Department of **Environment & Climate Change** NSW

Application for a

Section 91 Licence

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

1. Applicant's Name ^: *(if additional persons require authorisation by this licence, please attach details of names and addresses)*	Shaun Walsh (Road and Maritime Services) Nace Civil Engineering Pty Ltd	
2. Australian Business Number (ABN):	76 236 371 088	
3. Organisation name and position of applicant ^: *(if applicable)*	Roads and Maritime Services Senior Project Manager	
4. Postal address ^:	PO Box 477 Wollongong East NSW 2520	Telephone ^: B.H. 8874 6611 A.H. [redacted]
5. Location of the action *(including grid reference and local government area and delineated on a map).*	Upgrade of Princes Highway at South Nowra between McKay Street and Parma Road. Northern Limit of Work is: E – 281 018.348 N – 6136 291.909 Southern Limit of Work is: E – 280 746.823 N – 6128 139.935	
6. Full description of the	Road construction (Princes Highway Upgrade)	

* 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.

action and its purpose *(e.g. environmental assessment, development, etc.)*	Three separate REF's and Decision Reports undertaken for works and provided to OEH for Environmental Protection Licence Application 20035 (dated 3 November 2011). Copies of these reports are also available for viewing and download from the Road and Maritime Services' website at: http://www.rta.nsw.gov.au/roadprojects/projects/princes_hway/south_nowra/public_information.html
7. Details of the area to be affected by the action *(in hectares)*.	Approximately 9 hectares of land adjacent to the Princes Highway will be cleared to allow for the duplication of the Princes Highway between the project extents (Mckay Street in the north and Parma Road in the south).
8. Duration and timing of the action *(including staging, if any).*	The works are due to commence in November 2011 and are expected to be completed in mid-2013. The works will involve the construction of the new northbound carriageway on the western side of the existing highway between Quinns Lane and Forest Road. Once this new pavement is constructed and opened to traffic, works will commence on improving the southbound carriageway. Miscellaneous works will occur along the route between Quinns Lane and the northern limit (McKay Street) throughout the duration of the roadworks contract.
9. Is the action to occur on land declared as critical habitat*? *(tick appropriate box)*	☐ Yes ☑ No

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

10. Threatened species, populations or ecological communities to be harmed or picked.	Scientific name	Common name *(if known)*	Conservation status *(i.e. critically endangered, endangered or vulnerable)*	Details of no. of individual animals, or proportion and type of plant material *(e.g. fertile branchlets for herbarium specimens or whole plants or plant parts)*
	Litoria aurea	*Green and Golden Bell Frog*	Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) and Endangered under the NSW *Threatened Species Conservation Act 1995* (*TSC Act*).	1 sub-adult identified on site during its dispersion (migrated through the roadworks corridor)

11. Species impact: *(please tick appropriate box)*	
a) For action proposed on land declared as critical habtat; or b) For action proposed on land not declared as critical habitat.	an SIS is attached ☐ Yes ☐ No Items 12 to 25 have been addressed ☑ Yes ☐ No

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.	Adjacent habitats consist of degraded dispersal habitat, with no sites within the immediate area identified as suitable breeding habitat due to the presence of other predatory species (*Gambusia holbrooki).* No impacts on these adjacent habitat areas will be caused by the proposed roadworks construction.

13. Provide details of any known records of a threatened species in the same or similar known habitats in the locality *(include reference sources).* .	The Crookhaven River Floodplain population in the Shoalhaven Local Government Area (LGA) has been identified in the draft *Green and Golden Bell Frog Recovery Plan* as supporting eight of the 42 key GGBF populations in NSW (DEC 2005). GGBFs in the Crookhaven River Floodplain area occur on both private and publicly managed lands. The closest source population to the Project area is Worrigee Nature Reserve, which is approximately 2 kilometres east of the Project area (Figure 1). Based on data collected from surveys conducted in 2011, the Worrigee population is estimated to contain approximately several thousand GGBFs (Gaia Research 2011). Worrigee Nature Reserve is considered to be significant for the conservation of GGBFs within the locality as it provides refuge habitat outside the breeding season (Gaia Research 2011). Personal communication with Garry Daley (Gaia Research) and interrogation of the OEH Atlas of NSW Wildlife database identified records of GGBFs in and along Nowra Creek (Figure 1).
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 area to be affected is deemed to be suitable as a migratory habitat and is not deemed suitable for breeding or actual habitat. Refer to attached reports including: • *Green and Golden Bell Frog – South Nowra – Princes Highway* (Memo from LesryK Environmental dated 25 August 2011) • *Targeted survey for the Green and Golden Bell Frog (Litoria aurea) BTU Road, South Nowra, NSW.* (LesryK Environmental dated 17 October 2011)
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 .	Not applicable, see item 14 above.
16. Provide an assessment of the likely nature and intensity of the effect of the action on the lifecycle and habitat of the species.	Dispersing individuals may be impacted on during the roadworks construction. Noting studies undertaken by Roads and Maritime Services (formerly the NSW Roads and Traffic Authority) have not recorded any other occurrences of the species with the project area.
17. Provide details of possible measures to avoid or ameliorate the effect of the action.	Refer to attached Roads and Maritime Services' attached Green and Golden Bell Frog Management Plan dated October 2011.

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 24. Any additional information referred to in addressing these items 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.	The proposed road works would not decrease the size of an important population of this species in either the short or long term. The area investigated is not considered to support an important population of Green and Golden Bell Frogs.
19. In the case of an endangered population, whether the action proposed is likely to have 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.	The proposed road works would not decrease the size of an important population of this species in either the short or long term. The area investigated is not considered to support an important population of Green and Golden Bell Frogs.
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.	Not applicable. Indirect impacts may arise on the Green and Golden Bell Frog, although the adoption of the mitigation measures proposed are considered to negate these. As such, it is not considered that the proposed road works would have a significant impact on the Green and Golden Bell Frog.

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 (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.	The proposed road works would not decrease the size of an important population of this species in either the short or long term. The area impacted by the road development is not considered to support an important population of Green and Golden Bell Frogs. The proposal would not reduce the area of occupancy available to an important population of this species. Retention of the vegetation present would ensure that the north – south movement of any dispersing individuals would still be possible. As such, the proposal will not fragment an existing population into two or more populations. East-west movements are already fragmented due to the character of the highway. Though increasing gap widths, the proposed road works would not alter this situation. No habitat critical to the survival of this species or the breeding cycle is considered to be present. The proposed road works would not have a direct impact on the area in which the Green and Golden Bell Frog was recorded. Adoption of those mitigation measures proposed would ensure that the road works would not modify, clear, remove, isolate or decrease any areas of this species' habitat to the extent that it is likely to decline.
22. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	As stated within the attached reports, no critical habitat will be adversely affected by the proposed development. The study area is not listed as critical habitat under Part 3 Division 1 of the *TSC Act*.

23. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	The OEH is in the process of preparing a recovery plan for this species (Department of Environment and Conservation 2005), the broad objectives of this plan that are relevant to the current investigation would be: • The securing of Green and Golden Bell Frog populations by increasing the protection of their habitat areas and preventing the further loss of this species across its range; • Ensuring extant Green and Golden Bell Frog populations are managed to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species; and • The implementation of habitat management initiatives that are informed by data obtained through investigations into the general biology and ecology of the Green and Golden Bell Frog through a systematic and coordinated monitoring program. Adoption of the recommendations proposed in the Roads and Maritime Services' Green and Golden Bell Frog Management Plan would ensure consistency with the objectives and actions of this species recovery plan.
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.	Currently 31 Key Threatening Processes for mainland NSW are listed under Schedule 3 of the *TSC Act*, none of which would be applicable to the current proposal. The proposed road works would not have a direct impact on the site this species was located. Similarly, with the adoption of those mitigation measures proposed, no indirect impacts are likely to arise. The proposed road works would therefore not be considered to constitute a key threatening process.

