Attachment 5

Department of **Environment & Climate Change** NSW

Application for a

Section 91 Licence

to harm or pick a threatened species, population or ecological community*, or damage habitat under the *Threatened Species Conservation Act 1995.*

1. Applicant's Name ^: *(if additional persons require authorisation by this licence, please attach details of names and addresses)*	Tony Seibel-Barnes	
2. ABN Number:	39 052 096 769	
3. Organisation name and position of Applicant ^: *(if applicable)*	Springvale Coal	
4. Postal address ^:	Centennial Coal – Springvale Colliery PO Box 198 Wallerawang NSW 2845	4. Telephone ^: B.H. 02 6350 1600 A.H.
5. Location of the action *(including grid reference and local government area and delineated on a map).*	*East Wolgan Swamp* (above Springvale Colliery) and *Narrow Swamp* (above Angus Place Colliery). *East Wolgan Swamp* SV EWS Stage 1 Site 1 (Centre Point 6304446N, 236466E) SV EWS Stage 1 Site 2 (Centre Point 6304626N, 236511E) *Narrow Swamp* AP NS (Centre Point 6304532N, 235699E)	

* A threatened species, population or ecological community means a species, population or ecological community identified in Schedule 1, 1A or Schedule 2 of the *Threatened Species Conservation Act 1995.*

^The personal details of all Section 91 licences will be displayed in the register of Section 91 licences required under Section 104 of the *Threatened Species Conservation Act 1995.* See notes.

	GDA LGA – Lithgow City Council See Figure 1 for location of piezometers.
6. Full description of the action and its purpose *(eg., environmental assessment, development etc.).*	The action covers activities in two Newnes Plateau Shrub Swamps (NPSS) within Forests NSW lands. These swamps are known as Narrow Swamp and East Wolgan Swamp. Narrow Swamp is located on the western side of a north – south ridgeline, on which the opposite (eastern) side East Wolgan Swamp is located. The activity involves applying a range of geotechnical and geophysical techniques to understand the nature of the substrate within and the basement of the swamp to a depth of 25 metres. The purpose and desired outcome of this investigation will be to assist in understanding the causes of small isolated areas of slumping that was detected in April 2009 within these areas. The investigation works are divided into two stages. Stage 1 is a trial use of the proposed equipment (explained further below) to ensure it is appropriate to meet the desired outcome. The extent of Stage 1 will be limited to small areas. Should Stage 1 be successful, Springvale will apply to extend the subject area into Stage 2 which will encompass a larger area of the Swamps. Stage 2 will be the subject of a further Section 91 application. Stage 1 will involve trimming or brush-cutting an area of approximately ten transects (six within East Wolgan Swamp and four within Narrow Swamp), across the Swamps (ranging in lengths from 6 metres to 20 metres) depending on the width of the swamp at the transect site. For the purposes of calculating areas, swamp width has been determined to be 20 metres. Each transect will be 1.5 metres wide. The transects will be located across heavily disturbed areas of East Wolgan Swamp and Narrow Swamp. The area devised was chosen for its comparatively high level of existing disturbance. Transects will be surveyed using Ground Penetrating Radar techniques (GPR). The technique measures the reflection of electromagnetic waves as the equipment is pushed or pulled in front of or behind the operator. Examples of the equipment to be used has been presented in the cover letter attached to this application. Each GPR transect will then be extended 15 metres either side of the Swamp to enable the use of resistivity profiling survey techniques. The width required for the resistivity profiling will be reduced to 0.5 metres. Resistivity profiling consists of a series of approximately 15 – 30 probes to be inserted into the ground attached with cables. The probes will be inserted by hand. An electric current will then be placed through the cable and probes. The response of the electric current as it moves through the substrate will be mapped. It is important to note that the transects do not have to be in straight lines. Accordingly, trees or very large shrubs or threatened species can be avoided using the techniques proposed. Across (and adjacent to) each transect, Springvale also proposes to use a dynamic cone penetrometer (DCP). The DCP measures soil penetration resistance by assessing soil compaction and granular strength of the substrate. The DCP has a diameter of approximately 1.5

	centimetres. Approximately (depending on results) a maximum of six probes per swamp will be undertaken. Springvale proposes an additional 50 metre long by 1.5 metre wide transect that parallels the Narrow Swamp drainage line. This transect will be positioned as practicably possible within the disturbed area and will tie in the three transects oriented perpendicular to the drainage line. Both GPR and resistivity will be carried out within this transect. Within selected transects, Springvale also proposes to hand augur holes to determine the make up of the peat material and take soil samples. No more than nine augured holes will be carried out within each Swamp. The material will be augured, small samples taken with the remaining material returned to the augured hole. Hand augured holes will be undertaken within the transects and wherever possible in areas where there is no or limited vegetation. The Department of Environment, Climate Change and Water (**DECCW**), the Department of Environment, Water Heritage and the Arts (**DEWHA**) and the Department of Industry and Investment (**DII**) have been consulted on the proposed work. Whilst no formal feedback has been provided on the work program, there is an implied level of support for Springvale to pursue the proposed survey work.
7. Details of the area to be affected by the action *(in hectares)*.	*East Wolgan Swamp* Although cumulatively, the six proposed transects for the GPR work will represent approximately 180m^2. A further 90m^2 of vegetation may need to be trimmed for the resistivity profiling work. Brush-cutting will only take place where the resistivity rods do not have sufficient contact with the soil/peat substrate. This additional area for the resistivity work will generally be on the on the banks leading down to the swamp. Presently there is a general lack of native vegetation within the proposed investigation areas. As a result, it is believed that minimal brush-cutting or trimming will be required. In addition the base of existing plants within the proposed transects will be retained, so that existing vegetation is expected to regrow after the works are completed. *Narrow Swamp* Although cumulatively, the four proposed GPR transects will represent approximately 165m^2. A further 45m^2 of vegetation may need to be trimmed for the resistivity profiling survey. Brush-cutting will only take place where the resistivity rods do not have sufficient contact with the soil/peat substrate. This additional area for the resistivity survey will generally be on the banks leading down to the swamp. Presently there is a general lack of native vegetation within the proposed investigation areas. As a result, it is believed that minimal brush-cutting or trimming will be required. In addition the base of existing plants within the proposed transects will be retained, so that existing vegetation will regrow after proposed geophysical and geotechnical works are completed.

8. Duration and timing of the action *(including staging, if any).*	It is expected that these activities would be undertaken in December 2009.
9. Is the action to occur on land declared as critical habitat*? *(please tick appropriate box)*	Yes ☐ No ✓

10. Threatened species, populations or ecological communities to be harmed or picked.	Scientific Name	Common Name *(if known)*	Conservation Status *(ie. critically endangered, endangered or vulnerable)*	Details of no. of individual animals, or proportion and type of plant material *(eg. fertile branchlets for herbarium specimens or whole plants or plant parts)*
	Newnes Plateau Shrub Swamp (NPSS) in the Sydney Basin Bioregion.		Endangered Ecological Community	Approximately 180m^2 of NPSS at *East Wolgan Swamp* will be temporarily affected by the monitoring works. These works will assist in the long-term protection of the NPSS in this swamp because the information gained from the monitoring work will provide a comprehensive understanding of the habitat of these communities. This knowledge can be applied to other NPSS's for better and more informed management

* Critical habitat means habitat declared as critical habitat under Part 3 of the *Threatened Species Conservation Act 1995.*

				outcomes. An additional area of 90m^2 may need to be trimmed as the GPR transects are extended 15 meters either side of the swamp edges for the purposes of resistivity surveys. Approximately 165m^2 of NPSS at *Narrow Swamp* will be temporarily affected by the monitoring works. These works will assist in the long-term protection of the NPSS in this swamp because the information gained from the monitoring work will provide a comprehensive understanding of the habitat of these communities. This knowledge can be applied to other NPSS's for better and more informed management outcomes. An additional area of 45m^2 may need to be trimmed as the GPR transects are extended 15 meters either side of the swamp edges for the purposes of resistivity surveys.
11. Species impact: *(please tick appropriate box)*				

a) For action proposed on land declared as critical habtat; or	~~An SIS is attached~~
b) For action proposed on land not declared as critical habitat.	✓ Items 12 to 25 have been addressed

N.B: Provision of a species impact statement is a statutory requirement of a licence application if the action is proposed on critical habitat.
The provision of information addressing items 12 to 17 is a statutory requirement of a licence application if the action proposed is not on land that is critical habitat. Information addressing any of the questions below must be attached to the application.

12. Describe the type and condition of habitats in and adjacent to the land to be affected by the action.	The **letters** that have been prepared to describe the site surveys of the affected areas within East Wolgan Swamp and Narrow Swamp attached to this application detail the type of habitats present. East Wolgan Swamp was subject to investigations in two proposed activity areas (refer to letter for more detail). Narrow Swamp was subject to investigations at one activity area. Site 1 at East Wolgan Swamp and the Narrow Swamp site exhibited moderate to high levels of vegetation absence. Site 2 at East Wolgan Swamp was considered to be of low to moderate condition due to dieback of vegetation on the site. Upslope communities to the above areas were open forest exhibiting unaltered natural condition.
13. Provide details of any known records of a threatened species in the same or similar known habitats in the locality *(include reference sources).*	While no threatened species have been recorded within the specific areas to be affected by the works, several threatened species have been recorded surrounding the site. These species have been recorded in similar swamp habitats or adjoining forests. These include; **Fauna:** These include Stuttering Frog, Gang-gang Cockatoo, Glossy Black-cockatoo, Powerful Owl, Barking Owl, Brown Treecreeper, Hooded Robin, Grey-crowned Babbler, Black-chinned Honeyeater, Squirrel Glider, Eastern Pygmy-possum, Eastern Falsistrelle, Greater Broad-nosed Bat and the Eastern Bentwing Bat (Mount King Ecological Surveys 2008). **Flora:** *Boronia deanei*, *Derwentia blakelyi* and *Persoonia hindii* (Gingra 2005).
14. Provide details of any known or potential habitat for a threatened species on the land to be affected by the action *(include reference sources)*	The sites form potential habitat for *Eulamprus leuraensis* (Blue Mountains Water Skink), *Boronia deanei* and *Persoonia hindii.* These species were not recorded in the affected areas.

