring plans for dieback, weeds and fire management. While the EPA accepts that it is the proponent's intention to implement these, the issue is of so great an importance as to merit these plans being enforced by Ministerial conditions. The EPA therefore recommends conditions 8, 9 and 10 (Appendix 3). It is also of importance that dieback prevention management is implemented for all activities on the Kundip site and the haul road prior to construction of the project. Existing weed species on the Kundip site and haul road should also be eradicated.

To counter the impact of the haul road offering easier access for foxes to the proposed Nature Reserve, the proponent has offered as part of the offset package to donate sufficient money to fund fox baiting in the Ravensthorpe Range for five years. The EPA recommends that the haul road be removed and revegetated after this time, if CALM has no requirement for it.

Summary

The EPA considers the issue of the protection of neighbouring conservation areas can meet the EPA's objectives for this factor provided that the recommended conditions 8, 9 and 10 are implemented.

4.3 Fauna

Description

Kundip mining site

Fauna surveys were carried out in May and November 2004 (EPS, Appendix H, Biota, May 2004 and January 2005). The following conservation listed species were found during the first survey: Carnaby's Cockatoo *Calyptorhynchus latirostris* [Endangered under EPBC Act 1999, and listed under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2005], Malleefowl *Leipoa ocellata* [Vulnerable under EPBC Act 1999, and listed under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2005], *Lerista viduata* [Priority 1 under the Western Australian Wildlife Conservation Act (1950)]

Western Whipbird (southern WA subspecies) *Psophodes nigrogularis oregon* [Vulnerable under EPBC Act 1999, and Priority 4 *Western Australian Wildlife Conservation Act (1950)*] and the Western Brush Wallaby *Macropus irma* [Priority 4 *Western Australian Wildlife Conservation Act (1950)*]. The second survey particularly targeted the occurrence of the Heath Rat *Pseudomys shortridgei* and the population size of the Western Whipbird *Psophodes nigrogularis oregon*. No other species of conservation significance, including the Heath Rat, were found during this survey. A number of other listed species potentially inhabit the area, but were not found during the surveys.

Over 30 invertebrate taxa were recorded from the Kundip study site, many of which were not identified beyond family level. Only invertebrate taxa belonging to groups known to contain short range endemics or that were otherwise of conservation significance were identified to genus or species level. Two species of mygalomorph spiders from the family Nemesiidae were recorded from the Kundip project area; *Aneme mainae* and *Chenistonia tepperi*. Both species (as they are currently recognised) have broad distributions through the South-west of Western Australia (Biota, January, 2005). A single *Bothriembryon* (land-snail) that was not known to the WA Museum was collected during the survey from leaf litter at one sampling site. The conservation status of this taxon is unknown (Biota, January 2005).

Haul road

The construction of the haul road will require the removal of approximately 15 ha of native vegetation. The width of the road and verges will be 15-18 m. The haul road passes through habitats similar to those documented at Kundip and Trilogy, and a similar fauna assemblage would be expected to Kundip.

Trilogy mining site

The limited vegetation on this site would support little native fauna. Nine species of bird were recorded which were waterfowl and several species typical of farms and open habitat. No trapping was carried out at this site. Due to the limited potential for impact on native fauna no further assessment of impacts on this site is required.

RAV 8 site

The RAV 8 site has been operating as a mine site for five years and there is little vegetation on the site to provide habitat for fauna. Birds including black swans are occasionally seen on the saline water storage facility. The impact of the tailings water pond on fauna is discussed under surface water (Section 4.4). Tectonic currently operates a feral cat trapping program at RAV 8. This will be continued at RAV 8 and will be expanded to include the Kundip project area. Due to the limited potential for impact on native fauna no further assessment of impacts on this site is required.

Stygofauna

Stygofauna are known to occur in calcrete and alluvial aquifers, coastal karst systems, limestone and sandstone environments and palaeodrainages. None of these geological features are present within the Kundip project area, however the presence of stygofauna in this environment and in this region has not been qualified. Dewatering at the Trilogy mining site will be minor. Dewatering will only occur for a limited time at other mining sites. In addition the low groundwater inflow rates and the low dewatering rates necessary will have only localised aquifer effect. The Archaean volcanic rocks in the area are of low permeability and therefore any effects on groundwater level changes would be undetectable at more than 500m downgradient. The groundwater occurs in localised fractures, most of which are probably associated with mineralised zones. For these reasons it is considered that the

potential for significant impact on stygofauna, should they occur in the project area, is unlikely and no further assessment is required.

Assessment

The EPA's environmental objective for this factor is to:

- a) protect Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- b) maintain the abundance, species diversity and geographical distribution of terrestrial fauna.

Kundip mining site

The EPA notes that referral of the proposal under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) resulted in the Commonwealth deciding that the action proposed by Tectonic is not a controlled action and therefore did not require assessment under the EPBC Act.

Fauna surveys found that while Carnaby's cockatoos were seen in the area, they were not seen breeding at the site. The site is outside of the range of known breeding areas. Therefore loss of breeding holes should not be an impact to this species. Non-breeding birds are also able to forage further than breeding pairs. Consequently the EPA concludes that the loss of some vegetation, while it may reduce feeding area for some time, will not have an unacceptable impact.

The EPA notes that the proponent will sweep the area proposed for the ore haulage road and the Kundip project area, using the "human chain" technique, prior to clearing to detect active Malleefowl breeding mounds. Should any active mounds be discovered malleefowl eggs can be removed and incubated. The EPA agrees that the advice of CALM and the Malleefowl Preservation Group should be sought in the management of these birds.

The greatest impact is likely to be to the Priority 4 and vulnerable under the EPBC Act species Western Whipbird population as these are sedentary, territorial birds. The EPA notes that none of the records of the Western Whipbird fell within the proposed impact areas at Kundip but that two of the four vegetation units within which the bird was recorded occurs over the impact areas. The worst case scenario predicted by Biota (Appendix H.2 of EPS) would be that either:

- (1) between 5 and 7 pairs may be lost assuming only vegetation types in which they were recorded were suitable, or
- (2) between 8 and 12 pairs if all vegetation types are suitable.

However, Biota believe that this is an overestimate as no Western Whipbirds were recorded from any of the proposed pit or overburden areas suggesting that they are likely to be present at lower than average densities, a large proportion of the northern and central pit areas is already heavily disturbed or cleared of their natural vegetation suggesting whipbirds may occur only marginally in both of these areas and lastly, most of the records during Phase II are from *Banksia lemanniana* open mallee and thicket scrub/heath which will not be heavily disturbed and densities are likely to be lower than average in most of the other habitats. Advice was also obtained that this species was considered to be common in suitable habitat throughout the Ravensthorpe district. Although some birds may be impacted the scale of impact is not anticipated to be significant.

Haul road

The EPA expects that the amount of habitat and food area lost over the 17km of the road will have low impact on loss of habitat and feeding area. A search for active mallee fowl mounds will be undertaken prior to construction commencing. However, the haul road will provide better accessibility to the proposed nature reserve for foxes. This will be managed by the proponent contributing to the fox control programmes co-ordinated through CALM Ravensthorpe for five years.

