



## **Xstrata Tahmoor Colliery**

# **EXPLORATION BOREHOLE - TNG01 REVIEW OF ENVIRONMENTAL FACTORS**

**FOR THE NSW DEPARTMENT OF INDUSTRY AND INVESTMENT**

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Cover Photo: Location of TNG01. Niche Environment and Heritage ©

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## 1 CONTACT INFORMATION AND DECLARATION

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Tahmoor Colliery holds Mining Lease 1376. A single borehole is proposed to determine coal quality and gas content of the Bulli Seam in accordance with the provisions of this Mining Lease. This Review of Environmental Factors (REF) has been prepared in accordance with “Guidelines for Review of Environmental Factors” NSW Department of Industry and Investment Publication ESB 18. The REF has been prepared under Part 5 of the *Environmental Planning and Assessment Act 1979*.

### 1.1 Declaration

The information contained in this document is neither false nor misleading. The REF contains all information relevant to the environmental impact assessment for the development of a single exploration borehole within the Mining Lease 1376.



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## 2 INTRODUCTION

Tahmoor Coal Pty Ltd (Tahmoor Colliery) is seeking approval to undertake Category 2 exploration and geotechnical investigations within its Mining Lease (ML) 1376. A single borehole is proposed within a private property in Thirlmere, NSW.

This Review of Environmental Factors (REF) is submitted to the NSW Department of Industry and Investment (DII) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to satisfy the conditions of ML 1376. This REF assesses the environmental aspects of the proposed exploration drilling program and has been prepared generally in accordance with “Guidelines for Review of Environmental Factors” DII Publication ESB 18.

### 2.1 Locality

The proposed borehole (TNG01) is located on private property in Rita Street, Thirlmere NSW. The borehole is located within the Wollondilly Local Government Area. Figure 1 shows the location of the borehole. TNG01 is located on cleared, flat, rural-residential land and will not impact native vegetation. Location details are provided in Table 2.1 and Table 2.2.

Table 2.1

Borehole	Easting (MGA)	Northing (MGA)	Lot	DP	ML
TNG01	277014	6212474	6	245153	1376

The borehole is not located on land that is:

- An area reserved or dedicated under *the National Parks and Wildlife Act 1974*;
- Land reserved or dedicated with the meaning of the *Crown Lands Act 1989* for preservation or other environmental protection purposes;
- A World Heritage Area;
- Environmental Protection Zones within environmental planning instruments;
- Lands protected under SEPP 14 - Coastal Wetlands;
- Lands protected under SEPP 26 - Littoral Rainforest;
- Land identified as wilderness under the *Wilderness Act 1987* or declared as wilderness;
- Under the *National Parks and wildlife Act 1974*;
- Aquatic Reserves dedicated under the *Fisheries Management Act 1994*;
- Wetland Areas dedicated under the *Fisheries Management Act 1974*;
- Land identified as State Forest under the *Forestry Act 1916*;
- Western Lands Release, or;

- Crown Land.

## 2.2 Description of the Activity

A single borehole will be developed for this program to determine geological conditions and gas composition of the future workings. Borehole development will involve three stages which are described below.

### Site Setup

Access to the site will be from Rita Road, along the existing residential access road and then across a paddock to the site (Diagram 1 and Plate 1).

Site setup will involve the development of a site approximately 40 x 40 m (0.16 ha) in size. The site will be fenced to prevent unauthorised access and screened to obscure the view of surrounding landholders to the actual work area.

The borehole site will include development of two water sumps (approximately 4 x 4 x 2 m) with the soil excavated from these sumps to be used to develop water diversion bunds around the site and also used as fill to develop a level drill pad. Erosion and silt fencing will be erected around the site to prevent any dirty water runoff.

N.B. McDermott's Drilling (now Lucas Drilling) have previously supplied Tahmoor Colliery with a typical site setup diagram. That diagram has been widely circulated in the industry and has been reproduced below to illustrate the borehole site layout (Diagram 1).

### Drilling

Drilling equipment including a truck mounted drill rig, rod truck, core boxes, pumps and compressors and ancillary equipment will be delivered to site upon commissioning.

Drilling will be undertaken over approximately 14 days. A further five days has been included in the program prior to and post drilling for site set up and pack up.

Drilling will be to a depth of approximately 350-380 m. The base of the Bulgo Sandstone is the target depth. Geological and geochemical samples (mainly gas composition) will be taken from the borehole to test for coal and gas quality.

### Decommissioning

Decommissioning the site will involve the complete removal of all equipment and fencing, the reinstatement of the sumps and rehabilitation of the paddock with grasses which are acceptable to the landholder. Given the nature of the site the aim of the rehabilitation will be to return the paddock to its original contoured form which has a good cover of grasses. Silt fencing will remain in place until the

risks of erosion have been reduced to negligible by the onsite rehabilitation or until such time as the landowner is satisfied with the integrity of the site.

The cored hole will be sealed and capped to the standards of the DII (Borehole Sealing Requirements on Land - EDG01). It is possible that the hole may remain 'open' for future potential uses although any other use of the borehole other than identified in this REF will be subject to further approvals through the relevant State or Commonwealth departments and will be contingent upon reaching further landholder agreement. Should the hole remain open it will be capped and secured to the appropriate standards.

### **2.3 Timing and Hours of Operation**

Site development for the borehole will commence in mid to late May 2010 with drilling equipment commencing drilling in early June 2010.

Site set up will take approximately one week. Drilling duration will be approximately two weeks. Site decommission and rehabilitation will take a further week.

It should be noted that ongoing rehabilitation monitoring of the site will continue for six months following the completion of the project to ensure rehabilitation of the site (including good regeneration of grass cover) is successful.

Hours of operation will be 7.00am to 5.00pm Monday to Friday for the duration of the project.