15. Provide details of the amount of such habitat to be affected by the action proposed in relation to the known distribution of the species and its habitat in the locality.	Within *East Wolgan Swamp* approximately 180m^2 is likely to be affected, while within *Narrow Swamp* approximately 165m^2 is to be affected. The area to be disturbed is minimal and the associated impacts are not considered to be significant upon the NPSSs in their current state or potentially occurring threatened species. In fact, the works will assist in the long-term management of this habitat type in these and other similar swamps on the Newnes Plateau through a more comprehensive understanding of the NPSS habitat and substrate. The areas to be affected are comparatively small in relation to the distribution of similar swamps throughout the Newnes Plateau
16. Provide an assessment of the likely nature and intensity of the effect of the action on the lifecycle and habitat of the species.	The likely nature and intensity of the effect of the geotechnical and geophysical works are relatively minor and are outlined in the attached **letters** for *East Wolgan Swamp* and *Narrow Swamp.* The proposed activities are considered unlikely to impact on the lifecycle or habitat of any threatened species, populations or ecological communities.
17. Provide details of possible measures to avoid or ameliorate the effect of the action.	The sites will be accessed on foot only, no vehicular access will be permitted to minimise the impact on the EECs present. The works are being undertaken in consultation with DECCW and the Department of Environment, Water, Heritage and the Arts (**DEWHA**) to gain greater knowledge of the environment in which the NPSS's occur and assist in their future management. Recommendations have been provided in the attached **letters** regarding minimisation of impacts during the project.

N.B: The Director-General must determine whether the action proposed is likely to significantly affect threatened species, populations or ecological communities, or their habitats. To enable this assessment the Applicant is required to address items 18 to 25. Information addressing any of the questions below must be attached to the application.

18. In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	There are no threatened species recorded at the exact sites to be subject to investigations, apart from the NPSS EEC vegetation community that the activity is occurring in. The limited disturbance to be created in *East Wolgan Swamp* and *Narrow Swamp* as a result of the proposal will assist in the future management of this community (and habitat type). It is considered highly unlikely to disrupt the life cycle of any threatened species, population or ecological community such that it would place those species at risk of extinction.
19. In the case of an endangered population, whether the action proposed is likely to have	No Endangered Populations are likely to occur within the subject site.

an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	
20. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Due to the limited extent of Newnes Plateau Shrub Swamp EEC, any areas of this type are considered significant. As the proposal is of low intensity and does not involve the clearing of substantial tracts of EEC, it is not considered likely to destroy a significant area of this rare EEC. In fact, the activities will assist in better understanding the Swamps enabling management of the area to protect this EEC.
21. In relation to the habitat of a threatened species, population or ecological community: (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and	The proposal will not result in the disconnection of any corridors or area of interconnected habitat. Some modification of cover for small vertebrates may occur in the short-term, however it is unlikely that this would substantially impact upon these species.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	
22. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	No areas declared as Critical Habitat lie within the subject site.
23. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	160ha of the approximately 650ha of mapped Newnes Plateau Shrub Swamp (DECC, 2006) occurs within Blue Mountains and Wollemi National Parks. The proposal involves undertaking geophysical and geotechnical works limited to a maximum area of approximately 0.05 hectares within two Swamps (0.027 hectares within East Wolgan Swamp and 0.021 hectares within Narrow Swamp), however 0.014 ha of this area will represent areas where some vegetation trimming will only sparsely occur as required. Furthermore, due to the disturbed nature of both sites, large areas of the GPR transects will be represented by substrate where the vegetation has been affected and there is some level of dieback. Reasons for undertaking the said works at East Wolgan and Narrow Swamp relate to measuring potential impacts and gaining knowledge of NPSS subterranean physical structure and components. The program of works is likely to contribute to information useful to supporting the tenets of threat abatement and recovery of this community.
24. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	The geotechnical and geophysical works will involve a low level of brush cutting and disturbance to the ecosystem will be minimised. It may therefore contribute to the key threatening process "Clearing of Native Vegetation." As previously mentioned however, vegetation will not be cleared, rather trimmed or brush-cut. Additionally, the area to be affected is relatively small and the investigation will contribute to future management of this habitat.

Important information for the Applicant

Processing times and fees

The *Threatened Species Conservation Act 1995* provides that the Director-General must make a decision on the licence application within 120 days where a species impact statement (SIS) has been received. No timeframes have been set for those applications which do not require a SIS. The Director-General will assess your application as soon as possible. You can assist this process by providing clear and concise information in your application.

Applicants may be charged a processing fee. The Director-General is required to advise prospective applicants of the maximum fee payable before the licence application is lodged. Therefore, prospective applicants should contact the DECC prior to submitting a licence application .

A $30 licence application fee must accompany a licence application.

Protected fauna and protected native plants*

Licensing provisions for protected fauna and protected native plants are contained within the *National Parks and Wildlife Act 1974.* However, a Section 91 Licence may be extended to include protected fauna and protected native plants when these will be affected by the action.

If you are applying for a licence to cover both threatened and protected species please provide the information requested in Item 10 and a list of protected species and details of the number of individuals animals or proportion and type of plant material which are likely to be harmed or picked.

Request for additional information

The Director-General may, after receiving the application, request additional information necessary for the determination of the licence application.

Species impact statement

Where the application is not accompanied by a SIS, the Director-General may decide, following an initial assessment of your application, that the action proposed is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats. In such cases, the *Threatened Species Conservation Act 1995* requires that the applicant submit a SIS. Following initial review of the application, the Director-General will advise the applicant of the need to prepare a SIS.

Director-General's requirements for a SIS

Prior to the preparation of a SIS, a request for Director-General's requirements must be forwarded to the relevant DECC Office. The SIS must be prepared in accordance with section 109 and 110 of the TSC Act and must comply with any requirements notified by the Director-General of the Department of Environment and Climate Change (NSW).

Disclosure of Personal Information in the Public Register of s91 Licences

* Protected fauna means fauna of a species not named in Schedule 11 of the *National Parks and Wildlife Act 1974.*
Protected native plant means a native plant of a species named in Schedule 13 of the *National Parks and Wildlife Service 1974.*

The Public Register provides a list of licence applications and licences granted. A person about whom personal information is contained in a public register may request that the information is removed or not placed on the register as publicly available.

A full copy of licences granted is included on the DECC website at
http://www.environment.nsw.gov.au/npws.nsf/content/s91_tsca_register
or in a hardcopy available from The Librarian, DECC, 59 Goulburn St, Sydney.

Please contact the relevant Environment Protection and Regulation Division for more details (Contact details are below)

Certificates

If the Director-General decides, following an assessment of your application, that the proposed action is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, a Section 91 Licence is not required and the Director-General must, as soon as practicable after making the determination, issue the applicant with a certificate to that effect.

N.B: An action that is not required to be licensed under the Threatened Species Conservation Act 1995, may require licensing under the National Parks and Wildlife Act 1974, if it is likely to affect protected fauna or protected native plants.

I confirm that the information contained in this application is correct. I hereby apply for a licence under the provisions of Section 91 of the *Threatened Species Conservation Act 1995.*

Applicant's name, organisation and position *(Please print)*	Applicant's signature	Date
TONY SCOTT-BARNES ENV. COORDINATOR		25/11/09

For more information or to lodge this form, contact the Climate Change and Environment Protection Group in your nearest DECC office:

Metropolitan Branch
P: 02 9995 6851
F: 02 9995 6900
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RPS HARPER SOMERS O'SULLIVAN

Our Ref: 26408:TL:AR

20 November 2009

CENTENNIAL COAL – SPRINGVALE COAL
PO BOX 198
WALLERAWANG NSW 2845

ATTENTION: TONY SEIBEL-BARNES

Dear Sir,

RE: NARROW SWAMP PROPOSED GEOTECH / GEOPHYSICAL WORKS AND WEED CONTROL WORKS

RPS Harper Somers O'Sullivan (RPS HSO) has been engaged by Centennial Coal to undertake a portion of ecological inspections of Narrow Swamp for proposed geotechnical / geophysical and weed control works to be carried out by Springvale Colliery, Lithgow. It is noted that the subject area is above the Angus Place Colliery mining area

This letter is the subject of two separate Section 91 applications over Narrow Swamp as follows:

- Section 91 Application for Stage 1 Geophysical and Geotechnical Works within East Wolgan and Narrow Swamp
- Section 91 Application for the removal of weeds and installation of four soil moisture probes. The soil moisture probes will only be inserted into East Wolgan Swamp

Whilst there are multiple activities within Narrow Swamp, the Section 91 applications have been split into two on the advice of representatives from the Department of Environment, Climate Change and Water (**DECCW**). The rationale for doing this is to separate out complex activities (geotechnical and geophysical work) from the more straight forward activities (weed control and insertion of soil moisture probes).