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 Department of Environment, Climate Change and Water NSW (DECCW) prior to submitting a licence application .

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

Protected fauna and protected native plants*

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

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 *as well as* 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 DECCW 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 DECCW

Disclosure of Personal Information in the Public Register of s91 Licences

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.

Copies of all applications and licences issued under section 91 and certificates issued under section 95 of the Actare available on the DECCW website at
www.environment.nsw.gov.au/threatenedspecies/S91TscaRegisterByDate.htm
or in hardcopy form from The Librarian, DECC, 59 Goulburn St, Sydney.

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.*

Protected native plant means a native plant of a species named in Schedule 13 of the *National Parks and Wildlife Service 1974.*

Applicant's name *(Please print)*	*Shaun Walsh*
Applicant's Position & Organisation *(if relevant)* *(Please print)*	*Senior Project Manager* *Roads and Maritime Services*
Applicant's signature	
Date	7 November 2011

For more information or to lodge this form, contact the nearest branch of DECCW's Environment Protection and RegulationGroup:

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P: 02 9995 6804
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Transport Roads & Traffic Authority

NSW GOVERNMENT

MANAGEMENT PLAN FOR THE GREEN AND GOLDEN BELL FROG

SOUTH NOWRA UPGRADE

OCTOBER 2011

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1 Introduction

1.1 Background

The Roads and Traffic Authority of NSW (RTA) proposes to widen the Princes Highway (HW1) from Kinghorne St to Forest Road by constructing a two lane northbound carriageway adjacent to the existing Princes Highway. This is to improve road safety, traffic efficiency and to reduce delays by providing a consistent number of carriageways through South Nowra.

The section between Kinghorne Street and Forest Road was assessed under Part 5 of the *Environmental Planning and Assessment Act* (EP&A Act) and three Reviews of Environmental Factors (REFs) were undertaken for:

- Kinghorne Street to Warra Warra Road (determined on 26 February 2010)
- Warra Warra Road to Forest Road (determined on 8 October 2009)
- Warra Warra Road Roundabout (determined on 20 April 2009)

These REFs (and supporting technical reports) stated that the nearest records of the threatened Green and Golden Bell Frog (*Litoria aurea*) occurred 2 kilometres east of the study area, and that the species was unlikely to occur within the study area (Landscope 2008; Hayes 2009; nghenvironmental 2009).

However, during a site inspection on 9 August 2011 within the proposed Project area, an RTA officer noticed a green frog basking on Blady Grass (*Imperata cylindrica*) against the side of a building. The officer took photos of the frog and sent them to RTA Environment Branch for identification of the species by senior environment specialists. The frog was confirmed as being a Green and Golden Bell Frog by Josie Stokes. The Green and Golden Bell Frog (GGBF) is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Endangered under the NSW *Threatened Species Conservation Act 1995* (TSC Act).

Photograph 1: Green and Golden Bell Frog (*Litoria aurea*) sub-adult female identified adjacent to proposed Project area by Shane McCauley (RTA) on 9 August 2011 (Photo: Shane McCauley).

Photograph 2: The location where the GGBF was discovered basking on Blady Grass (*Imperata cylindrica*). The brick wall is a part of the nearby brickworks quarry (SCCCR quarry) (Photo: Josie Stokes).

While the proposed construction works associated with the Project would not directly impact on the location where the individual GGBF was detected, or directly impact the ponds within the adjacent SCCCR quarry or the nearby Nowra Creek, the RTA sought advice from an expert on local GGBF populations, Garry Daley (Gaia Research Pty Ltd). Garry is a committee member of the NSW GGBF Recovery Team (Office of Environment and Heritage (OEH)), and has prepared several management plans and survey reports for populations of this species within the locality.

Following expert herpetological advice, the RTA contracted ecologists (LesryK Environmental Consultants) to undertake targeted surveys for the GGBF within the proposed Project area to assess the current activity level of this species in the locality.

Targeted surveys were undertaken throughout August and September 2011 in accordance with the *Survey Guidelines for Australia's Threatened Frogs* (Department of the Environment, Water, Heritage and the Arts 2010). Survey techniques included a combination of spotlighting, call playback and call detection surveys and dipnetting for tadpoles within the Project area. No additional GGBFs were detected during these surveys.

A known reference site (Worrigee Nature Reserve) was also inspected to assess overall activity levels for the GGBF within the locality. No GGBFs were observed or heard calling within the sampled section of Worrigee Nature Reserve.

To further consider the potential impacts of the Project on the GGBF, assessments of significance under the TSC Act and EPBC Act were completed by LesryK Environmental Consultants. The assessments concluded that the GGBF is unlikely to be significantly affected by the Project.

Notwithstanding, this GGBF Management Plan has been developed as a precautionary measure and to outline mitigation measures to protect any GGBFs that may be encountered within the Project area during construction.

1.2 GGBF Management Plan

This Green and Golden Bell Frog Management Plan details mitigation measures to be implemented to protect any GGBFs that may be encountered during construction works for the Project.

This management plan has been prepared by Senior Biodiversity Specialists from the RTA's Environment Branch in consultation with Garry Daley (Gaia Research Pty Ltd), and must be included in the Construction Environmental Management Plan (CEMP) prepared by the contractor for all construction works to be undertaken for the Project.

1.3 GGBF Management Plan Objectives

The objectives of this GGBF Management Plan are to:

- Identify potential threats to GGBFs during construction.
- Provide mitigation measures and procedures to minimise impact to any GGBFs found during construction works for the Project.

1.4 GGBF populations within the locality

The Crookhaven River Floodplain population in the Shoalhaven Local Government Area (LGA) has been identified in the draft *Green and Golden Bell Frog Recovery Plan* as supporting eight of the 42 key GGBF populations in NSW (DEC 2005). GGBFs in the Crookhaven River Floodplain area occur on both private and publicly managed lands. The closest source population to the Project area is Worrigee Nature Reserve, which is approximately 2 kilometres east of the Project area (Figure 1). Based on data collected from surveys conducted in 2011, the Worrigee population is estimated to contain approximately several thousand GGBFs (Gaia Research 2011). Worrigee Nature Reserve is considered to be significant for the conservation of GGBFs within the locality as it provides refuge habitat outside the breeding season (Gaia Research 2011).

Personal communication with Garry Daley (Gaia Research) and interrogation of the OEH Atlas of NSW Wildlife database identified records of GGBFs in and along Nowra Creek (Figure 1). Nowra Creek runs between the SCCCR Brick Works quarry and the nearby correctional facility, and flows in a northerly direction. Nowra Creek is approximately 350 metres west of the site where the individual Bell Frog was found. Considering GGBFs have been documented travelling distances of up to 1.5 kilometres per night (Pyke and White 2001), this is a small distance that could easily be traversed by this species. Furthermore, creeklines such as Nowra Creek are considered to be a major dispersal corridor for GGBFs within the Shoalhaven LGA (Gaia Research 2011).

