

Granite Power

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# **Review of Environmental Factors for Exploration Geothermal Borehole at Bulli-1**

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February 2008



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Prepared by  
**Umwelt (Australia) Pty Limited**  
on behalf of  
**Granite Power Limited**

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# 1.0 Introduction

Granite Power Limited proposes to drill a geothermal exploration borehole within an existing quarry located by Appin Road between Bulli and Appin (NSW) and is within the Wollondilly Local Government Area (LGA). It is understood that the quarry is currently operated by Joe Taylor Sand Pty Limited, a subsidiary of Benedict Industries Pty Ltd, under Permissive Occupancy (PO) 1975/1 of Crown land.

This Review of Environmental Factors (REF) has been prepared by Umwelt (Australia) Pty Limited on behalf of Granite Power Limited to assess the potential environmental impacts of the geothermal borehole for the duration of the project operations commencing in April 2008.

This REF assesses the potential environmental impacts of exploration borehole activities at Bulli-1 (proposed drilling location) under EL 6360. The document is produced in accordance with the DPI (2006) Guidelines for REF. Approval is sought to undertake exploration activities according to the defined Proposed Activities outlined in **Section 2.2**.

## 1.1 Locality

The current operations proposed under EL 6360 will cover an area of 900m<sup>2</sup> and are located within the Wollondilly LGA. The existing quarry site is adjacent to Appin Road and is approximately 8.6 kilometres south east of the town of Appin (refer to **Figure 1.1**). The Loddon River crosses Appin Road approximately 5.2 kilometres to the east of the site and Georges River approximately 8.6 kilometres to the west. The entrance to West Cliff Colliery (a BHP Billiton Illawarra Coal site) is approximately 4 kilometres to the west of the proposed site.

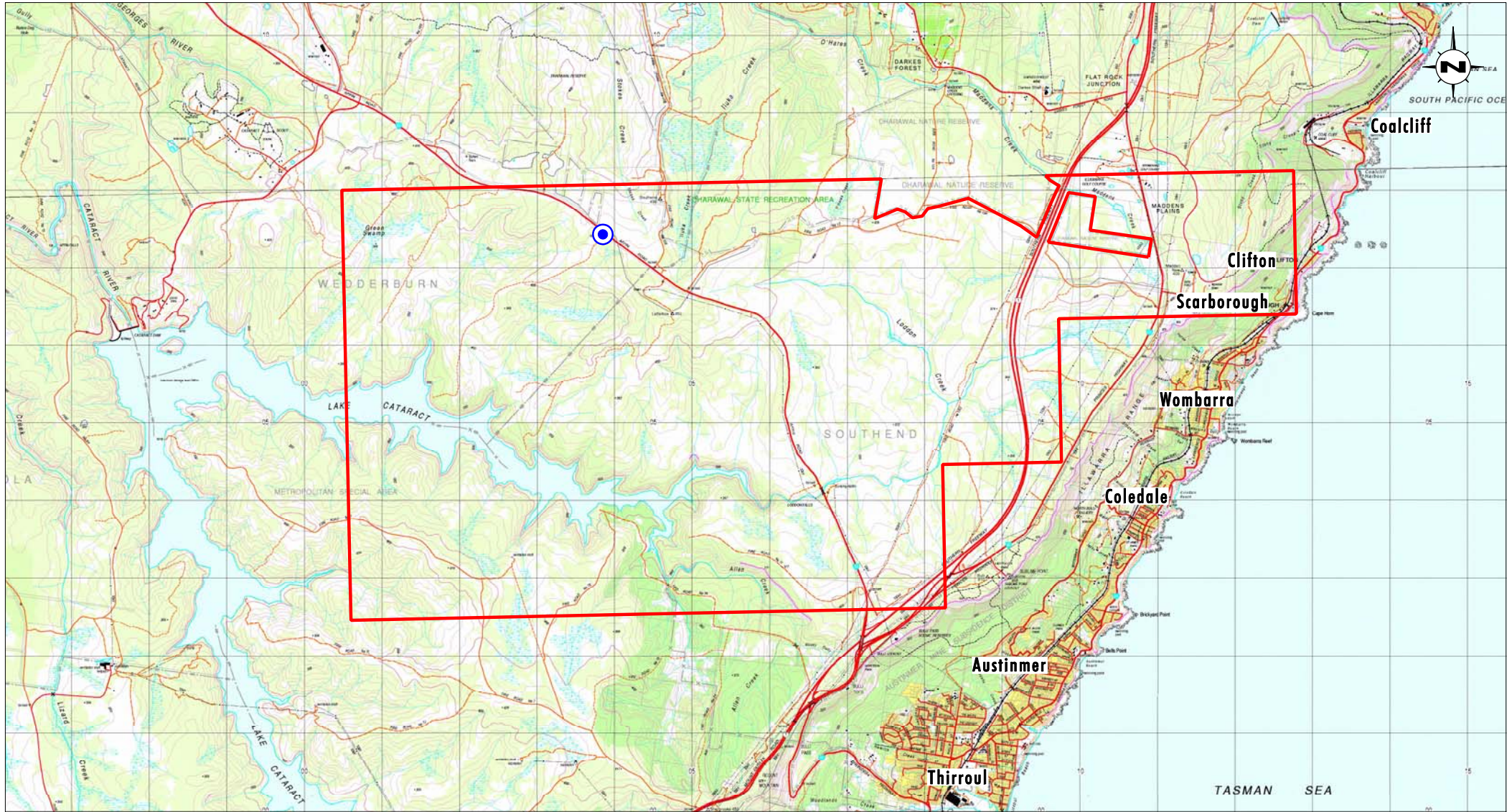
The quarry site is Crown land and is within the O'Hares Creek Special Area (as part of the Sydney Catchment Authority). The site is also surrounded by the Dharawal State Conservation Area (SCA). Immediately on the southern side of Appin Road is the Metropolitan Special Area, also under the management of the Sydney Catchment Authority.