PROPOSAL OVERVIEW

Geotechnical / geophysical investigations (**GGI**) at Narrow Swamp will encompass the following works:

Geophysical Works

- Ground penetrating radar (**GPR**) will be used over an area of approximately 20m x 50m, represented by three (approximately) 20 metre long transects at

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10 metre intervals perpendicular to the drainage line. A fourth 50 metre long transect that is aligned along the drainage line and intersects the three perpendicular transects tying them together. The GPR survey will only be applied to the swamp's area to define both internal and basement features. Each transect will be cleared/trimmed with brush-cutter approximately 1.2-1.5m wide to enable the GPR to have direct sight with the ground. Transects will be shortened where the width of the swamp profile is narrower than the 20metres proposed. **Figure 2** shows the application of this technique in a cleared open site.

- Resistivity profiling will also be undertaken requiring the insertion of narrow rods in an array across the profile of the swamp. This will involve an extension of the three transects (perpendicular to the flow) utilised for the GPR survey. The extension will be in the order of approximately 15m either side of the edge of the swamp. **Figure 1** shows the application of this technique in a cleared open site. The insertion of narrow rods may not necessarily require brush-cutting of vegetation in between rod insertion, however, through thick areas of Geichenia dicarpa or other ferns or shrubs, vegetation will need to be brush cut to ensure the rods are appropriately inserted into the soil substrate.

Figure 1. Resistivity Profiing
(Source: AlphaGeoscience, 2009)

Figure 2. GPR

Geotechnical Works

Geotechnical works will be undertaken after geophysical works in transects established for geophysical sites to minimise impacts within **NPSS** vegetation and will consist of the following applications:

- Dynamic cone penetrometer (**DCP**) testing will be utilised to measure soil penetration resistance by assessing soil compaction and granular strength of the substrate - requiring insertion of a narrow penetrometer rod into the substrate (6 maximum). **Figure 3** shows the application of this technique in a cleared open site. The width of the DCP will be in the order of 1.5 cm.
- At selected areas within the transect profile, soil samples will be obtained using hand augurs. The holes, ideally, will be extended to the basement or to the limit of the hand augur tool. At various depths, soil samples will be obtained. The remaining material will be returned to the hole. The hand augured holes will be restricted to areas of the transect(s) where there is currently no vegetation.
- A maximum of nine augur holes are proposed within transects within the Swamp.

Figure 3. DCP Testing

The above GGI at Narrow Swamp are proposed to accurately assess the current status and nature of the swamp's substrates and profile, which will aid in the assessment of potential impacts of mining underneath **NPSS**. The objective of the GGI is to also identify any structure, cavity, piping or anomaly down to a depth of approximately 25 metres. Access to the GGI locations will be by vehicle on the nearest track then on foot to the GGI locations to prevent unnecessary damage to the **NPSS** EEC. Potential impacts are likely to be relatively minimal considering the minor disturbance represented by the majority of GGI activities. Plates 1 and 2 present examples of the current condition of some areas of Narrow Swamp. Retention of plant bases during GPR brush-cutting operations will allow regeneration of vegetation.

AP NS (Centre Point 6304532N, 235699E)

Plate 1: Narrow Swamp vegetation condition and GGI site south view.

METHODS

An ecological inspection was undertaken by a RPS HSO ecologist on 28 October 2009 and included the area encompassed by the four proposed GPR transects and surrounds (see Plates 1 and 2). The aim of the site inspection was to identify possible ecological constraints in relation to the area where proposed GGI would take place, to verify the extent of significant vegetation communities and conduct targeted threatened flora and fauna surveys.

RESULTS

The location of the proposed GGI works were found to be located within vegetation consistent with **NPSS** in the Sydney Basin Bioregion which is listed as an Endangered Ecological Community (**EEC**) under the *Threatened Species Conservation Act 1995* (**TSC Act 1995**). **NPSS** within the site is also consistent with Temperate Highland Peat Swamps on Sandstone which is listed as an Threatened Ecological Community under the *Environment Protection Biodiversity Conservation Act 1999* (**EPBC Act 1999**). Although, **NPSS** vegetation occurs within the site, vegetation has been significantly affected at the site. Although regrowth of pre-existing vegetation has begun the general absence of vegetation from much of the site offers opportunity to undertake the proposed GGI while minimising impact upon onsite vegetation. The occurrence of threatened flora and **EEC** vegetation is shown in Figure 4 (Attached). The occurrence of **NPSS** at Narrow Swamp as depicted is derived from the Vegetation of the Western Blue Mountains (**VWBM**) (DECC, 2006)

mapping and although it overlays the occurrence of this **EEC** the boundary of this community in some areas is substantially inside the mapped area.

A description of the proposed GGI site is provided below, along with site specific recommendations to minimise potential impacts on native vegetation (namely **NPSS**), associated threatened flora and potential threatened fauna habitats.

SITE DESCRIPTIONS

The **NPSS** within which the GGI will be undertaken is named Narrow Swamp due to the relatively narrow profile of the swamp in relation to other swamps in the wider locality. Narrow Swamp occurs in the next gully west of East Wolgan Swamp in the headwaters of the Wolgan River. Narrow Swamp is situated between open forested slopes and is dominated by the shrubs *Leptospermum obovatum* (River Tea tree), *Epacris paludosa* (Swamp Epacris), *Grevillea acanthifolia* and occasional occurrences of *Leptospermum lanigera* (Woolly Tea Tree). Understorey vegetation was dominated by the sedges *Baumea rubiginosa* (Twig Rush), *Baloskion australe* and *Empodisma minus* and the fern *Gleichenia dicarpa* (Pouched Coral Fern). Several herbaceous species were also widespread, notably *Geranium solanderi* (Cutleaf Cranesbill) was widespread and to a lesser extent *Senecio linearifolius* (a Fireweed). A description of the ecological features of the site, photographs and co-ordinates (MGA) is provided below. The co-ordinates for the site given above Plate 1 represents the centre point of the site for GGI with the five transect footprint extending 25m north and south along the swamp's alignment and 7.5m east and west of the centre point in relation to the cross-sectional orientation of the swamp.

Plate 2: Photograph of Narrow Swamp substrate condition

Description

The GGI site at Narrow Swamp lies within an area mapped as Newnes Plateau Shrub Swamp (DECC, 2006). The site occurs within an area of Narrow Swamp that has been to a significant extent denuded of vegetation (see Plate 2). Elsewhere, outside of the proposed GGI site, intact areas of the swamp are dominated by *Gleichenia dicarpa* (Pouched Coral Fern) and interspersed with *Baumea rubiginosa* (Twig Rush), *Lepidosperma australe* and *Baloskion australe*. While no canopy elements were found to exist above the GGI site, a patchy shrub layer is present elsewhere within the swamp dominated by *Leptospermum obovatum* (River Tea Tree), *Epacris paludosa* (Swamp Epacris), *Grevillea acanthifolia*, with *Leptospermum lanigerum* (Woolly Tea Tree) also present. See **Attachment 1** for the flora list of this site, which includes other species occurring adjacent to the proposed GGI site.

The proposed GGI siting has been selected to avoid any open water areas and potential occurrences of local threatened flora species. However, there are occurrences of *Derwentia blakelyi* at the foot of the western slopes adjacent to **NPSS** vegetation. During the locating of GGI locations and site access *D. blakelyi* individuals should be avoided to prevent impacts upon them.

Apart from the density of surrounding swamp vegetation there is little forest debris present, and the general absence of onsite vegetation (see Plate 1 and 2) represents few foraging and shelter opportunities for local fauna species.

THREATENED SPECIES

As mentioned previously, the proposed GGI site at Narrow Swamp is located within NPSS which is listed as an EEC under TSC Act 1995 and EPBC Act 1999. Additionally, 1 threatened flora species was recorded within the locality of the broader Narrow Swamp, being *Derwentia blakelyi*.

Derwentia blakelyi was found to occur at the foot of the western slope in a band extending up the lower slope from immediately adjacent to the swamp vegetation. As such, care should be taken to avoid *D. blakelyi* plants during the location of specific GGI sites, especially GPR transects that extend into and beyond the edges of swamp vegetation. The location of threatened flora species in relation to the proposed GGI site is shown in Figure 1 attached.

It should be noted that the greatest majority of Narrow Swamp was surveyed for threatened flora and those plants existing outside of the proposed GGI site are unlikely to be impacted as a result of the proposed works.

Additionally, potential habitat for one threatened fauna species was found to occur within the wider locality of the site, although not within the site due to the general lack of cover, being:

- Blue Mountains Water Skink (*Eulamprus leuraensis*), listed as Endangered under TSC Act 1995 and Endangered under EPBC Act 1999;

The Blue Mountains Water Skink has been recorded within the Springvale mining lease area during ecological monitoring surveys previously undertaken and is considered to have limited potential to utilise the GGI site in conjunction with the surrounding swamp habitats. The recovery plan for *E. leuraensis*, notes that sites where this species has been confirmed "appear" to be permanently wet. If permanent water is pre-requisite for occurrences of this species then it is unlikely to occur in Narrow Swamp, due to its ephemeral nature. However, the habitat requirements of this species are not well known and the water skink group is largely semi-aquatic in habits, although most species do not require permanent water. Another water skink species *E. heatwolei*, was observed onsite associated with fallen timber. As such, *E. leuraensis* is considered to have some potential to occur within Narrow Swamp, although opportunities may be somewhat limited. Nevertheless, the relatively low impact works associated with the GGI sites is considered unlikely to cause any significant damage to the habitat of this species.