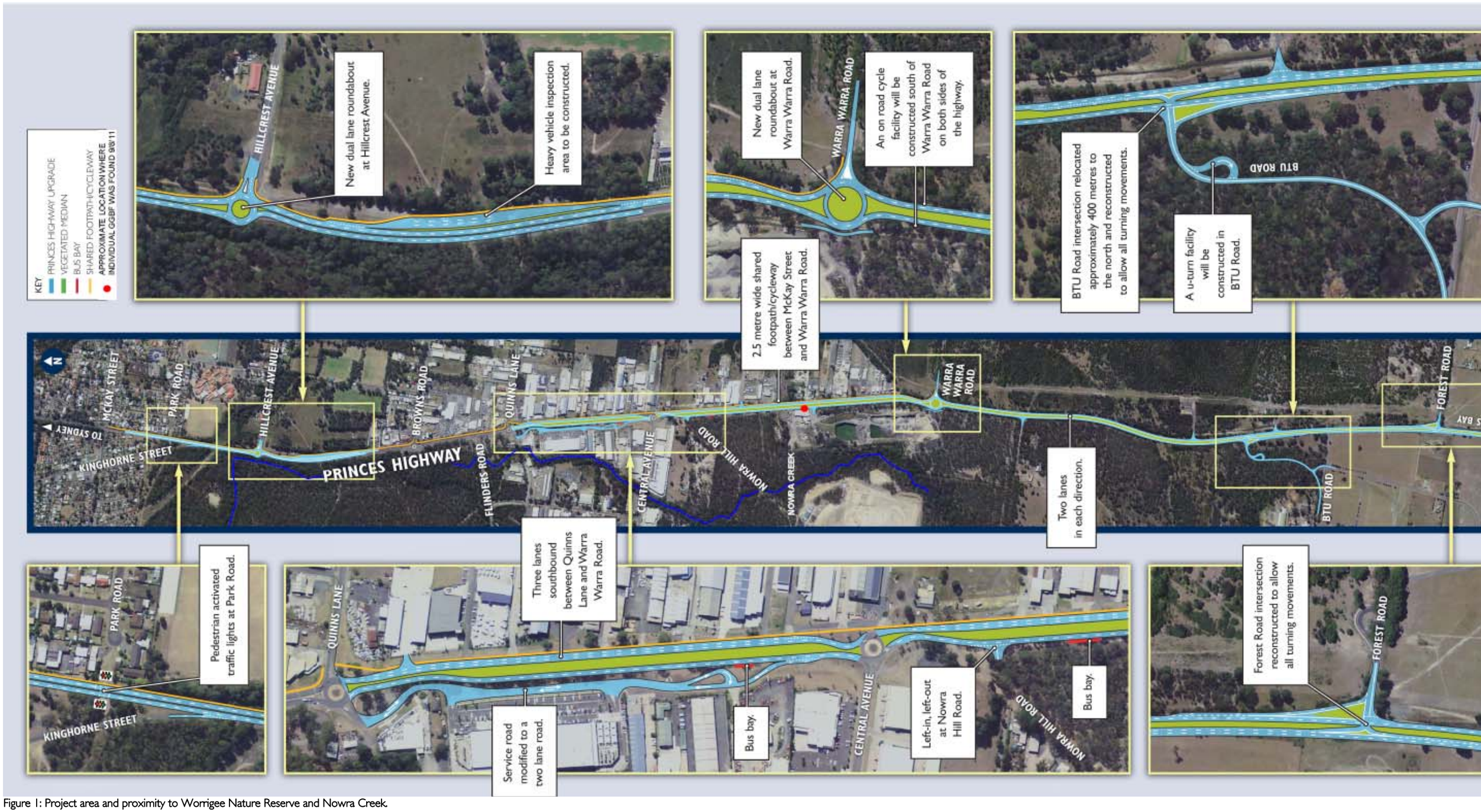

Figure 1: Project area and proximity to Worrigee Nature Reserve and Nowra Creek.

2 Potential threats to GGBF during construction

Injury or death to GGBFs may potentially occur as a result of direct and indirect impacts during construction of the Project as outlined below.

2.1 Direct impacts

1. Depending on timing of works, hibernating GGBFs may be run over or injured by heavy vehicles moving around the Project area.

2. GGBFs that may be sheltering in grass being impaled or injured during the installation of fences.

3. GGBF entering the Project works area overnight and seeking refuge under machinery, vehicles, construction materials or stockpiles, may be injured or squashed when these items are moved for use.

4. GGBF sheltering in grass or reeds, on tree branches, underneath rocks, debris or timber, or within culverts and waterbodies, may be killed or injured during vegetation removal and earthworks.

These potential impacts would be mitigated through the use of frog exclusion fences and pre-clearance surveys for GGBFs as outlined in Section 3.

2.2 Indirect impacts

1. Chemical, fuel or solvent spills contaminating the soil or waterways being used by GGBFs and causing death or injury to frogs or tadpoles.

2. Sediment laden water may be discharged and potentially contaminate GGBF habitat.

3. Wind-blown dust, Quick Lime particles or industrial fumes causing burns or injury to frogs or contaminating water that is being used as a breeding site.

4. Soil, mulch or other landscaping materials containing spores of *Batrachochytrium dendrobatidis* (Chytrid Fungus) causing illness or death to frogs and tadpoles.

5. Water containing spores of *Batrachochytrium dendrobatidis* (Chytrid Fungus) being imported onto the work site, causing illness or death to frogs and tadpoles.

6. Water containing the introduced Plague Minnow (*Gambusia holbrooki*) being imported onto the work site or spread into adjacent waterways.

7. Use of herbicides on the work site.

Measures to mitigate these potential impacts are outlined in Section 3.

3 GGBF mitigation measures

The following management procedures would be implemented to minimise potential impacts on the GGBF and must be incorporated into the CEMP:

- Environmental induction training
- Site hygiene management
- Frog exclusion fencing
- Pre-clearing surveys for GGBF (nocturnal and diurnal)
- GGBF relocation procedures
- Construction works procedures (including timing of works)
- Reporting procedures

3.1 Environmental induction training

All personnel and contractors would undergo environmental induction training before commencing work on site. Information to be addressed during this training would include:

- GGBF profile and identification.
- Identification of GGBF habitat areas. Project personnel would be prohibited from entering GGBF habitat areas located outside defined construction or operation areas.
- Site hygiene management in accordance with the Hygiene Protocol.
- Procedures to be followed in the event that GGBFs are found or injured.

3.2 Site hygiene management

The accidental introduction or spread of pathogens such as *Batrachochytrium dendrobatidis* (Chytrid Fungus) has the potential to adversely affect frog populations worldwide. In Australia, Chytrid has impacted on native frog species causing the extinction of one species and suspected to have caused the extinction of three others. The *'Infection of frogs by amphibian Chytrid fungus causing the disease Chytridiomycosis'* is listed as a Key Threatening Process under the TSC and EPBC Acts.

Typical symptoms of frogs infected with Chytridiomycosis include lethargy, accumulation of sloughed skin over the body, emaciation, half-closed eyes, redness on the underside of the body and legs. *Batrachochytrium dendrobatidis* (Chytrid Fungus) is a virulent and highly contagious frog disease that kills frogs and tadpoles. Chytrid is a water-borne fungus that may be spread as a result of handling frogs or through cross contamination of water bodies.

3.2.1 Training

To reduce the likelihood of introducing or spreading pathogens such as Chytrid fungus, all Project personnel and contractors would be trained in site hygiene management in accordance with the *RTA Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects* (Guide 7- Pathogens) (RTA 2011) as part of environmental induction training.

