

# Gold Coast Quarry:

## Coordinator-General's evaluation report on the environmental impact statement

December 2013

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# Synopsis

This report evaluates the potential impacts of the Gold Coast Quarry (the project). It has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (QLD) (SDPWO Act).

The proponent for the project is Boral Resources (Qld) Pty Ltd (Boral), a wholly owned subsidiary of Boral Limited, a company listed on the Australian Stock Exchange.

The proponent is proposing to establish a hard rock quarry on a 217-hectare (ha) greenfield site in the Tallebudgera Valley at Reedy Creek on the Gold Coast.

The proposed quarry would extract and process up to 2 million tonnes per annum of meta-greywacke hard rock over 40 years, which will be used for the manufacture of concrete, asphalt, drainage material, road base, bricks, pavers, pipes and landscape supplies for the building and construction industry.

The following components will be developed on the site:

- a quarry pit excavated to a maximum depth of –66 metres Australian Height Datum (AHD)
- product processing areas for plant and stockpiling of material, including run of mine (ROM) pad and ROM ramps
- mobile and fixed crushing and screening plant
- mobile fleet comprising excavators, graders, front end loaders, bulldozers, compactors, articulated dump trucks, water trucks and haulage trucks
- weighbridge and wheel wash area
- an 89.5-megalitre (ML) water storage dam
- an 11.5 ML sediment pond
- temporary and permanent buildings including site administration office, employee facilities, maintenance workshop, and a vehicle parking area
- external and internal access roads
- 152 ha vegetated buffer zone (70 per cent of the site) to protect its ecological and biodiversity values and to enhance the connectivity of the Springbrook to Burleigh bio-regional corridor.

The capital cost of the project is estimated to be \$160 million (2012 dollars). The project is expected to create 246 full-time equivalent (FTE) positions over the five-to-six-year establishment, development and construction stages. Once operational, the project would provide direct employment for 24 FTE persons.

Construction of the project is estimated to contribute over \$700 million in direct and indirect benefits to Gross State Product (GSP), while the operation of the project would inject \$43.5 million annually into the Queensland economy, the majority of which would be within the local Gold Coast economy.

In undertaking my evaluation of the environmental impact statement (EIS), I have considered the EIS, issues raised in submissions, the additional information to the EIS, further information provided by the proponent following the conclusion of the EIS

process and advice I have received from state agencies, Gold Coast City Council and the Commonwealth Department of the Environment.

The following provides an overview of the key issues arising from the EIS assessment, together with conditions and recommendations that I have made to manage impacts.

### **Project need and alternatives**

Population growth and increased economic activity on the Gold Coast and across South East Queensland will continue the demand for housing and related supporting infrastructure such as transport, health and education. This demand will ensure there is an ongoing need for extractive resources in the Gold Coast region, which are the primary source of materials used in the building and construction industry.

There are seven operating quarries in the Gold Coast region with similar resource characteristics to that of the Gold Coast quarry at West Burleigh, Cedar Creek, Nerang, Ormeau, Yatala, Wolffdene and Beenleigh. The existing West Burleigh quarry has a remaining resource lifespan of between 6.5 and 9 years.

The existing West Burleigh quarry operations within the southern Gold Coast corridor is a key part of the supply chain for future infrastructure development. However, the depletion of existing reserves at the West Burleigh quarry would result in the central and southern Gold Coast having only one significant long-term resource for building and construction materials remaining in operation, at Nerang.

The strategic importance of the proposed Gold Coast quarry as a significant supply source to the building and construction industry to meet an anticipated continued growth in demand for building and construction materials has been recognised in various planning documents and instruments since 2007.

### **Amenity**

While the quarry will change the existing character and amenity of the local area, the impacts of the project on the surrounding community can be largely minimised through design criteria and operating practices. These measures include the use of the existing topography of the site with ridgelines and a large vegetated buffer zone around quarry operations to separate the quarry from the surrounding land uses.

In addition, the hours of operation will be limited to between 6:00 am and 6:00 pm, Monday to Saturday. Blasting may only be carried out between 9am to 5pm on Monday to Friday. No blasting will be allowed on weekends or public holidays. Blasting is likely to occur only once per week and the duration of disturbance is approximately 2 seconds.

Proponent commitments and conditions, set out in the appendices of this report, further mitigate the impact of the quarry on the amenity, lifestyle, ecological and biodiversity values of the community in the immediate vicinity of the quarry.

### **Nature conservation**

The site of the proposed Gold Coast quarry was formerly a cattle grazing property and was largely cleared of vegetation. Cattle grazing and ancillary activities such as logging

were ceased in the early 1970s. Vegetation has progressively regrown on the site since this time.

Accordingly, the majority of the vegetation on the site is considered to be non-remnant, with 26.83 ha (12 per cent of the site) considered to be remnant vegetation under the *Vegetation Management Act 1999* (VM Act). Of the 26.83 ha of remnant vegetation, 1.45 ha will be cleared as a result of the project.

Ground-truthing surveys confirmed the presence of four regional ecosystems (REs) on the project site—one of which supports two major vegetation communities and one of which is classified as endangered (the Northern Grey Ironbark and Grey Gum Eucalypti). Approximately 0.34 ha of the endangered RE will be cleared as a result of the project.

Seven flora species listed as threatened under the *Nature Conservation Act 1992* (NC Act) were recorded on the project site during field surveys. However, none of those listed flora species were identified as occurring within areas directly impacted by the proposed project activities.

No endangered, vulnerable, or near-threatened species of aquatic plants or animals listed under state legislation were recorded in the waterways within the project site.

Fauna species recorded in the project area include the glossy-black cockatoo and the koala (NC Act listed). Clearing of vegetation required for the quarry would result in the loss of 1.11 ha of essential habitat for the koala and no direct impact to habitat for the glossy-black cockatoo. While the koala was recorded in the project area, the impacts are not assessable as the koala conservation measures included in the State Planning Policy 2013 are not applicable due to the project being declared a 'coordinated project'. Despite this, the proponent has committed to mitigation measures and offsets in the Koala Management Plan, which will result in a net benefit for koalas with the planting of additional trees that will be a food source for the species.

The project site is situated in the Springbrook to Burleigh Heads Bioregional Corridor which facilitates the movement of species and the maintenance of genetic diversity among populations. While the proposed disturbance footprint results in the removal of 63 ha of vegetation of variable integrity, a total of 152 ha will be retained, restored and managed within the buffer area.

### **Surface water**

The project site is characterised by steeply undulating topography which results in three main catchments on the site. The catchments discharge into the Nerang River and Tallebudgera Creek. There are numerous mapped waterways within the catchments, all of which are typically dry with flow occurring only during and following significant rainfall events.

The EIS assessed the waterways and determined that two of the waterways were watercourses as defined in the *Water Act 2000*. The proposed quarry disturbance footprint avoids impacting these watercourses.

Surface water impacts include:

- changes to sediment loads discharging from the site to the waterways and watercourses
- changes in water flow as a result of water harvesting to the quarry dam to meet the project's water demands
- increased flood risk due to the removal of vegetation and material (overburden and rock) resulting in potential compaction of soils which can increase the volume and rate of runoff.

These impacts will be mitigated and managed through the measures adopted in the Stormwater Management Plan, the Sediment and Erosion Control Program, and the Landscape Rehabilitation Plan.

Flood risk as a result of changes to the site topography is considered low as the EIS found that existing floods within the site are generally confined to within the steep, narrow gullies and as a result, the extent of flooding does not change significantly with increasing flood magnitude. Modelling of water runoff with the proposed quarry disturbance footprint in place predicts that the catchments are typically responsive with flows rising and falling quickly during and immediately following the triggering storm, with increases in downstream flows shown to be minimal and only present in temporary phases.

The mitigation measures and adaptive management strategies proposed and to be implemented by the proponent result in a decrease in stormwater pollutant loads discharging from the site relative to the existing site and a moderate decrease in flows throughout the year (approximately 7 per cent), while dry season flows are expected to increase moderately (approximately 6 per cent). Accordingly, no significant impacts to surface water hydrology are expected.

### **Groundwater and groundwater-dependent ecosystems**

The aquifer system of the site is described in the EIS to be of very low to low permeability and the groundwater characteristics of the site rely primarily on rainfall for recharge. Accordingly, groundwater is present in the upper surface of the rock mass after heavy rainfall and discharges to the surrounding waterways and watercourses quickly because of the steep topography.

The quarry pit would interrupt the existing groundwater flow, recharge and discharge characteristics of the site with groundwater seeping into the quarry pit. However, most groundwater inflow is predicted to evaporate from the pit walls due to the slow rate of seepage, with any water collecting in the in-pit sumps being pumped into the surface water management system.

The EIS considers that while quarry operations will reduce groundwater discharge to the creeks, groundwater discharge will continue and the pools and saturated alluvium will continue to exist. However, the pools and saturation of the alluvium will not last as long into the dry season as they currently do. The removal of the aquifer over the area of the quarry footprint has the potential to impact ecosystems along the creeks, affecting both flora and fauna that are partially dependent on groundwater discharge. However, the flora and fauna impact assessment found these impacts to be low risk.

The proponent has committed to implementing a Groundwater Monitoring Plan to manage the impacts on groundwater and groundwater-dependent ecosystems.

### **Air quality**

The background sources of dust emissions in the project area at present are from industrial activity to the north of the project, including the existing West Burleigh quarry, the Reedy Creek Landfill, the Elanora wastewater treatment plant, the Burleigh Heads Bakery and exhaust emissions from vehicles travelling along the Pacific Motorway.

Additional emissions of Total Suspended Particulates (TSP), Particulate Matter (PM)<sub>10</sub> and PM<sub>2.5</sub> would be generated by quarrying activities, including: material excavation, handling, crushing, screening and haulage; wind erosion of exposed areas and stockpiles; and drilling and blasting.

The proponent has proposed a number of dust control measures and treatments to manage the project's dust emissions, including: plant enclosures; dust suppression of stockpiles and pads, internal roads, and blasting areas; sealing of selected internal roads; and the covering of loads and wheel washing of all trucks leaving the quarry.