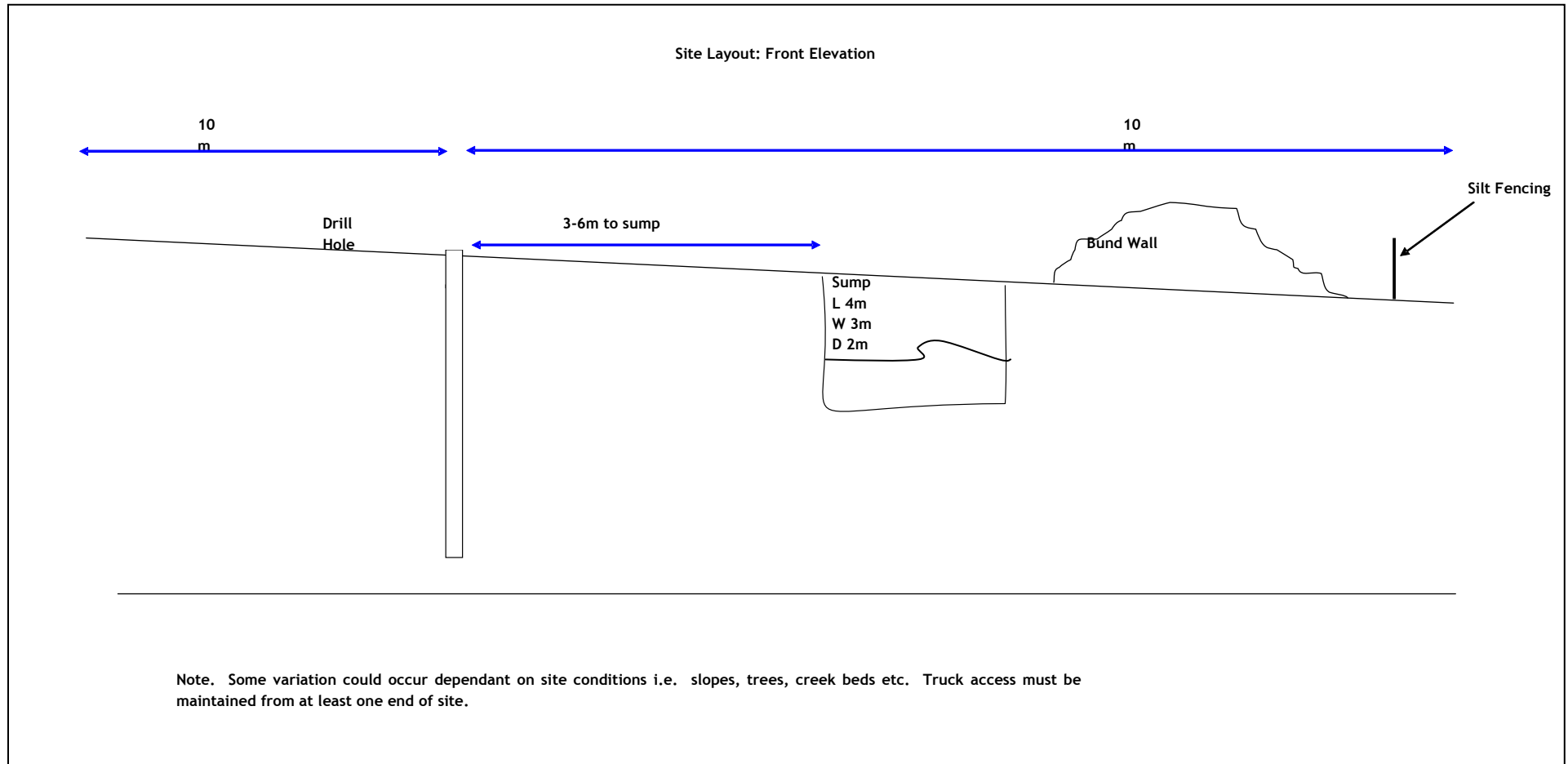
### **2.4 Justification of the Activity**

Collection of geological and geochemical data from target coal seams and other stratigraphic units within a mining domain can only be reliably achieved through down hole core drilling.