Two common skink species were observed adjacent to the site, being *Eulamprus heatwolei* (Yellow-bellied Water Skink) and *Acritoscincus duperreyi* (Eastern Three-lined Skink.

POTENTIAL IMPACTS

Although cumulatively, the four proposed GPR transects will represent 165m^2, the general lack of vegetation within the GGI site will realise a smaller area of vegetation that will require trimming or brush-cutting. The resistivity profiling may require additional brush-cutting to ensure probes have sufficient contact with the soil and/or peat substrate. Potentially, an additional area of up to 45m^2 may require minor brush-cutting. All efforts to minimise unnecessary brush-cutting or trimming will be made and threatened species avoided both within the Swamp and on its associated slopes. In addition the base of existing plants within the proposed transects will be retained, so that existing vegetation will regrow after GGI are completed.

Due to the absence of vegetation within the existing investigation area, GGI impacts are believed to be minimal. However, potential impacts of each of the proposed GGI are as follows:

- Dynamic cone penetrometer application and hand auguring of substrates for soil sampling purposes (8 – 9 in all), realising a total of 0.27m^2 clearing for these GGI applications; and
- Resistivity profiling of the swamp substrate will be conducted within the transects established for GPR investigations.

Within the GPR transects, the potential impacts associated with the installation of each of the proposed GGI sites include:

- the loss of less than 5 shrubs and small areas of groundcover (this does not include trimming of vegetation required to ensure probes have sufficient contact with the soil substrate);;

- small areas of soil disturbance which are unlikely to lead to erosion due to the minimal slope; and
- the creation, over time of walking tracks to the GGI sites which may develop as a result of return traffic to the site (although in some areas such tracks occur naturally, due to the movements of local Macropods and wombats).

Formal assessment of the potential impacts of the proposal on threatened species, populations and EECs is made within the Section 91 Referral to be submitted to NSW DECCW and the Referral to be submitted to the Commonwealth Department of Environment Water Heritage and the Arts (**DEWHA**).

RECOMMENDATIONS

A number of general recommendations that should be adopted for all GGI sites are:

- Removal of native vegetation should be minimised during all phases of work;
- The sites must be accessed on foot from the nearest existing track;
- GGI holes are to be drilled with a hand auger to minimise potential impacts on the EEC within which the GGI applications are to be placed;
- If there is fallen timber (logs and fallen branches) within the vicinity of the sites it is recommended that an Environmental Officer inspect the fallen timber for fauna such as small reptiles and mammals before being moved. Any timber that is moved should be done carefully and with minimal disturbance and replaced on the ground away from the access track or work areas;
- Onsite workers / staff should be familiar with the identification of the Blue Mountains Water Skink (*Eulamprus leuraensis*), particularly those undertaking vegetation trimming, and a careful approach to vegetation cutting / habitat disturbance should be adopted;
- Threatened native plants should be clearly marked and avoided or protected by visual barriers to avoid accidental trampling; and
- Vehicle access is to remain within existing tracks to minimise potential impacts on surrounding vegetation and reduce erosion.

WEED REMOVAL

In addition to ecological investigations regarding proposed GGI works ecological investigations were also conducted over the greater Narrow Swamp (southern area) site to ascertain the occurrence of floral weeds and any potential ecological impacts that might be associated with their removal.

Onsite investigations found weed species to be in relatively low densities, with species confined to the Asteraceae family, which are proficient colonisers of soils exposed by disturbance. As a consequence of onsite investigations the following recommendations are suggested to ensure that weeds are controlled within the site and that weed control measures do not have the potential to adversely impact upon existing and regrowing native vegetation:

- Weed control measures should be conducted during seasonal contexts and frequencies to prevent weed species maturing and setting seed;
- Weed removal should be undertaken by hand to prevent potential contamination of habitats with herbicides;
- Weed removal should be undertaken by personnel proficient in distinguishing between weed species and juvenile / maturing native vegetation; and
- All weeds gathered from the site should be disposed of in such a manner that it is impossible for them to propagate elsewhere by vegetative or seed dispersal means.

Weed control works within Narrow Swamp and East Wolgan Swamp as well as the installation of soil moisture probes within East Wolgan Swamp have been discussed with the DEWHA. Advice was sought from Centennial Coal on the likelihood of this activity being controlled. DEWHA responded to the request identifying that it would be highly unlikey that the activity proposed (being hand removal of weeds and the installation of soil moisture probes) would be controlled. Both pieces of correspondence are provided in **Attachment 2** of this letter.

CONCLUSION

The ecological inspection found that the proposed GGI installations are located within an EEC listed under TSC Act 1995 and EPBC Act 1999 which represents marginal potential habitat for the Blue Mountains Water Skink and occurs in the vicinity of one threatened flora species, *Derwentia blakelyi*, occurring upslope in adjacent habitat to the site to the west. However, the largely small scale of the proposal and minimal vegetation disturbance required is considered unlikely to have a significant impact on sensitive ecological features provided the recommendations above are adhered to. A formal impact assessment has been undertaken within the Section 91 Application to DECCW and the EPBC Act Referral to DEWHA for relevant threatened species and communities likely to be present within Narrow Swamp.

If you have any further enquiries regarding the above please do not hesitate to contact Allan Richardson (Ecologist) or the undersigned on (02) 4961 6500.

Yours faithfully
RPS HARPER SOMERS O'SULLIVAN PTY LTD

Toby Lambert
Senior Ecologist
BEnvSc MECA

Attachment 1

Flora Species List for Narrow Swamp Assessment Area

Family	Scientific Name	Common Name	Status	Narrow Swamp Transect
Apiaceae	*Centella asiatica*	Swamp Pennywort		x
Apiaceae	*Platysace linearifolia*	Narrow-leafed Platysace		x
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting		x
Asteraceae	*Cirsium vulgare**	Spear Thistle		x
Asteraceae	*Euchiton gymnocephalus*	Cudweed		x
Asteraceae	*Hypochaeris glabra**	Smooth Catsear		x
Asteraceae	*Olearia erubescens*	Moth Daisy-bush		x
Asteraceae	*Senecio linearifolius*	Fireweed		x
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle		x
Asteraceae	*Taraxacum officinale**	Dandelion		x
Droseraceae	*Drosera binata*	Forked Sundew		x
Epacridaceae	*Epacris paludosa*	Swamp Epacris		x
Fabaceae/faboideae/	*Acacia binervata*	Two-veined Hickory		x
Geraniaceae	*Geranium solanderi*	Cutleaf Cranesbill		x
Myrtaceae	*Eucalyptus oreades*	Blue Mountains Ash		x
Myrtaceae	*Eucalyptus radiata*	Narrow-leaved Peppermint (Juv)		x
Myrtaceae	*Leptospermum lanigerum*	Wooly Tea-tree		x
Myrtaceae	*Leptospermum obovatum*	Broad-leaf Tea-tree		x
Proteaceae	*Grevillea acanthifolia*			x
Proteaceae	*Lomatia myricoides*	River Lomatia		x
Proteaceae	*Persoonia myrtilloides*			x
Proteaceae	*Persoonia recedens*			x
Santalaceae	*Choretrum species A*	White Sour Bush		x
Scrophulariaceae	***Derwentia blakelyi***		**V**	**x**
Scrophulariaceae	*Verbascum virgatum**	Twiggy Mullein		x
Cyperaceae	*Baumea rubiginosa*	Twig Rush		x
Cyperaceae	*Gahnia microstachya*	Slender Saw-sedge		x
Cyperaceae	*Gahnia sieberiana*	Red-fruited Saw-sedge		x
Cyperaceae	*Lepidosperma limicola*	-		x
Iridaceae	*Patersonia sericea*	Wild Iris		x
Juncaceae	*Juncus continuus*	-		x
Restionaceae	*Baloskion australe*	-		x
Restionaceae	*Empodisma minus*	-		x
Blechnaceae	*Blechnum nudum*	Fishbone Water Fern		x
Gleicheniaceae	*Gleichenia dicarpa*	Pouched Coral Fern		x

Attachment 2 – Correspondence with DEWHA

Centennial Coal

25th September 2009

Dr. Jan Klaver
Director
EPBC Act Compliance Section
Department of Environment, Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

RE: Weed Control and Soil Moisture Monitoring within Temperate Highland Peat Swamps on Sandstone (THPSS)

Dear Dr. Klaver

We refer to our meeting in Canberra on the 22nd September 2009 with Centennial Coal representatives and representatives of the Department of Environment, Water Heritage and the Arts (**DEWHA**). We specifically refer to Centennial's presentation and the ensuing discussion regarding weed control activities within East Wolgan Swamp and Narrow Swamp, which are Temperate Highland Peat Swamps on Sandstone (**THPSS**). I also refer to the installation of soil moisture monitoring probes within East Wolgan Swamp.

With regard to weed control activities, we queried the need to refer the activity for assessment under the Environment Protection and Biodiversity Act 1999 (**EPBC**). It is proposed to remove weeds from the THPSS's by hand. The weed material will be removed from the TPHSS community and disposed of appropriately. There is no intention to use herbicides within the THPSS. The weed control program will be followed through with a monitoring program, initially for a period of six months.