The results of the predictive modelling presented in the EIS found that the maximum concentrations of nitrogen dioxide (resulting from explosives used in blasting) and particulate matter as TSP, PM<sub>10</sub> and PM<sub>2.5</sub> would not exceed the relevant standard and guidelines set out in the Environmental Protection (Air) Policy 2008 (EPP (Air)) at all residential sensitive receptors, with the exception of two locations for PM<sub>10</sub>. However, it is standard in the assessment of PM<sub>10</sub> concentrations to consider 5 exceedances per year as acceptable. The modelling results indicate the 6<sup>th</sup> highest per centile predicted maximum 24-hour average ground-level concentration of PM<sub>10</sub> which are below the EPP Air criteria. It is noted that the ground-level concentrations of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> could exceed the regulatory limits in limited areas of the buffer zone to the north and south of the quarry operating pit. However, these predicted exceedances are not considered large enough to adversely affect vegetation.

In addition to particulate matter TSP, PM<sub>10</sub> and PM<sub>2.5</sub>, the EIS and further information provided to the Coordinator-General following the EIS process<sup>1</sup> specifically assessed respirable crystalline silica, and mineral actinolite and other fibrous minerals similar to asbestos (asbestiform). Crystalline silica and asbestiform minerals such as actinolite can be present in hard rock and can be released as a result of the cutting, drilling, blasting and processing of the hard rock.

Crystalline silica is controlled and monitored as part of PM<sub>2.5</sub> and can generally be adequately managed through control measures. The EIS assessed the level of crystalline silica to be below the relevant regulatory limits at all residential sensitive receptors. In terms of risks to workers, the proponent has committed to conducting routine monitoring of its workforce to exposure to crystalline silica and will be required to comply with the relevant provisions of the *Mining and Quarrying Safety and Health Act 1999*.

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<sup>1</sup> Report on SEM, TEM XRD and PLM analysis of quarry core samples for the presence of asbestos fibre, W Kwiecien, Queensland University of Technology, June 2013

The presence of actinolite and other asbestiform minerals in the Gold Coast quarry hard rock resource was considered as part of the geological and geotechnical assessment of the project. An analysis of rock drill core samples indicated that actinolite may form between 1 per cent and 3 per cent of the total mineralogical composition of the rock. Actinolite and other asbestiform minerals are commonly found in greenstone hard rock resources. The Gold Coast quarry is a meta-greywacke hard rock resource which does not exhibit the presence of greenstone and is not associated with asbestos mineralisation. Given the preliminary core sample analysis findings, further drilling and analysis of rock drill core samples was undertaken post-EIS process, which did not detect the presence of any asbestiform minerals such as actinolite. The proponent will be required to comply with the relevant provisions of the *Mining and Quarrying Safety and Health Act 1999* which would protect workers from any risk of exposure. A condition has been stated to address the risk to human health of exposure to asbestiform minerals.

The dust control measures and treatments committed to by the proponent to manage the project's dust emissions, together with the site specific meteorology, terrain and land-use (i.e. vegetated buffer zone) demonstrate that the predicted dust emissions from project activities would not cause a risk to human health and would not cause a nuisance to the community.

### **Noise and vibration**

The ambient noise sources and levels are representative of the semi-rural/bushland setting of the site, whilst still in close proximity to a major urban centre.

The project will introduce noise sources to the local area which are not currently present. These new noise sources include: the operation of plant and equipment; additional traffic noise; and rock drilling and blasting.

The proponent has adopted a number of project design and operating practices, and mitigation measures which will result in the noise emissions from the project being compliant with the relevant regulatory noise criteria at sensitive receptors. The noise attenuation measures include: use of the site topography and vegetated buffer zone to shield plant and equipment operation; enclosure of crushing and screening plant; use of low noise rock drills; deployment of acoustic barrier fences; and lower truck speeds around private dwellings.

Potential sources of vibration from the project include earthmoving activities, processing of raw material, haulage trucks and blasting. Vibration from use of earthmoving equipment, crushing and screening plant, and the operation of haulage trucks is not predicted to be at a level that would adversely affect human comfort or cause damage to property.

Vibration and air overpressure from blasting would be mitigated by separation distances and the size of the explosive charges. The proponent proposes to carry out blasting once a week, generally in the middle of a regular weekday. Each blast will have a duration of around two seconds. The proponent has committed to offering building condition surveys to a limited number of houses in the surrounding area, prior to the commencement of works at the site, to assist in assessing any possible claim related to potential structural damage to any nearby buildings.

Based on the design and operational practices adopted by the proponent and the mitigation measures contained in the draft EMP and the Blasting Management Plan, the project can achieve compliance with the regulatory limits for noise and vibration. The predicted noise and vibration levels are not considered to be intrusive or unpleasant, and should not adversely affect human comfort or cause damage to property.

### **Transport**

The EIS predicted that the project would generate increased traffic movements on the roads surrounding the quarry during the pre-operational and operational phases of the project. The additional truck movements generated by the project were estimated to be around 230 per day, Monday to Saturday at peak times on average during pre-operations, and 280 per day, Monday to Saturday at peak times on average during operations.

The road network impacted by the haulage of construction and quarry materials is limited to the designated haulage route, which incorporates Old Coach Road (Reedy Creek), Pacific Motorway, Stapley Drive, Scottsdale Drive, Reedy Creek Road and Bermuda Street (Burleigh Heads-Varsity Lakes).

The potential impacts to the designated haulage route are broadly categorised into increased pavement wear and road safety issues due to the increased traffic volume, particularly heavy haulage vehicles.

The traffic analysis concluded that the increased traffic generated by the project would not adversely affect the level of service at peak times.

Further traffic and transport analysis is required to address the road safety, transport efficiency, road surface and traffic impacts on the local government road network, particularly Old Coach Road. The proponent has committed to reviewing and updating its traffic analysis and accompanying Road Impact Assessment, Road-Use Management Plan and Traffic Management Plan during detailed design, when additional and more certain trip generation and traffic volume information would be available.

A number of conditions have been stated to address the potential traffic and transport impacts.

### **Matters of national environmental significance**

An assessment of the predicted impacts of the project on threatened species and ecological communities undertaken by the proponent as part of the EIS process indicated that no threatened fauna species or ecological communities (listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)) (EPBC Act) were recorded during surveys of the project area.

Two EPBC Act listed flora species—Durobby (*Syzygium moorei*) and Ribbon Orchid (*Taeniophyllum muelleri*)—were recorded in the project area. However, neither of these flora species would be directly impacted by the project.

There will be no residual impacts to threatened species and ecological communities in the project area subsequent to implementation of the commitments and management plans proposed by the proponent.

### **Coordinator-General's conclusion**

The project is the only feasible source of meta-greywacke hard rock on the central and southern Gold Coast capable of compensating for the loss of the West Burleigh quarry. It would support the building and construction industry in South East Queensland by providing supply flexibility for building and construction materials and reducing transport costs.

I consider that the environmental impact assessment requirements of the SDPWO Act for the Gold Coast Quarry project have been met and that sufficient information has been provided to enable a thorough evaluation of the potential impacts of the project.

I conclude that there are local, regional and state benefits to be derived from the development, and that any adverse environmental impacts can be acceptably avoided, minimised, mitigated or offset through the implementation of the proponent's mitigation measures and commitments outlined in the EIS documentation. My conditions and recommendations in this report have been formulated in order to further manage all impacts associated with the project.

I conclude that the economic benefits of the project outweigh the socio-economic and other environmental impacts of the project. Accordingly, I recommend the project proceed subject to the conditions and recommendations set out in the appendices of this report. In addition, it is expected that the proponent's commitments will be fully implemented.

This report will be provided to the Commonwealth Minister for the Environment, pursuant to section 36(2) of the SDPWO Regulation and the assessment bilateral agreement between the State of Queensland and the Commonwealth to support a decision on the controlled actions for this project, pursuant to section 133 of the EPBC Act.

A copy of this report will also be provided to the proponent, Gold Coast City Council and relevant state government agencies, and will also be made publicly available at: [www.dsdip.qld.gov.au](http://www.dsdip.qld.gov.au)



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Barry Broe  
Coordinator-General

20 December 2013

# 1. Introduction

This report has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) for the proposed Gold Coast Quarry project (the project).

The report:

- summarises the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels
- presents an evaluation of the project, based on information contained in the EIS, additional information to the EIS, submissions made on the EIS and information and advice from advisory agencies and other parties
- sets conditions under which the project may proceed.

## 2. About the project

### 2.1. The proponent

The proponent for the project is Boral Resources (Qld) Pty Ltd (Boral), a wholly owned subsidiary of Boral Limited, a company listed on the Australian Stock Exchange.

Founded in Sydney in 1946 as a bitumen and oil refiner, Boral Limited has operated solely as a construction materials and building products group since the Company's de-merger in January 2000, when its non-building sector activities were separated and incorporated into a new listed entity, Origin Energy Limited.

Boral Limited is headquartered in Sydney and primarily services customers in the building and construction industries producing and distributing a broad range of construction materials, including quarry products, cement, fly ash, pre-mix concrete and asphalt; and building products, including clay bricks and pavers, clay and concrete roof tiles, concrete masonry products, plasterboard, windows and timber. It has operations in three key geographical markets—Australia, the USA and Asia.

Boral operates over 100 sites across Queensland, including 30 quarries, 68 concrete batching plants, and 16 asphalt plants. The business is geographically diverse with operations in all major coastal centres from the Gold Coast to Cairns and westward as far as Barcaldine. Within the Gold Coast region, Boral currently operates four quarries (Yatala, Stapylton, Ormeau and West Burleigh), eight concrete batching plants (Robina, Benowa, Labrador, Coomera, Beenleigh, Chinderah as well as two Q-Crete plants) and one fixed asphalt plant (West Burleigh).

Boral has operated its existing West Burleigh quarry, which is approximately 500 metres to the east of the proposed quarry site on the opposite side of the Pacific Motorway, for over 30 years.

### 2.2. Project description

The proponent is proposing to establish a hard rock quarry on a greenfield site in the Tallebudgera Valley at Reedy Creek on the Gold Coast (refer Figure 2.1).



Figure 2.1 Site regional locality plan

The proposed quarry will extract and process up to 2 million tonnes per annum (Mtpa) of meta-greywacke hard rock over 40 years, which will be used for the manufacture of concrete, asphalt, drainage material, road base, bricks, pavers, pipes and landscape supplies for the building and construction industry.

## **2.2.2. Tenure and location**

The proposed quarry is contained wholly within Lot 105 on SP 144215. Lot 105 has an area of 216.7 hectares (ha) and is bisected by Lot 901 on SP 907357. Lot 901 is a gazetted fire trail used for fire management.

Lot 105 is owned by Boral in freehold. Lot 901 is owned by the State of Queensland and is administered by the Gold Coast City Council (GCCC) as trustee.