3.2.2 Best practice hygiene protocols for Chytrid fungus

In accordance with *EPBC Act Policy Statement 3.19 Significant impact guidelines for the vulnerable Green and Golden Bell Frog (Litoria aurea)* the contractor would prepare a hygiene protocol to be implemented for the Project. Table 1 presents a range of best practice hygiene protocols to reduce the risk of the introduction or spread of Chytrid on the Project.

Table 1: Best practice hygiene protocols to be implemented for the Project to prevent the spread or introduction of Chytrid.

Best Practice Hygiene Protocols	Chytrid (*Batrachochytrium dendrobatidis*)
Work programs	- Minimise work during excessively wet or muddy conditions. - Programming of works should always move from uninfected areas to infected areas.
Restrict access	- Set up exclusion zones with fencing and signage to restrict access into potential frog habitat areas outside of the Project boundary.
Inductions	- All personnel (including visitors) to be inducted on Chytrid management measures for the site through toolbox talks and site inductions.
Vehicles and machinery	- Vehicles initially entering the Project area must not be tracking soil/mud and/or vegetative material. If soil/mud and/or vegetative material are found on these vehicles, they must be cleaned in a hard stand area within the site compound area. Any organic waste collecting during the washdown process would be removed from site. - Restrict vehicles to parking within project boundary and site compound parking areas (eg Nowra Hill Rd and BTU Rd). - Provide parking and turn-around points on hard, well-drained surfaces.
Personnel and equipment	- For high risk activities including establishing frog exclusion fencing and undertaking clearing and grubbing, provide boot wash down facility for ALL personnel. - Disinfecting boots with cleaning products containing benzalkonium chloride (eg 'Toilet Duck') or methylated spirits diluted in town water (70:30 ratio))for ALL personnel. - Disinfect hands or change gloves between the handling of individual frogs and between each site. - Only handle frogs when necessary. Use the 'one bag-one frog' approach.
New material	- Source landscaping materials from a supplier that is certified to be disease-free.
Disposing of material	- To avoid cross contamination, generally avoid transferring water between two or more separate waterbodies.
Further information	- *Hygiene protocol for the control of disease in frogs, Information Circular Number 6* (Wellington and Haering 2008).

Photograph 3: Boot wash down to prevent the spread of Chytrid on shoes on the Sapphire to Woolgoolga project, Northern Region (Photo: Josie Stokes).

3.3 Frog exclusion fencing

Due to the detection of a GGBF adjacent to the Project works area in August 2011, it is highly likely GGBFs may enter the works area from off-site habitat under suitable weather conditions. Frog protection measures are therefore required to protect GGBFs from injury or death during construction for the Project.

Additionally, given the proximity of the Project works area to core and supplementary GGBF habitat (eg Nowra Creek and Worrigee Nature Reserve) the majority of the works area would be considered potential GGBF habitat, especially the vegetated sections between Nowra Hill Road and Forest Road.

In accordance with *EPBC Act Policy Statement 3.19 Significant impact guidelines for the vulnerable Green and Golden Bell Frog (Litoria aurea)* frog exclusion fencing would be installed prior to the commencement of construction. The design of frog exclusion fencing and locations for installation would be developed in consultation with the Project Ecologist / Herpetologist and are shown in the attached documents.

Temporary frog exclusion fencing provides a barrier which minimises the risk of GGBF entering the construction works area and being injured or killed. The contractor would ensure relevant signage is erected on the frog exclusion fencing to alert staff to the "environmentally sensitive area" and to prevent personnel from entering these areas. The signage should be visible for up to 20 metres away.

In some locations, frog exclusion fencing may need to include frog-proof gates to allow vehicle and personnel access to the Project works area. If frog-proof gates are installed, they must be shut at the end of each day.

The Contractor would include the inspection of frog exclusion fences to ensure they are functional and not torn or holed, as part of the daily checklist for personnel. Damage to the fence from machinery during construction would be fixed within the working day. The Contractor would ensure any repairs to the fence are made before dusk to minimise the risk of frogs entering the works area overnight.

It is anticipated that a minimum of two nocturnal and two diurnal pre-clearing GGBF surveys would be undertaken prior to the installation of frog exclusion fencing.

3.3.1 Marking of GGBF habitat beyond the frog exclusion fencing

It is recommended that potential GGBF habitat beyond the frog exclusion fencing be marked on maps and included in the CEMP.

Project personnel would be prohibited from entering GGBF habitat areas beyond the frog exclusion fencing. The establishment of the GGBF habitat areas would be conducted in accordance with the relevant measures outlined in the Hygiene Protocol.

3.4 Pre-clearing surveys for GGBFs

Pre-clearing surveys for GGBFs would include nocturnal (night-time) and diurnal (day-time) searches.

Pre-clearing surveys for GGBFS would be carried out within the Project works area before the installation of frog exclusion fencing and before clearing and grubbing operations.

It is anticipated that a minimum of two nocturnal and two diurnal pre-clearing GGBF surveys would be undertaken prior to the installation of frog exclusion fencing to assess frog activity in the area and relocate any found frogs to an area of suitable habitat outside the Project works area (see Section 3.5 for methods).

All surveys for GGBFs would be undertaken in accordance with the relevant measures outlined in the Hygiene Protocol.

Pre-clearing surveys for GGBF would be undertaken by a suitably qualified and licensed ecologist / herpetologist with a **minimum of 5 years experience** with amphibians.

All GGBFs that are collected by hand during nocturnal pre-clearing surveys and diurnal searches would be measured, sexed and checked for signs of disease (or injury) prior to being relocated by the Project Ecologist / Herpetologist to an adjacent area of suitable habitat in accordance with the GGBF relocation procedures (Section 3.5).

3.4.1 Nocturnal (night-time) pre-clearing surveys for GGBFs

Nocturnal pre-clearing surveys for GGBFs would be undertaken by the Project Ecologist / Herpetologist immediately **the night before clearing and grubbing operations commence** in the Project works area to assess frog activity and reduce the likelihood of GGBFs being injured or killed during construction activities.

Nocturnal pre-clearing surveys of the Project works area may include the following methods:

- Spotlighting (in the lower branches of trees, Typha, ephemeral waterbodies and grass)
- Spotlighting of frog exclusion fencing once installed (particularly along the ground on the inside and outside of the fence)
- Active searching of potential sheltering habitat within the Project works area (hand-turning rocks, timber, bricks and other debris)
- Call play-back

3.4.2 Diurnal (day-time) pre-clearing surveys before construction

A minimum of **two** diurnal (day-time) pre-clearing surveys would be carried out by the Project Ecologist / Herpetologist after the frog exclusion fences have been installed and **before clearing and grubbing commences** to reduce the risk of injury or death to GGBFs that may be sheltering or utilising habitat within the Project works area.

Habitat resources that are typically associated with the life-cycle components of the GGBF would be **actively searched** by the **Project Ecologist / Herpetologist**.

This may include searching:

- Frog exclusion fencing
- Vegetation (including groundcover) that is scheduled to be removed
- Under rocks, debris, timber and other construction materials, within the site.

3.4.3 Pre-start up checks for GGBFs during construction

During construction, site personnel would be responsible for checking on and around plant and equipment for any GGBFs that may have moved into the construction works area overnight. The base of the frog exclusion fencing should also be checked as part of this procedure for any frogs that may be sheltering under the base of the fencing.

The pre-start up check for GGBFs would be added to the form for the pre-start checklist, and a fortnightly review/audit of these forms would be undertaken by the Environment Representative as part of the environment inspections.