# 2.0 Proposed Bulli-1 Geothermal Exploration Borehole

## 2.1 EL Requirements

EL 6360 defines three categories of prospecting operations. Category 1 activities involve reconnaissance and low intensity activities including:

- a) geological mapping;
- b) airborne surveys;
- c) sampling and coring using hand held equipment;
- d) geophysical surveys and downhole logging, but not seismic surveys;
- e) drilling involving no more than minimal site preparation;



Source: LPI NSW, 2006

**Legend**

- Appin EL 6360
- ⊙ Geothermal Borehole location

FIGURE 1.1

Locality Plan  
Appin EL 6360

- 
- f) minor clearing or cutting of native vegetation;
  - g) minor excavations excluding costeaning or bulk sampling; and
  - h) vehicle access that does not require construction of new access tracks.

Category 2 operations are those that have potential for moderate disturbance to the land surface, native vegetation or other environmental value, including:

- a) operations under Category 1 (c) to (h) within or adjacent to Sensitive Areas;
- b) operations under Category 1 (c) to (h) of a concentrated or cumulative nature;
- c) seismic surveys;
- d) excavating or bulk sampling not exceeding 60 cubic metres;
- e) non-intensive drilling involving no more than moderate site preparation, excluding drilling holes exceeding 400 millimetres diameter;
- f) camp construction; and
- g) access tracks, drill pads or line clearing involving no more than moderate native vegetation disturbance.

The exploration activities proposed for Bulli-1 are reconnaissance or low intensity activities (classified as Category 1 activities under EL 6360) for the period commencing April 2008.