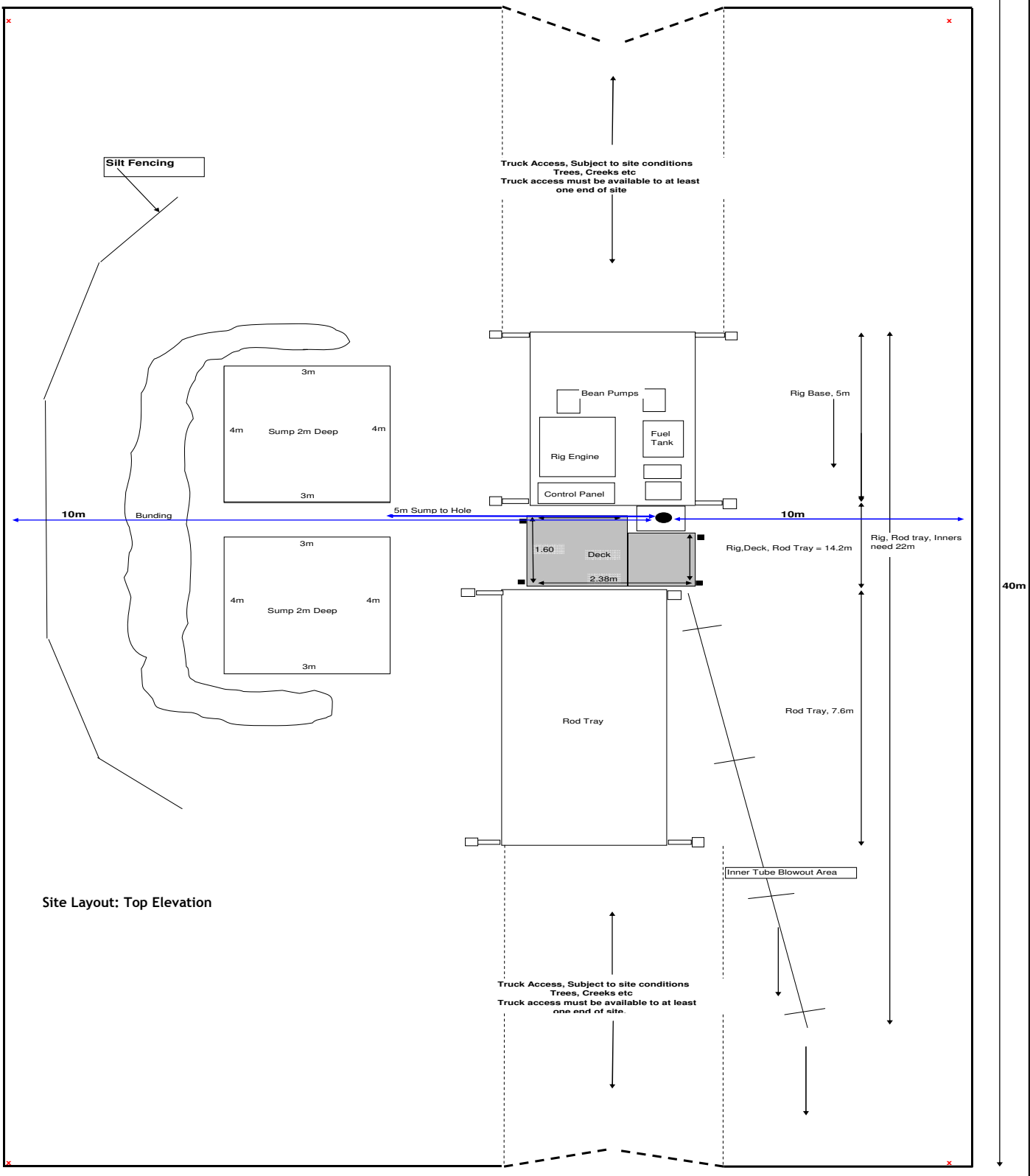
### **2.5 Evaluation of Alternatives**

There are no practical alternatives to the proposed borehole development that can accurately deliver the required information in the timeframe available.

**Diagram 1: Typical Site Layout - Source McDermott's Drilling (now Lucas Drilling)**



Site Layout for Exploration Core Rig  
20m



Site Layout: Top Elevation

**Plate 1: Location of borehole site - TNG01 and access to the site**



**Borehole site - TNG01**

**Existing access track to site**

**Table 2.2: Borehole TNG01 - Location and Environmental Constraints Table**

Borehole	Location and Access	Environmental Issues	Cultural Heritage Issues	Controls and Safeguards Specific to the site*
TNG01	<p>Location: on private property off Rita Road, Thirlmere, NSW.</p> <p>Access to the site will be via Rita Road. Once on the property, vehicles will utilise the existing driveway and then be driven over a cleared paddock to access the borehole site.</p> <p>A written agreement with the landowner has been entered into and can be provided to DII if required. All other nearby landowners will be consulted prior to the boreholes development.</p>	<p>The borehole site is located in a cleared paddock which does not retain any native vegetation or fauna habitats.</p> <p>Threatened flora and fauna are highly unlikely to use this site.</p> <p>Water for use in the drilling process will be delivered to site via a water cart. Water will not be extracted from local farm dams.</p>	<p>There are no archaeological issues associated with the site.</p> <p>The borehole is not located near any known archaeological site.</p>	<p>Sediment and erosion controls will be important at this site to prevent sediment deposition in nearby drainage lines.</p>

\*Common Safeguards that will be employed at the site include the following:

- Prior to site preparation and before any vehicle access private property, all vehicles will be washed down to remove any soil, mud or vegetative material which has the potential to spread pathogens and weed seed.
- During site preparation - the site will be confined to a footprint of approximately 40 x 40 m. The site will be fenced to exclude all unauthorised access. All access to the site will be via existing roads or across cleared paddocks.
- Sediment and erosion controls will be employed at the site to direct overland flows around the site and to prevent the escape of sediment laden waters from the site. In particular, the site will employ filter cloth and possibly use of bails of hay to screen any water leaving the site in order to prevent sediments being deposited in native vegetation.
- At decommissioning all drill sumps will be filled in. Topsoil stockpiled during site preparation will be spread over the site to aid in rehabilitation. The landowner will be consulted and if required a commercially available pasture grass seed mix will be applied to the site.

## 3 PLANNING CONTEXT

Approval to develop the current borehole is being sought under Part 5 of the EP&A Act. Other relevant legislation and licensing requirements are discussed below.

### 3.1 Licenses and Approvals Required

Tahmoor Colliery holds Mining Lease 1376. Borehole TNG01 will be developed in accordance with the conditions of this lease.

### 3.2 Zoning and Local Planning Instruments

The property on which Borehole TNG01 is located occurs within the Wollondilly Shire Local Government Area. The land is zoned RU4 - Rural Small Holdings in the Wollondilly Local Environmental Plan (LEP). The objectives of that land zoning are identified in Table 3.1.

The proposed borehole will result in a localised short term environmental change that is not in conflict with the objectives identified by Wollondilly Shire Council for the land zoned RU4.