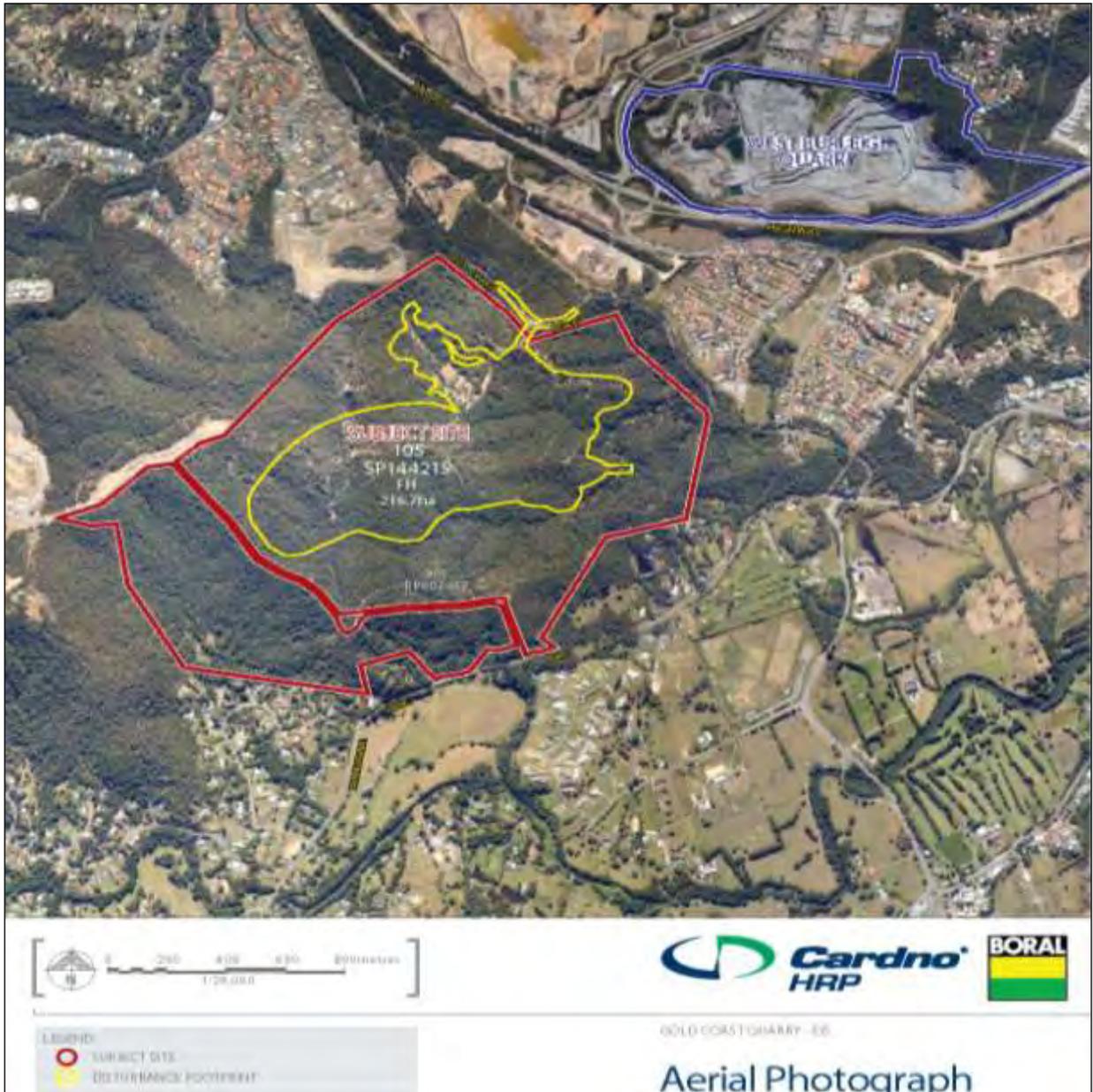
The project site is bounded by Old Coach Road to the north-east, Tallebudgera Creek Road to the south-east, Kingsmore master-planned housing estate to the north-west and Stockland Observatory master-planned housing estate to the west.

## **2.2.3. Project components**

The project comprises construction and operation of a quarry and associated infrastructure.

### **Gold Coast Quarry**

The Gold Coast Quarry project (quarry pit and associated infrastructure and works) will have a disturbance area of 65 hectares, with the remaining 152 ha, or 70 per cent, of the site area to be retained in its existing vegetated state to protect its ecological and biodiversity values and to enhance the connectivity of the Springbrook to Burleigh bio-regional corridor (refer Figure 2.2).



**Figure 2.2 Project-site locality plan**

The proposed quarry has an estimated resource of 79 million tonnes of meta-greywacke hard rock, which will be extracted and processed over 40 years at an annual rate of up to 2 Mtpa. In addition to the meta-greywacke hard rock resource, up to 6 million tonnes of material will be removed from the site to allow the quarry and related plant to be established. The project is anticipated to be fully operational within five to six years of obtaining development approval.

The following components (see Figure 2.3) will be developed on the site:

- a quarry pit excavated to a maximum depth of Reduced Level (RL) –66 metres Australian Height Datum (AHD)

- a quarry sump for dewatering of the quarry pit excavated 12 metres into the floor of the quarry pit and measuring approximately 100 metres long and 100 metres wide
- product processing areas for plant and stockpiling of material, including run of mine (ROM) pad and ROM ramps
- mobile and fixed crushing and screening plant with processing capacity of between 750 tonnes per hour (tph) and 900 tph
- mobile fleet comprising excavators, graders, front end loaders, bulldozers, compactors, articulated dump trucks, water trucks and haulage trucks (Tandem Rear Axle, Tri Rear Axle Semi, Tandem Rear Axle Truck and Quad Dog)
- weighbridge and wheel wash area
- a water storage dam, 200 metres long and 120 metres wide, with a maximum water storage capacity of 89.5 megalitres (ML), an average depth of 2.2 metres and a maximum depth of 11 metres, located in the northern portion of the site
- a sediment pond, 100 metres long and 60 metres wide with a maximum water storage capacity of 11.5 ML, an average depth of 4.5 metres and a maximum depth of 4.7 metres
- temporary and permanent buildings including site administration office, employee facilities, maintenance workshop, and a vehicle parking area
- external access road and associated intersection (from Old Coach Road)
- internal access and maintenance roads.



The project includes the following key environmental design features:

- a disturbance footprint which avoids any vegetation species of national significance, endangered regional ecosystems, the nesting tree of a white-bellied sea eagle and a number of feed trees for the glossy-black cockatoo
- buffer zones:
  - from the edge of the quarry disturbance footprint to:
    - the boundaries of Lot 105 of 104 metres to 611 metres
    - residences of 205 metres to 800 metres
  - from the edge of the quarry operations pit to:
    - the boundaries of Lot 105 of 224 metres to 735 metres
    - residences of 395 metres to 1100 metres
- progression of the pit development in a manner that reduces potential external views for the longest period possible and incorporates staged rehabilitation of terminal quarry benches and faces
- acoustic barrier mounds and fences of up to 8 metres high.

## **2.2.4. Development stages**

The project will be developed in the following stages:

- site establishment
- development and construction
- quarrying operation
- rehabilitation and decommissioning.

The site establishment stage involves activities required to gain access to and around the site and to the quarry plant pad floor, including:

- construction of external and internal access roads
- vegetation clearing
- earthworks (cut and fill) for infrastructure, facilities, plant and equipment pads
- construction of weighbridge and wheel wash facilities
- construction of a sedimentation pond and water storage dam embankment wall and associated spillway
- construction of temporary buildings.

This stage is anticipated to take approximately 12 months.

The development and construction stage involves activities required to prepare the future crushing plant ROM pad and main platform floor, and construction of permanent crushing plant, support buildings, workshop and infrastructure, including:

- further earthworks for the plant pad
- creation of ROM pad and ROM ramp, and stockpile area
- erection of crushing plant
- construction of permanent buildings (site office, employee facilities, workshop).

This stage is anticipated to take approximately four to five years.

The site establishment stage is scheduled to commence in 2016 and the development and construction stages would be completed around five to six years later.

During the site establishment, development and construction stages of the project, activities associated with site works (specifically bulldozers, rock breakers and rock drills) and mobile crushing and screening would take place between the hours of 7:00 am and 6:00 pm, Monday to Saturday. Blasting activities would take place between the hours of 9:00 am and 5:00 pm, Monday to Friday. Maintenance activities would take place 24 hours a day, Monday to Saturday, and 8:00 am to 6:00 pm, Sundays.

The quarry operation stage involves:

- extractive activities, including blasting, crushing, screening
- rehabilitation of benches.

This stage is anticipated to take approximately 40 years.

Quarry extraction, crushing and screening operational activities are proposed between the hours of 6:30 am and 6:00 pm, Monday to Saturday. Blasting activities would take place between the hours of 9:00 am and 5:00 pm, Monday to Friday. Maintenance activities would take place 24 hours a day, Monday to Saturday, and 8:00 am to 6:00 pm, Sunday.

The rehabilitation and decommissioning stage involves:

- rehabilitation and revegetation of benches on a progressive basis during quarry operations
- dismantling and removal from the site of plant and equipment on completion of quarry operations
- conversion of the quarry pit into a lake.

The quarry lake will be approximately 700 metres long, 400 metres wide and 90 metres deep and is estimated to have a capacity of 9000 ML.

The quarry lake which will form in the quarry pit will take approximately 14 years to fill.

## **2.2.5. Infrastructure requirements**

Infrastructure and service requirements associated with the construction and operation of the proposed quarry include:

- access to the road network via an intersection at Old Coach Road and use of the local and state-controlled road network for haulage of quarry plant and equipment, and material during all stages of the project's life
- telecommunications infrastructure via fibre-optic cable in dedicated conduits and pits
- connection to the local electrical mains infrastructure. A number of options have been discussed with Energex and depending on the option ultimately adopted, there may be a requirement for easements to be obtained over adjoining allotments to facilitate the provision of electricity.

The project will not be connected to the trunk water reticulation system or the local trunk sewerage network. All water used on site will be captured in the project's water storage dam and treated to the appropriate standard depending on the usage. An on-site sewage treatment plant system will be provided to dispose of sewage.