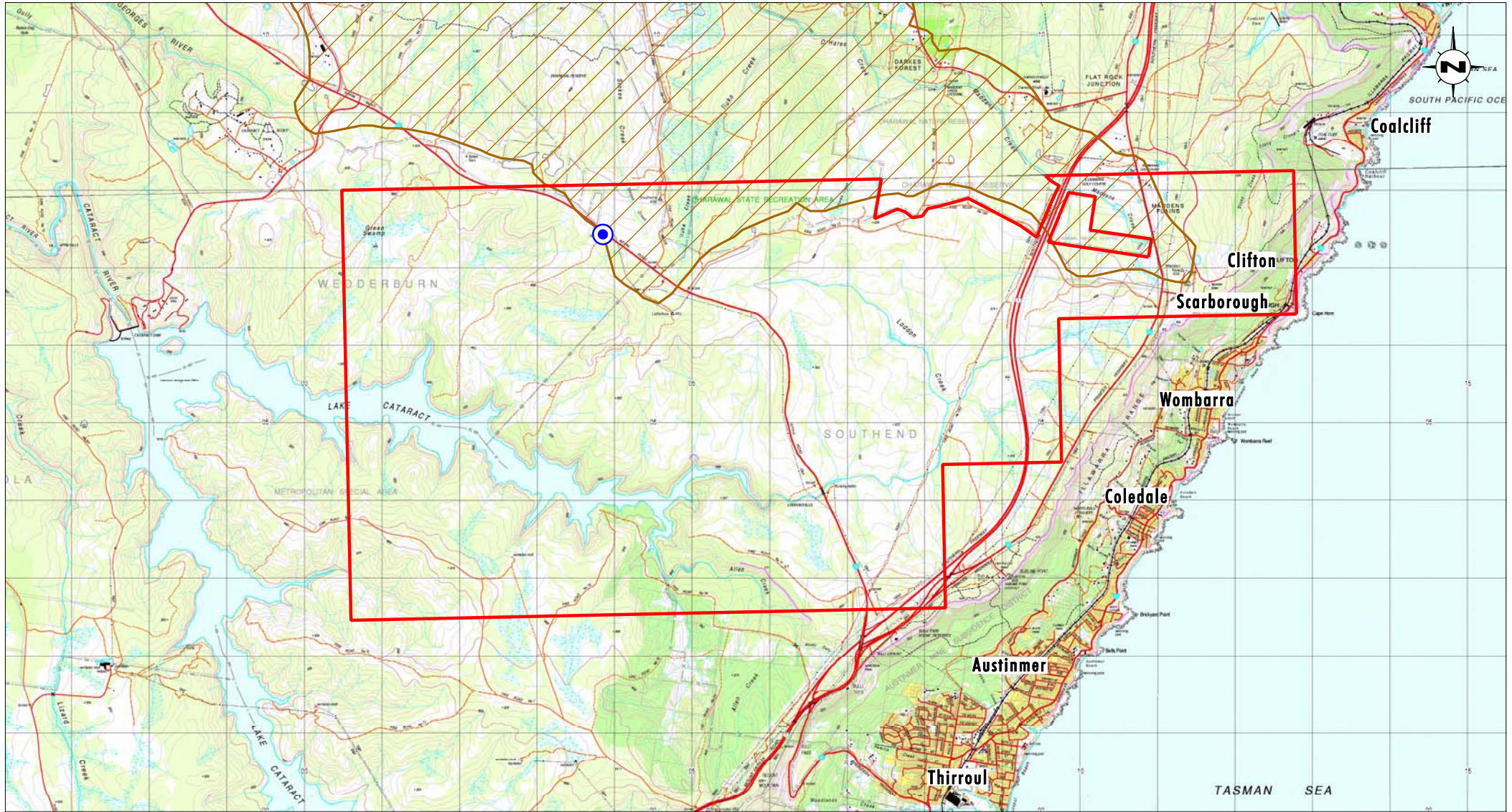
The proposed Bulli-1 site is within an existing and operational quarry. The quarry is located within the O'Hares Creek Special Area as managed by the Sydney Catchment Authority (SCA) (refer to **Figure 2.1**). This Special Area is categorised as Schedule 2 under the Sydney Catchment Authority Special Areas Strategic Plan of Management (SCA, 2007). The EL specifies that areas prescribed by a controlling water authority are considered Sensitive Areas and that operations under Category 1 (c) to (h) within Sensitive Areas are considered to be Category 2 operations. Therefore, the proposed Bulli-1 site is a Category 2 operation and a Surface Disturbance Notice and accompanying REF is required.

### **2.1.1 Exempted Areas**

Condition 3 of Section B of the EL outlines the application of Special Area Conditions. Where an Exempted Area is identified, the licence holder must not commence prospecting operations in an exempted area under the Act without obtaining prior written consent from the Minister. 'Exempted Areas' under the Act are lands set aside for public purposes. They include travelling stock reserves, road reserves, water supply reserves, State forests, public reserves and permanent commons.

Under Section 30 of the Act the 'exercise of rights' under an exploration licence is subject to the consent of the Minister. The 'exercise of rights' includes the right to conduct prospecting operations. The Minister's consent requires assessment and determination under Part 5 of the EP&A Act.

The proposed Bulli-1 site meets the definition of an Exempted Area as it is Crown land. Minister's consent will therefore be required under Section 30 of the Act. As previously outlined, the proposed site is also located within O'Hares Creek Special Area, as managed by the SCA. Discussions are currently being held with the SCA to confirm whether this



Source: LPI NSW (2006), Sydney Catchment Authority (2007)

0 1 2 3 km  
1:70 000

**Legend**

- Appin EL 6360
- O'Hares Creek Catchment Area
- ⊙ Geothermal Borehole location

FIGURE 2.1

Location of O'Hares Creek Special Area

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Special Area is also considered part of a water supply reserve under Section 30 of the Act. An assessment of the potential environmental impacts of drilling activities on exempted areas is provided in **Section 5.0**.