**Table 3.1: Zoning and Permissible Land Use of the Borehole Site**

Borehole	Zoning	Title	Objectives
TNG01	RU4	Rural Small Holdings	<ul style="list-style-type: none"> <li><input type="checkbox"/> To enable sustainable primary industry and other compatible land uses.</li> <li><input type="checkbox"/> To maintain the rural and scenic character of the land.</li> <li><input type="checkbox"/> To ensure that development does not unreasonably increase the demand for public services or public facilities.</li> <li><input type="checkbox"/> To minimise conflict between land uses within the zone and land uses within adjoining zones.</li> <li><input type="checkbox"/> To minimise the impact of noxious environmental weeds.</li> <li><input type="checkbox"/> To maintain existing significant stands of native vegetation and wildlife corridors.</li> <li><input type="checkbox"/> To protect and enhance the water quality of receiving watercourses and groundwater systems and to reduce land degradation.</li> </ul>

### 3.3 Regional Environmental Plans (REP)

There are no REP's that apply to the proposed activities.

### 3.4 NSW State Legislation

Several key State level legislative instruments have been considered briefly below.

#### 3.4.1 Environmental Planning and Assessment Act (EP&A) 1979

This REF is being prepared in accordance with Part 5 of the EP&A Act. The NSW DII is the relevant determining authority for this proposal. An assessment of the proposal to impact threatened species, populations and ecological communities listed on the *Threatened Species Conservation Act 1995* (TSC Act) as required under Part 5a of the EP&A Act is provided in Attachment A.

Clause 111 of the EP&A Act outlines the primary considerations for any determining authority when determining an application under Part 5 of the EP&A Act. Those matters are outlined below. The proposal to develop Borehole TNG01 is in accordance with the EP&A Act.

EP&A Act	Project Compliance
To the fullest extent possible, all matters affecting or likely to affect the environment due to the proposed activity.	This REF addresses relevant environmental matters relating to the proposal to drill Borehole TNG01. The proposal will have a negligible environmental impact.
Any conservation agreement entered into or any plan of management under the <i>National Parks and Wildlife Act 1974</i> applying to any part of the land on which the activity relates.	The property on which the borehole is located is not subject to any agreement under the NPW Act.
Any joint management agreement entered into under the <i>Threatened Species Conservation Act 1995</i> .	The property on which the borehole is located is not subject to any agreement under the TSC Act.
Any BioBanking agreement entered into under Part 7A of the <i>Threatened Species Conservation Act 1995</i> that applies to any part of the land to which the activity relates.	The property on which the borehole is located is not subject to any BioBanking agreement.
The effect of an activity on any wilderness area in the locality in which the activity is intended to be carried on.	The proposal will not affect any wilderness areas.
Critical habitat, threatened species or populations and ecological communities and any other protected fauna or protected native plants within the meaning of the <i>National Parks and Wildlife Act 1974</i> .	The proposal will not impact any critical habitat, threatened species, populations of ecological communities within the meaning of the NPW Act.

### 3.4.2 Mining Act 1992

In NSW the activities of mining companies are regulated by the Mining Act.

Approval for the proposed development of Borehole TNG01 is required under the Mining Act.

Tahmoor Colliery holds Mining Lease 1376 under which this borehole will be developed.

A surface disturbance notice has been prepared and accompanies this REF.

### 3.4.3 Protection of the Environment Operation Act (POEO) 1997

The POEO Act permits Environmental Protection Licences (EPL) to be granted for activities that will result in air, water or noise pollution and also for waste management.

In relation to these matters:

- Air pollution will be negligible and can only emanate from machinery and equipment used for the project. These emissions are in keeping with normal vehicle use and will not contribute significantly to poor air quality in the vicinity of the borehole.
- The project will not result in pollution of waterways or natural water bodies. On site water management and removal of dirty water from site will reduce any potential for the proposal to impact local water quality.
- Noise pollution will be minimised through the use of silenced equipment and installation of noise barriers should local residents request it.
- All waste products will be removed from the site and disposed off appropriately.

An EPL is not considered to be necessary.

### 3.4.4 National Parks and Wildlife Act (NPW) 1974

The NP&W Act aims to manage the following:

- The conservation of nature.
- Conservation of objects, places and features of cultural value.
- Public appreciation, understanding and enjoyment of nature and cultural heritage.
- Land reserved under this NP&W Act.

Section 5.13 addresses the conservation of objects, places and features of cultural value. The development of Borehole TNG01 will not impact any of these values.

#### **3.4.5 Threatened Species Conservation Act (TSC) 1995**

The TSC Act lists and protects threatened species, populations, communities and critical habitats in NSW. Section 5.5 of this REF outlined the ecological values of the borehole site and the relationship of those values to the TSC Act.

The proposal to develop Borehole TNG01 will not impact any threatened species, population, community or critical habitat listed on the TSC Act.

#### **3.4.6 Native Vegetation Conservation Act (NV) 2003**

Under the NV Act all native vegetation is protected. The Act aims to manage, improve all native vegetation in NSW and provide protection for areas of high quality and is specifically focussed on the control of native vegetation clearing.

No native vegetation will be impacted by the development of Borehole TNG01. This Act has not been considered further.

#### **3.4.7 Fisheries Management Act (FM) 1995**

The FM Act applies to all waters in NSW and aims to conserve, develop and share the fisheries resources of the state for the benefit of current and future generations.

No creeks, rivers, streams, dams or other waterways will be impacted by the development of Borehole TNG01. This Act has not been considered further.

#### **3.4.8 Water Management Act 1995**

The Water Management Act applies to designated water management catchments in NSW. Specifically the Act seeks to conserve and regulate access to the States water resources and promotes protection of riparian lands and other lands adjacent to waterways.

Borehole TNG01 will not extract water from surface or groundwater systems, nor will it contaminate those systems. Fresh water will be used in the drilling process and will not contaminate groundwater systems. The borehole will be lined to prevent loss of head pressure and this in turn will prevent cross contamination of aquifers if any exist in the vicinity of the borehole. The borehole will not impact riparian or other lands adjacent to waterways. This Act has not been considered further.