The GGBF relocation procedure would be followed for any live frogs found as part of the pre-start up check. Specifically, **the frog/s would be placed into a plastic holding container with a small amount of water and the Project Ecologist / Herpetologist would be immediately advised**. Personnel are not to relocate frogs found during the pre-start check under any circumstance. The **Project Ecologist / Herpetologist** contact number would be displayed around the site and included within the Project's Inspection and Test Plans, and on relevant site cards.

The pre-start up check for GGBFs is an adaptive procedure that would be reviewed monthly by the RTA's Environmental Representative. If GGBFs are regularly found by personnel within the construction works area, the procedure would be amended and additional mitigation measures would be implemented to further minimise risk of injury or death to GGBFS.

3.5 GGBF relocation procedures

All relocation procedures are to be undertaken in accordance with the relevant measures outlined in the Hygiene Protocol.

Details of GGBF relocations (eg lifecycle stage and sex of individual, location where found, location of release, and any additional information such as PIT tag number) collected during nocturnal pre-clearing surveys and diurnal searches would be recorded and reported (see Section 3.7 Reporting procedures).

Frogs that are not diseased or injured would be released by the Project Ecologist / Herpetologist in an adjacent area of pre-identified suitable habitat (eg Nowra Creek, at Central Avenue- refer Photograph 4).

Photograph 4: Potential site (Nowra Creek) at Central Ave for relocating frogs found during clearance surveys and construction (Photo: Josie Stokes).

Frogs that are injured would be taken into captive care, treated and when fully recovered, returned to an area of suitable habitat, as close as possible to where it was found. If the injury is permanent, the frog may be kept in captivity as a potential breeding animal.

If diseased or sick GGBFs are found, they would be placed in small, plastic terrariums and taken to an approved quarantine area where they would be treated. In cases where Chytrid Fungus is suspected, the frog may be forwarded to Taronga Zoo for diagnosis and treatment. Frogs suspected of being infected with Chytrid, would not be returned to the Project area. Details of sick or dead GGBFs found within the Project works area would be recorded and reported (see Section 3.7).

In the event that live frogs are discovered while construction is being undertaken, the Contractor must place the frog/s into a plastic holding container with a small amount of water and immediately advise the Project Ecologist / Herpetologist. Clean, plastic terrariums would be supplied by the Project Ecologist / Herpetologist for this purpose. The Project Ecologist / Herpetologist contact number would be displayed around the site and included within the Project's Inspection and Test Plans, and on relevant site cards.

The Contractor must retain the carcass of any dead frogs found during construction and immediately advise the Project Ecologist / Herpetologist. If the cause of death is not obvious, the Project Ecologist / Herpetologist would preserve the frog in buffered alcohol and forward to Taronga Zoo for pathological testing.

3.6 Mitigation measures to address indirect impacts

3.6.1 Construction spills and air quality impacts

Chemical, fuel or solvent spills have the potential to contaminate waterways and adjacent GGBF habitat, particularly to the east (Worrigee Nature Reserve) and the west (Nowra Creek), which may cause death or injury to frogs and tadpoles.

Fuel and chemical storage sites would be stored in site compound areas in accordance with the procedures for fuel and chemical storage for the Project.

Wind-blown dust, industrial fumes or construction particulates would be contained through the use of silt screens, where possible. Volatile substances would not be permitted in areas of GGBF habitat. These substances must only be used in suitable locations and stored in a manner that is appropriate for the substance.

Water tankers would be used to settle dust in exposed areas (see Section 3.6.2 for mitigation measures that address importation of water to the Project works area).

3.6.2 Importation of water to the Project works area

Water that may be used on site to suppress dust may contain spores of *Batrachochytrium dendrobatidis* (Chytrid fungus). It is important that any off-site water used in dust suppression has been chlorine-treated as it will be less likely to contain Chytrid spores. Mains water could be used for dust suppression as it is chlorine-treated. The Dust Management Plan (DMP) in the CEMP would outline that chlorine-treated water (town-water) could be used for dust suppression.

Water imported to the Project works area from other water bodies within the Project area could potentially contain juvenile Plague Minnows (*Gambusia holbrooki*). The Plague Minnow predates on GGBF tadpoles and is listed as a Key Threatening Process under the TSC Act. Several waterbodies sighted in the Project area (Flinders Road and the eastern culvert between Warra Warra Road and BTU Road) were observed to contain high densities of Plague Minnows.

Water would not be used on site unless it has been demonstrated to be fish-free. If water is sourced from open water bodies within the Project area, it must be screened through 600 micron mesh before being used.

3.6.3 Discharging water from sediment basins

Sediment laden water that may be discharged from construction sediment basins has the potential to contaminate GGBF habitat. The Erosion and Sediment Control Plan would be reviewed by the Project Ecologist / Herpetologist to ensure it is consistent with the objectives of this GGBF Management Plan. Water from construction basins would meet the Environmental Pollution Licence requirements and would be either re-used on site for dust suppression or would be discharged off site.

3.6.4 Importation of landscaping materials to the Project works area

Soil, mulch, tubestock and landscaping materials may contain spores of *Batrachochytrium dendrobatidis* (Chytrid fungus). The *'Infection of frogs by amphibian Chytrid fungus causing the disease Chytridiomycosis'* is listed as a Key Threatening Process under the TSC and EPBC Acts.

In accordance with *EPBC Act Policy Statement 3.19 Significant impact guidelines for the vulnerable Green and Golden Bell Frog (Litoria aurea)* a Hygiene Protocol would be developed and implemented for the Project. The Hygiene Protocol (refer Table 1) in the CEMP would include best practice hygiene management measures for site landscaping materials. Site landscaping materials would be sourced from a supplier that is certified to be disease-free.

3.6.5 Use of herbicides

The use of herbicides should be avoided around aquatic habitats and in the vicinity of potential GGBF habitat within the Project area. Where herbicides are to be used on other areas within the Project area, ensure spray drift cannot reach aquatic habitats and potential GGBF habitat. Ensure surface sprays cannot enter aquatic habitats and potential GGBF habitat (eg Nowra Creek and Worrigee Nature Reserve) in solution via surface water run-off.

3.7 Reporting procedures

The NSW Office of Environment and Heritage (OEH) must be informed on the number, sex and age of all frogs found and removed from each disturbed area and relocated. The Project Ecologist / Herpetologist is to supply a post-construction report which fulfils these requirements to the OEH and RTA Project Manager.

3.8 Additional Recommendations

Additional recommendations for the Project that are consistent with the objectives of this GGBF Construction Management plan include:

- The site Environmental Representative (ER) would be on site during the removal of potential GGBF sheltering/overwintering habitat (eg large boulders, culvert pipes, concrete rubble and pond mud) to capture any GGBFs and immediately notify the Project Ecologist / Herpetologist.

- The Project Ecologist / Herpetologist would be on call to assist with the relocation procedure for any GGBFs found during construction.

- Clearing and grubbing works are to be timed when GGBFs are at their most active (September to April), and can move away from potential disturbances in accordance with *EPBC Act Policy Statement 3.19 Significant impact guidelines for the vulnerable Green and Golden Bell Frog (Litoria aurea).* If clearing and grubbing works are scheduled to be undertaken outside the activity period for GGBFs, the Project Ecologist / Herpetologist and/or RTA Environment Branch must be consulted as additional mitigation measures (eg pre-clearing surveys) would need to be implemented.