### **2.1.2 Notification of the Sydney Catchment Authority**

The Sydney Catchment Authority confirms that the existing quarry is within the O'Hares Creek Special Area. Condition 7 of section B of the EL requires that at least 28 days prior to commencing any prospecting operations, which will involve disturbance to the surface of any area under the control of the Sydney Catchment Authority, the licence holder must notify the Authority of the intention to do so and must supply any information required by the Authority to determine the precise location of the proposed operations.

## **2.2 Proposed Activities**

The exploration activities proposed for Bulli-1 will involve the drilling of a geothermal borehole within an existing quarry (refer to **Plates 2.1** and **2.2**). The drilling activity will occupy an area of 900m<sup>2</sup> and may use an additional 100m<sup>2</sup> for storing consumables and equipment.

The operation will be termed Bulli-1 by Granite Power and will involve up to 10 people during the activity. The site will be drilled to test the geothermal potential of Granite Power's EL 6360 tenement. The drill hole will be approximately 5cm diameter and will extend to a depth of 500 metres. A temperature measuring probe, small water pumps, and diesel powered lighting towers are also likely to be used. If the temperature and thermal conductivity data acquired from this hole and further future exploration prove successful, at least one deep production bore may be drilled to assess the feasibility of a small geothermal pilot plant (not included in this REF). If successful, this may lead to the development of a full scale power plant on the tenement within EL 6360.

The establishment of the drill site will not generally require any earthworks, except for the excavation of sumps to contain drilling water and to prevent run-off into surrounding natural drainage pathways. There will be no clearing of vegetation for the activity. The main water supply to the site will be from the existing quarry dams as the drill site is located on the quarry floor. In agreement with the quarry operators, water that is taken from the containment dam may be returned to the containment dam at the cessation of drilling. Contaminated water (including intersected groundwater) will be trucked off site and disposed of by a water management company at an appropriately licenced facility rather than being returned to any treatment facility at the quarry. An estimated 10 kilolitres will be used during the operation.

The soil excavated for the sumps will be stockpiled on site and the sumps filled in and the area reshaped, according to Joe Taylor Sand requirements (in addition to those of the EL), once drilling has ceased. The only other ground disturbance associated with the operations will be the borehole itself. The remainder of operations at the drill site including laydown areas for drilling equipment and temporary storage areas will not require any earthworks.

Access to the drilling site will be via existing tracks that are established for the quarry. No new access tracks involving formed construction will be undertaken. Access to the site comprises a two lane bitumen road (Appin Road) with a 100 kilometre per hour speed limit. A maximum of five vehicle trips per day are expected, with the rig entering/leaving only once.



**PLATE 2.1**  
Site of Bulli-1 within existing Quarry



**PLATE 2.2**  
Aerial photo of the site.  
(Source: Google Earth)

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Drilling of the exploration borehole is expected to take approximately three weeks, for 24 hours per day, depending on the depth of the hole, testing regime and geological conditions. Site preparation works (e.g. fencing and excavation of sumps) would typically commence one week prior to drilling. The site will remain open for a further three to four weeks for testing and will then be capped. The operations are expected to extend for a total of approximately 14 weeks.

Granite Power intends to cement the drill hole, upon conclusion in accordance with DPI (2006) Guidelines. Granite power may also discuss alternative site-specific methods to filling the drill hole with the DPI. Site rehabilitation works will be undertaken following capping.

### **2.2.1 Environmental Due Diligence Inspections**

The exploration activities are scheduled to take place within an active quarry. Prior to the commencement of the geothermal borehole drilling, the intended activity location will be discussed with the PO licence holder to ensure that potential land use impacts are minimised. Umwelt performed a site inspection of Bulli-1 on 13 December 2007. In accordance with condition 13, Section C, of EL 6360, there were no potential or site-specific constraints identified at Bulli-1 as the proposed site is within an existing disturbed area (refer to **Section 5.0**).

## **2.3 Justification of the Activity**

The site has been identified by Granite Power as having a stratigraphic section that is representative of most of the area within EL 6360. The site was also chosen due to its close proximity to a buried granite body lying to the north. That the site is already active and disturbed and not surrounded by another underlying mining tenement were also significant factors in the consideration of alternatives. Granite Power is in active discussion with Joe Taylor Sand to finalise the specified rehabilitation of the site once operations have been completed. Additionally, a draft Land Access Agreement between Granite Power and Joe Taylor Sand is under negotiation.