### **2.2.6. Dependencies and relationships with other projects**

The existing West Burleigh quarry (Key Resource Area (KRA) 70), which is approximately 500 metres to the east of the proposed quarry site on the opposite side of the Pacific Motorway, is anticipated to exhaust its reserves of meta-greywacke hard rock in the next 6.5 to 9 years. The existing West Burleigh quarry produces primarily asphalt aggregates, road base and concrete aggregates.

In addition to the depletion of the resource, the West Burleigh quarry is constrained by a number of other factors, including surrounding development and proposed infrastructure development. The West Burleigh quarry is surrounded on all sides by urban development, such as roads, residential and industrial estates. Infrastructure developments have been proposed locally, including widening of the Pacific Motorway, extension of the Gold Coast heavy gauge railway line south of Varsity Lakes terminus station and High Voltage (HV) power transmission lines. The proposed infrastructure projects, if they proceed, would potentially sterilise approximately 30 per cent of the remaining reserves at the West Burleigh quarry.

As a result of the limitations to the ongoing operation of the West Burleigh quarry imposed by the remaining resource lifespan and proposed infrastructure developments, the Gold Coast Quarry, with a similar resource characteristic, would form an integral and important part of the supply of material to the building and construction industry, particularly on the southern Gold Coast.

## **2.3. Project rationale**

Extractive resources are the primary source of materials used for building roads, bridges, railways, factories, hospitals, schools and homes.

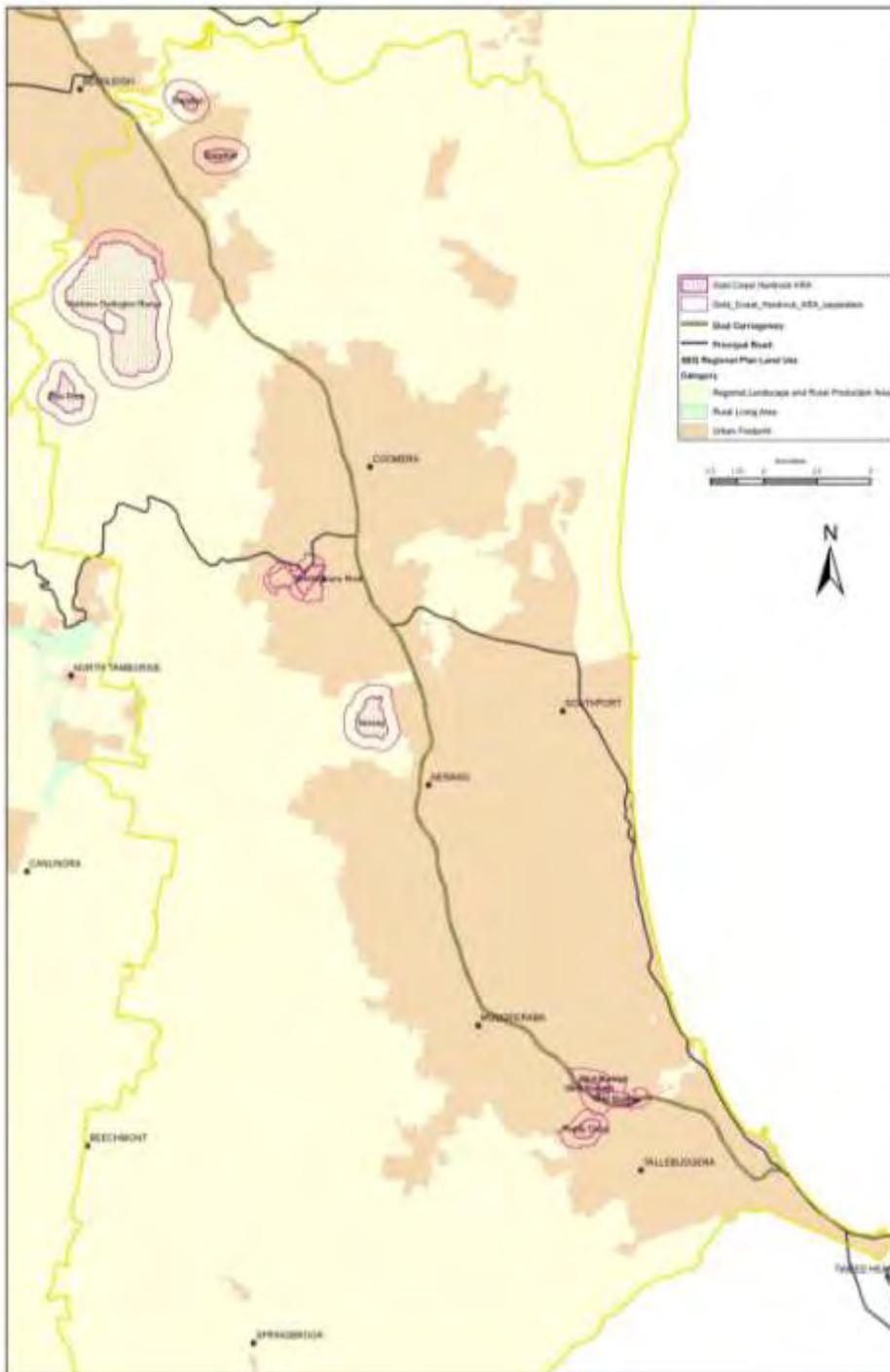
Population growth and increased economic activity on the Gold Coast and across South East Queensland will continue the high demand for housing and related supporting infrastructure such as transport, health and education. This demand will ensure there is an ongoing need for extractive resources in the Gold Coast region.

The existing West Burleigh quarry operations within the southern Gold Coast corridor are a vital part of the supply chain for future infrastructure development. However, the depletion of existing reserves at the West Burleigh quarry would result in the central and southern Gold Coast having only one significant long term resource for building and construction materials remaining in operation, located at Nerang.

Other operating quarries in the Gold Coast region with similar resource characteristics are located in the northern part of the region (refer Figure 2.4) and include:

- Blue Rock, Cedar Creek (KRA 62)—a greenstone and greywacke resource producing primarily asphalt aggregates and road base

- Nerang (KRA 66)—a meta-greywacke, quartzite and argillite resource producing primarily road base and concrete aggregates
- Northern Darlington (KRA 67)—a meta-greywacke, quartzite and greenstone resource comprising four individual quarries located in Ormeau, Yatala, Wolffdene, Beenleigh and producing primarily asphalt aggregates, concrete aggregates, crusher fines, fine aggregate/manufactured sand and road base.



**Figure 2.4 Other quarries operating in the Gold Coast region**

According to Department of Natural Resources and Mines (NRM) information, the six operating quarries above have an average remaining resource lifespan of over 27 years, based on an estimate of the remaining resource and future production rates.

None of the quarries above are able to produce similar end-use materials in similar proportions as the existing West Burleigh quarry (KRA 70), which produces primarily asphalt aggregates, road base and concrete aggregates and has a remaining resource lifespan of between 6.5 and 9 years.

Given that extractive industry development can only occur in locations where the hard rock resource occurs naturally, the only feasible source of meta-greywacke hard rock on the central and southern Gold Coast capable of substituting for the loss of the West Burleigh quarry is the proposed Gold Coast Quarry (Reedy Creek KRA 96).

The strategic importance of the proposed Gold Coast Quarry as a significant supply source to the building and construction industry to meet an anticipated continued growth in demand for building and construction materials has been recognised in various planning documents and instruments since 2001 (refer Section 4.3.1 of this report for further discussion).

While other hard rock deposits have been identified in the broader Gold Coast region, most have been rendered either inaccessible or uneconomic due to topographic and transport issues, including longer haul routes and roads which are not suitable for high volume truck traffic.

The proposed Gold Coast Quarry offers a secure, long-term building and construction materials resource for the Gold Coast and is the only quarry capable of directly substituting for the loss of the West Burleigh quarry. The project would enhance building and construction materials supply flexibility in the wider South East Queensland region by allowing the Gold Coast quarries to the north to continue serving the needs of areas beyond the Gold Coast, such as the cities of Brisbane, Logan and Ipswich.

The proposed Gold Coast quarry has a number of benefits, not only to the Gold Coast, but to the wider South East Queensland region, compared to alternatives, including:

- lower prices for building and construction materials due to increased supply
- lower transport costs due to reduced transport distances
- greater diversity of resources to cater for demand generated from other areas, such as Brisbane City
- decreased air pollution due to reduced transport haulage distances.

A cost benefit analysis prepared as part of the EIS found that the project is expected to deliver a positive net state benefit with a Net Present Value of \$594.7 million, of which \$91.8 million is attributable to the proponent and \$502.9 million is attributable to all other stakeholders.

The operating revenue of the proposed Gold Coast Quarry is projected to be in the order of \$45 million. The flow-on or multiplier effects to the Queensland economy are estimated to be in the order of \$43.5 million, with \$40.3 million generated within the local Gold Coast economy.

The capital cost of the project is estimated to be \$140–\$160 million (2012 dollars). The project is expected to create 246 full-time equivalent (FTE) positions over the five to six year establishment, development and construction stages. Once operational, the project would provide direct employment for 24 FTE persons.

Establishment, development and construction of the project is anticipated to generate flow-on employment opportunities for the wider Gold Coast region and Queensland of approximately 480 and 490 FTE positions, respectively. The flow-on employment benefits from operation of the project are estimated to be 62 FTE positions for the Gold Coast and 65 FTE positions in Queensland.

## 3. Impact assessment process

### 3.1. Overview

This section details the steps in the project's EIS assessment process. For a detailed explanation of the EIS process, refer to [www.dsdip.qld.gov.au/cg](http://www.dsdip.qld.gov.au/cg)

In undertaking this evaluation, I have considered the following:

- initial advice statement (IAS)
- EIS
- issues raised in submissions to the EIS
- additional information to the EIS
- technical reports
- agency advice from:
  - Department of Agriculture, Fisheries and Forestry
  - Department of Community Safety
  - Department of Education, Training and Employment
  - Department of Environment and Heritage Protection (DEHP)
  - Department of Health
  - DNRM
  - Department of Transport and Main Roads
  - GCCC
- comments and properly made submissions<sup>2</sup> from members of the public.

Table 3.1 shows the steps taken in the project's EIS process.

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<sup>2</sup> For a definition of a 'properly made submission', refer to the Glossary on page 118 of this report.