- A provision of funding to OEH (up to $3500) to update *The Management Plan for the Green and Golden Bell Frog Population within the Crookhaven River Floodplain.*

4 References

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To: John Speight, LandScope Environmental Consultants

CC: Shaun Walsh, Senior Project Manager
Graham Roche, RTA Senior Environmental Officer

Subject: Green and Golden Bell Frog – South Nowra – Princes Highway

Date: 25 August 2011

MEMO

An inspection of the site where the Green and Golden Bell Frog (*Litoria aurea*) was observed by NSW Roads and Traffic Authority (RTA) staff previously was undertaken in your company on 15 August 2011. The inspection was undertaken during a period of relatively clear skies, light breezes and warm weather (~17) and lasted for approximately 1 hour (11.00am – 12.00am). During the site inspection, the area where the Green and Golden Bell Frog was recorded seven days earlier by members of the RTA was hand searched. During this time one Green and Golden Bell Frog was observed.

A second inspection was carried out on the 18 August. This survey included both diurnal and nocturnal inspections, these lasting for around 30 minutes per investigation. The weather conditions experienced were overcast skies, a southerly breeze (that dropped off around 17.00hours) and temperatures that were around 15 degrees. Hand searches were again undertaken during the diurnal survey, whilst a hand help spotlight was used to investigate the site during the nocturnal study. When conducting the spot lite searches, the entire length of the brick wall was investigated. The second investigation was undertaken after a period of moderate rainfall.

In addition to surveying the site where the Bell Frog was recorded, in conjunction with another amphibian study that is being undertaken within the South Nowra area, three other known or potential Bell Frog sites were surveyed during the evening of the 18 August, these being Nowra Creek (where it flows under Central Avenue – 800m north west of the survey site), Browns Creek (at its intersection with Western Road – 750m south east) and a wetland that is present to the north west of the BTU Road – Princes Highway intersection (2.4km south). During this survey, no Bell Frogs were observed, heard calling or responded when characteristic calls of this species were broadcast.

The area where the Green and Golden Bell Frog was recorded is approximately 3 metres (m) long by 30 centimetres (cm) wide and occurs at the base of a brick wall (refer to Attachment 1). The brick wall is a component of the nearby brick works site. The site is vegetated by a high density layer of Blady Grass (*Imperata cylindrica*) and the occasional exotic weed such as Crofton Weed (*Ageratina adenophora*). Plumbing associated with a water main is present along this portion of the brick wall.

When inspected on the 15th, the area investigated was damp whilst the remainder of the site was dry. Due to the influence of rainfall experienced during the two surveys, the site was quit wet underfoot on the 18th, a thin sheet of water extending for a distance of 9m eastward from the base of the brick wall.

Due to the recent establishment of new water mains at this site, the movement of construction vehicles have produced ruts in the soft, clay based soils. Within these ruts, pools of water have accumulate (refer to photographic record). This area is vegetated by a suite of exotic grasses, the pools of water being no greater than 5cm deep. Given their location and character, the pools are considered to be ephemeral.

Hand searches of the pools conducted during each survey did not identify any tadpoles or frog spawn.

As mentioned, only one Green and Golden Bell Frog was found during the hand searches conducted on the 15th of August. Based on the size of this individual (approximately 40 millimetres), it was considered to be a sub-adult.

During the investigation undertaken on the 18th, no Green and Golden Bell Frogs were found during either the diurnal or nocturnal surveys. Similarly, none were heard calling.

The Green and Golden Bell Frog is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) and Endangered under the NSW *Threatened Species Conservation Act 1995* (*TSC Act*). This species mainly occurs along the coastal lowland areas of eastern NSW and Victoria (Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] 2011a). The distribution of the Green and Golden Bell Frog is broadly from Yuraygir National Park (NP) near Grafton on the North Coast of NSW (White and Pyke 2008) through to Lake Wellington, just west of Lakes Entrance, in south-eastern Victoria (Gillespie 1996). Within this area this carnivorous species is known to inhabit a variety of environments, including disturbed sites, ephemeral ponds, wetlands, marshes, dams and stream-sides, particularly those that contain one or more of the following aquatic plants: bullrush (*Typha* spp.), spikerush (*Eleocharis* spp.), *Juncus kraussii*, *Schoenoplectus litoralis* and *Sporobolus virginicus* (Office of Environment and Heritage [OEH] 2011a, DSEWPC 2011a).

The Green and Golden Bell Frog requires various habitats for different aspects of their life cycle, including features that meet their foraging, breeding, over-wintering and dispersal needs (DSEWPC 2011a). This amphibian will also use different habitats or habitat components on a temporal or seasonal basis (DSEWPC 2011b). Work done on this species (Pyke *et al*. 2002) identified the breeding habitat in NSW for the Green and Golden Bell Frog includes water bodies that are:

- Smaller than 1000m²;
- Shallow, less than a metre deep;
- Still;
- Ephemeral (temporary);
- Unpolluted (but the frog can be found in polluted habitats);
- Unshaded;
- Low in salinity (fewer than 7.3 parts per thousand);
- Support aquatic plants;
- Free of Mosquito Fish (*Gambusia holbrooki*) and other predatory fish;
- Support terrestrial habitats that consisted of grassy areas and vegetation no higher than woodlands; and
- Support a range of diurnal shelter sites.

The Green and Golden Bell Frog is known to breed from late winter through to early autumn, but generally during September–February with a peak around January–February after heavy rain or storms (Daly 1995, White 2001). Eggs hatch within 2–5 days after ovipositing/fertilisation (Anstis 2002), and metamorphosis can take 2–11 months (Anstis 2002, Daly 1995, Pyke and White 2001) however, six weeks appears to be an average duration in the field (DSEWPC 2011b).

In regards to the over-wintering requirements of this species, long thick grass would be used, particularly by morphlings (Van de Mortel and Goldingay 1998).

Various studies have revealed that the Green and Golden Bell Frog is capable of moving long distances in a single day/night with distances of between 1 kilometre (km) and 3km being recorded (Pyke and White 2001). Other observations suggest movements of up to 5km may be common, and the frog may possibly disperse as far as 10km (White and Pyke 2008).

Based on the descriptions provided above, the area where the Green and Golden Bell Frog was recorded is not considered to be prime breeding habitat for this species.