Granite Power is seeking to conduct the exploration program in a manner that reduces impacts on landholders and the local community, and consultation is actively taking place between Granite Power and Joe Taylor Sand. Exploration activities are located to minimise environmental impacts and satisfy landholder preferences where possible. This is achieved through the completion of consultation with affected landholders regarding suitable drilling locations and consideration of environmental factors.

Providing that the drilling activities are carried out in accordance with the Proposed Activities outlined in **Section 2.2**, the potential impacts of the Bulli-1 exploration program on the environment are expected to be minimal (refer to **Section 5.0**).

## **2.4 Evaluation of Alternatives**

As discussed in **Section 2.2**, the exploration activity location has been selected to minimise potential impacts on environmental values, and to satisfy the landholder preferences where possible.

That the site is already active and disturbed and not surrounded by another underlying mining tenement were significant factors in the consideration of alternatives. Given the

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extent of bushland within the EL and considering the location of residential areas, the selected site has minimal potential community and environmental impacts.

## 3.0 Planning Context

### 3.1 Licences and Approvals Required

The requirements of the EL 6360 were described in **Section 2.1**, in addition to the requirements outlined in the EL. Exploration activities in some areas within EL 6360 may trigger the need for subsequent approval as discussed below.

#### 3.1.1 *Water Management Act 2000*

The *Water Management Act 2000* (WMA Act) repeals a number of legislative instruments including the licensing provisions of the *Water Act 1912* and the *Rivers and Foreshores Improvement Act 1948*. The provisions of the WMA Act repeal the *Water Act 1912* once a Water Sharing Plan for the water source has been gazetted. A water licence will not be required for the proposed drilling as water will not be extracted from the drill hole.

#### 3.1.2 Sydney Catchment Authority Area

The Sydney Catchment Authority confirms that the existing quarry is located within the O'Hares Creek Special Area. Condition 7 of section B of the EL requires that at least 28 days prior to commencing any prospecting operations, which will involve disturbance to the surface of any area under the control of the Sydney Catchment Authority, the licence holder must notify the Authority of the intention to do so and must supply any information required by the Authority to determine the precise location of the proposed operations.

Schedule 2 Special Areas are reserved and managed for both their raw water contributions to the catchment and for the preservation of the ecological values for this aim. The management of the Special Areas must also meet other relevant NSW legislation including specific environmental laws and regulations including the Commonwealth EPBC Act (SCA, 2007). Management Target 1 in Section 5 of the Sydney Catchment Area Special Areas Strategic Plan of Management 2007 outlines also that the Water Quality Risk Management that will be implemented by the SCA for all land that is within a Special Area. The SCA maintains a water quality monitoring program and management framework which addresses both aims. As noted in Section 2.2, the location of the drill hole within an existing quarry floor minimises potential water quality impacts. Further discussion on water quality controls is provided in **Section 5.4**. No additional licences or approvals are required.

### 3.2 Zoning

Wollondilly Local Environment Plan 1991 (WLEP), considers the site of the quarry as Zone No 5 (c1) (Special Uses 'C1' (Water Catchment) Zone). The proposed exploration activities are generally consistent with the objectives of the zone.

### 3.3 Stakeholder Consultation

Granite Power is committed to an open and transparent consultation process as part of the Bulli-1 exploration program. This initial Bulli-1 exploration program has key stakeholders

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including the DPI, Joe Taylor Sand Pty Limited and the parent company Benedict Industries Pty Ltd, the local Council and relevant government agencies. Consultation regarding the exploration program has been undertaken with the DPI and Joe Taylor Sand and will be ongoing for the duration of the project.

Consultation has also been undertaken with the landholder (Department of Lands) during the due diligence process to determine preferred locations for boreholes to be drilled.

Granite Power will consult as required, with the relevant authorities regarding current and proposed exploration activities in exempted areas and special areas.

## **4.0 Existing Environment**

The Bulli-1 site is within a disturbed active quarry within an area with no immediate vegetation.

The site is surrounded by dense native vegetation to the north, south (beyond Appin Road), east and west with the Dharawal SCA, the Dharawal Nature Reserve and O'Hares Creek and Metropolitan Special Areas surrounding the site. Bulli-1 is generally situated between the Illawarra Escarpment and the George's River. The site and adjacent Reserves are located on the Woronora Plateau (also known as the Nepean Ramp) which forms part of the southern rim of the Sydney Basin. The dissected plateau dips gently north-west away from the abrupt edge formed by the Illawarra Escarpment to the Cumberland Plain. Watercourses drain to the Nepean and Georges Rivers (NSW NPWS, 2006).