**Table 3.1 Overview of EIS process**

Date	Process
8 December 2009	Final initial advice statement and request for project declaration received
19 November 2010	Project declared a 'coordinated project' by Coordinator-General
25 November 2010	Proposed action referred to Australian Government for 'controlled action' determination
21 December 2010	Australian Government determined project is a 'controlled action'
19 February 2011	Submission period on draft terms of reference (TOR) commenced
1 April 2011	Submission period on draft TOR closed
26 July 2011	TOR finalised
25 March 2013	Draft EIS provided to Coordinator-General for TOR adequacy review
27 April 2013	EIS released for public and agency comment
11 June 2013	Submission period on EIS closed
6 August 2013	Additional information requested by Coordinator-General
27 September 2013	Additional information provided to Coordinator-General for adequacy review
31 October 2013	Additional information released for agency comment
22 November 2013	Submission period on additional information closed

## 3.2. Coordinated project declaration

On 19 November 2010, the then Coordinator-General declared this project to be a 'coordinated' project under section 26(1)(a) of the SDPWO Act. This declaration initiated the statutory environmental impact evaluation procedure of Part 4 of the SDPWO Act, which required the proponent to prepare an EIS for the project.

The SDPWO Act was amended in December 2012 (with the amendments taking effect on 21 December 2012). The amendments have renamed 'significant project' to 'coordinated project'. The project will be referred to as a coordinated project throughout this evaluation report.

## 3.3. Controlled action

On 21 December 2010, the Commonwealth Minister for the Environment (previously the Minister for Sustainability, Environment, Water, Population and Communities) determined that the project is a 'controlled action'<sup>3</sup> under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

The relevant controlling provision under the EPBC Act is:

- sections 18 and 18(a)—listed threatened species and ecological communities.

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<sup>3</sup> For a definition of 'controlled action', refer to the Glossary on page 118 of this report.

A bilateral agreement exists between the Australian and Queensland governments that allows the Queensland Government to conduct the EIS assessment process to meet the needs of both jurisdictions. Section 7 (Matters of national environmental significance) lists the controlling provision under the EPBC Act and explains the extent to which the Queensland Government EIS process addresses the actual or likely impacts of the project on the matters covered by the provision.

The Commonwealth Environment Minister will use the information in Section 7 to assess the project under the EPBC Act.

### 3.4. Terms of reference

The draft terms of reference (TOR) for the EIS for the proposed project was released for public and advisory agency comment from 19 February 2011 to 1 April 2011. Twenty-five submissions were received, comprising 11 from advisory agencies, 3 from non-government organisations and 11 from public submitters.

A final TOR was prepared having regard to submissions received and was issued to the proponent on 26 July 2011.

### 3.5. Review of the EIS

The EIS, prepared by the proponent, was available for public and agency comment from 19 April 2013 to 11 June 2013.

A total of 4087 submissions (including several form letters submitted by 3829 respondents) was received. Copies of the submissions were forwarded to the proponent. Only submissions relating to matters of national environmental significance (MNES) were forwarded to the Australian Department of the Environment (DOE) (previously the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)).

The primary issues raised in public submissions related to: noise; air quality; water quality and groundwater-dependent ecosystems; traffic and transport; location; property values; and terrestrial flora and fauna.

Table 3.2 summarises the number of public and agency submissions on the EIS. For an assessment of the environmental impacts of this project, refer to Section 5 of this report.

**Table 3.2 Public and agency comments received on the EIS**

<b>Submitter</b>	<b>No. of submissions</b>	<b>Issue</b>
<b>Queensland Government</b>	<b>14</b>	
• Department of Agriculture, Fisheries and Forestry		Forest products, pests, aquatic ecology
• Department of Community Safety		No comment
• Department of Education, Training and Employment		Traffic, noise and vibration, air quality
• Department of Energy and Water Supply		No comment
• DEHP		Water quality, air quality, flora and fauna, sediment and erosion control, land contamination
• Department of Health		Air quality, health and safety
• Department of Housing and Public Works		No comment
• Department of Justice and Attorney-General		No comment
• Department of National Parks, Recreation, Sport and Racing		No comment
• DNRM		Native vegetation, ground water, water quality, sediment and erosion control, soil
• Department of State Development, Infrastructure and Planning		No comment
• Department of Transport and Main Roads		Pavement impact, traffic operations, road safety
• Department of Tourism, Major Events, Small Business and the Commonwealth Games		No comment
• Queensland Police Service		No comment
<b>Australian Government</b>	<b>1</b>	
• Department of the Environment		Terrestrial flora, surface and ground water hydrology, habitat fragmentation and edge effects, cumulative impacts
<b>Local Government</b>	<b>1</b>	
• GCCC		Traffic and road safety, planning and land use, ecological values, decommissioning
<b>Private organisations/ community groups</b>	<b>12</b>	
• Birdlife Southern Queensland		Nature conservation—terrestrial flora and fauna
• Blinds2Go		Planning and land use, noise and vibration, nature conservation, flora and fauna

Submitter	No. of submissions	Issue
• Cement Concrete and Aggregates Australia		Supports project
• Elesanar Constructions		Access to site, impacts flora and fauna, visual impact, dust and air quality, floodplain management, rehabilitation
• Gecko – Gold Coast and Hinterland Environment Council		Impacts on flora and fauna, visual impact, dust, traffic and transport, blasting
• Hammercall Land Developers		Access to site, impacts flora and fauna, visual impact, dust and air quality, floodplain management, rehabilitation
• Housing Industry Association		Supports project
• Master Builders		Supports project
• Master Concreters Qld		Supports project
• Stockland		Visual amenity, community consultation
• Stop the Gold Coast Quarry Association		Impacts on flora and fauna, groundwater management, floodplain management, noise and dust management, cultural heritage
Urban Development Institute of Australia		Supports project
<b>Private individuals (form letters)</b>	<b>3829</b>	Air quality, traffic and transport, noise and vibration, blasting, nature conservation, planning and land use, economy
<b>Private individuals</b>	<b>230</b>	Air quality, nature conservation, transport, blasting, planning and land use, dust
<b>TOTAL</b>	<b>4087</b>	

Of the 4087 submissions received, 132 were received after the closing date for public comment on the EIS. These submissions are unlikely to be considered ‘properly made submissions’.

However, for the purposes of my evaluation of the predicted environmental impacts of the project, I have considered the issues raised by these submitters.

### 3.6. Additional information

On 6 August 2013, I requested that Boral provide additional information to address the following key issues raised during the public consultation period:

- air quality (dust emissions and deposition rate, modelling and control objectives)
- water quality (sediment and erosion control, total suspended solids and discharge criteria)
- groundwater-dependent ecosystems (vegetation and hydrology impacts)
- terrestrial fauna (white-bellied sea-eagle and nocturnal fauna)

- transport (traffic operations, traffic safety and pavement impact)
- project need (continuity of supply and cost-benefit analysis).

Agencies were requested to provide final comments and advice for consideration for inclusion as conditions of subsequent approvals or recommendations in this evaluation report. The additional information to the EIS was available for agency comment from 31 October 2013 to 22 November 2013.

The additional information to the EIS was available for public viewing over this period on Boral's website and was accessible via a link on the department's website.

Six submissions were received, copies of which were forwarded to the proponent. The primary issues raised in these submissions related to: air quality, water quality, traffic and transport, groundwater, noise.

Table 3.3 summarises the agency submissions on the additional information to the EIS. For an assessment of the project's key issues and potential impacts, refer to Section 5 of this report.

**Table 3.3 Submissions received on supplementary project information**

Agency	No. of submissions	Issue
<b>Queensland Government</b>	<b>5</b>	
• Department of Agriculture, Fisheries and Forestry		No comment
• Queensland Health		Air quality, pest management, water quality
• DNRM		Groundwater, soil, vegetation clearing
• Department of Transport and Main Roads		No comment
• DEHP		Air quality, water quality, sediment and erosion control, fauna
<b>Local Government</b>	<b>1</b>	
• Gold Coast Regional Council		Air quality, noise, traffic & transport, planning and land use, water quality, sediment and erosion control
<b>TOTAL</b>	<b>6</b>	

Since the release of the additional information to the EIS, the proponent has provided further information to the Coordinator-General<sup>4</sup> about the likely presence of actinolite and other asbestiform minerals in the Gold Coast Quarry hard rock resource. This information was provided in response to issues raised by the community with GCCC during the advisory agency comment period on the additional information to the EIS. GCCC raised this matter with the Coordinator-General as part of its submission on the additional information. I have considered this further information in my evaluation of the environmental effects of the project. Further details can be found in Section 5.4.

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<sup>4</sup> *Report on SEM, TEM XRD and PLM analysis of quarry core samples for the presence of asbestos fibre*, W Kwiecien, Queensland University of Technology, June 2013

## 4. Project approvals

Approvals for the project must be provided by several local, state and Australian Government agencies, and I have set conditions for these matters. The likely approvals or permits, approving agencies and associated legislation are listed in Table 4.1. More information about each approval is in Sections 4.2 to 4.4 below.

**Table 4.1 Approvals and permits required for the project**

Project phase	Agency	Legislation	Approval/permit
<b>Local council</b>			
Development	GCCC	<i>Building Act 1975</i>	All aspects of the project that require building works e.g. workshop, weighbridge
Development	GCCC	<i>Local Government Act 2000</i>	<ul style="list-style-type: none"> <li>Local Law No. 6 (Vegetation Management)</li> <li>Local Law No. 8 (Public Health, Safety and Amenity)</li> <li>Local Law No. 11 (Roads and Malls)</li> <li>Local Law No. 15 (On-site Sewerage Facility)</li> <li>Subordinate Local Law No.15.1 (On-site Sewerage Facility)</li> <li>Local Law No 16.(Licensing)</li> <li>Subordinate Local Law No.16.8 (Advertisement)</li> </ul>
Development	GCCC	<i>Sustainable Planning Act 2009</i>	Development Application for a Material Change of Use of premises
<b>State</b>			
Development	Department of Aboriginal and Torres Strait Islander and Multicultural Affairs	<i>Aboriginal Cultural Heritage Act 2003</i>	Cultural Heritage Management Plan
Development	DEHP	<i>Environmental Protection Act 1994</i>	Approvals: ERA 16(2)(d) Extracting ERA16 (3)(c) Screening ERA 63(2)(a)(ii) Operating sewerage treatment works
Development	DEHP	<i>Environmental Protection (Air) Policy 2008</i>	Development permits
Development	DEHP	<i>Environmental Protection (Noise) Policy 2008</i>	Development permits

Project phase	Agency	Legislation	Approval/permit
Development	DEHP	<i>Environmental Protection (Water) Policy 2000</i>	Development permits
Development	DEHP	<i>Nature Conservation Act 1992</i>	Approval/Licences
Development	DNRM	<i>Vegetation Management Act 1999</i>	Approval for clearing of remnant vegetation
Development	DEHP	<i>Water Act 2000</i>	Resource Entitlement Riverine Protection Permit
<b>Australian Government</b>			
Whole of project	DOE	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>	Controlled action

## 4.2. Local government approvals

The proposed quarry and associated infrastructure works would be carried out on land located wholly within the GCCC local government area.