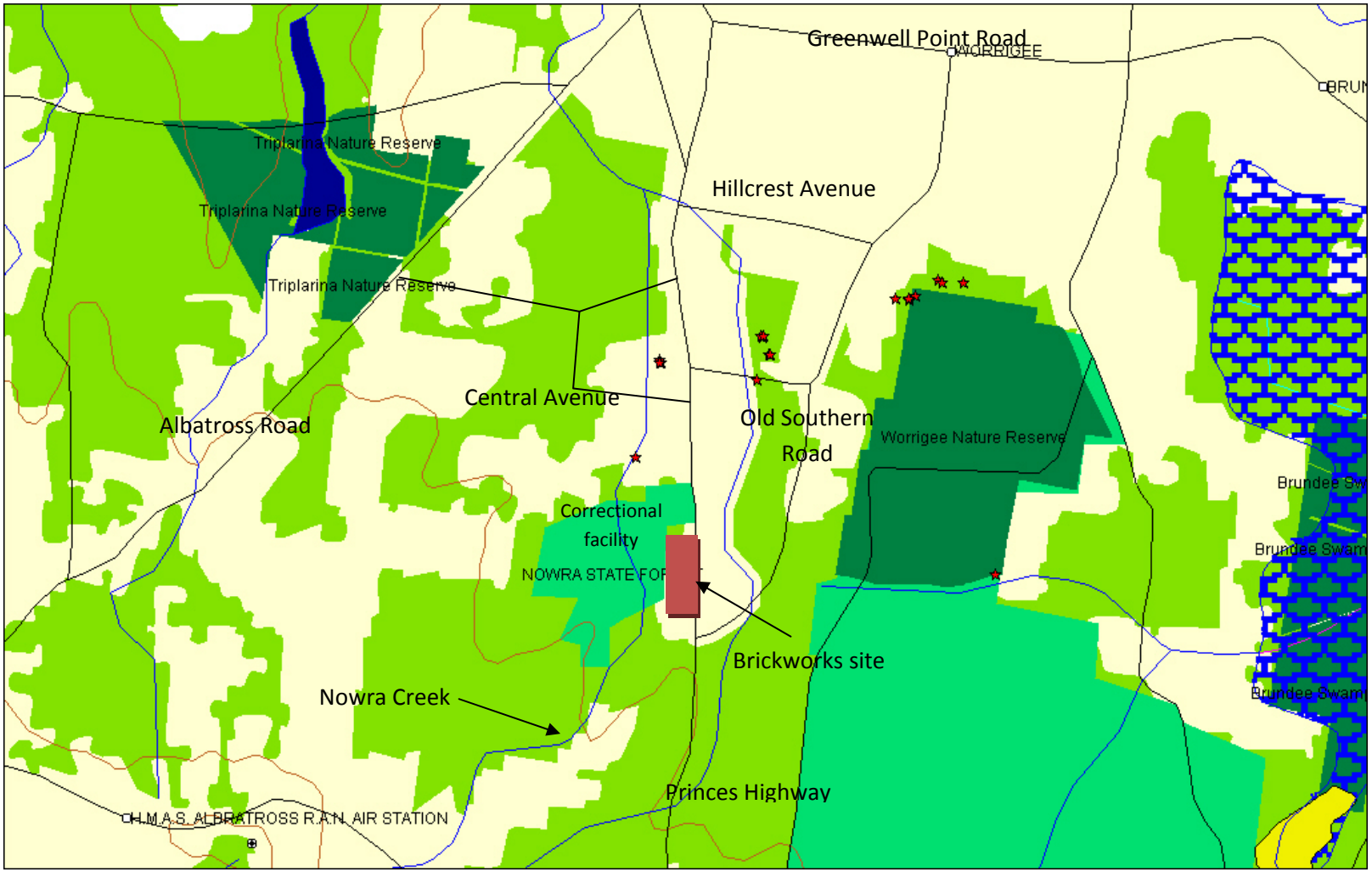
The density of the grass present, or the lack of this, would also negate its over-wintering value. Few insects were observed within the site during either inspection, and the disturbance and maintenance of the adjacent exotic grassland, would limit the foraging opportunities available.

Given its limited habitat value, and the time of year, the site is only considered to be occupied on a temporal basis by a dispersing individual(s). This assumption is supported by the finding of the survey undertaken on the 18 August when no individuals were found. The frog detected is considered to have dispersed from a more suitable site, such as Nowra Creek and its associated flood plain. As noted above, the Green and Golden Bell Frog breeds from September onwards, the combination of this timing and the warm weather (average of 20 degrees for the last 15 days) that followed a wet period is expected to have triggered this individual to disperse and seek a mate. The individual present is considered to have dispersed from one of the water bodies to the west and occupied its detection site as this is damp and offers some sheltering opportunities. Immediately north, south and east of the detection site, limited vegetation is present, the only sheltering opportunities being offered by the site where the frog was recorded (refer to the Attachment 1).

Discussions held with Mr John Green, Manager of the adjacent brick works site, and the ecological consultant engaged in monitoring that site, Mr Garry Daly, on the 19th of August identified that no Green and Golden Bell Frogs are known to be present within that site. Mr Green noted that no Bell Frogs have been recorded within that property during the course of any ecological surveys undertaken.

Consultation of the OEH Atlas of NSW Wildlife identified surrounding sites where Green and Golden Bell Frogs have been recorded (OEH 2011b) (Figure 1). Three records are present to the north, these being associated with Nowra Creek (Figure 1). A review of aerial photography that encompasses the South Nowra area indicates that this creek line is present between the brick works site and nearby correctional facility, this flowing in a northerly direction. Nowra Creek is only 300m west of the site where the Bell Frog was found, a distance that could be easily traversed by this species.

A table drain has been construction approximately 150m north of the brickworks site. This drain is approximately 2m wide and is vegetated by a combination of exotic grasses and weeds, and occurrences of the aquatic sedge *Cyperus* sp. Depending on the influence of past disturbances, the vegetation is either limited or of a high density.



Not to scale. Source: OEH (2011b)

Figure 1: Green and Golden Bell Frog Atlas records.

The table drain collects runoff generated on the highway and channels it westward to into Nowra Creek. At the time of the field survey, this drain was flowing.

Discussions held with both Michael Smith, Shoalhaven City Council's Environmental Officer on the 9th of August and the National Parks and Wildlife Service's Nowra Area Manager Mr Greg Tedder on the 15th identified that the Green and Golden Bell Frog is currently experiencing a rise in population numbers in the South Nowra region, with Bell Frogs being recorded at Worrigee, on Nowra Hill and to the rear of the commercial developments that are present north of Central Avenue. Subsequent to the breaking of the recent drought, the Bell Frog currently appears to be "common" throughout the surrounding flood plain area in association with those drainage lines present.

In the surrounding locality, the main habitat where the Key Population of this species is present is within Brundee Swamp Nature Reserve, this being present 4km east of the Princes Highway (Figure 1). A plan of management has been prepared for this Key Population (Department of Environment and Climate Change 2007a). Whilst populations are known to be present in this area, the proximity of the Princes Highway, and the traffic volumes that traverse this road, would negate any east – west movements of this animal. The current character of the Princes Highway, combined with the industrial/commercial character of the surrounding developments, is considered to have fragmented and isolated those Green and Golden Bell Frog populations that occur to the east and west of this road. The presence of the Princes Highway is considered to substantially reduce any interbreeding of those populations that are known to occur to the east and west. Given the adverse influence of the current situation, though physically widening the gap, the upgrading and widening of this highway would not further fragment or isolate those populations present.

The proposed works associated with the upgrading of the Princes Highway would not have a direct impact on the location where the Green and Golden Bell Frog was recorded. The road upgrading would not require the area to be further disturbed or cleared. Similarly it would not have a direct impact on the nearby Nowra Creek. The highway upgrade would not further fragment any habitat areas currently available to this species. As noted, the existing character of this location is already expected to prevent any eastward movements.

To further consider the impacts of the proposed road works on this species, an assessment drawing on the criteria provided under both the *EPBC Act* for a Vulnerable species (Significant Impact Guidelines) and Section 5A of the NSW *Environmental Planning and Assessment Act 1979* (these commonly referred to as the seven part test) has been undertaken (Attachment 2).

The outcomes of these assessments concluded that the Green and Golden Bell Frog would not be significantly affected by the proposed road works. The undertaking of further studies, or the referral of the matter to the Federal Minister for Sustainability, Environment, Water, Population and Communities for further consideration and approval, was not recommended.

Indirect impacts may arise due to site disturbance. Adoption of the recommendations presented below would ensure that no indirect impacts arise.

To avoid disturbing the area where the Green and Golden Bell Frog was detected, and to maintain habitat connectivity, the following measures are recommended.

1) Frog exclusion fencing ("fencing") should be erected between the existing brick building and the proposed road works.
2) The fencing should be placed at a distance of around 1m to 1.5m off the brick wall.
3) The lower edge of the fencing should be buried into the ground, at a depth 5 centimetres or great.
4) The fence should extend from the northern entrance gate of the brick works through to the southern gate.
5) The northern and southern ends of the fencing should be tapered to encourage any dispersing Green and Golden Bell Frogs to enter the adjacent brick pit site (Figure 2).