## 3.5 State Environmental Planning Policies

### 3.5.1 State Environmental Planning Policy (Mining, Petroleum, Production and Extractive Industry) 2007

The aims of the SEPP are to:

- a) Provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State;
- b) Facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources; and
- c) Establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.

This SEPP also provides conditional approval for certain types of related activities to be undertaken without requiring approval under the EP&A Act.

The proposed development of Borehole TNG01 is not exempt, a complying or prohibited development as defined by this SEPP. Consent is therefore required under the EP&A Act.

Clauses 12 and 13 of the Mining, Petroleum and Extractive Industries SEPP details matters that the consent authority must consider prior to issuing a decision regarding an application under the EP&A Act. These matters are listed and considered against the proposed development in Table 3.2.

Clause 14 of the SEPP details the prerogative of the Determining Authority to issue conditional consent with the specific purpose of ensuring impacts to significant water resources, threatened species and biodiversity are minimised to the greatest extent possible. This Clause also addresses the need to ensure that the proposal minimises green house gas emissions

Clause 15 of the SEPP directs the Determining Authority to consider the efficiency of the proposal with regards to optimising resource recovery.

Clause 16 directs the Determining Authority to consider the impact of the proposal on roads and road users and, if necessary, to provide a conditional approval limiting or regulating certain types of vehicle movements at various times.

Clause 17 directs the Determining Authority to consider the adequacy of the proposed rehabilitation of the development site (see Section 2.2 and Section 6).

**Table 3.2: Requirements of the Mining SEPP**

Requirements of SEPP <sup>1</sup>	This Proposal
<b>Clause 12</b>	
Consideration of existing and approved land use.	The property in which the borehole is situated is Zoned RU4 – Rural Small Holdings under the Wollondilly LEP. The property is a residential property with no apparent co-incident land use (e.g. hobby farm, running cattle or horse agistment). The site of the borehole is within the mown front section of the property.
Consideration of significant impact on uses that are likely to be the preferred use of land in the vicinity of the development.	The development of Borehole TNG01 will have a short term impact to the mown area but will otherwise not impact any other activity on the property. The drilling activities will not have a significant impact on the rural use of the land.
Any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses.	Development of Borehole TNG01 will only have a short term visual impact on the property. Rehabilitation of the property to its current condition will restore all current land uses in a short period of time.
Evaluate and compare the respective public benefits of the development and the land uses referred to above.	The land use will not alter due to the proposed temporary activity.
Evaluate any measures to avoid or minimise incompatibility between proposed activity and existing use.	The landowners are aware of the project and its potential impacts. They have provided written agreement to Tahmoor Colliery for the development of Borehole TNG01.
<b>Clause 13</b>	
Evaluate the impact of the proposal on current and future extraction or recovery of a resource.	The development of Borehole TNG01 will not impact current or future resource recovery.
Compare the respective public benefits of the existing land use and the proposal.	The development of Borehole TNG01 will occur on private land with the landowners written consent.

## 3.6 Commonwealth Legislation

### 3.6.1 Environmental Protection & Biodiversity Conservation Act (EPBC) 1999

The EPBC Act is a commonwealth instrument for the protection of nationally significant natural or cultural values or the regulation of certain activities. These values are known as Matters of National Environmental Significance (MNES) and the regulated activities are known as Controlled Actions and include:

<sup>1</sup> Relevant sub-clauses of the Mining SEPP that may apply to the proposed borehole have been included in this table and addressed accordingly.

1. World Heritage properties
2. National Heritage places
3. Wetlands of international importance
4. Threatened species and ecological communities
5. Migratory species
6. Commonwealth marine or land areas
7. Nuclear actions (including uranium mining).

Borehole TNG01 is not located within a World Heritage site, a National Heritage place, a wetland or a Commonwealth marine or land area.

Section 5.5 of this REF considers potential impacts on habitat for threatened species and ecological communities listed on the EPBC Act. The proposed development of Borehole TNG01 will not impact any MNES.

The exploration activities are not related to nuclear actions or any activity that may lead to extraction associated with nuclear activities.

As the drilling activity will not have any impact on controlled matters or MNES a referral or assessment in relation to the EPBC Act is not considered necessary.

### **3.7 Stakeholder Consultation**

A written agreement with the landowners of the property on which Borehole TNG01 will be developed has been reached. The agreement can be made available to the DII if necessary.

All other residences within 200 m of the borehole collar will be consulted prior to commencement of site activities. Their concerns will be considered and any reasonable requests to minimise local disturbance will be implemented.

Early consultation with the DII (Wollongong) has already been sort to confirm the level of detail required for inclusion in this REF.

## 4 EXISTING ENVIRONMENT

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As indicated in Figure 1 and Plate 1 the site chosen for the proposed Borehole TNG01 is entirely clear of native vegetation and is regularly mown as part of the rural/residential lot.

### 4.1 Landforms and Geology

The proposed borehole site is situated on what Hazelton and Tille (1990:27-30) define as the Blacktown Soil Landscape. Topographically this landscape consists of gently undulating rises situated on Wianamatta Shales. The range of relief is up to 30 m and slopes are generally less than a 5% gradient. Overall the landscape is one of broad rounded crests and ridges with gently inclined slopes. The soils are red and yellow podsols.

The soil at the proposed well site, situated on a lower slope, is hard setting brown clay loam and this was confirmed during the site inspection. The loam is likely to include ironstone and shale fragments. The ground surface consisted of dense, improved pasture.

### 4.2 Climate

Camden Airport weather station is the closest official weather station to the proposed site of Borehole TNG01. The following climate information for that area has been derived from the Bureau of Meteorology ([http://www.bom.gov.au/climate/averages/tables/cw\\_068192\\_All.shtml](http://www.bom.gov.au/climate/averages/tables/cw_068192_All.shtml), accessed 7 May 2010).