The site of the proposed Gold Coast Quarry (Lot 105 on SP 144215) is designated part urban residential, part park living and part open space/nature conservation in the *Gold Coast Planning Scheme 2003*.

The following approvals are required from GCCC:

- Development approval for a Material Change of Use of premises for an extractive industry assessable pursuant to the *Gold Coast Planning Scheme 2003*
- Development approval for building works (Workshop, Weighbridge/despatch Office, Administration Office, Quality Assurance laboratory, staff amenity buildings and plant) under the *Building Act 1975*
- Various permits and licenses pursuant to local laws under the *Local Government Act 2009*, including:
  - Local Law No. 6 (Vegetation Management)
  - Local Law No. 8 (Public health, Safety and Amenity)
  - Local Law No. 11 (Roads and Malls)
  - Local Law No. 15 (On-site Sewerage Facility)
  - Local Law No. 16 (Licensing – Advertisement)

### 4.3. State government approvals

The SDPWO Act establishes the framework for environmental assessment of declared 'coordinated projects' in Queensland and coordinates the relevant state development assessment jurisdictions for the project.

The planning and approvals framework applicable to the project's development is the *Sustainable Planning Act 2009* (SPA). SPA and the Sustainable Planning Regulation 2009 (SPR) provide for the assessment of certain development against local government planning schemes and policies and state government legislation.

Approval of a Cultural Heritage Management Plan (CHMP) for the project pursuant to the *Aboriginal Cultural Heritage Act 2003* (ACH Act) will ensure project activity recognises, protects and conserves Aboriginal cultural heritage.

The following approvals are required pursuant to the *Environmental Protection Act 1994* (EP Act):

- development approval for a Material Change of Use (MCU) of premises for an Environmentally Relevant Activity (ERA) 16—Extractive and screening activities. Extracting, other than by dredging, a total of 1 000 000 tonnes or more of material, in a year, and screening 1 000 000 tonnes or more of material, in a year (threshold 2(c) and 3(c))
- development approval for an MCU of premises for an ERA 63—Sewage treatment. Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21–100EP and the treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme (threshold 1(a)(i)).

In addition to the approvals required above under the EP Act, the project activities will be required to comply with the relevant quality objectives, standards and guidelines set out in the following Environmental Protection Policies (EPPs):

- EPP (Air) 2008—states environmental values for the air environment which are to be enhanced or protected
- EPP (Noise) 2008—states environmental values for the acoustic environment which are to be enhanced or protected
- EPP (Water) 2009—states environmental values for waters which are to be enhanced or protected.

Approvals under the *Nature Conservation Act 1992* (NC Act) for the following activities may be required:

- permit for the relocation of protected animals
- permit for the clearing of protected plants
- permit for the clearing of least concern vegetation.

Approval, under the *Transport Infrastructure Act 1994* (TI Act), of the project's road impacts is required to ensure a safe and efficient state-controlled road network is maintained for all road users.

A development permit for clearing native vegetation would be required under the *Vegetation Management Act 1999* (VM Act).

The following approvals and permits may be required, depending on the nature and extent of works which will be further defined during the detailed design phase of the project, under the *Water Act 2000* (Water Act):

- Water permit for the taking of water
- Riverine Protection Permit for excavating, placing fill in or destroying vegetation in a watercourse
- Development Permit for interfering with overland flow water, other than a referable dam.

The project will be required to comply with the objectives of the *Mining and Quarrying Safety and Health Act 1999* (MQSH Act) and the *Work Health and Safety Act 2011* (WHS Act) for securing the health and safety of workers and workplaces, including mining and quarrying operations, by protecting workers and other persons against harm to their health, safety and welfare through the elimination or minimisation of risks arising from work or from particular types of substances, including the storage and handling of dangerous goods, or plant.

#### **4.3.1. State planning instruments**

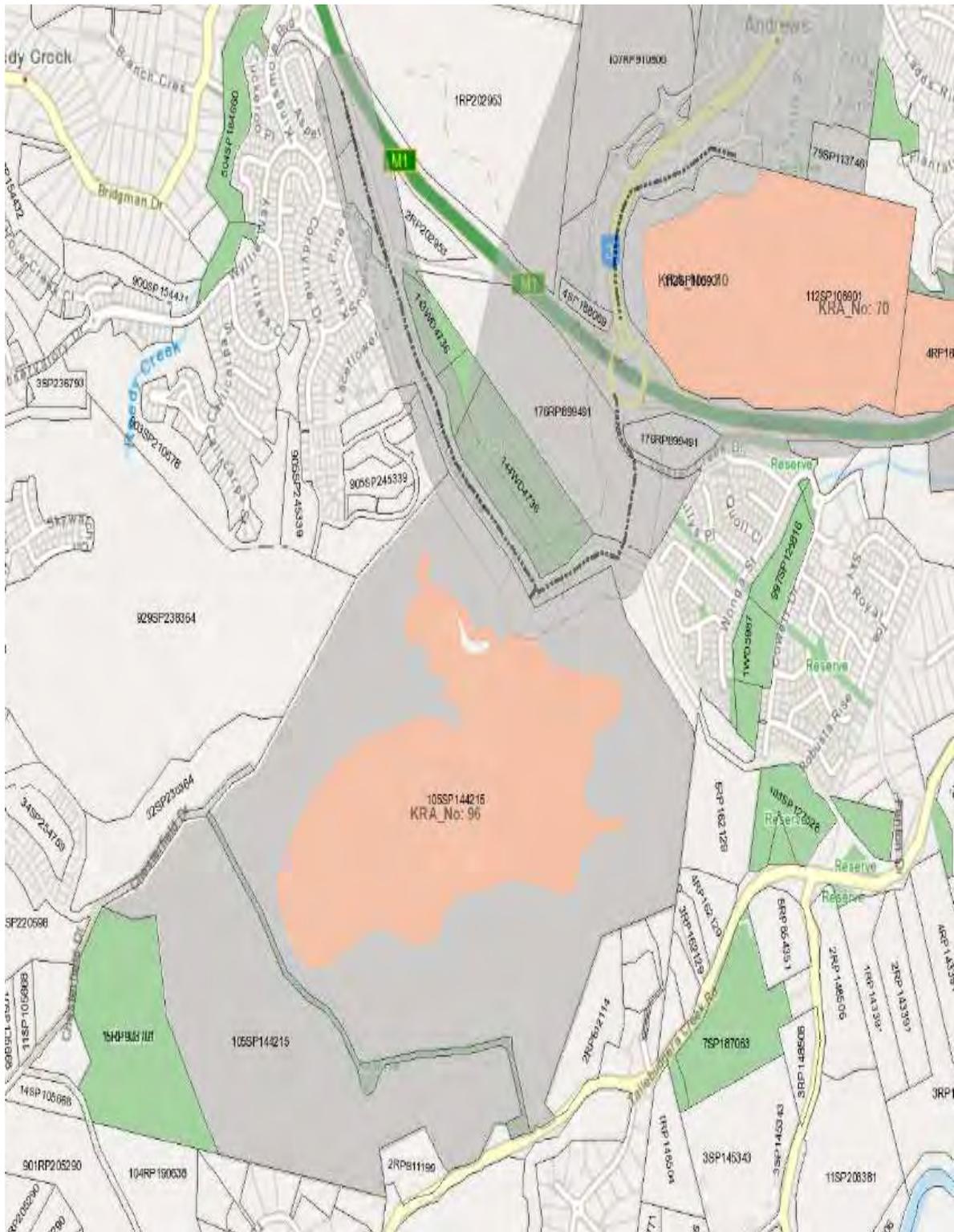
The following state planning instruments are applicable to the proposed Gold Coast Quarry:

- State Planning Policy 2013 (SPP 2013)
- *South East Queensland Regional Plan 2009–2031* (SEQRP).

The Reedy Creek resource was initially identified as a possible hard rock resource in 1979. Following further investigation, the Queensland Government recommended in 2001 that GCCC include the site as a resource of regional significance in its planning scheme. Further investigation and public consultation resulted in the Reedy Creek hard rock resource being declared a KRA (96) under State Planning Policy 2/07: Extraction of Extractive Resources (SPP 2/07) in 2007.

SPP 2/07 was superseded by a new single State Planning Policy (SPP 2013) on 2 December 2013. SPP 2013 outlines the state's policy on matters of state interest in planning and development and addresses how these are to be dealt with in planning instruments, council development assessment processes and in designating land for community infrastructure.

SPP 2013 sets out the state's position regarding mining and extractive resources. The policy position is similar to the policy position adopted in SPP 2/07 and as such Reedy Creek KRA 96 will continue to be recognised and protected from incompatible development which may prevent or constrain future extraction, ensuring it is appropriately considered in land use planning decisions (refer *SPP Guideline: Mining and extractive resources*) (refer Figure 4.2).



**Figure 4.1 State Planning Policy 2013 key resource area map**

The SEQRP, which came into effect in 2005 and was amended in 2009, reflects SPP 2/07 and identifies KRA 96 as an extractive resource (refer SEQRP 2009–2031, Map 8: Rural production and natural resources) (refer Figure 4.2).



Figure 4.2 South East Queensland Regional Plan natural resources map

The inclusion of KRA 96 in SPP 2013 declares it an extractive resource of state or regional significance and is designed to protect the resource from incompatible development, which may prevent or constrain future extraction.

The *Gold Coast Planning Scheme 2003* is required under SPA to reflect the SEQRP, which identifies KRA 96. However, various versions of the *Gold Coast Planning Scheme* have not been amended to reflect SEQRP and in particular KRA 96.

SPA states that if there is an inconsistency between an SPP and another planning instrument, the SPP prevails to the extent of the inconsistency.

The possibility of a quarry being developed at this location was notified publicly in October 2004 when SPP 2/07 was released for public consultation. The proposed Gold Coast Quarry has been identified in state planning instruments since 2005 with the release of the SEQRP. Accordingly, the proposed Gold Coast Quarry is entirely consistent with all state planning instruments and the fact that KRA 96 is not reflected in the Gold Coast Planning Scheme is not a key consideration for the purposes of assessing an application for development approval for the proposed Gold Coast Quarry pursuant to the planning scheme.