The plateau is dominated by the Triassic Hawkesbury Sandstone Formation, composed primarily of quartzose sandstone, with outcrops of shale and ironstone in some areas. The Hawkesbury Sandstone is underlain by the Triassic Narrabeen Sandstone Group and the Permian Illawarra Coal Measures respectively. Along the eastern edge, the plateau is characterised by deposits of swamp alluvium which have accumulated in low-relief headwater valley, forming numerous uplands swamps. The Dharawal Reserve and SCA contain some 26 swamps, including one of the largest on the Woronora Plateau (NSW NPWS, 2006).

Further details of the existing environment in the EL area are discussed where relevant in **Section 5.0**.

## **5.0 Environmental Impacts and Management**

### **5.1 Ecology**

#### **5.1.1 Environmental Due Diligence Surveys**

Condition 13, Section C, of EL 6360 specifies that prior to carrying out any prospecting operations the licence holder must consider potential impacts on threatened species, populations and ecological communities and their habitats. Umwelt performed a Site Inspection for potential impacts on threatened species, endangered populations and EECs listed under the TSC Act or the Commonwealth EPBC Act on 13 December 2007. No potential impacts on threatened species, endangered populations or EECs were identified during the inspections as the site is an active quarry and already disturbed.

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The inspections targeted potentially occurring threatened flora species, endangered populations and EECs. The inspection also targeted any significant fauna habitat features that could be utilised by threatened fauna, such as hollow-bearing trees, feed trees and hollow logs.

### **5.1.2 EECs at the Bulli-1 Site**

The proposed drilling site is disturbed and within an active quarry. There is no vegetation and no EECs identified in the quarry. The cleared quarry site is within the O'Hares Creek Special Area (1927) and is adjacent to the Dharawal SCA.

#### **5.1.2.1 EECs Immediately Adjacent to Bulli-1 within EL 6360**

English and Wilkins have assessed the area and list one EEC as listed on the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection Biodiversity Conservation Act 1999* (EPBC Acts) as occurring in the immediate O'Hares Creek Special Area: *Shale Sandstone Transition Forest*. Potential habitat for five threatened plant species was also recorded: *Acacia bynoeana*, *Epacris purpurescens* var. *purpurescens*, *Grevillia parviflora* spp. *Parviflora*, *Persoonia hirsuta* and *Pultenaea aristata* (Biosis Research, 2007). At the time of this study, the community was considered to be in moderate condition.

The Wollondilly State of the Environment Report 06/07 also lists the presence of the EEC *O'Hares Creek Shale Forest* (WSC, 2007) that may occur around the Bulli-1 site.

### **5.1.3 Regional Context and Significant Species and Communities**

The Bulli-1 site is within an active and disturbed quarry. There are no noted vegetation communities within the proposed drilling area.

The immediately surrounding area comprises dense native vegetation and is part of the O'Hares Creek Special Area and includes the Dharawal SCA. The presence of the EEC *Shale Sandstone Transition Forest* has been found in the nearby area (Biosis Research, 2007). The EEC *O'Hares Creek Shale Forest* is described in the area (WSC, 2007) as part of the Dharawal Reserves which covers 5981 hectares (NSW NPWS, 2006).

A number of threatened flora and fauna species are considered to potentially occur in the area surrounding the Bulli-1 site. Potential habitat for five threatened plant species was also recorded: *Acacia bynoeana*, *Epacris purpurescens* var. *purpurescens*, *Grevillia parviflora* spp. *Parviflora*, *Persoonia hirsuta* and *Pultenaea aristata* (Biosis Research, 2007). A total of 40 threatened or migratory animal species have been previously recorded within the local area.

No threatened flora or fauna species have been identified at the site of the proposed exploration activities. Similarly, no endangered populations are considered likely to occur at the proposed exploration activity location.

### **5.1.4 Impact Assessment**

#### **5.1.4.1 Borehole at Bulli-1**

The proposed exploration activities involve the drilling of a geothermal borehole and associated activities. The impact of the drilling will be limited to a compound of approximately 30 metres by 30 metres, with ground disturbing works limited to the drilling of the borehole

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and excavation of water sumps, all within the active and disturbed quarry. Therefore, the extent of impact of exploration activities will be minimal.

There will be no vegetation impacts associated with the exploration activity, therefore, a Seven-Part Test of Significance, in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979* is not required for Bulli-1.