Another potential impact will be the risk of road kill from the transportation of ore 24 hours per day. The EPA considers that the impact of this on native fauna should be monitored and a register of road kill kept. If it is found that species of conservation significance or an excessive number of native animals are being killed on the road, haulage should be planned to reduce or avoid the use of the road at times when fauna in the area are most active or other contingency plans implemented.

The EPA notes that the proponent has committed to preparing and implementing a fauna management and monitoring plan. The EPA recommends that this commitment should be replaced by a Ministerial condition (Condition 7, Appendix 3).

Summary

The EPA considers the issue of fauna has been adequately addressed and can meet the EPA's objectives for this factor provided that recommended condition 7 is imposed.

4.4 Surface water quality

Description

The project will create a number of surface water bodies. At the Trilogy site a temporary water storage dam will be constructed into which saline, acidic water with elevated metal concentrations will be pumped during pit dewatering. The potential impact of this surface water is to birds which may be attracted to the waterbody.

At the Kundip site a water storage dam will also be constructed. This is to hold diverted fresh water and is not expected to impact bird life, groundwater or vegetation. At Kundip a number of pits will remain at the conclusion of mining and these will contain saline water which will have the potential to attract birds.

At RAV 8 water from tailings discharge will form a pond on top of the tailings in the pit. The tailings discharge to the pond is predicted to have maximum levels of cyanide of 50 milligrams per litre (mg/L) and of copper of 32 mg/L during the first two years of discharge (Enesar, April 2005 and Outback Ecology, 11 October 2005, *pers comm.*). This assumes that ore with low copper levels is processed during the first two years of operation. It is planned to establish from the initial ore processing whether a cyanide detoxification process will need to be undertaken when higher grade copper ore is processed. The tailings pond may be a hazard to bird life if cyanide concentrations are higher than expected. In addition, seepage of the tailings liquor to the groundwater could eventually discharge to Bandalup Creek (Enesar, April 2005). Further, some tailings will be acid generating and will require either to be stored below natural groundwater water level or if above groundwater level, will require capping to minimise water infiltration with a layer of mine waste and topsoil, and revegetation (SRE, 2005).

Potential impacts to surface water quality may arise from acid drainage and the leaching of soluble metals from mineralised waste or low grade ore. The Trilogy site will generate some regolith waste material which is enriched in lead. Some potentially acid forming (PAF) bedrock material enriched in lead and copper will also be stored as waste at the Trilogy site. PAF low-grade ore mined at Trilogy will be transported to RAV 8 for processing. At Kundip PAF low-grade transition and primary ore and primary sulphide ore, all enriched in copper will be mined. Some sub-grade ore will be stored at Kundip and the remainder transported to RAV 8 for processing.

Surface drainage on the mining sites may cause erosion and transportation of silt into creeks and streams. Surface water runoff from the haul road may impact DRF close to the road through silt content and erosion.

Assessment

The EPA's environmental objective for this factor is to maintain the quality of surface water so that existing and potential uses, including ecosystem maintenance, are protected.

The EPA notes that the proponent proposes to undertake strategies to lessen the attraction of saline and contaminated surface water bodies for birds. At Trilogy a farm dam will be maintained to provide a freshwater alternative for birds. At Kundip pit berms will be left so that they do not present attractive landing sites to birds and the two fresh water diversion dams will remain. At the RAV 8 tailings dam a small fresh water dam will be maintained on the site, the supernatant pond will be located away from the bank of the tailings and it will be ensured that the banks do not provide attractive landing sites for birds. Weak acid dissociable (WAD) cyanide concentrations in the tailings pond will be maintained below 50 mg/L, a level considered to be protective of most wildlife and livestock mortality other than aquatic organisms. The EPA notes that should the WAD cyanide levels exceed 50 mg/L, cyanide destruction or detoxification will be implemented.

The EPA notes that the report, Enesar, April 2005, predicts that seepage from tailings storage at RAV 8 could take as long as 50 years to reach Bandalup Creek. Prior to seepage free cyanide may volatilise from the tailings pond and surface and copper cyanide complexes may convert to stable non-toxic iron cyanide complexes and compounds in the settled tailings. During transport the cyanide and copper concentrations would be attenuated by the soil and concentrations considerably reduced. It is therefore unlikely that contaminants in the tailings discharge would reach the creek in detectable concentrations unless rapid leakage occurs through high permeability areas in the storage. The discharge to Bandalup Creek would still be saline, however, monitoring of water quality in Bandalup Creek has shown that pools formed in the creek when it is not flowing have a high salinity.

The EPA considers that it is possible for leakage from the tailings storage to occur through the highly permeable mine workings or faults in the pit walls and impact surface waters and therefore recommends that the proponent prepare a groundwater monitoring programme for the tailings storage, which specifies to the requirement of the Department of Environment, the parameters at which recovery of groundwater should be undertaken and the actions to be undertaken. Long-term monitoring of seepage from the tailings storage facility is likely to be required post mine closure and criteria for when monitoring should cease. The EPA recommends that this is addressed as part of the Final Rehabilitation and Closure Management Plan required for the site by recommended condition 12 (Appendix 3).

Storage of mineralised and PAF waste at the Trilogy mining site requires management to prevent impacts on surface or groundwater quality. The EPA notes that any mineralised waste material that may be PAF, highly saline, or enriched in appreciable quantities of copper, lead and other metals, will not be placed within the surface zone (0 – 2 m) of the waste rock dump and that wastes with a lead of content of greater than 0.1% and total sulphur greater than 0.2‰ will be encapsulated within the waste dump. This will ensure that material at the surface of the waste dump is comparable in metals content to existing surface soils. The top surface of the waste dump will be constructed from soil/regolith material which will prevent infiltration and erosion. These management measures will reduce the risk of acid drainage and soluble metals being leached to surface or groundwater. The EPA recommends that the proponent's commitment to isolate potential acid forming waste and mineralised waste from oxygen and rainfall be a recommended condition (Condition 11, Appendix 3).

A dedicated stockpile area will be established for PAF low grade ores to manage any potential acid drainage. Rainfall runoff from the Trilogy waste rock dump, ROM pad and sub-economic ore stockpile will be directed into lined containment ponds placed strategically as required. It will then be pumped out into the water storage and redirected into the open pit at the end of the mine life. Ore will be transported in a dedicated road train with ample freeboard to prevent ore spillage during transport.

The EPA notes that the proponent intends to implement erosion controls for all cleared areas at the Trilogy and Kundip sites. Water control bunds and engineered drains will be incorporated into infrastructure to control drainage. Minimum drainage design will be based on the 1 in 100 year rainfall event. Drainage from the office and workshop areas will be managed using sediment traps, hydrocarbon traps and erosion controls.

To minimise damage to vegetation along the haul road, the proponent intends to manage drainage water by confining it in the road easement where possible, by V-drains and small sediment traps. More competent siltation settling ponds will be established at areas where road surface run-off re-enters natural drainage lines. The EPA considers that these management measures are appropriate. Drainage control works will be undertaken where the road crosses the Steere and Jerdacuttup Rivers.

Summary

The EPA notes that the proponent has made a commitment to a management and monitoring plan for the protection of water resources. It is recommended that this commitment is designated a management action. Surface water quality can also be managed by permits to modify bed and banks, through Department of Environment Part V licensing and pollution prevention procedures and through the Department of Industry and Resources tenement conditions. The EPA considers the issue of surface water quality has been adequately addressed and can meet the EPA's objectives for this factor provided the management actions outlined in the EPS and recommended condition 11 are implemented.