The region typically enjoys warm summers with an average maximum temperature of 29.5°C in the hottest month (January) and cool to cold winters with an average minimum temperature of 2.9°C in the coolest month (July). The wettest month in the region is February with an average rainfall of 104.2 mm while the driest month also corresponds with the coldest (July) with an average rainfall of 39.0 mm. The region receives on average 110.8 days of rain annually.

## 5 ENVIRONMENTAL IMPACTS AND MANAGEMENT

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### 5.1 Air and Greenhouse Gas Emissions

Any development has the potential to alter local or regional air quality through dust generation, vehicle movement including exhaust emissions and use of equipment.

Dust generation for the development of Borehole TNG01 will be minimised through the use of existing roads and tracks to access the site and limiting the borehole site footprint to a very small area (40 x 40 m), which will be managed to minimise soil disturbance and will be rehabilitated quickly at the completion of the project. Should the landowners or near neighbours request dust suppression activities (i.e. use of a water cart or similar) it will be employed at the site.

Exhaust emissions will be limited to vehicles and or equipment that are fit for purpose and which utilise well maintained exhaust systems. All vehicles however will result in emissions of greenhouse gasses and an assessment of the greenhouse gas emissions arising from this project is provided below. Greenhouse gas emissions are calculated from the volume of diesel consumption anticipated and based on the Australian Greenhouse Office Factors and Methods Workbook (Dec 2006). Greenhouse gas emissions will be derived from three main sources for this project including excavators, the drill rig and ancillary equipment and the personnel transports to and from the site. Each source has been considered below.

Excavators:

- Excavators consume an estimated 80 L of diesel fuel/day
- 1 day (total) is required for an excavator to develop the site and rehabilitate the site
- Total diesel consumption for excavators: 80L

Drilling Rigs

- Drilling rigs consume approximately 150 L of diesel fuel/day
- 14 Days of drilling are anticipated in this program
- Total diesel consumption for drilling rig: 2,100 L

Personnel Transports to Drill Sites

- One 4wd vehicle has been estimated to use 20 L of diesel/day
- A total of 16 days of drilling and site set up/rehabilitation are anticipated
- Total diesel consumption for the personnel transport: 320 L

Total diesel consumption (estimate): 2,500 L

The total full fuel cycle emissions generated from the consumption of 2,500 L of diesel are calculated using the Australian Greenhouse Office Factors and Methods Workbook (Dec 2006). Table 1 from this workbook states an energy content (conversion factor) of **38.6GJ/kL** for diesel.

An estimated total of **2.5 kL x 38.6GJ/kL = 96.5 GJ** of energy will be consumed by the development of Borehole TNG01.

This table also makes note of Scope 1, Scope 3 and Full Fuel Cycle (FFC) emission factors which equates energy consumption with greenhouse gas emissions. The FFC emission factor for diesel is stated as being **77.2 kg CO<sub>2</sub>-e/GJ**.

A total of **96.5GJ x 77.2 kg CO<sub>2</sub>-e/GJ = 7.5 tonnes CO<sub>2</sub>-e** (or greenhouse gas emissions)

As stated above mitigation of these emissions will be through the use of equipment utilised which is fit for purpose and well serviced. Given the small quantity of emissions generated, further mitigation efforts are not considered necessary.

## 5.2 Water

The proposed development of Borehole TNG01 will not impact surface or groundwater resources for the following reasons:

- The borehole site is not within a creek or located within riparian vegetation or in close proximity to any creek, waterway, drainage line or dam.
- Soil excavation will be limited to the development of sumps and a drill pad. This excavated area will be fully bunded to divert overland flows away from the site.
- Appropriate silt and sediment fencing will be placed around the site to prevent any dirty water runoff.
- Freshwater will be used as the drilling fluid (lubricant). The need to use drilling 'muds' and other drilling chemicals is not anticipated. Water will not be taken from farm dams but will be transported to site by a water truck. Approximately 40 000L of water may be used in a drilling operation such as the one proposed in this REF.
- Silts and drilling fines will be captured in the reticulated drilling water system (i.e. the sumps). These fines will either be used on site during the rehabilitation phase of the project or will be removed from site upon site closure and disposed of appropriately.
- Refuelling of drilling equipment will be undertaken in a controlled manner. Sufficient spill management kits will be located on site in the event of

minor fuel spillage. Contaminated soils will be removed from site and disposed of appropriately.

- ❑ No other chemicals or hazardous materials will be used during the borehole development.
- ❑ Groundwater loss or cross contamination of aquifers will not occur as the borehole will be fully sealed. Upon abandonment of the well the borehole will be sealed with concrete and capped to the relevant standards.

### 5.3 Soils

Soils at the site of Borehole TNG01 are described in Section 4.1.

The development of this borehole will manage the erosion potential at the site such that all overland flows which may come from up-slope of the site will be directed around the site through appropriate bunding. All soil disturbance on the site will be minimised and contained within suitable sediment and erosion controls.

It should be noted that various options for ground cover or work area matting is available which could be employed should soil disturbance occur at the site from general site activities.

Rehabilitation of the disturbance footprint will commence immediate upon completion of site works. Regular consultation with the landowner and post closure site inspections will be undertaken

### 5.4 Noise and Vibration

Noise and vibration sources for this project will be from vehicles and drilling equipment. Appropriately silenced generators and air compressors will be utilised where needed .

Noise and vibration impacts will be very localised as all equipment to be used for the development of Borehole TNG01 is well maintained and has been designed or modified to significantly reduce noise at the source. These design specification and modifications have been implemented primarily to improve the working environment of site personnel. The flow on benefit from these modifications is improved noise and vibration control for nearby receivers such as local residences.