We also proposed to install a transect of approximately three soil moisture probes within a disturbed area of East Wolgan Swamp. The soil moisture probes have a diameter of approximately 5cm (depending on the brand) and will be inserted into the peat material to a depth of approximately 2 metres. The probes have a data logger installed and will need to be down loaded every month. The objective of the installations will be to assess the natural fluctuation of soil moisture at varying depths. The data collected will be assessed against the progress of the revegetation of the disturbed area. This will assist us to understand the peat's ability to retain moisture both in the absence of vegetation and during the re-establishment of vegetation.

As discussed, we request advice on whether the above mentioned activities would necessitate a referral to determine whether they are controlled activities. As we are keen to commence the activities, your timely advice is greatly appreciated. If you wish to discuss any of the above, please do not hesitate to contact Edwina White on 0427 780 786 or email edwina.white@centennialcoal.com.au

Yours faithfully,

Richard Tacon
General Manager – Western Operations

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Australian Government

Department of the Environment, Water, Heritage and the Arts

Contact Officer: Trish Randell
Telephone: (02) 6275 9295 **Facsimile**: (02) 6274 1878

Mr Richard Tacon
General Manager – Western Operations
Centennial Coal
PO Box 198
WALLERAWANG NSW 2845

Dear Mr Tacon

Thank you for your letter dated 25 September 2009 regarding a weed control and soil moisture monitoring program which is proposed to be implemented at East Wolgan and Narrow Swamps on the Newnes Plateau. These swamps are Temperate Highland Peat Swamps on Sandstone (THPSS), an endangered ecological community which is protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as a matter of national environmental significance.

Having regard to the information provided in your letter, and our discussion with Edwina White and Mary-Anne Crawford on 22 September 2009, the activity would appear to be unlikely to have a significant impact on the THPSS.

Please note that this letter must not be construed in any way as Australian Government approval of the proposed activity or a decision about its EPBC Act status. A legally binding decision that an action is not subject to the EPBC Act can only be made after the action has been referred to the department in the way specified in the Act. Any person proposing to take an action must, following suitable investigations, reach their own decision as to whether or not they think the impact of an action is likely to be significant. If a person thinks that the action may be a 'controlled action' (which in this context involves having a significant impact on the above mentioned matter of national environmental significance), the person must refer the action to the department. Even where a person thinks that the action is not a controlled action, he or she can choose to refer the action to the department to remove uncertainty.

Should you have any queries about the matters raised in this letter please contact me on (02) 6274 2609.

Yours sincerely

Jan Klaver

Dr Jan Klaver
Director
EPBC Act Compliance Section (NSW)

25 September 2009

J:\JOBS\Centennial\All Jobs\26408 Springvale - Narrow Swamp \1G- Drafting\ 26408 Site Location A-A4.wor

TITLE: FIGURE 4
ECOLOGICAL CONSTRAINTS MAP

LOCATION: NARROW SWAMP, ANGUS PLACE

DATUM: DATUM
PROJECTION: MGA ZONE 56 (GDA 94)

DATE: 4/11/2009
PURPOSE: PURPOSE

LAYOUT REF:
VERSION (PLAN BY): A-A4 JA RICHARDSON

CLIENT: CENTENNIAL COAL
JOB REF: 26408

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RPS HARPER SOMERS O'SULLIVAN

RPS HARPER SOMERS O'SULLIVAN

Our Ref: 26407:TL:AR

23 November 2009

CENTENNIAL COAL – SPRINGVALE COLLIERY
PO BOX 198
WALLERAWANG NSW 2845

ATTENTION: TONY SEIBEL-BARNES

Dear Sir,

RE: EAST WOLGAN SWAMP PROPOSED STAGE 1 GEOTECH / GEOPHYSICAL WORKS, SOIL MOISTURE PROBES AND WEED CONTROL WORKS

RPS Harper Somers O'Sullivan (RPS HSO) has been engaged by Centennial Coal to undertake a portion of ecological inspections of East Wolgan Swamp for proposed geotechnical / geophysical works within Springvale Colliery, Lithgow.

This letter is the subject of two separate Section 91 applications over East Wolgan Swamp as follows:

- Section 91 Application for Stage 1 Geophysical and Geotechnical Works within East Wolgan and Narrow Swamp
- Section 91 Application for the removal of weeds and installation of four soil moisture probes.

The Section 91 applications have been split into two applications on the advice of representatives from the Department of Environment and Climate Change (**DECCW**). The rationale in doing this is to separate out complex activities (geotechnical and geophysical work) from the more straight forward activities (weed control and insertion of soil moisture probes).

PROPOSAL OVERVIEW
Stage 1 Geotechnical / geophysical investigations (**GGI**) are proposed at two isolated sites within East Wolgan Swamp ((herein referred to as Site 1 and Site 2 as shown in the attached **Figure 1**), which will encompass the following cumulative works:

Geophysical Works

- Ground penetrating radar (**GPR**) will be used over two areas of approximately 20m x 20m, represented by three by 20 metre long transects perpendicular to the drainage line. There will be a total of six transects within the Swamp. The

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CJ Anderson B APP Sc (EAM)
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GPR survey will be applied only to the Swamp area to define both internal structures and basement. Each transect will be cleared/trimmed with brush-cutter approximately 1.5m wide to enable the GPR to have direct sight with the ground. Transect length will vary depending on Swamp width as the GPR lines extend from Swamp edge to Swamp edge. Within the two proposed investigation areas, Swamp widths are generally around 20 metres wide. The length of transects will vary in relation to swamp width and will be adjusted to fit the width of the swamp profile as it becomes narrow. A nominal transect length of 20m has been used to be conservative. **Figure 3** shows the application of the GPR technique in a cleared open site.

- Resistivity profiling will also be undertaken requiring the insertion of narrow rods in an array across the profile of the swamp. This will involve an extension of the transects utilised for the GPR. The extension will be in the order of approximately 15m each side of the edge of the swamp. **Figure 2** shows the application of this technique in a cleared open site. The insertion of narrow rods may not necessarily require brush-cutting of vegetation in between rod insertion, however, through thick areas of *Gleichenia dicarpa* or other ferns or shrubs, vegetation will need to be brush cut or pushed aside to ensure the rods are appropriately inserted into the soil substrate.

Figure 2. Resistivity Profiling
(Source: Alpha Geoscience, 2009)

Figure 3. GPR

Geotechnical Works

Geotechnical works will be undertaken after the geophysical surveys, within the transects already established, to minimise impacts within **NPSS** vegetation and will consist of the following applications:

- Dynamic cone penetrometer (**DCP**) application will be utilised to measure soil penetration resistance by assessing soil compaction and granular strength of the substrate - requiring insertion of a narrow penetrometer rod into the substrate (6 maximum). **Figure 4** shows the application of this technique in a cleared open site. The width of the DCP will be in the order of 1.5 cm.
- At selected areas within the transect profile, soil samples will be obtained using hand augurs. The holes, ideally, will be extended to the basement or to the limit of the hand augur tool. At various depths, soil samples will be obtained. The remaining material will be returned to the hole. The hand augured holes will be restricted to areas of the transect where there is currently no vegetation.
- A maximum of nine augur holes are proposed. Augur holes will be drilled within the transects and will avoid vegetation where possible. Peat material will be replaced back into the holes after the peat has been sampled.

Figure 4. DCP Testing

Installation of a soil moisture probe transect across East Wolgan Swamp will also be established. This will not require trimming or brush-cutting as they will be installed in areas that are already clear of vegetation. This work will require the insertion of 4 x 50mm probes into the soil at a depth of 1m. The probes will continuously monitor soil moisture. To enable capture of the data, the probes will be connected by cables that will need to be pushed in to the peat material to a depth of around 50-100mm. A data logger will be placed adjacent to the probe closest to the western side of the bank.

The above GGI at East Wolgan Swamp are proposed to accurately assess the current status and nature of the swamp's substrate and profile. The objective of the GGI is to also identify any structure, cavity, piping or anomaly down to a depth of approximately 25 metres. The GGI techniques proposed in this Stage 1 work is a trial to test the techniques' ability to achieve the desired outcomes. If successful, the GGI techniques will be applied across a larger area of the swamp to obtain a clear picture of the underlying material and to test the methods for utilisation in other swamps as a pre-mining and post mining monitoring tool.

Access to the GGI locations will be by vehicle on the nearest track then on foot to the GGI locations to prevent unnecessary damage to the **NPSS EEC**. Potential impacts are likely to be relatively minimal considering the minor disturbance represented by the majority of GGI activities. Plates 1 and 2 represent examples of the current condition of some areas of East Wolgan Swamp and the retention of plant bases during GPR brush-cutting operations will allow regeneration of vegetation. **Figure 1** (Attached) shows the location and extent of the maximum GGI works footprint.

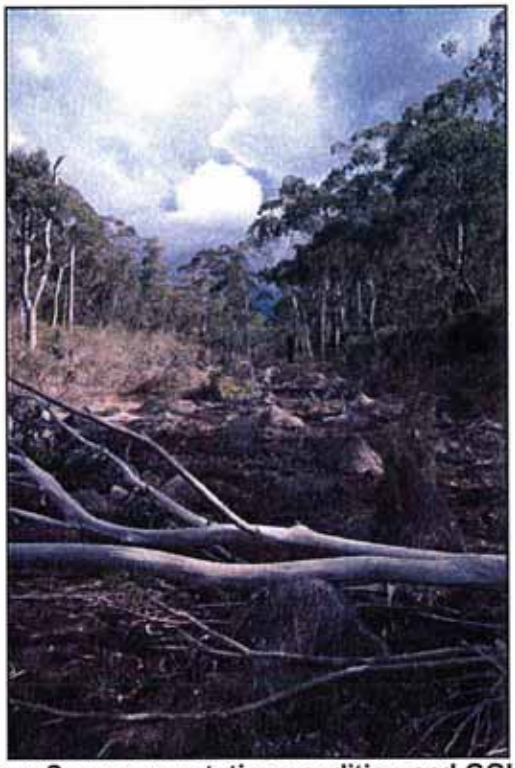

Plate 1: East Wolgan Swamp vegetation condition and GGI site 1 south view.