### **4.3.2. Environmental management plans**

#### **Overview**

This section details the environmental management plans (EMPs) for the site establishment, development and construction, operation, and rehabilitation and decommissioning stages of the project.

Appendix TT of the proponent's EIS provided a draft EMP for all stages and components of the project. The EMP becomes the key reference document that converts the undertakings and recommendations of the environmental studies into actions and commitments to be followed by the designers, construction operators and subcontractors of the proposed project. The EMP specifies:

- proposed environmental management objectives, and strategies, actions and procedures to be implemented to mitigate adverse and enhance beneficial environmental and social impacts
- monitoring, reporting and auditing requirements
- the entity responsible for implementing proposed actions
- proposed timing
- corrective actions if monitoring indicates that performance requirements have not been met.

Effective implementation of the EMP will satisfy the commitments made by the proponent in the EIS, additional information to the EIS, and in correspondence with advisory agencies, and will ensure the environmental impacts of the project are appropriately managed.

The project commitments made by the proponent during the EIS process are included in the EMP and are included at Appendix 2.

The draft EMP is structured according to specific project issues and/or elements identified in the EIS. The draft EMP will be further refined and expanded after this report is finalised, during the detailed design phase of the project and through ongoing

consultation with the relevant advisory agencies, and will reflect the provisions of any environmental conditions which are attached to approvals for the project.

The final project EMP will be the primary environmental control document for the project that specifies environmental management requirements and procedures for the life of the quarry.

### **EMP structure**

- Site Inductions
- Access Control
- Hours of Operation
- Plant Output and Duration of Operations
- Boundary of operational area
- Identification of Restricted Areas
- Site Security and Signage
- Sewage Treatment
- Stormwater Management
- Sediment and Erosion Control
- Waste management
- Noise
- Blast Vibration
- Air Quality
- Vegetation and Fauna Management
- Cultural Heritage
- Visual Impact
- Rehabilitation
- Chemical and Fuel Storage
- On-site Spills
- Extreme Rainfall and Flooding
- Bushfire
- Unauthorised access
- Community Consultation
- Complaints Management
- Notification of Government Agencies
- Environmental Monitoring Programs
  - Blast Monitoring
  - Noise Monitoring
  - Air Quality Monitoring
  - Water Monitoring
  - Ecological Monitoring.

## Specialised EMPs

In addition to the whole-of-project EMP discussed above, individual and related EMPs will also be developed to manage specific issues and/or elements of the project.

A number of specialised management plans may be required by regulators under approval conditions. Findings and recommendations from these plans have been incorporated into the draft EMP where possible.

Specialised environmental management plans include:

- Blasting Management Plan
- Bushfire Management Plan
- Construction EMPs
- Emergency Response Plan
- Koala Management Plan
- Lake Water Quality Management Plan
- Landscape Rehabilitation Plan
- Overburden Management Plan
- Sediment and Erosion Control Program
- Stormwater Management Plan
- Vegetation Management Plan
- Waste Management Plan
- Wildlife Management Plan.

## Coordinator-General's conclusion

I recognise that further information in addition to the draft EM plans will need to be provided to DEHP and other agencies to support an application for an environmental authority (EA) for a prescribed ERA and to support an application for a development permit for carrying out operational works.

I consider that effective implementation of the EMPs and proponent commitments through an effective monitoring, auditing and reporting framework would ensure that the environmental impacts of the project can be managed appropriately.

## 4.4. Australian Government approvals

As indicated in Table 4.1 on page 21, the project must be approved by the Commonwealth Environment Minister, under Part 9 of the EPBC Act. Section 7 of this report (matters of national environmental significance) details the Australian Government's environmental assessment process.

## 5. Environmental impacts

This section outlines the major environmental effects<sup>5</sup> identified in the EIS, supplementary project information, submissions on the EIS and comments from advisory agencies and other stakeholders. This report provides comments on the effects and, where necessary, includes conditions or recommendations to mitigate adverse impacts.

### 5.1. Land use

#### 5.1.1. Overview

The project site is approximately 5 km west of Burleigh Heads and is situated between Old Coach Road and Tallebudgera Creek Road, west of the Pacific Motorway.

The quarry and all associated plant, equipment, facilities and works, with the exception of some road works, are located wholly within Lot 105 on SP144215, which has an area of 216.7 ha. Lot 105 is bisected by Lot 901 on SP 907357, which is a gazetted fire trail used for fire management.

The project site is characterised by steep undulating topography and has numerous ridges and side spurs, valleys, gullies, tributaries and waterways which discharge to either the Tallebudgera Creek or the Nerang River catchments.

The site has historically been utilised for agricultural purposes, primarily cattle grazing until the early 1980s. As a result, the project site has been extensively cleared, with only small areas of remnant vegetation remaining in the north-western and southern central portions of the site. Since the cessation of agricultural uses the site has progressively returned to a natural condition with vegetation regeneration reclaiming much of the site.

Native title has been extinguished over the site.

The surrounding land uses of West Burleigh, Tallebudgera and Reedy Creek, include a mixture of residential and rural residential development, rural properties and forested ridges. The lands and geology surrounding the project form part of the intermediate interface between the hinterland areas to the west and the highly urbanised areas of the Gold Coast to the east.

The total disturbance footprint of the project (quarry pit and associated infrastructure and works) is 65 ha or 30 per cent of the total site area. The approximate remaining 152 ha—or 70 per cent of the site area—is to be retained in its existing vegetated state to enhance the connectivity of the Springbrook to Burleigh bio-regional corridor and to provide a 205 m buffer zone between the edge of the quarry disturbance footprint and residences.

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<sup>5</sup> For a definition of 'environmental effects', refer to the Glossary on page 154 of this report.

### 5.1.2. Planning and land use

The project site is bounded by Old Coach Road to the north-east, Tallebudgera Creek Road to the south-east, Kingsmore master-planned housing estate to the north-west and Stockland Observatory master-planned housing estate to the west. Given the proximity to the abovementioned residential communities, numerous responses during the public notification stage of the EIS assessment pertained to land use conflicts in both the natural and built environments.

Submitter concerns related to inconsistency between the Gold Coast Planning Scheme and state planning policies, and how a future quarry would impact on the surrounding residential and open-space land uses. Impacts on scenic amenity, degree of lighting and general liveability of the area were also highlighted as contributing to perceived conflict.

Additionally, Gold Coast City Council raised issues concerning conflicts with a number of Desired Environmental Outcomes (DEOs) pertaining to the ecological processes, natural resources and community wellbeing aspects of the strategic framework of the planning scheme.

#### Planning framework

The Queensland planning framework created under SPA describes state interests in certain aspects of planning and development. Planning instruments created and/or bound by SPA include, but are not limited to, the SPP, the SEQRP and the *Gold Coast Planning Scheme 2003*.

Chapter 3 of the EIS detailed the planning and land use requirements of the project and highlighted where land use conflicts occurred. Land use conflicts were addressed in accordance with the Queensland planning framework. A full town planning report was provided in Appendix P of the EIS.

The SPP is a planning instrument that the planning minister can make to protect aspects of planning and development that are of interest to the State. When a local council is developing its planning scheme, it must ensure that the planning scheme reflects the elements outlined in the state planning policy. If there is any inconsistency between a local planning scheme and the state planning policy, the state planning policy prevails.

#### Pre-existing SPPs

At the time of EIS preparation, lodgement and early stages of assessment, SPPs were standalone documents each with their own land use areas of interest. On 2 December 2013, a new single SPP 2013 was released by the Deputy Premier and Minister for State Development, Infrastructure and Planning. This revised SPP amalgamated pre-existing SPPs into a single document to ensure conflicts occurring within State interests were resolved and to ensure amendments to local planning schemes could be achieved more efficiently.

The proponent's town planning assessment within Chapter 3 and Appendix P of the EIS provided a full description and evaluation of the project in relation to the pre-existing SPPs. From this assessment, two SPPs were highlighted as being applicable

to the proposed quarry development. These included SPP 2/07: Protection of Extractive Resources and SPP 2/10: South East Queensland Koala Conservation. All remaining SPPs were considered to either not apply to the project site or were already adequately reflected in the Gold Coast Planning Scheme.

### **State Planning Policy 2/07: Protection of Extractive Resources**

SPP 2/07 identifies extractive resources of State or regional significance and aims to protect those resources from development that might prevent or severely constrain current or future extraction when the need for the resource arises. SPP 2/07 refers to such areas as KRAs. A KRA may contain a resource and processing area, a separation area and an associated transport route—which also includes a transport separation area.

SPP 2/07 specifies that the identification of a site as being a KRA does not guarantee that a particular proposal to activate a KRA will be approved. As part of a proposal for an extractive industry project, relevant consideration (and where necessary, justification) needs to be given to the environment, amenity, traffic and other associated impacts (amongst other matters).

Lot 105 was identified as KRA 96 in SPP 2/07. The following was noted from the KRA 96 designation map:

- the resource/processing area does not encroach on Lot 901; the KRA is fully contained in Lot 105
- the entirety of Lot 105 and Lot 901, outside of the nominated resource/processing area, is the separation area
- two transport routes have been identified—one extends north-west along Old Coach Road, while the other is a direct link to the Pacific Motorway (M1) and the north via an extension of the Bermuda Street interchange.

### **State Planning Policy 2/10: South East Queensland Koala Conservation**

SPP 2/10 aims to ensure that koala habitat is taken into account in planning processes within the South East Queensland Koala Protection Area (SEQKPA). SPP 2/10 took effect in May 2010 and details a number of local government areas (LGAs) that comprise the SEQKPA, including Gold Coast City.

SPP 2/10 does not prevail over the requirements of any other SPP. The entirety of Lot 105 is identified as containing koala habitat, and SPP 2/10 specifies that in circumstances such as the proposed quarry project, an outcome that best achieves the purposes of the conflicting SPPs should be sought.

To compensate for the clearing of vegetation to facilitate the proposed quarry, vegetation and koala habitat offsets will be provided within the buffer area and will deliver a net benefit for koalas.