The landowners of the property on which Borehole TNG01 is located have been consulted regarding the proposal and are aware of the noise and vibration implications for the project. All other nearby neighbours will be consulted prior to development and will be provided with contact details of Tahmoor Collieries Community Liaison person who will address any concerns raised.

Measures to reduce impacts of noise and vibrations to nearby residences include the limited hours of operations (7.00am - 5.00pm Monday to Friday). Further, should noise and vibration impacts be raised as a concern by any nearby resident, noise attenuation barriers will be erected at site to further reduce impacts.

## 5.5 Flora and Fauna

The site of the proposed borehole is completely devoid of any native vegetation. The area has been cleared for some years and been subject to regular mowing or slashing.

Grass cover<sup>2</sup> of the site was typical of pasture grass lawns and was dominated by Kikuyu (*Pennisetum clandestinum*), Couch (*Cynodon dactylon*) Clover (*Trifolium* sp.) and Paspalum (*Paspalum* sp.).

Other species present include Paddies Lucerne (*Sida rhombifolia*), Ink Weed (*Phytolacca octandra*), Canary Grass (*Phalaris* sp.) and Catsear (*Hypochaeris radicata*).

Several native grasses and herbs were observed on the site including *Pratia purpurascens*, *Eragrostis* sp., *Plantago* sp (probably *P. gaudichaudii*) and *Hibbertia diffusa*.

Two native trees (*Eucalyptus tereticornis* and *Angophora floribunda*) occur in the adjacent paddock to the borehole site (see Figure 2). These trees will not be impacted by the proposal.

No native fauna were recorded from the site though it is likely that the grass paddock is used as foraging habitat by a range of common native fauna including birds and reptiles. A number of threatened flora and fauna have been recorded within 10 km of the borehole site (Figure 3 and Figure 4). None of these species were recorded from the site or are considered likely to depend on the site for their ongoing survival in the local area.

Rabbit pellets were recorded at the site and are considered likely to be a common visitor to the site along with Hares and Foxes.

The vegetation of the site is not considered to represent any Endangered Ecological Community on either the TSC or EPBC Acts, although such communities are known to occur nearby.

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<sup>2</sup> Due to the regular nature of the disturbance on the site many grasses were indeterminate as they were not flowering or have been reduced to a mown tussock.

## 5.6 Chemical and Hazardous Substance Management

The only chemicals to be used in the drilling program will be diesel fuel for equipment and vehicles. All fuels will be contained and appropriate fuel spill kits will be available on site to manage any minor spills.

Material Safety Data Sheets (MSDS) will be required for the use of any other chemical or hazardous material. Copies of the MSDS will be lodged with Tahmoor Colliery should they be required.

## 5.7 Contaminated Land

Past land use at the site of Borehole TNG01 has included semi-rural residential activities and those activities have primarily been restricted to vegetation clearing and maintenance of the property as a mown rural lot. No contaminated lands have been identified at the site.

The proposal will not result in the contamination of the property.

## 5.8 Waste Minimisation and Management

All waste products including packaging for equipment or waste generated by site personnel will be removed from the site each day.

A portable toilet will be located at the site and serviced regularly.

## 5.9 Natural Resource Use

Natural resources that will be utilised in the development of Borehole TNG01 will be limited to a small amount of water (approximately 40 000L). Approximately 2,500 L of diesel fuels will be used during the drilling program. Neither of these natural resources are in sufficiently short supply as to concern their limitation for this project.

The proposal will not impact on fishing, agricultural or forestry resources.

## 5.10 Impact on the Community

The proposal will have a short term, minor impact on the residents of the property on which the borehole is sited. The landowners have provided written consent for the works to proceed and a compensation arrangement has been reached between Tahmoor Colliery and the landholders.

Other nearby neighbours will be consulted prior to the development of the borehole and any concerns expressed by these residents will inform the site operations.

Rita Street is a quiet street in a rural setting. Access to the site via Rita Street is unlikely to affect traffic flow in the street or surrounds.

### **5.11 Visual Assessment**

The work site has limited visual access at the present time. The work site will be fully fenced and can be shielded by mesh gauze to reduce the visual aspects of the site to other nearby residents if required.

Upon completion of the works the site will be fully rehabilitated and the rehabilitation of the site will be monitored to ensure that a good grass coverage of the site is achieved in as short a time as possible.

Any visual impacts from the proposal will be short-lived and are unlikely to extend beyond the actual time required to access the site.

### **5.12 Heritage**

Searches of the Heritage Branch, Department of Planning heritage database and the National Heritage database showed there are no listed heritage sites within the vicinity of the proposed well site.

### **5.13 Aboriginal Heritage**

The proposed well site is situated on the lower slopes of a small, intermittent drainage depression, and is therefore not an area likely to contain Aboriginal objects. The area has been extensively cleared and modified, including local landscaping to form dams and horse training pads. Thick pasture meant there was no archaeological visibility during the site inspection. A search of the AHIMS register showed that a total of nine archaeological sites occur within a few kilometres of the borehole site (see Figure 5). The closest site is approximately 750m from the borehole site and will not be impacted by it.

### **5.14 Landuse**

Landuse on the property is confined to rural residential living. The actual borehole site is cleared and regularly mown/slashed.

Following rehabilitation of the site the landuse of the site will remain rural residential living.

## 5.15 Cumulative Environmental Impacts

Given the landuse history of the borehole site, the short term, minimal impact of the proposal will not add significantly to the cumulative impacts of all development in the local area. Further, the site will be fully rehabilitated and any impacts from the proposal will be unlikely to be evident within several months of project completion.