4.5 Groundwater quality

Description

Groundwater quality may be impacted by seepage from the water storage facility at Trilogy.

It is proposed to store saline dewatering water from pits at Kundip in old underground mine workings and the Hillsborough pit. This has the potential to raise the groundwater table in the vicinity of the storages and for the saline water to impact vegetation. Several mine voids at Kundip will remain unfilled and it is expected that water accumulating in the pit will increase in salinity through evaporation. Seepage of saline and contaminated water from these voids has the potential to impact groundwater quality.

Seepage of tailings water from the tailings deposition at the RAV 8 pit may impact groundwater quality. In addition filling of the pit with tailings may raise groundwater levels, causing waterlogging of vegetation roots and salt damage to soil and vegetation in low-lying areas. Spillages of tailings during transport or spillages of hydrocarbons also has the potential to contaminate groundwater.

As described in Section 4.4 the storage of PAF and mineralised materials has the potential to leach contaminants to groundwater. The EPA has recommend condition 11 (Appendix 3) to manage this impact.

Assessment

The EPA's environmental objective for this factor is to maintain the quality of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

The EPA notes that existing groundwater in the proposal areas is saline and has little current beneficial use except for mining.

The EPA notes that the water storage dam at Trilogy will be constructed with a clay floor and that acid water will be treated with lime. In addition monitoring around the dam is proposed. These management measures are considered to be adequate.

The proponent proposes to monitor groundwater on the Kundip site. Any rise in levels of groundwater or seepages from dewatering storages should be detected and subsequent management will be required.

The EPA notes that the proponent will backfill the Try Again, Flag Central and Western Gem open pits and partially fill the Hillsborough open pit. The proponent has considered the pits that will remain open and the impact of the pit lakes. Results of studies have shown that three pits. (Maydon, Kaolin and Flag West) will become minor groundwater sinks and one (Hillsborough) pit will act as a throughflow lake. Evaporation from the Kaolin, Maydon and Flag West pits will cause a small increase in groundwater salinity in an already saline aquifer (22,000mg/L – 38,000 mg/L). It is not anticipated that this will have an environmental impact due to the depth to groundwater. Two other pits, Flag Main and Flag Central B will remain as open pit voids above the water table.

Preliminary geochemical investigations have also identified that Kundip pit water quality may initially experience acidification and elevations in copper levels (less than 1 g/l). It is predicted that as filling proceeds, copper levels will decline with dilution, and wall-rock buffering will contribute to alleviate the possible acidity. The proponent will monitor the pit infill water quality to confirm that there will be no long term effect upon pit water. Final Closure Plan requirements include addressing the long term management of pit voids and any groundwater impacts from voids (Condition 12, Appendix 3).

Tailings storage at the RAV 8 site will be managed to reduce seepage, for example by keeping the supernatant pond as small as possible. While the level of tailings is below the local groundwater table level the pit will act as a groundwater sink. If tailings deposition is required above the level of the surrounding aquifers baseline standing water level, the proponent intends to implement cyanide destruction or detoxification to ensure that liquor contaminants are reduced to a level which will not adversely effect the surrounding aquifer if seepage occurs. If the supernatant level is above the natural groundwater levels it is possible that elevation of the groundwater table in the local area could occur, which may impact vegetation roots. The proponent predicts that this would be a localized impact and intends to monitor groundwater in the area. The water table should return to natural levels after decommissioning.

Potentially acid forming tailings will also be stored in the tailings pit. If the final tailings level does not fill the open pit to the height of the water table tailings will be in a subaqueous state and no further rehabilitation work will be undertaken. If the final tailings height is above the water table it is planned to cap the tailings with non-acid forming material.

Tailings and return water will be transported by pipelines that are banded and designed to contain any spillages. Hydrocarbon management on all sites will be in accordance with normal best practice management for storage and spill management.

Management of potential PAF and mineralised waste and low grade ores is discussed in Section 4.4. Encapsulation of waste and collection of leachate from storages of ore should ensure that contamination of groundwater does not occur.

Summary

The EPA notes that the proponent has made a commitment to a management and monitoring plan for the protection of water resources. It is recommended that this commitment is designated a management action. Groundwater quality can also be managed through Department of Environment Part V licensing and pollution prevention procedures, the Department of Industry and Resources tenement conditions and the recommended closure condition (Condition 12, Appendix 3). The EPA considers the issue of groundwater quality has been adequately addressed and can meet the EPA's objectives for this factor, provided the recommend closure condition is imposed and the proponent implements the management action described in the EPS.

5. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The proponent has provide an array of commitments to ameliorate the impacts of the proposal on the environment. The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. These are included in the EPS document for completeness.

The EPA has recommended conditions to which the proposal should be subject. These conditions will replace commitments 3,4,5,6,7 and 11, and part of commitment 1. In addition certain commitments are considered to be management actions to ensure good environmental management. These do not necessarily require auditing by the Department of Environment and in most cases can be managed under alternative legislation administered by the Department of Environment and the Department of Industry and Resources. These commitments are 8, 9, 10, 12, and 13 and the remainder of commitment 1. Commitment 2 detailing offsets offered is retained.

6. Other advice

The Fitzgerald Biosphere and the adjoining vegetated areas are one of 15 national biodiversity hotspots listed by the Commonwealth Department of Environment and Heritage. In addition the greenstone areas and the Ravensthorpe Range support significantly different plants and vegetation communities to other vegetated areas in the broader area. A significant proportion of these plants and communities are yet to be described formally and further survey work is expected to identify currently unknown species. As a consequence the broader area, of which the project area is part, is of outstanding flora and fauna conservation value on a local, regional, national and international scale.

There are a series of areas currently recommended for protection as conservation reserves in the broader area. The project area is adjacent to an area of the Ravensthorpe Range recommended by the EPA Red Book (Recommendation 3.8) to become a nature reserve (Proposed Nature Reserve 56). The area also has mineralised zones as evidenced by this proposal and the Ravensthorpe nickel project. It is important that this area of diverse and endemic flora and restricted vegetation communities is protected. The EPA, therefore, considers that the proposed Nature Reserves in the area should be added to the conservation estate and afforded protection as soon as possible. In addition currently available information should be utilised and further survey should be undertaken to ascertain the adequacy of the current proposed conservation estate and, where required, recommend further areas for protection.

7. Conclusions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA concludes that the factor of flora and vegetation communities can meet the EPA's objectives of protecting Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950* and maintaining the abundance, species diversity, and geographic distribution of vegetation communities provided that the recommended condition for a flora and vegetation management plan is imposed and implemented.

The EPA concludes that the factor of neighbouring conservation areas can be managed to meet the EPA's objective of ensuring that the conservation values of the surrounding proposed Nature Reserves are not compromised provided that the recommended conditions are imposed and implemented.

The EPA concludes that the factor of fauna can be managed to meet the EPA's objective of protecting Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950* and maintaining the abundance, species diversity and geographical distribution of terrestrial provided that recommended condition is imposed.