Not to scale. Source: NearMaps (2011)

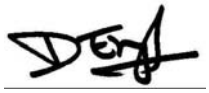
Figure 2: Recommended fencing layout.

6) If still present (i.e. not dried up), at the time of the fence's establishment, a check for tadpoles or frog spawn should be undertaken within those pools present. Though highly unlikely given the ephemeral nature of the pools and their shallow depth, if present tadpoles and/or spawn should be collected and relocated locally to a known Bell Frog site (e.g. Brundee Swamp Nature Reserve).
7) The fencing should not be removed until the road construction works have been completed.
8) The area encompassed within the fencing should not be mown or slashed.
9) Vehicles and personnel should not be permitted to enter the fenced off area.
10) The fenced off area should be highlighted both on site and on the construction plans as a "No Go Zone".
11) The fenced off area should be included in any ongoing environmental monitoring undertaken during the course of the project. The monitoring should focus on ensuring the fencing is in place and is effective.

12) Should any culverts under the highway be included in the road's design, several of these should be designed to permit the movement of Green and Golden Bell Frogs. Discussions should be held with a suitably qualified ecologist to ensure that several of the culverts would permit the unobstructed movement of this, and other ground traversing, native animals. Green and Golden Bell Frogs are known to utilise road underpasses (Department of Environment and Climate Change 2007, Department of Environment and Climate Change 2008).

If you require any further information on this matter please contact the under signed on (02) 9523 2016, 0408 25 8129 or (fax) 02 9544 1835

Yours sincerely,



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Attachment 1: Photographic record.

Plate 1: Looking south along the existing brickyard wall.

Plate 2: Vegetation in which the Green and Golden Bell Frog was recorded.

Attachment 2: Ecological assessments – Green and Golden Bell Frog (*Litoria aurea*).

With reference to the *EPBC Act* Significant Impact Guidelines that are relevant to a Vulnerable species, an action is likely to have a significant impact on a Vulnerable species (i.e. the Green and Golden Bell Frog) if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population*[1] *of a species;*

The proposed road works would not decrease the size of an important population of this species in either the short or long term. The area investigated is not considered to support an important population of Green and Golden Bell Frogs.

- *reduce the area of occupancy of an important population;*

The proposal would not reduce the area of occupancy available to an important population of this species.

- *fragment an existing important population into two or more populations;*

Retention of the vegetation present would ensure that the north – south movement of any dispersing individuals would still be possible. As such, the proposal will not fragment an existing population into two or more populations.

East-west movements are already fragmented due to the character of the highway. Though increasing gap widths, the proposed road works would not alter this situation.

- *adversely affect habitat critical to the survival of a species*;

No habitat critical to the survival of this species is considered to be present.

- *disrupt the breeding cycle of an important population*;

No habitat important to the breeding cycle of this species was detected.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*;

The proposed road works would not have a direct impact on the area in which the Green and Golden Bell Frog was recorded. Adoption of those mitigation measures proposed would ensure that the road works would not modify, clear, remove, isolate or decrease any areas of this species' habitat to the extent that it is likely to decline.

[1] An important population is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans and/or that are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintain genetic diversity; and/or
- Populations that are near the limit of the species range.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*;

The area is regularly maintained and currently supports exotic plants. The proposed road works would not further contribute to this situation or the establishment of any species that are harmful to the Green and Golden Bell Frog.

- *introduce disease that may cause the species to decline*;

The proposal is unlikely to introduce diseases that may cause the Green and Golden Bell Frog to decline.

- *or interfere substantially with the recovery of the species*.

Given the scope and extent of the proposed action, it is considered that the proposed action would not interfere with the recovery of this species.

Conclusion.

The proposed road works would not have a direct impact on the area where the Green and Golden Bell Frog was recorded. Indirect impacts may arise, though the adoption of those mitigation measures proposed are considered to negate these. As such, it is not considered that the proposed road works would have a significant impact on the Green and Golden Bell Frog. Therefore, it is considered unnecessary that the matter be referred to the Federal Minister for Sustainability, Environment, Water, Population and Communities for further consideration and approval.

State - *Environmental Planning and Assessment Act 1979*.

An assessment using the criteria provided under Section 5A of the *Environmental Planning and Assessment Act 1979* has been undertaken to determine whether the proposed road works would have an adverse impact on the Green and Golden Bell Frog. The Section 5A assessment criteria are used to determine "whether there is likely to be a significant effect on these species, their populations, ecological communities or habitats", and consequently whether a Species Impact Statement is required.

(a) *"…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…"*

Only one Green and Golden Bell Frog was recorded within the area investigated. This, combined with the limited quality of the habitat present, is not considered to constitute a local population. Adoption of those mitigation measures proposed would ensure that the site where this species was recorded, and its movement "corridor", are retained. As such, the proposed road works are not considered to have an adverse effect on the life cycle of this species such that its population is likely to be placed at risk of extinction.

(b) *"…in the case of an endangered population, whether the action proposed is likely to have 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…",*

An endangered population is defined under the *TSC Act* as 'a population specified in Part 2 of Schedule 1'. At the present time, there are no endangered populations of this species listed under the *Act*. As such, the proposal would not be significantly compromising an endangered population.

(c) *"…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

1) 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
2) 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..."

Not applicable to a threatened species.

(d) *"…in relation to the habitat of a threatened species, population or ecological community:*

1) "… the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

The proposed road works would not have a direct impact on the site where the Green and Golden Bell Frog was recorded.

2) "… 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

Adoption of those mitigation measures proposed would ensure that no areas of habitat suitable for the Green and Golden Bell Frog become further isolated or fragmented.

3) "…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…"

Given its limited size and degraded nature, the site where the Green and Golden Bell Frog was located is not considered to be important for the long-term survival of this species in this locality.

(e) *"…whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)…"*

No critical habitat will be adversely affected by the proposed development. The study area is not listed as critical habitat under Part 3 Division 1 of the *TSC Act*.

(f) *"… whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan…",*

The OEH is in the process of preparing a recovery plan for this species (Department of Environment and Conservation 2005), the broad objectives of this plan that are relevant to the current investigation would be:

- The securing of Green and Golden Bell Frog populations by increasing the protection of their habitat areas and preventing the further loss of this species across its range;
- Ensuring extant Green and Golden Bell Frog populations are managed to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species; and
- The implementation of habitat management initiatives that are informed by data obtained through investigations into the general biology and ecology of the Green and Golden Bell Frog through a systematic and coordinated monitoring program.

Adoption of the recommendations proposed would ensure consistency with the objectives and actions of this species recovery plan.

(g) *"… 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…".*

Currently 31 Key Threatening Processes for mainland NSW are listed under Schedule 3 of the *TSC Act*, none of which would be applicable to the current proposal. The proposed road works would not have a direct impact on the site this species was located. Similarly, with the adoption of those mitigation measures proposed, no indirect impacts are likely to arise. The proposed road works would therefore not be considered to constitute a key threatening process.

Conclusion.

The Green and Golden Bell Frog individual, and the site where it was recorded, would not be directly disturbed by the proposed road works. The proposed road works would not require the clearing or modification of any portions of the habitat in which this individual was located. Indirect impacts may arise, such as site access by machinery and personnel. Adoption of those mitigation measures proposed would negate the influence of these. Therefore, the undertaking of the proposed road works is not considered to have a significant impact on the Green and Golden Bell Frog.