## 5.16 Summary of Mitigation Measures

The proposed development of Borehole TNG01 will have a negligible and short-lived impact on the environment and the local community. Several key measures to further mitigate any impacts of the proposal have been described above. They can be summarised to include the following:

- Locating the borehole site in a cleared paddock to negate any impacts to native vegetation, fauna habitat or heritage values (Aboriginal or other).
- Employment of suitable sediment and erosion controls to minimise erosion potential and surface water quality impacts. Efficient drilling practices will also reduce the length of the onsite works.
- Use of state of the art drilling equipment which has been designed to minimise noise and vibration output.
- Use of clean water as the drilling fluid thereby reducing any potential for surface or groundwater contamination from drilling fluids. Further, casing the borehole will reduce any potential for cross contamination of aquifers.
- Confining the hours of operation to daylight hours during the working week.
- Fencing and screening the site from the view of nearby neighbours if required.
- Forming an agreement with the landowners of the property on which the borehole is located to ensure the appropriate rehabilitation of the site to pre-disturbance standards.
- Notifying all nearby neighbours of the proposal and including any stated concerns in the operational planning of the project.

## 6 REHABILITATION WORKS

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Rehabilitation works will involve the following:

- Removal of all surface infrastructure and fencing from the site immediately upon the completion of works.
- Removal of all waste and used materials.
- Any contaminated soils that may arise from minor fuel spills will be collected in salad containers and disposed of appropriately at the Tahmoor Colliery site in accordance with its relevant environmental licenses.
- All sumps will be filled in with stockpiled soils (which will be employed throughout the life of the project in water diversion bunds). The land's surface will be re-contoured.
- Appropriate grass cover will be reinstated at the site in accordance with the requirements of the landowner to facilitate the immediate coverage of disturbed soils and erosion control. The grass cover will be monitored by both the landowner and also Tahmoor Colliery to ensure that the rate of rehabilitation is adequate. Adaptive management of the grassed area will be employed if the initial regeneration is considered to be inadequate or is progressing too slowly.

## 7 SUMMARY OF IMPACTS AND CONCLUSIONS

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This REF outlines the proposal of Tahmoor Colliery to develop a single exploration borehole within a cleared paddock in a rural/residential setting in Thirlmere NSW. The proposal will be completed in approximately four weeks from commencement with the only ongoing component being rehabilitation monitoring and management.

Impacts from noise and vibration as well as visual impacts may be anticipated, although they will be extremely minor and will be managed through the use of well serviced machinery that has been designed to minimise noise and vibration at the source for the benefit of site personnel. These parameters will provide further protection to nearby residents as they will be further from the site.

Further, owners of the property on which the borehole is located have entered into a written access and compensation agreement with Tahmoor Colliery. All nearby neighbours will be consulted prior to the commencement of works and any concerns that they have will be included in the operational planning of the project.

Subject to the design constraints and mitigation measures outlined in this REF the proposed Borehole TNG01 is unlikely to result in any significant environmental impact.

## 8 REFERENCES

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- ❑ Hazelton, P.A. and P.J. Tille (1990). *Soil Landscapes of the Wollongong-Port Hacking 1:100 000 Sheet*. Soil Conservation Service, Sydney.
- ❑ NPWS Atlas of NSW Wildlife - Accessed May 2010.
- ❑ NSW Department of Primary Industries (1997). *Borehole Sealing Requirements on Land* - Departmental Reference EDG01.
- ❑ NSW Department of Primary Industries (2006). *Guidelines for the Review of Environmental Factors* - Departmental Reference ESB18.
- ❑ NSW Department of Primary Industries (2006). *Surface Disturbance Notice* - Departmental Reference EDG10.
- ❑ Wollondilly Shire Council (2009). Draft Wollondilly Local Environmental Plan 2009.

# FIGURES

**Figure 1: Location of TNG01**

**Figure 2: Proposed Well Site Arrangement and Access.**

**Figure 3: Threatened Flora Recorded Within 10km of the Borehole Site.**

**Figure 4: Threatened Fauna Recorded Within 10km of the Borehole Site.**

**Figure 5: Results of the AHIMS Search Showing Aboriginal Sites in Close Proximity to the Borehole Site.**

# ATTACHMENTS

## ATTACHMENT A

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### Assessment of the Proposal under Part 5 of the EP&A Act

An assessment under Part 5 of the E&A Act has seven parts or questions. These questions are outlined below and have been applied to the current proposal.

- 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**

No threatened species were recorded at the site or are likely to utilise the site.

The proposal is unlikely to have an adverse affect 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.

- 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,**

No endangered populations were recorded at the site or are likely to utilise the site.

The proposal is unlikely to have an adverse affect on the life cycle of the species such that an endangered population of the species is likely to be placed at risk of extinction.

- C. 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,**

No endangered ecological communities occur at or in close proximity to the borehole site.

The proposal is unlikely to have an adverse affect on the extent of a local occurrence of any endangered ecological community such that it would be placed at risk of extinction.

The proposal is unlikely to have an adverse affect on the composition of a local occurrence of any endangered ecological community such that it would be placed at risk of extinction.

**D. 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, an**
- 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 site of the proposed borehole does not provide important habitat for any threatened species, population or ecological community. Therefore habitat will not be removed, modified, fragmented or isolated.

**E. whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

The site of the proposed borehole does not constitute critical habitat for any threatened species, population or ecological community. The proposal will not impact any critical habitat either directly or indirectly.

**F. whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

The proposed borehole development is not inconsistent with the objectives or actions of any recovery plan or threat abatement 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.**

The proposal does not constitute an action that is part of a key threatening process and is not likely to result in the operation or increase impact of a key threatening process.

### **Conclusion**

The development of Borehole TNG01 is not likely to result in a significant impact on any threatened species, population or ecological community.

A Species Impact Statement is not considered necessary.

# ATTACHMENT B

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## Surface Disturbance Notice