METHODS

An ecological inspection was undertaken by an RPS HSO ecologist on 29 October 2009 and included the area encompassed by the six proposed GPR and resistivity transects and surrounds (see Plates 1, 2 and 3). The aim of the site inspection was to identify possible ecological constraints in relation to the areas where proposed GGI would take place, to verify the extent of significant vegetation communities and

conduct targeted threatened flora and fauna surveys. It is noted that weed control work is proposed to take place over the whole extent of the area shown in **Figure 1**.

RESULTS

The location of the proposed GGI works were found to be located within vegetation consistent with **NPSS** in the Sydney Basin Bioregion which is listed as an Endangered Ecological Community (**EEC**) under the *Threatened Species Conservation Act 1995* (**TSC Act 1995**). **NPSS** within the site is also consistent with Temperate Highland Peat Swamps on Sandstone which is listed as an Threatened Ecological Community under the *Environment Protection Biodiversity Conservation Act 1999* (**EPBC Act 1999**). Although **NPSS** vegetation occurs within the site, areas of vegetation have already been affected from GGI site 1. Although regrowth of pre-existing vegetation has begun at site 1 the general absence of vegetation from much of site 1 offers opportunity to undertake the proposed GGI while minimising impact upon onsite existing vegetation.

A description of Stage 1 of the proposed GGI site is provided below, along with site specific recommendations to minimise potential impacts on native vegetation (namely **NPSS**), associated threatened flora and potential threatened fauna habitats. The occurrence of threatened flora and **EEC** vegetation is shown in Figure 1 (Attached). The occurrence of **NPSS** at East Wolgan Swamp as depicted is derived from the Vegetation of the Western Blue Mountains (VWBM) (DECC, 2006) mapping and although it overlays the occurrence of this **EEC** the true boundary of this community in some areas is substantially inside the mapped area.

SITE DESCRIPTIONS

The **NPSS** within which the GGI will be undertaken is named East Wolgan Swamp due to its location in the headwaters of the Wolgan River. East Wolgan Swamp occurs to the west of Campbell's Road on the Newnes Plateau.

East Wolgan Swamp is situated between open forested slopes and is dominated by the shrubs *Leptospermum obovatum* (River Tea tree), *Epacris paludosa* (Swamp Epacris), *Grevillea acanthifolia* and occasional occurrences of *Leptospermum lanigera* (Woolly Tea Tree) and *Baeckea diosmifolia* (Fringed Baeckea). Understorey vegetation was dominated by the sedges *Baumea rubiginosa* (Twig Rush), *Baloskion australe* and *Empodisma minus* and the fern *Gleichenia dicarpa* (Pouched Coral Fern).

Several herbaceous species were also widespread, notably *Hydrocotyle algida* (a Pennywort) was widespread and to a lesser extent *Viola hederacea* (Ivy-leafed Violet).

A description of the ecological features of the site, photographs and co-ordinates (MGA) are provided below. The co-ordinates for the site given above Plates 2 and 3 represent the centre points of the two sites within Stage 1 of GGI. The 3 transect footprint occurring at each of the sites extends approximately 10m north and south,

respectively, along the swamp's alignment and approximately 10m east and west of the centre point in relation to the cross-sectional orientation of the swamp.

SV EWS Stage 1 Site 1 (Centre Point 6304446N, 236466E)

Plate 2: Photograph of Proposed East Wolgan Swamp GGI Site 1 north view

Description

Stage 1 GGI site 1 at East Wolgan Swamp lies within an area mapped as Newnes Plateau Shrub Swamp (DECC, 2006). The site occurs within an area of East Wolgan Swamp that has been largely denuded of vegetation (Plates 1 and 2). Elsewhere, outside of the proposed Stage 1 GGI site 1, intact areas of the swamp are dominated by *Gleichenia dicarpa* (Pouched Coral Fern) and interspersed with *Baumea rubiginosa* (Twig Rush), *Lepidosperma australe* and *Baloskion australe*. While no canopy elements were found to exist above the GGI site, a patchy shrub layer is present elsewhere within the swamp dominated by *Leptospermum obovatum* (River Tea Tree), *Epacris paludosa* (Swamp Epacris), *Grevillea acanthifolia*, with *Baeckea diosmifolia* (Fringed Baeckea) and *Leptospermum lanigerum* (Woolly Tea Tree) also being present. See **Attachment 1** for the flora list, which includes other flora species observed adjacent to the proposed Stage 1 GGI site.

Apart from the density of surrounding swamp vegetation there is little forest debris present, and the general absence of onsite vegetation (see Plate 1 and 2) represents few foraging and shelter opportunities for local fauna species.

Stage 1 GGI site 2 at East Wolgan Swamp also lies within an area mapped as **NPSS** (DECC, 2006). The site occurs within an area of East Wolgan Swamp that retains much of its native vegetation cover although the shrub layer and to some extent the ground cover layer exhibits evidence of damage and dieback (Plate 3). Proposed Stage 1 GGI site 2, exhibits vegetation dominated by *Gleichenia dicarpa* (Pouched Coral Fern) and interspersed with *Baumea rubiginosa* (Twig Rush), *Lepidosperma australe* and *Baloskion australe*. While no canopy elements were found to exist above GGI site 2, a patchy shrub layer is present dominated by *Leptospermum obovatum* (River Tea Tree), *Epacris paludosa* (Swamp Epacris), *Grevillea acanthifolia*, with *Baeckea diosmifolia* (Fringed Baeckea) and *Leptospermum lanigerum* (Woolly Tea Tree) also present. See attachment 1 for the flora list, which includes other species occurring adjacent to the proposed Stage 1 GGI site 2.

Apart from the density of surrounding swamp and forest vegetation there is little forest debris present, although there is sufficient cover to provide meagre foraging and shelter opportunities for local fauna species.

SV EWS Stage 1 Site 2 (Centre Point 6304626N, 236511E)

Plate 3: Photograph of Proposed East Wolgan Swamp GGI Site 2 north view

The proposed Stage 1 GGI locations have been selected to avoid any open water areas and potential occurrences of local threatened flora species and to coincide with those areas displaying the greatest damage.

However, there are still occurrences of the threatened *Derwentia blakelyi* at the foot of the western slopes adjacent to **NPSS** vegetation. The threatened *Persoonia hindii* occurs upslope in a band some 50m above the **NPSS** vegetation. The ROTAP *Olearia quercifolia* (Oak-leaved Daisy-bush) occurs sparsely to the north and to the south of both GGI sites. During the locating of GGI locations and site access these species should be avoided to prevent impacts upon them.

THREATENED SPECIES

As mentioned previously, the proposed Stage 1 GGI sites are located within **NPSS** which is listed as an EEC under TSC Act 1995 and EPBC Act 1999.

Additionally, three threatened flora species were recorded within the locality of the broader East Wolgan Swamp, being *Derwentia blakelyi*, *Persoonia hindii* and *Olearia quercifolia* (Oak-leaved Daisy-bush).

O. quercifolia is only listed as a ROTAP species and does not occur within the GGI sites, although it occurs in a number of locations elsewhere within East Wolgan Swamp and provision should be made for its protection during onsite works.

Persoonia hindii was not recorded within the proposed Stage 1 GGI site during the site inspection as shrub swamp vegetation associated with the site is not suited to the habitat requirements of this species. However a band of this species was noted well up the slope and traversing of open forest habitats between the swamp and access roads should avoid locations of this species where possible. *P. hindii* is listed under the TSC Act 1999 as **Endangered**.

In addition, *Derwentia blakelyi* was found to occur at the foot of the western slope in a band extending up the lower slope from immediately adjacent to the swamp vegetation. As such, care should be taken to avoid *D. blakelyi* plants during the location of specific GGI sites, especially GPR transects that extend into and beyond the edges of swamp vegetation. The location of threatened flora species in relation to the proposed sites is shown in **Figure 1** attached. *D. blakelyi* is listed under the TSC Act 1999 as **Vulnerable**.

It should be noted that the majority of East Wolgan Swamp was surveyed for threatened flora and those plants existing outside of the proposed GGI site are unlikely to be impacted as a result of the proposed works.

Additionally, potential habitat for one threatened fauna species was found to occur within the wider locality site, although not within GGI site 1 due to the general lack of cover, being:

- Blue Mountains Water Skink (*Eulamprus leuraensis*), listed as Endangered under TSC Act 1995 and Endangered under EPBC Act 1999;

The Blue Mountains Water Skink has been recorded within the Springvale mining lease area during ecological monitoring surveys previously undertaken and is considered to have limited potential to utilise the GGI site 2 in conjunction with the

surrounding swamp habitats. The recovery plan for *E. leuraensis*, notes that sites where this species has been confirmed "appear" to be permanently wet. If permanent water is pre-requisite for occurrences of this species then it is unlikely to occur in East Wolgan Swamp, due to its ephemeral nature. However, the habitat requirements of this species are not well known and the water skink group is largely semi-aquatic in habits, although most species do not require permanent water. Another water skink species *E. heatwolei*, was observed nearby in another ephemeral swamp associated with fallen timber. As such, *E. leuraensis* is considered to have some potential to occur within East Wolgan Swamp, although opportunities may be somewhat limited. Nevertheless, the relatively low impact works associated with the GGI sites is considered unlikely to cause any significant damage to the habitat of this species.