## **5.2 Heritage**

### **5.2.1 Aboriginal Archaeology**

The proposed borehole is located within an existing and operational quarry. As such, a detailed assessment for sites and artefacts of Aboriginal significance was not required.

The Dharawal SCA and Dharawal Reserve that surround Bulli-1 have a long and significant history of Aboriginal use. A search of the national Native Title Tribunal Register was conducted by Umwelt on 11 January 2008. There are two active native title claims within the Wollondilly LGA (NNTT file numbers NC96/30 and NC97/7) however these relate to the tribal territory of the Gundungurra people and do not incorporate Bulli-1. Most of the sites identified are associated with water and many are concentrated along creeklines which include open campsites, art shelters, axe-grinding grooves, a scarred tree and the only known Aboriginal well in south-east Australia. Three sites within the reserves are listed on the Register of the National Estate (NSW NPWS, 2006b).

While the management of constraints posed by the richness of Aboriginal Archaeology within the SCA Special areas require specialist knowledge and Aboriginal consultations (Department of Environment and Conservation 2004) significant mining and infrastructural projects have and continue to operate within the area.

No sites or findings were recorded at the quarry site and no further assessment or management is required for the proposed exploration activity.

### **5.2.2 Historic Heritage**

As indicated in **Section 5.2.1**, Bulli-1 is located within a cleared area in an existing and operational quarry and as such a detailed Historic Heritage assessment is not required.

The Dharawal SCA and Dharawal Reserve that are adjacent to the site contain few indications of European heritage, and there are no European heritage sites listed on the NPWS Historic Heritage Information Management System. The Australian Army used part of the O'Hares Creek catchment for training as a supplement to the Holsworthy Field Firing Range between 1930 and 1990. Several, small concrete v-notch gauging weirs relating to past water supply investigations exist on O'Hares and Stokes Creeks to record stream flow. Physical evidence of past and current coal mining, and previous sand and shale extraction are widespread in the reserves in the form of cleared or excavated areas and utility infrastructure (NSW NPWS, 2006b).

No sites or findings were recorded at the quarry site and no further assessment or management is required for the proposed exploration activity.

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## 5.3 Amenity

### 5.3.1 Noise

The proposed activities are at least 8.6 kilometres away from the nearest residence, so there will be minimal noise exposure. Nevertheless, exploration activities will be undertaken to minimise potential off-site noise impacts on residential receivers. The drill power pack will be fitted with appropriate noise suppression equipment (e.g. mufflers). The drill will be driven by a 149kW diesel engine also with integrated noise suppression. All equipment used on site being maintained in good working order and pre-start inspections of equipment will be conducted.

### 5.3.2 Air Quality

Best management practices will be adopted during mineral exploration activities (NSW Minerals Council 1998). The diamond coring drilling method to be used is a wet process and therefore has limited potential to generate dust. Pre-start inspections of dust control equipment will be performed. Any cuttings that come out of the drill stems will be saturated with water, keeping dust distribution to a minimum. Speed limits on access tracks will be adhered to at all times to minimise dust generation.

The proposed activities are at least 8.6 kilometres away from the nearest residence, so there will be minimal exposure to dust and associated emissions.

## 5.4 Water, Hazardous Substances and Waste Management

### 5.4.1 Water

#### Surface Water

As discussed in **Section 4.0**, the EL lies within the Sydney Catchment Area and is part of the O'Hares Creek Special Area. No water courses flow through the Bulli-1 site. Joe Taylor Sand has established quarry dams for water supply and water quality control for the current operations. These dams will be the main water supply for the drilling operations. In agreement with the quarry operators, water that is taken from the containment dam may be returned to the containment dam at the cessation of drilling. Any contaminated water will be disposed of at a liquid disposal centre off-site. An estimated 10 kilolitres will be used during the operation.

Surface water operational controls will be implemented for all exploration activities as outlined in **Section 2.0**. This will include the construction of drilling sumps (and other containment measures) to hold slurry and dirty water generated during drilling. The slurry and dirty water facility will be treated within the existing quarry water management system. With these controls in place, it is expected that the impact of exploration activities on surface water will be minimal.

#### Groundwater

Exploration activities that could potentially intersect the groundwater table are required to be planned and conducted in a manner which does not cause adverse changes to groundwater quality, the aquifer encountered or leakage between aquifers (NSW Minerals Council 1998). To minimise the potential impacts on groundwater, exploration activities will be undertaken in accordance with operational controls relating to groundwater management and include the

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use of appropriately licensed drillers, sealing bores to prevent any ingress of water into the hole which would allow for cross contamination between aquifers and grouting holes on completion of testing. With these controls in place, it is expected that the impact of exploration activities on groundwater will be minimal.