The EPA concludes that the factor of surface water quality can be managed to meet the EPA's objective maintaining the quality of surface water so that existing and potential uses, including ecosystem maintenance, are protected, through the requirements of existing legislation administered by the Department of Industry and Resources and the Department of Environment and through the management actions proposed by the proponent in the EPS.

The EPA concludes that the factor of groundwater quality can be managed to meet the EPA's maintain the quality of groundwater so that existing and potential uses, including ecosystem maintenance, are protected, through the requirements of existing legislation administered by the Department of Industry and Resources and the Department of Environment and through the management actions proposed by the proponent in the EPS.

6. Recommendations

The EPA considers that the proponent has demonstrated, in the EPS document, that the proposal can be managed in an environmentally acceptable manner and provides the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the Phillips River Gold Project.
2. That the Minister considers the report on the relevant environmental factors as set out in Sections 4.1 - 4.5.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions and proponent commitments as set out in Appendix 3.
4. That the Minister imposes the conditions and procedures recommended in Appendix 3 of this report.

Appendix 1

References

Biota, May 2004: *Fauna and Fauna Assemblages of the Kundip and Trilogy Study Sites*, Biota Environmental Sciences Pty Ltd, May 2004

Biota, January 2005: *Kundip Phase II Fauna Study – Summary of Findings*, Biota Environmental Sciences Pty Ltd, January 2005

Craig, April 2004: *Kundip Mining Leases M74/41, 51, 53 & 135 and P74/153, Vegetation and Flora Survey*, Dr G F Craig, April 2004

Craig, May 2004: *Kundip Haul Road, Declared Rare and Priority Flora Survey*, Dr G F Craig, May 2004

Craig, November 2004: *Kundip Mining Leases, Pultenaea and Melaleuca*, Dr G F Craig, November 2004

Craig, October 2005: *Kundip Mining Leases, Waste Dumps and Haul Road, Declared Rare and Priority Flora Surveys*, Dr G F Craig, October 2005

Enesar, April 2005: *Impact of Pit Seepage on Surrounding Environment and Bandalup Creek*, Enesar Consulting Pty Ltd, 1 April 2005

Outback Ecology 2002: *Trilogy Baseline Study*, Outback Ecology, October 2002

Outback Ecology 2005: *Phillips River Gold Project, Tectonic Resources NL*, Outback Ecology, November 2005

SRE, 2005: *Notice of Intent*, Soil and Rock Engineering, June 2005

Appendix 2

Identification of Relevant Environmental Factors

Identification of Relevant Environmental Factors

Preliminary Environmental Factors	Proposal Characteristics				Identification of Relevant Environmental Factors
	Trilogy	Kundip	Haul Road	RAV 8 site	
BIOPHYSICAL					
Flora and Vegetation Communities	Site is cleared farming land, minimal impact	Clearing of DRF and Priority species on the site Possible damage to potential TEC	Clearing of DRF and Priority species in road reserve	No clearing	Clearing of native vegetation and protected species considered to be a relevant environmental factor.
Fauna	Minimal impact to fauna and habitat	Disturbance to protected birds and habitat	Disturbance to protected birds and habitat. Bisection of proposed nature reserve, access for foxes.	Possible impact on bird life from tailings dam	Considered a relevant factor.
Surface water	Stream diversion and off site drainage has potential impact on vegetation. Minimal impact expected.	Stream diversion and off site drainage has potential impact on vegetation.	Possible impact on DRF from road drainage diversion.	Off-site drainage diversion has potential impact on vegetation.	Management measures described in the EPS are considered adequate to manage this factor. Vegetation issues are considered under Flora and Vegetation factor. No further assessment is required.
Groundwater	Potential for drawdown to affect biophysical environment. Lack of native vegetation, minimal impacts. Possibility of stygofauna.	Potential for drawdown and underground water storage to affect biophysical environment Possibility of stygofauna.	No impact	Underground tailings storage has potential to affect groundwater movement and levels	Depth of groundwater table indicates no groundwater dependent vegetation. Potential for the occurrence of stygofauna considered to be low. Limited dewatering unlikely to impact stygofauna substantially if present. Groundwater quality considered a relevant factor (see pollution factors).

POLLUTION					
Surface water quality	Dam water will be acidic, saline with elevated metals content Low grade ore storage may leach soluble metals Some waste regolith material may leach soluble lead	Pit water post closure will be saline. Possible leakage of saline water from underground storage to surface areas Low grade ore storage may leach soluble metals	Drainage control required to prevent turbidity, erosion, dieback impacts	Possible seepage of tailings water to surface expression or Bandalup Creek which will be saline, possibly contain Cu, CN Possible tailings transport leakage	Surface water quality considered to be a relevant environmental factor.
Groundwater quality	Possible leakage from dam storage. Pit void to be filled to above groundwater level. Possible contamination from fuel storages	Possible raising of groundwater levels from storage of saline water in old workings. Possible contamination from fuel storages	No impact expected	Possible contamination with Cu, CN	Groundwater is saline in the area with limited beneficial uses. Potential impact is to surface waters and vegetation through rising groundwater table and leakage. Groundwater quality considered to be a relevant environmental factor.
Acid rock drainage	Possible impact from low grade ores and fresh phyllite	Possible impact from low grade ores	Not applicable	Management of acid tailings	Potential impact to surface and groundwater quality. Surface and groundwater quality considered to be a relevant environmental factors.
Dust	Possible site contamination from metals and impact on vegetation	Possible site contamination from metals and impact on vegetation	Possible impact on vegetation	Possible site contamination from metals	Vegetation issues are considered under Flora and Vegetation factor. Management measures described in the EPS are considered adequate to manage this factor. No further assessment is required.
Noise	Compliance with Noise Regulations	Compliance with Noise Regulations	Not applicable	Compliance with Noise Regulations	Noise impacts not expected as most operations distant from habitation. While relevant, this factor is managed through legislation.
Light	No impact expected	Possible impact on fauna	No impact expected	Minimal impact expected	Management measures described in the EPS are considered adequate to manage this factor. No further assessment is required.

Odour	No impact expected	No impact expected	No impact expected	Odour from process chemicals. Not expected to impact on nearest neighbours	Management measures described in the EPS are considered adequate to manage this factor. No further assessment is required.
SOCIAL SURROUNDINGS					
Aboriginal heritage	Not applicable	Access to Kaolin	Impact on river crossing and trees	Not applicable	Consultation and surveys undertaken. S18 for construction of river crossing granted. No further assessment required.
European heritage	Not applicable	Railway walk Historic mining	Not applicable	Not applicable	Railway walk to be fenced off. Photographic record of Harbour View Shaft to be obtained. Management measures described in the EPS are considered adequate to manage this factor. No further assessment required.

Appendix 3

Recommended Environmental Conditions and Proponent's Commitments

RECOMMENDED CONDITIONS AND PROCEDURES

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

**PHILLIPS RIVER GOLD PROJECT
SHIRE OF RAVENSTHORPE**

Proposal: The developing of mining operations at the areas of Trilogy and Kundip and construction and operation of a processing plant and disposal of tailings at the RAV 8 site, as documented in schedule 1 of this statement.