POTENTIAL IMPACTS

Although cumulatively (averaged figures), the six proposed GPR transects will approximate 180m^2, the general lack of vegetation within Stage 1 GGI site 1 will realise a much smaller area of vegetation that will require trimming or brush-cutting. The resistivity profiling may require additional brush-cutting to ensure probes have sufficient contact with the soil and/or peat substrate. Potentially, an additional area of up to 90m^2 may require minor brush-cutting. All efforts will be made to minimise unnecessary brush-cutting and threatened species will be avoided both within the Swamp and on its associated slopes. In addition the base of existing plants within the proposed transects will be retained, so that existing vegetation is expected to regrow after GGI are completed. Geotechnical works will be undertaken after geophysical works are completed within transects established for GPR investigations to minimise impacts on **NPSS** vegetation.

Due to the general absence of vegetation with the existing investigation areas, GGI impacts are believed to be minimal. However, potential impacts of each of the proposed GGI are as follows:

- Resistivity profiling of the swamp substrate will be conducted within transects established for GPR investigations. The transect lines will extend 15 metres outwards from the swamp edge and minor trimming or brush-cutting may be required.
- Conservatively, a maximum of approximately 0.03m^2 of clearing will be required for each individual installation of soil moisture probes, Dynamic cone penetrometer application and hand auguring of substrates for soil sampling purposes (8-9 sample points in all), realising a total of 0.27m^2 clearing for these three GGI applications. All efforts will be made to undertake these works in areas that are already clear of vegetation; and

Within the GPR transects, the potential impacts associated with the works proposed within each of the proposed GGI sites include:

- the loss of less than 5 shrubs (per GGI application site) and small areas of groundcover (this does not include trimming of vegetation required to ensure probes have sufficient contact with the soil substrate);
- small areas of soil disturbance which are unlikely to lead to erosion due to the minimal slope and filing of holes with augur fines; and
- the creation, over time of walking tracks to the GGI sites which may develop as a result of return traffic to the site (although in some areas such tracks occur naturally, due to the movements of local Macropods and wombats). This will however, be short term in nature.

The above vegetation losses are calculated as the maximum within respective GGI application sites as the principle of avoiding vegetation removal where possible will be adopted during on site GGI works as is set out in the recommendations given below.

Formal assessment of the potential impacts of the proposal on threatened species, populations and EECs is made within the Section 91 applications to be submitted to NSW DECCW and the Referral to be submitted to the Commonwealth Department of Environment Water Heritage and the Arts (**DEWHA**).

RECOMMENDATIONS
A number of general recommendations that should be adopted for all GGI sites are:

- Removal of native vegetation should be minimised during all phases of work;
- The sites must be accessed on foot from the nearest existing track;
- GGI holes are to be drilled with a hand auger to minimise potential impacts on the EEC within which the GGI applications are to be placed;
- If there is fallen timber (logs and fallen branches) within the vicinity of the sites it is recommended that an Environmental Officer inspect the fallen timber for fauna such as small reptiles and mammals before being moved. Any timber that is moved should be done carefully and with minimal disturbance and replaced on the ground away from the access track or work areas;
- Onsite workers / staff should be familiar with the identification of the Blue Mountains Water Skink (*Eulamprus leuraensis*), particularly those undertaking vegetation trimming, and a careful approach to vegetation cutting / habitat disturbance should be adopted;
- Threatened native plants should be clearly marked and avoided or protected by visual barriers to avoid accidental trampling; and
- Vehicle access is to remain within existing tracks to minimise potential impacts on surrounding vegetation and reduce erosion.

WEED REMOVAL

In addition to ecological investigations regarding proposed GGI works ecological investigations were also conducted over the greater East Wolgan Swamp site to ascertain the occurrence of floral weeds and any potential ecological impacts that might be associated with their removal.

Onsite investigations found weed species to be in relatively low densities, with species confined to the Asteraceae family, which are proficient colonisers of soils exposed by disturbance. As a consequence of onsite investigations the following recommendations are suggested to ensure that weeds are controlled within the site and that weed control measures do not have the potential to adversely impact upon existing and regrowing native vegetation:

- Weed control measures should be conducted during seasonal contexts and frequencies to prevent weed species maturing and setting seed;
- Weed removal should be undertaken by hand to prevent potential contamination of habitats with herbicides;
- Weed removal should be undertaken by personnel proficient in distinguishing between weed species and juvenile / maturing native vegetation; and
- All weeds gathered from the site should be disposed of in such a manner that it is impossible for them to propagate elsewhere by vegetative or seed dispersal means.

Weed control works within Narrow Swamp and East Wolgan Swamp as well as the installation of soil moisture probes within East Wolgan Swamp have been discussed with the DEWHA. Advice was sought from Centennial Coal on the likelihood of this activity being controlled. DEWHA responded to the request identifying that it would be highly unlikely that the activity proposed (being hand removal of weeds and the installation of soil moisture probes) would be controlled. Both pieces of correspondence are provided in **Attachment 2** of this letter.

CONCLUSION

The ecological inspection found that the proposed Stage 1 GGI surveys are located within an EEC listed under TSC Act 1995 and EPBC Act 1999 which represents marginal potential habitat for the Blue Mountains Water Skink and occurs in the vicinity of three threatened flora species occurring both upslope and in adjacent habitat to the site to the west and both up and downstream of GGI sites within **NPSS** vegetation. However, the generally small scale of the proposal and minimal vegetation disturbance required is considered unlikely to have a significant impact on sensitive ecological features provided the recommendations above are adhered to. A formal impact assessment has been undertaken within the Section 91 Application to DECCW and the EPBC Act Referral to DEWHA for relevant threatened species and communities likely to be present within East Wolgan Swamp. The monitoring works to be undertaken will in fact assist future long-term management and protection of the swamp areas due to increased knowledge ascertained as a result of the proposed work.

If you have any further enquiries regarding the above please do not hesitate to contact Allan Richardson (Ecologist) or the undersigned on (02) 4961 6500.

Yours faithfully
RPS HARPER SOMERS O'SULLIVAN PTY LTD

Toby Lambert
Senior Ecologist
BEnvSc MECA

Attachment 1

Flora Species List for East Wolgan Swamp Assessment Area

Family	Scientific Name	Common Name	Status	East Wolgan Swamp
Apiaceae	*Hydrocotyle algida*	Pennywort		x
Apiaceae	*Hydrocotyle tripartita*	Pennywort		x
Asteraceae	*Cirsium vulgare**	Spear Thistle		x
Asteraceae	*Hypochaeris radicata**	Flatweed		x
Asteraceae	*Lagenophora stipitata*	Blue Bottle-daisy		x
Asteraceae	*Olearia erubescens*	Moth Daisy-bush		x
Asteraceae	*Olearia quercifolia*	Oak-leaved Daisy-bush	ROTAP	x
Asteraceae	*Senecio linearifolius*	Fireweed		x
Asteraceae	*Senecio minimus* subsp. *minimus*	Saw Groundsel		x
Casuarinaceae	*Allocasuarina nana*	Stunted She-oak		x
Dilleniaceae	*Hibbertia acicularis*	Prickly Guinea Flower		x
Epacridaceae	*Epacris paludosa*	Swamp Epacris		x
Epacridaceae	*Monotoca elliptica*	Tree Broom-heath		x
Euphorbiaceae	*Poranthera microphylla*	Small Poranthera		x
Fabaceae/faboideae	*Daviesia latifolia*	Broad-leaved Bitter Pea		x
Fabaceae/faboideae	*Daviesia squarrosa*	-		x
Fabaceae/faboideae	*Gompholobium huegelii*	Pale Wedge-pea		x
Fabaceae/faboideae	*Phyllota squarrosa*	Dense Phyllota		x
Fabaceae/faboideae	*Pultenaea canescens*			x
Myrtaceae	*Baeckea diosmifolia*	Fringed Baekea		x
Myrtaceae	*Leptospermum lanigerum*	Wooly Tea-tree		x
Myrtaceae	*Leptospermum obovatum*	Broad-leaf Tea-tree		x
Oxalidaceae	*Oxalis perennans*	Yellow-flowered Wood Sorrel		x
Pittosporaceae	*Billardiera scandens*	Hairy Appleberry		x
Pittosporaceae	*Banksia cunninghamii* subsp. *cunninghamii*	Hairpin Banksia		x
Proteaceae	*Grevillea acanthifolia*			x
Proteaceae	*Lomatia myricoides*	River Lomatia		x
Proteaceae	*Lomatia silaifolia*	Crinkle Bush		x
Proteaceae	*Persoonia chamaepitys*	Mountain Geebung		x
Proteaceae	*Persoonia recedens*			x
Proteaceae	*Petrophile sessilis*	Conesticks		x
Ranunculaceae	*Clematis aristata*	Old Man's Beard		x
Rosaceae	*Rubus ulmifolius**	Blackberry		x
Rubiaceae	*Galium gaudichaudii*	Rough Bedstraw		x