#### **5.4.2 Hazardous Substances and Waste Management**

All wastes generated by exploration activities will be collected, segregated and stored in properly constructed containers and removed to an approved landfill or other disposal site in accordance with local council requirements. No servicing of equipment will be undertaken on site. All chemicals, fuels and oils used on site will be appropriately banded, and spill and oil absorbent materials will be maintained on site. Drill cuttings and fluids will be contained in in-ground sumps. Any soil potentially contaminated by chemicals, oils, fuels or other drilling products will be collected and disposed of in an approved manner and the site rehabilitated on completion in accordance with the process outlined in **Section 6.0**.

### **5.5 Soils, Land Use and Natural Resources**

Soils on the plateau are generally shallow, sandy and infertile. Soil landscapes for the district have been mapped and described by Hazelton and Tille (1990) and are listed in Appendix 1 - Soil Landscapes. The reserves are dominated by the Lucas Heights and Hawkesbury soil landscape units. The former characterises the ridges and the latter the water courses and surrounding gorges. The Hawkesbury unit has a very high to extreme erosion hazard. Immediately adjoining the reserves, orchards and hobby farms occupy shale capped ridges at Darkes Forest and Wedderburn on the eastern and western watersheds of the catchment respectively (NSW NPWS 2006). The land capability of the site is Class two and three. Class two means that the land is suitable for regular cultivation but has some limitations to production due to site conditions (e.g. erosion). Class three indicates that the land is suitable for cropping on a rotational basis, with production limited by soil erosion hazards.

The impact of proposed exploration activities on soils, land use and natural resources are expected to be minimal as the activities to be undertaken involves only minor excavation and minimal site preparation and will be undertaken within an existing quarry floor. As such, there will be no clearing of tree or shrub vegetation and minimal ground disturbance required for completion of the boreholes and therefore minimal impact to soils and natural resources will occur. The drilling program will have a minimal impact on the current use of the land as drilling activities are only undertaken for a period of approximately two to four weeks. Exploration activities, including site preparation, rig mobilisation and demobilisation; stabilisation and temperature measuring and site rehabilitation will take a total of approximately 14 weeks.

### **5.6 Community**

As discussed in **Section 3.3**, Granite Power has undertaken active consultation with the current landholder as part of its exploration activities. This consultation has been used to determine landholder preferences for borehole locations and requirements.

The operational controls outlined for the Bulli-1 site will have minimal impact on the local environment and community. The nearest residence is approximately 8.6 kilometres from the site which is surrounded by bushland. Due to the operational controls to be implemented

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during drilling and the short period of time that exploration activities will occur at the location, the potential impacts of the exploration program on the community is predicted to be minimal.

## 5.7 Cumulative Impacts

The controls outlined in this REF have been designed to minimise potential cumulative impacts from exploration activities. The controls will be implemented for the entire exploration activity during the Bulli-1 exploration program. Exploration activities at the site will be of a short term nature and the site will be appropriately rehabilitated after activities cease. Due to the short term nature of the operation, the controls to be implemented during drilling, the cumulative impacts of the Bulli-1 exploration operations are predicted to be minimal.

## 6.0 Rehabilitation

Once the drill hole has been sealed, surveyed and marked, disturbed land will be rehabilitated to the quarry operator's requirements.

In accordance with the EL 6360, land disturbed will be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the DPI. Rehabilitation activities will be completed as soon as possible after the cessation of exploration work at the site.

The drill hole will be sealed, surveyed and marked generally in accordance with the DPI guideline *Borehole Sealing Requirements on Land: Coal Exploration*. To overcome any potential impacts from slumping or the concrete seal failing, the borehole will be inspected approximately two weeks after sealing and appropriate remedial activities will be undertaken should any slumping be identified.

## 7.0 Summary of Impacts and Conclusions

The operational controls outlined in this REF, along with the conditions contained in the EL 6360 have been designed to minimise potential impacts of exploration activities on the environment and community. The nearest residence is 8.6 kilometres from the site with the surrounding area comprising bushland. The REF also considers the impact of exploration activities occurring within exempted area of the Bulli-1 site, and has found that these activities are unlikely to have a significant impact on the local environment. With the proposed controls in place, the impact of the proposed exploration program on the local environment and community is expected to be minimal.

## 8.0 References

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