Proponent: Tectonic Resources NL

Proponent Address: Suite 4, 100 Hay Street
SUBIACO WA 6008

Assessment Number: 1618

Report of the Environmental Protection Authority: Bulletin: 1213

The proposal referred to above may be implemented subject to the following conditions and procedures:

1 Implementation

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

2 Proponent Commitments

2-1 The proponent shall fulfil the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

- 3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.
- 3-3 The nominated proponent shall notify the Department of Environment of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

- 4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

- 4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;
2. new, significant, environmental issues have not arisen; and
3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit and Performance Review

- 5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environment which address:
1. the status of implementation of the proposal as defined in schedule 1 of this statement;
 2. evidence of compliance with the conditions and commitments; and
 3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environment is empowered to

monitor the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every four years after the start of operations, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the environmental objectives for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those objectives;
2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
3. significant improvements gained in environmental management, including the use of external peer reviews;
4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
5. the proposed environmental objectives over the next five years, including improvements in technology and management processes.

6 Flora and Vegetation Communities

6-1 Prior to ground-disturbing activities, the proponent shall prepare a Flora and Vegetation Communities Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Advisory agency (See procedure 3):

- Department of Conservation and Land Management

The objective of this Plan is:

- to ensure the conservation of flora species and vegetation communities which occur within the project area.

This Plan shall address:

- 1 management to minimise the clearing of Declared Rare and Priority Flora during implementation of the proposal;
- 2 minimisation of the impact of the haul road to the population of *Allocasuarina sclerocada* spp Bandalup located in the road reserve,

including further consideration of re-routing the road to avoid the population;

- 3 measures to be taken to protect vegetation of conservation significance outside of areas of direct impact from accidental damage, including the establishment of buffers;
- 4 design and construction of haul road and drains to avoid impact on Declared Rare and Priority Flora as far as practicable;
- 5 design and construction of haul road and drains to avoid impact to vegetation from drainage of surface water;
- 6 establishment of vegetation monitoring quadrats prior to implementation of the proposal utilising species accumulation curves to determine the appropriate number of baseline quadrats (but should include at least two quadrants of at least ten by ten metres corresponding to communities in each area to be disturbed);
- 7 baseline photographic monitoring prior to the implementation of the proposal and on-going monitoring of vegetation upstream and downstream of creek diversions;
- 8 preliminary research into the propagation of suitable species and conservation species during the first year of mining, in order to select initial rehabilitation techniques to be used during rehabilitation;
- 9 baseline and on-going monitoring of vegetation condition and appropriate management along haul roads and adjacent to mining areas for impacts from dust and the use of saline water for dust control;
- 10 baseline and on-going monitoring of and appropriate management for, vegetation of conservation significance, including Declared Rare Flora, key priority flora and the proposed melaleuca over mallee Threatened Ecological Community for indirect impacts, such as dust and dewatering and any other disturbances;
- 11 monitoring of vegetation condition to detect impact from saline water storage in underground mine workings;
- 12 management of vegetation and topsoil stockpiling, including ensuring that these can be matched to an appropriate rehabilitation area;
- 13 seed collection protocols for rehabilitation;
- 14 contingency plans for the management of impacts on vegetation detected during operations;
- 15 progressive rehabilitation, including previously disturbed areas; and

16 education of workforce to minimise vegetation damage.

6-2 The proponent shall implement the Flora and Vegetation Communities Management Plan required by condition 6-1.

6-3 The proponent shall make the Flora and Vegetation Communities Management Plan required by condition 6-1 publicly available, in a manner approved by the Department of Environment.

7 Fauna

7-1 Prior to ground-disturbing activities, the proponent shall prepare a Fauna Management to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Advisory agency (See procedure 3):

- Department of Conservation and Land Management.

This Plan shall address:

- 1 management and monitoring to minimise impacts on fauna within the project area and the adjacent proposed conservation areas;
- 2 monitoring and keeping a register of road kill, particularly on the haul roads through Kundip to RAV 8 site;
- 3 contingency plans to reduce road kill should this be found to be impacting conservation species and other native fauna;
- 4 management of saline and contaminated surface waters to discourage birds and other fauna;
- 5 monitoring of birdlife at RAV8 to determine any impact from the tailings water pond; and
- 6 contingency plans for the management of any impacts on fauna detected during operations.

7-2 The proponent shall implement the Fauna Management Plan required by condition 7-1.

7-3 The proponent shall make the Fauna Management Plan required by condition 7-1 publicly available, in a manner approved by the Department of Environment.

8 Weed Management

8-1 Prior to ground-disturbing activities and in consultation with the Department of Conservation and Land Management and the Department of Agriculture, the proponent shall prepare a Weed Management Plan to the requirements of the

Minister for the Environment on advice of the Environmental Protection Authority.

The Weed Management Plan shall set out the procedures and/or measures for:

1. control and eradication of weed species on the Kundip and haul road sites;
2. weed control during construction and operation at the Kundip site and haul road;
3. hygiene and wash-down for all plant and equipment; and
4. monitoring the success of weed control.

8-2 The proponent shall implement the Weed Management Plan required by condition 8-1.

8-3 The proponent shall make the Weed Management Plan required by condition 8-1 publicly available, in a manner approved by the Department of Environment.

9 Dieback Management

Within one month following the issuing of the notice to the decision-making authorities under section 45(7) of the *Environmental Protection Act 1986* and in consultation with the Department of Conservation and Land Management, the proponent shall prepare a Dieback Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The objective of the Dieback Management Plan is to prevent the introduction of dieback to the Kundip mining site and haul road area.

The Plan shall include the procedures and/or measures for:

1. hygiene and wash-down for all plant and equipment;
2. restriction of use of the haul road to vehicles which are dieback-free only;
3. monitoring of vegetation condition along the haul road and within the Kundip site for signs of dieback;
4. training of personnel; and
5. contingency plans for the management of dieback, if introduced.

9-2 Within two months following the issuing of the notice to the decision-making authorities under Section 45(7) of the *Environmental Protection Act 1986*, the proponent shall implement the Dieback Management Plan for all activities on the Kundip site and the haul road.

- 9-3 The proponent shall make the Dieback Management Plan required by condition 9-1 publicly available, in a manner approved by the Department of Environment.

10 Bush Fire Management

- 10-1 Prior to commencement of ground-disturbing activity and in consultation with the Department of Conservation and Land Management and the Fire and Emergency Services Authority, the proponent shall prepare a Bush Fire Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall include:

1. bush fire prevention measures;
 2. bush fire detection and reporting procedures;
 3. fire brigade and the proponent's fire suppression equipment and preparedness measures; and
 4. training of personnel for fighting fires.
- 10-2 The proponent shall implement the Bush Fire Management Plan, required by condition 10-1.
- 10-3 The proponent shall make the Bush Fire Management Plan, required by condition 10-1 publicly available, in a manner approved by the Department of Environment.

11 Waste Management

- 11-1 The proponent shall encapsulate potential acid-forming waste within waste dumps in such a manner that it remains isolated from oxygen and rainfall after placement and in the long-term post site closure.
- 11-2 The proponent shall encapsulate mineralised waste within waste dumps in such a manner that it remains isolated from oxygen and rainfall after placement and in the long term post site closure.

12 Rehabilitation and Closure

- 12-1 Prior to construction and during operation, the proponent shall implement the Rehabilitation and Preliminary Closure Management Plans as provided with the Environmental Protection Statement (dated November 2005) and subsequent revisions, which provide the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Department of Conservation and Land Management and the Department of Industry and Resources.