Family	Scientific Name	Common Name	Status	East Wolgan Swamp
Rutaceae	*Boronia microphylla*	Small Leaved Boronia		x
Scrophulariaceae	***Derwentia blakelyi***		**V**	**x**
Violaceae	*Viola betonicifolia*	Native Violet		x
Cyperaceae	*Baumea rubiginosa*	Twig Rush		x
Cyperaceae	*Gahnia grandis*	Brickmakers Sedge		x
Cyperaceae	*Gahnia microstachya*	Slender Saw-sedge		x
Cyperaceae	*Lepidosperma limicola*	-		x
Iridaceae	*Patersonia sericea*	Wild Iris		x
Juncaceae	*Juncus continuus*	-		x
Liliaceae	*Dianella revoluta var. revoluta*	Mauve Flax Lily		x
Lomandraceae	*Lomandra filiformis* subsp. *coriacea*	Wattle Mat-rush		x
Lomandraceae	*Lomandra glauca*	Pale Mat-rush		x
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush		x
Phormiaceae	*Dianella revoluta* var. *revoluta*	Spreading Flax Lily		x
Poaceae	*Poa sieberiana*	Tussock Grass		x
Poaceae	*Poa sieberiana* subsp. *cyanophylla*	Tussock Grass		x
Restionaceae	*Baloskion australe*	-		x
Restionaceae	*Empodisma minus*	-		x
Gleicheniaceae	*Gleichenia dicarpa*	Pouched Coral Fern		x

Attachment 2 – Correspondence with DEWHA

Centennial Coal

25th September 2009

Dr. Jan Klaver
Director
EPBC Act Compliance Section
Department of Environment, Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

RE: Weed Control and Soil Moisture Monitoring within Temperate Highland Peat Swamps on Sandstone (THPSS)

Dear Dr. Klaver

We refer to our meeting in Canberra on the 22nd September 2009 with Centennial Coal representatives and representatives of the Department of Environment, Water Heritage and the Arts (**DEWHA**). We specifically refer to Centennial's presentation and the ensuing discussion regarding weed control activities within East Wolgan Swamp and Narrow Swamp, which are Temperate Highland Peat Swamps on Sandstone (**THPSS**). I also refer to the installation of soil moisture monitoring probes within East Wolgan Swamp.

With regard to weed control activities, we queried the need to refer the activity for assessment under the Environment Protection and Biodiversity Act 1999 (**EPBC**). It is proposed to remove weeds from the THPSS's by hand. The weed material will be removed from the TPHSS community and disposed of appropriately. There is no intention to use herbicides within the THPSS. The weed control program will be followed through with a monitoring program, initially for a period of six months.

We also proposed to install a transect of approximately three soil moisture probes within a disturbed area of East Wolgan Swamp. The soil moisture probes have a diameter of approximately 5cm (depending on the brand) and will be inserted into the peat material to a depth of approximately 2 metres. The probes have a data logger installed and will need to be down loaded every month. The objective of the installations will be to assess the natural fluctuation of soil moisture at varying depths. The data collected will be assessed against the progress of the revegetation of the disturbed area. This will assist us to understand the peat's ability to retain moisture both in the absence of vegetation and during the re-establishment of vegetation.

As discussed, we request advice on whether the above mentioned activities would necessitate a referral to determine whether they are controlled activities. As we are keen to commence the activities, your timely advice is greatly appreciated. If you wish to discuss any of the above, please do not hesitate to contact Edwina White on 0427 780 786 or email edwina.white@centennialcoal.com.au

Yours faithfully,

Richard Tacon
General Manager – Western Operations

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Australian Government

Department of the Environment, Water, Heritage and the Arts

Contact Officer: Trish Randell
Telephone: (02) 6275 9295 **Facsimile**: (02) 6274 1878

Mr Richard Tacon
General Manager – Western Operations
Centennial Coal
PO Box 198
WALLERAWANG NSW 2845

Dear Mr Tacon

Thank you for your letter dated 25 September 2009 regarding a weed control and soil moisture monitoring program which is proposed to be implemented at East Wolgan and Narrow Swamps on the Newnes Plateau. These swamps are Temperate Highland Peat Swamps on Sandstone (THPSS), an endangered ecological community which is protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as a matter of national environmental significance.

Having regard to the information provided in your letter, and our discussion with Edwina White and Mary-Anne Crawford on 22 September 2009, the activity would appear to be unlikely to have a significant impact on the THPSS.

Please note that this letter must not be construed in any way as Australian Government approval of the proposed activity or a decision about its EPBC Act status. A legally binding decision that an action is not subject to the EPBC Act can only be made after the action has been referred to the department in the way specified in the Act. Any person proposing to take an action must, following suitable investigations, reach their own decision as to whether or not they think the impact of an action is likely to be significant. If a person thinks that the action may be a 'controlled action' (which in this context involves having a significant impact on the above mentioned matter of national environmental significance), the person must refer the action to the department. Even where a person thinks that the action is not a controlled action, he or she can choose to refer the action to the department to remove uncertainty.

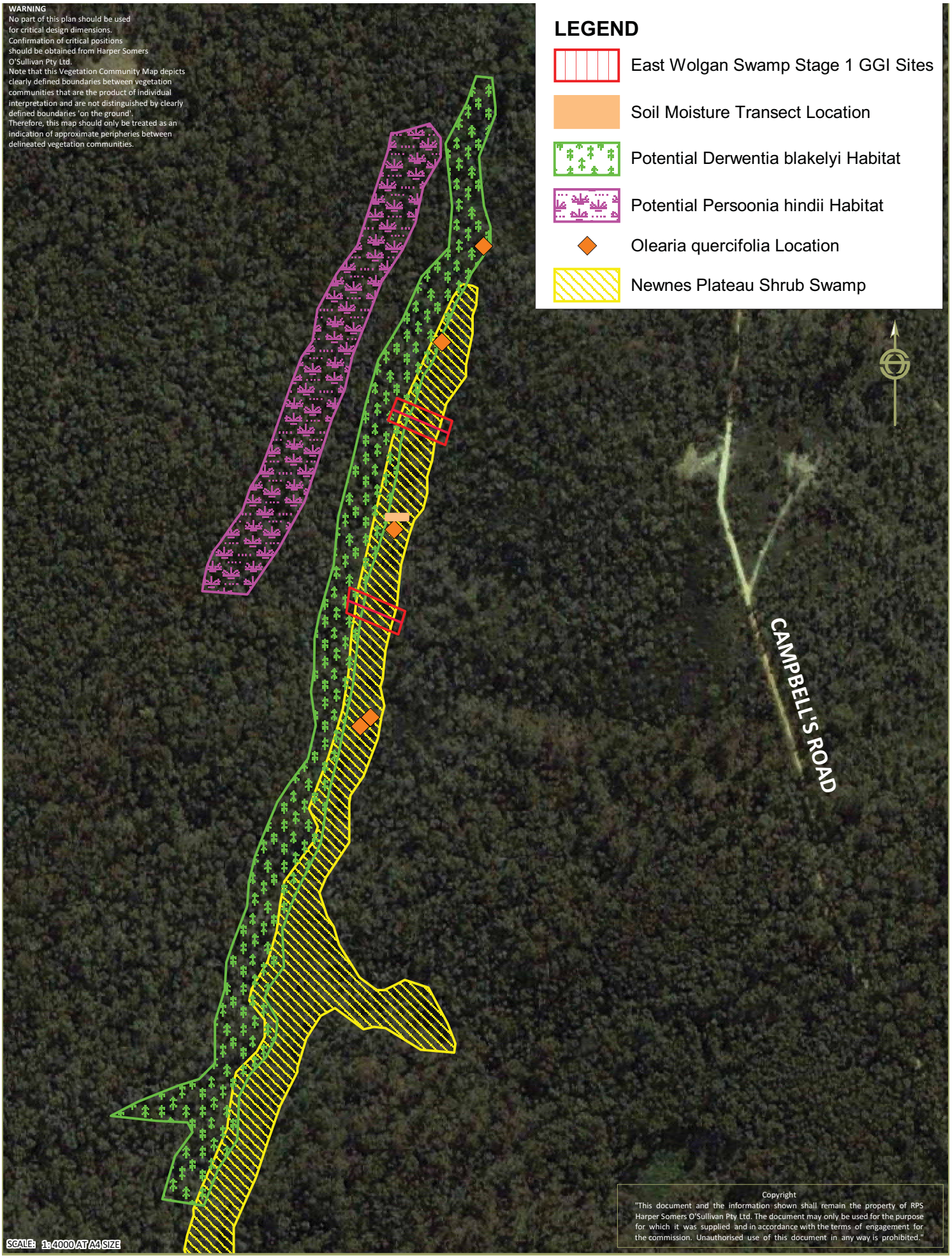
Should you have any queries about the matters raised in this letter please contact me on (02) 6274 2609.

Yours sincerely

Jan Klaver

Dr Jan Klaver
Director
EPBC Act Compliance Section (NSW)

25 September 2009



J:\JOBS\Centennial\All Jobs\26407 Springvale - East Wolgan Swamp\10- Drafting\ 26407 Site Location A-A4.wo

TITLE: FIGURE 1 ECOLOGICAL CONSTRAINTS MAP

LOCATION: EAST WOLGAN SWAMP, SPRINGVALE

DATUM: DATUM
PROJECTION: MGA ZONE 56 (GDA 94)

DATE: 12/11/2009
PURPOSE: PURPOSE

LAYOUT REF:
VERSION (PLAN BY): A-A4 (A.RICHARDSON)

CLIENT: CENTENNIAL COAL
JOB REF: 26407

241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303
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