12-2 At least 12 months prior to the anticipated date of closure, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare Final Rehabilitation and Closure Management Plans designed to ensure that all the project sites are left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Department of Conservation and Land Management and the Department of Industry and Resources.

The Final Rehabilitation and Closure Management Plans shall address:

- 1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
- 2 post-closure monitoring of groundwater around the tailings storage facility for seepage and criteria for when monitoring will no longer be required;
- 3 long-term management of ground and surface water systems affected by the tailings storage facility and waste rock dumps;
- 4 long-term management of pit voids and groundwater impacts from voids;
- 5 applicable criteria for rehabilitation to be considered as successful;
- 6 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and
- 7 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

12-3 The proponent shall implement the Final Rehabilitation and Closure Management Plans required by condition 12-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's closure responsibilities have been fulfilled.

12-4 The proponent shall make the Final Rehabilitation and Closure Management Plan required by condition 12-2 publicly available.

Procedures

- 1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment for the preparation of written notice to the proponent.
- 2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment.

- 3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment.

Notes

- 1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment over the fulfilment of the requirements of the conditions.
- 2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.
- 3 Within this statement, to “have in place” means to “prepare, implement and maintain for the duration of the proposal”.

Schedule 1

The Proposal (Assessment No. 1618)

The proposal is to undertake mining in the areas of Trilogy on mining lease M74/176 and Kundip on mining leases M74/41, M74/51, M74/53, M74/135, M74/121 P74/153 and L74/34, construct a haul road within M74/176, M74/51 and Gazetted Road No. 8432, upgrade the processing plant situated east of Ravensthorpe on M74/13, and discharge process tailings to the existing pit on M74/13. Figure 1 shows the project location.

Development within the Trilogy Project area (Figure 2) includes:

- mining of the ore body within the Trilogy project area;
- transport of overburden to one surface waste rock dump, which will be rehabilitated to form a permanent landscape feature of the site;
- transport of the ore to a designated Run-Of-Mine (ROM) pad;
- development of a 1.4km internal haul road from the Trilogy ROM pad to the Ravensthorpe – Hopetoun Road;
- development of a vegetation corridor along the 1.4 km length of the internal haul road; and
- construction of a water storage facility to contain excess water pumped from the open pit. The water will be returned to the open pit and the embankment walls removed at the end of the project.

Development within the Kundip Project area (Figure 3) includes:

- mining of the ore bodies from nine pits by open-cut method and underground mining from Kaolin, Maydon and Flag West pits;
- transport of overburden to surface waste rock dumps, which will be rehabilitated to form permanent landscape features of the site;
- transport of the ore to designated Run-Of-Mine (ROM) pad; and
- construction of two dams to intercept water and redirect it around the Flag pit.

The route of the haul road is shown in Figure 4. The haul road is to be built with a running surface of 11 metres and a total width of 15 to 18 metres.

Development at the RAV 8 site (Figure 5) includes:

- a treatment plant with conventional ore processing facilities;
- existing flotation, thickening, filtration, concentrate storage, reagent mixing and distribution, laboratory, workshop/store, fuel storage area, power generation area and offices; and
- storage of tailings in the RAV 8 pit.

Table 1 – Key Proposal Characteristics

Element	Mining and development of the Trilogy ore body	Mining and development of the Kundip ore body	RAV 8 ore processing and tailings disposal
Approximate life of project (mine production)	5-6 months	4.3 years	4.3 years
Size of Resource (tonnes)	4,200,000	3,700,000	-
Number of open pits	1	9	-
Number of underground operations	0	3	-
Depth of mine pits (metres)	44	20 to 85	-
Total mined ore (tonnes)	350,000	1,200,000	-
Total waste (tonnes)	1,500,000	8,200,000	-
Ore mining rate (maximum tonnes)	75 000 per month	62 000 per month	-
Water table depth (metres)	33.5	37	-
Area of disturbance (including access) (hectares)	29.2	109.7	-
Native vegetation to be cleared (hectares)	0	69.73 – Kundip 15.07 – Haul Road	-
Operating hours (hours/day)	24	24	24
List of major components • pit • waste dump • treatment plant • infrastructure	See Figure 2	See Figure 3 & 4	See Figure 5
Water supply source	Groundwater	Run-off / Ground water	Tails return/ groundwater
Water usage - approximate maximum annual requirement (cubic metres)	10,000	30,000	630,000
Fuel storage (kilolitres)	55,000	110,000	165,000
Fuel usage (litres)	90,000 life of mine	10,500,000 life of mine	580 per hour
Power supply	Hopetoun Grid	Diesel generators	Diesel generators
Haulage times	1 truck/hour 7 days/week	1 truck/hour 7 days/week	-

Figures (attached)

Figure 1 Project location

Figure 2 Trilogy mining site

Figure 3 Kundip mining site

Figure 4 Haul road route

Figure 5 RAV 8 plant site and tailings disposal site

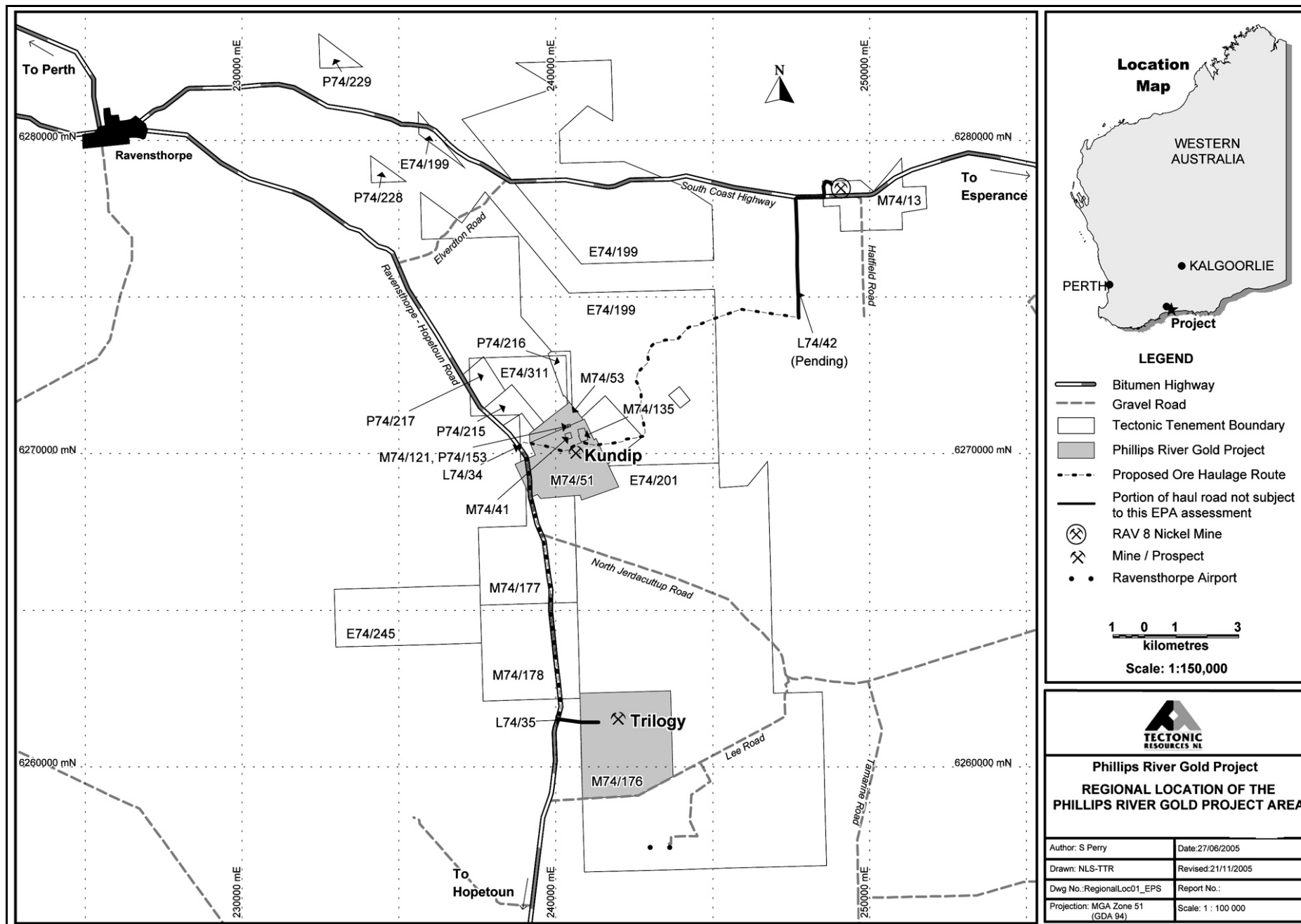


Figure 1: Project location



LEGEND

- Ravensthorpe - Hopetoun Highway
- Gravel Road
- Road - Internal
- Road - Ore Haulage Route
- Portion of haul road not subject to this EPA assessment
- Access Road
- Tenement Boundary
- ROM Pad
- Magazine
- Waste Dump
- Pit Shell
- Offices, Workshop & Fuel Storage Area
- Water Monitoring Bore
- Proposed Water Monitoring Bore
- Water Storage Facility

N

300 0 300

metres

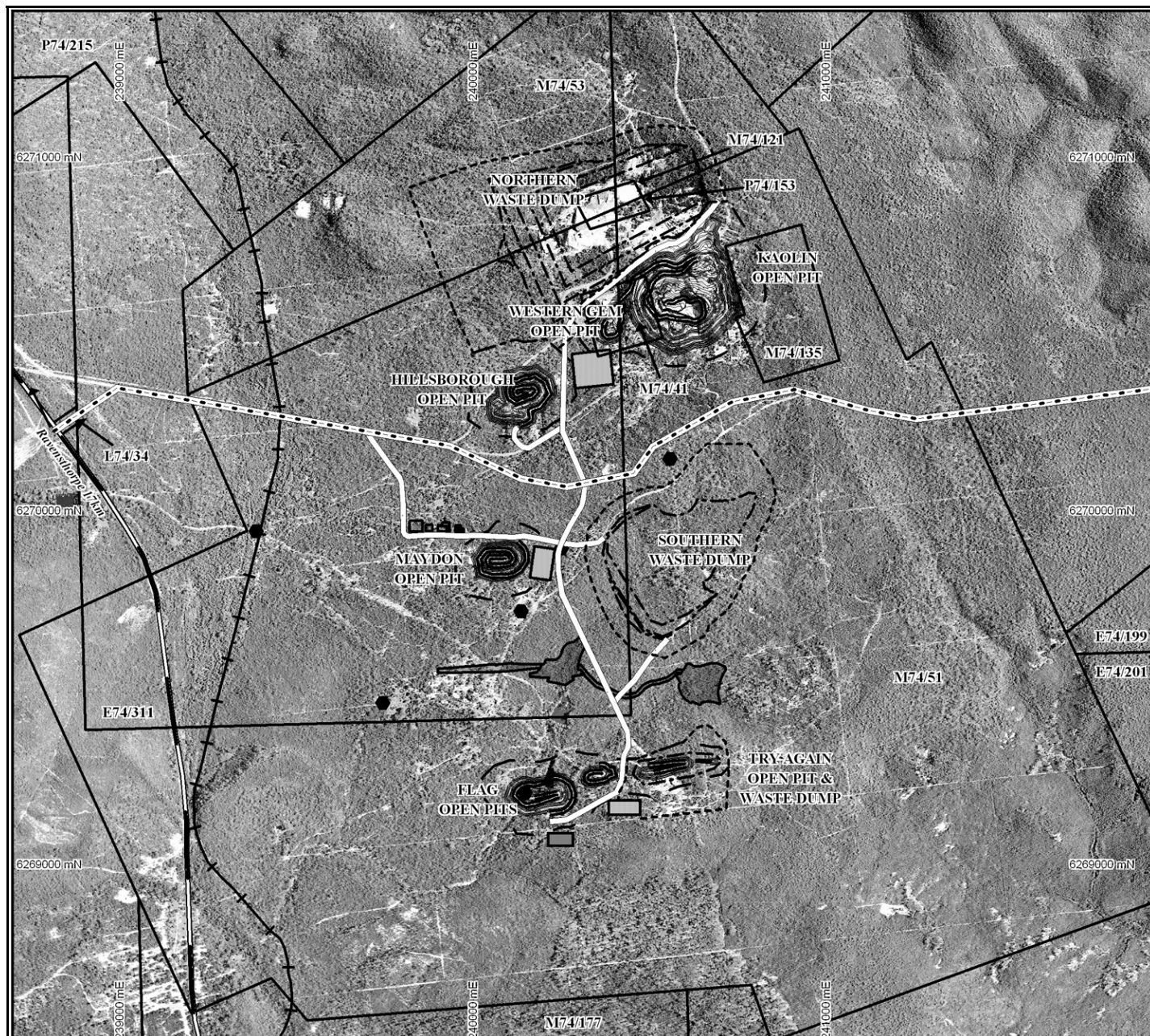
Scale: 1:17,500

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RESOURCES NL

Phillips River Gold Project
AERIAL PHOTO OF THE TRILOGY MINING PROJECT AREA AND THE PROPOSED SITE PLAN

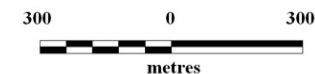
Author: S Perry	Date: 15/09/2005
Dwg No.: TrilogySitePlanNo2_ NOI	Drawn: NLS-TTR
Projection: MGA Zone 51 (GDA 94)	Scale 1 : 17 500

Figure 2: Trilogy mining site



LEGEND

- Ravenssthorpe - Hopetoun Highway
- Railway - Abandoned
- Tenement Boundary
- Road - Internal
- Road - Ore Haulage Route
- ROM Pad
- Magazine
- Waste Dump
- Pit Shell
- Pit Abandonment Bund
- Offices & Workshop Area
- Topsoil Storage Area
- Water Monitoring Bore
- Proposed Water Storage Facility



Scale: 1:15,000



Phillips River Gold Project AERIAL PHOTO OF THE KUNDIP MINING PROJECT AREA AND THE PROPOSED SITE PLAN

Author: S Perry	Date: 27/09/2005
Drawn: NLS-TTR	Revised: 15/11/2005
Dwg No.: KundipSitePlan04_NOI	Report No.:
Projection: MGA Zone 51 (GDA 94)	Scale: 1 : 15 000

Figure 3: Kundip mining site

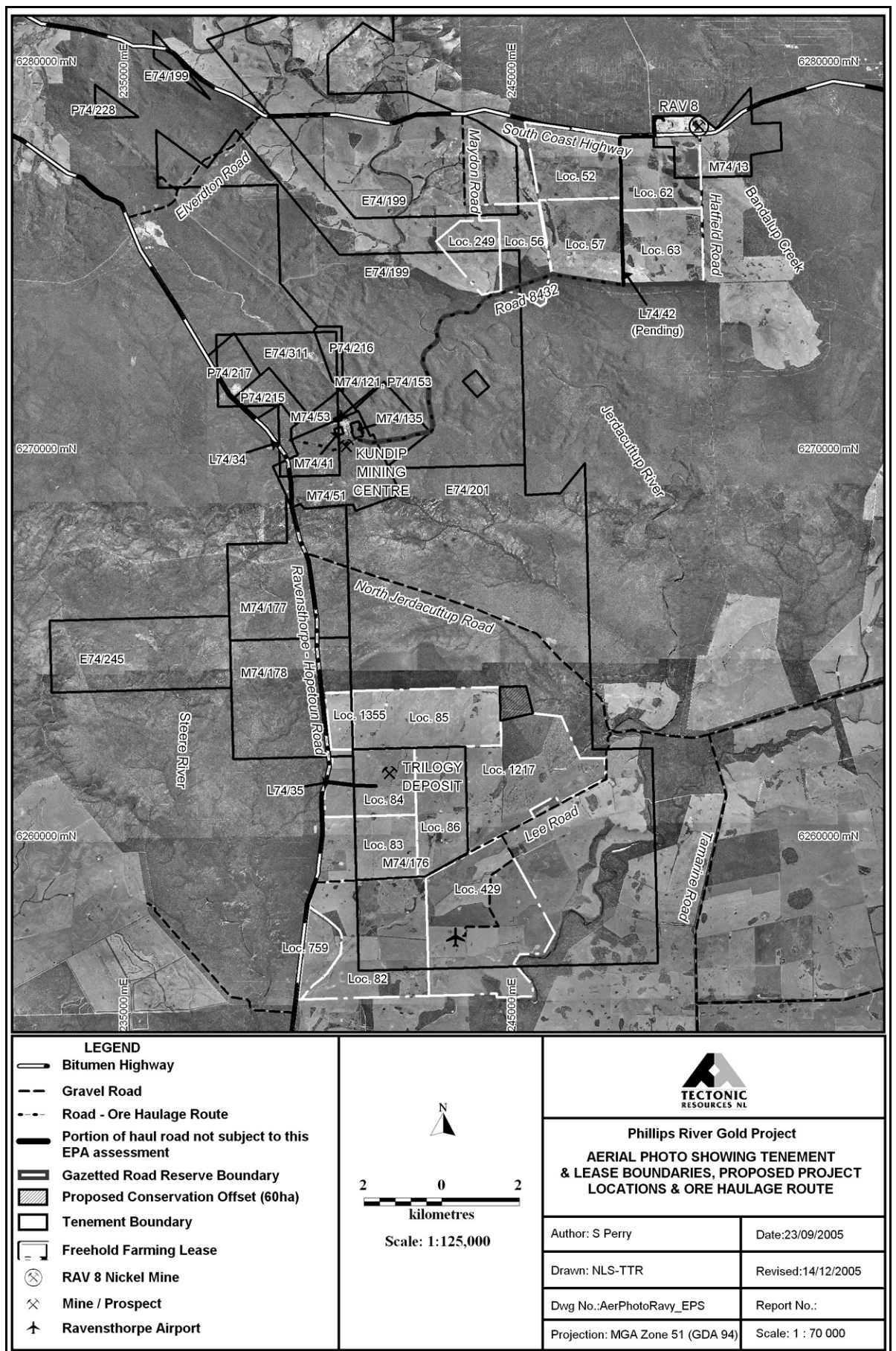


Figure 4: Haul road route



Figure 5: RAV 8 plant site and tailings disposal site

Schedule 2

Proponent's Environmental Management Commitments

December 2005

PHILLIPS RIVER GOLD PROJECT, SHIRE OF RAVENSTHORPE

(Assessment No. 1618)

Tectonic Resources NL

Proponent's Environmental Management Commitments – December 2005

PHILLIPS RIVER GOLD PROJECT (Assessment No. 1618)

Note: The term “commitment” as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the ‘action’ to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environment.

No.	Topic	Objective	Commitment	Timing	Advice
1	Conservation Offset	Provide a contribution to regional conservation that will offset the clearing of native vegetation within the Kundip project area and the haul road.	1 Rehabilitation of historically disturbed areas within the Kundip site. 2 Purchase a 60 ha parcel of vegetated land for contribution to the conservation estate. 3 Contribute \$10,000/yr to the Western Shield project to allow fox baiting of the entire Ravensthorpe Range for five years. 4 Contribute \$10,000 towards a targeted survey of <i>Melaleuca stramentosa</i>. 5 Contribute \$10,000 towards a regional survey of the proposed Melaleuca-over-mallee Threatened Ecological Community. 6 Contribute 10% or 10 000 seeds where practicable, of seeds collected from each native species to the Millenium Seed Bank.	During life of project as appropriate	Department of Conservation and Land Management

Management actions (not included in final condition statement)

No.	Topic	Objective	Commitment	Timing	Advice
1	Environmental Management and Monitoring Plan	Protection of key environmental aspects during all phases of mining.	Prepare and implement an Environmental Management and Monitoring Plan that addresses the following: 1 Information management and document control 2 Stakeholder identification 3 Protection of water resources including surface water management 4 Management of waste 5 Management of dangerous and hazardous substances 6 Management of dust 7 Management of noise 8 Management of greenhouse gases 9 Management of visual amenity 10 Management of risk 11 Protection of heritage values 12 Programs for monitoring, auditing and review for the purposes of performance assessment and continual improvement.	Prior to project commencement, during development, operation and decommissioning	Department of Conservation and Land Management Department of Industry and Resources
2	Light	To avoid or manage impacts from light spill to the surrounding environment.	Manage light according to Australian Standard AS 4282-1997, Control of Obtrusive Effects of Outdoor Lighting	Commencement of project	Department of Industry and Resources
3	Dust	To ensure that dust emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses.	Manage and monitor dust in accordance with acceptable standards	Commencement of project	Department of Industry and Resources
4	Noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards.	Monitor mining noise levels to ensure compliance with Part 7, Division 1 of the <i>Mine Safety and Inspection Regulation (1995)</i> , as well as the <i>Environmental Protection (Noise) Regulations 1997</i> .	Commencement of project	Department of Industry and Resources
5	Aboriginal Heritage	To ensure that Aboriginal Heritage sites are not adversely affected by the proposal.	Report any new Aboriginal heritage sites discovered during development of the Project to the register of the Department of Indigenous Affairs.	Commencement of project	Department of Indigenous Affairs
6	European Heritage	To ensure that impacts to European Heritage sites are minimised	Conduct a full archive record including an archaeological survey of the Harbour View mine shaft.	Prior to any development	Heritage Council of WA