### **SPP 2013**

The new SPP 2013 supersedes the SPPs referred to above. Transitional provisions apply where a local government planning scheme is not yet aligned with the new SPP 2013. Part E of SPP 2013 contains 'interim requirements', which should be

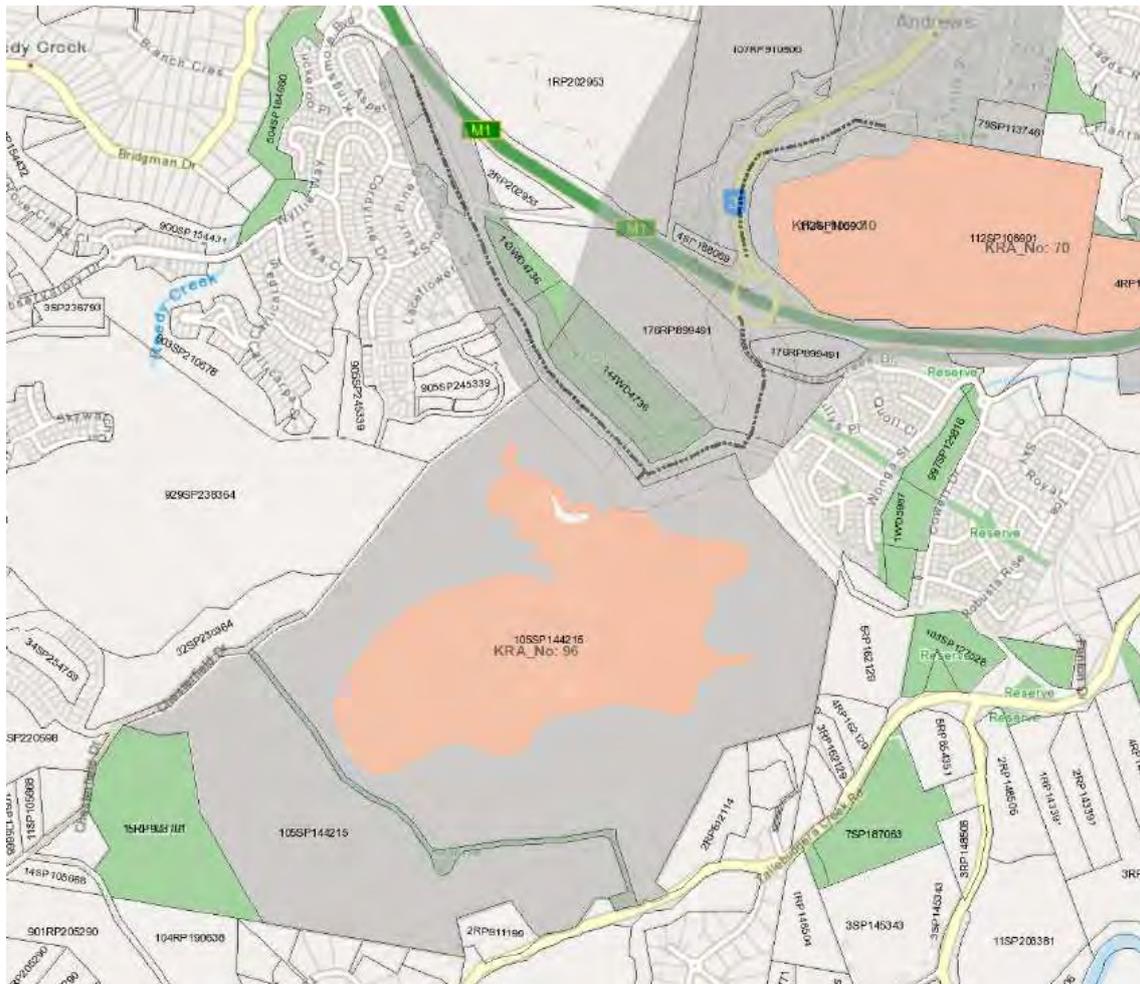
considered by applicants when preparing a development application and must be considered by the assessment manager when assessing a development application. When inconsistencies occur between SPP 2013 and pre-existing local planning schemes, the transitional provisions described in Part E prevail.

The interim development assessment requirements will remain in force for a particular LGA until the Minister is satisfied the local planning scheme has appropriately integrated the state interests described in the SPP.

To assist in the identification of these interim provisions, the SPP 2013 Interactive Mapping System provides a visual representation of the policies or requirements associated with some state interests. The mapping has been separated into two systems, one for plan making and one for the interim development assessment.

Currently, KRA 96 is identified in both the interim development assessment and plan-making mapping systems. This indicates that KRA 96 is still in the state's interest to be preserved for activation. Gold Coast City Council is currently preparing a new planning scheme in accordance with SPP 2013. As the planning scheme is yet to be approved by the minister, the project will need to comply with the interim requirements presented in Part E in association with Council's pre-existing planning scheme. When Council's new planning scheme is finalised, it is intended that KRA 96 would be reflected accordingly.

Figure 5.1 illustrates KRA 96 in accordance with the interim development assessment mapping. The mapping includes reference to the separation area, resource/processing area as well as the transport route separation area.



**Figure 5.1 Excerpt from SPP 2013 - Location of KRA 96**

### South East Queensland Regional Plan

The SEQRP, as amended in 2009, provides for the future development of the region to 2031. The policies and provisions within the SEQRP are focused predominantly on development which is of a scale and nature that is significant to the planning, development and growth of the region.

The SEQRP is the predominant planning document for the region and must be appropriately reflected in local government planning schemes. In accordance with section 26(3) of SPA, if there is any inconsistency between a regional plan and another planning instrument or policy, then the regional plan prevails. Furthermore, section 29(2) of SPA confirms that the Council must amend its planning scheme to reflect the regional plan as made, amended or replaced.

Associated maps attached to the SEQRP detail that Lot 105 on SP144215 is designated as an 'extractive resource' area located within the urban footprint.

### Gold Coast Planning Scheme 2003

The *Gold Coast Planning Scheme 2003, version 1.2* is the primary town planning document that guides development within the Gold Coast City Council LGA. The

current version of the planning scheme was adopted by Gold Coast City Council on 24 October 2011 and formally commenced on 14 November 2011.

Given the size of Lot 105 and the connecting and existing land uses of surrounding lots, the planning scheme identifies four land use themes pertaining to the project site. These are set out in the Reedy Creek Structure Plan:

- (a) Urban Residential Land Use
- (b) Park Living Land Use
- (c) Open Space/Natural Conservation Land Use
- (d) Rural/Nature Conservation Land Use.

In Appendix P of the EIS, the proponent also provided a comprehensive assessment of the project against the following aspects of the planning scheme:

- desired environmental outcomes (DEOs)
- land use themes and relevant key strategies
- emerging community domain place code
- relevant specific development codes
- relevant constraint development codes.

As the Gold Coast City Council has not amended the planning scheme in accordance with SPP2/07 and the SEQRP, the town planning assessment identified conflicts within the land use themes presented in the planning scheme.

### **5.1.3. Scenic amenity**

#### **Landscape context**

The subject site is located within the Gold Coast hinterland at Reedy Creek approximately 5 km from the coastline of Burleigh and Palm Beach. This area forms the southern part of Queensland approximately 8 km from the Queensland/NSW border, and near the picturesque Currumbin and Tallebudgera Valleys.

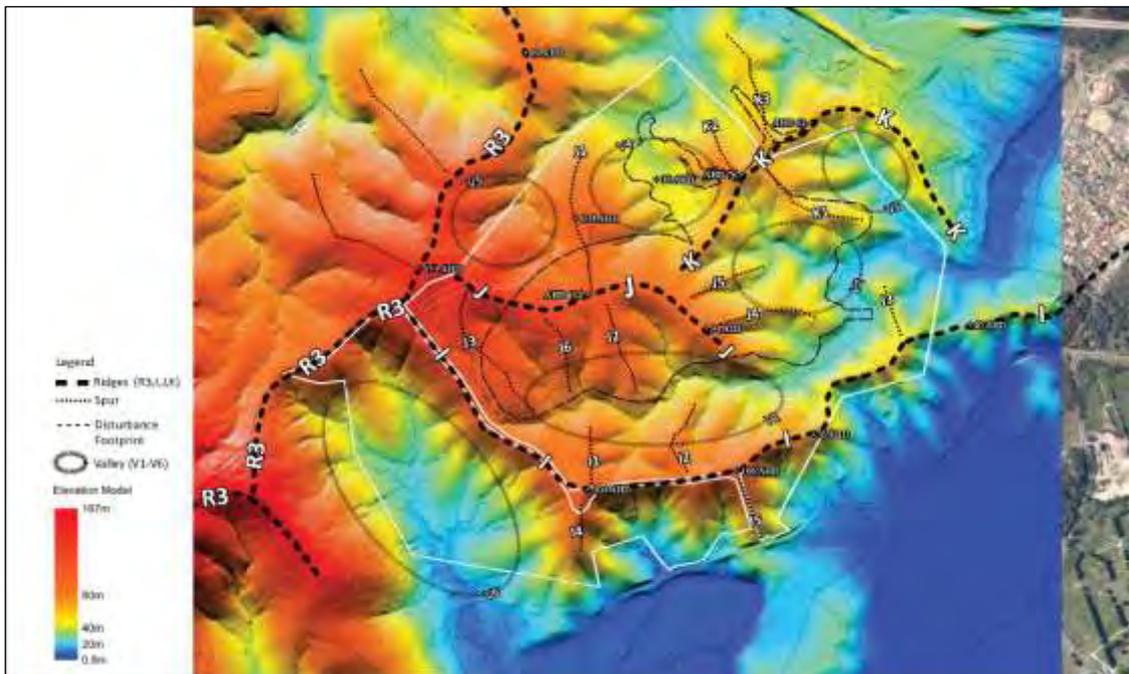
The landscape is visually dominated by background mountain ranges of the Springbrook and Lamington plateaus to the west, the Darlington and Nimmel Ranges and Tamborine Plateau in the north, and the Tweed and Macpherson Ranges in the south. These mountains and their eastern spurs and foothills provide views to the coast and ocean, to the linear strip of coastal urban development and high rise spine of the Gold Coast.

Surrounding the project site, ridgelines rise in height predominantly to the north-west where three defined ridgelines meet together and often running from an easterly direction. As a result of the local geology, ridgelines bounding the project site generally encircle the disturbance area with various ridgelines occurring to the north, south and west. This unique geology largely shelters the quarrying activities from surrounding vantage points.

Significant ridgelines and valleys are mapped by Council and attached as guidance material pertaining to the planning scheme. These maps were reproduced by the proponent to include reference to the site boundary (see Figure 5.2).

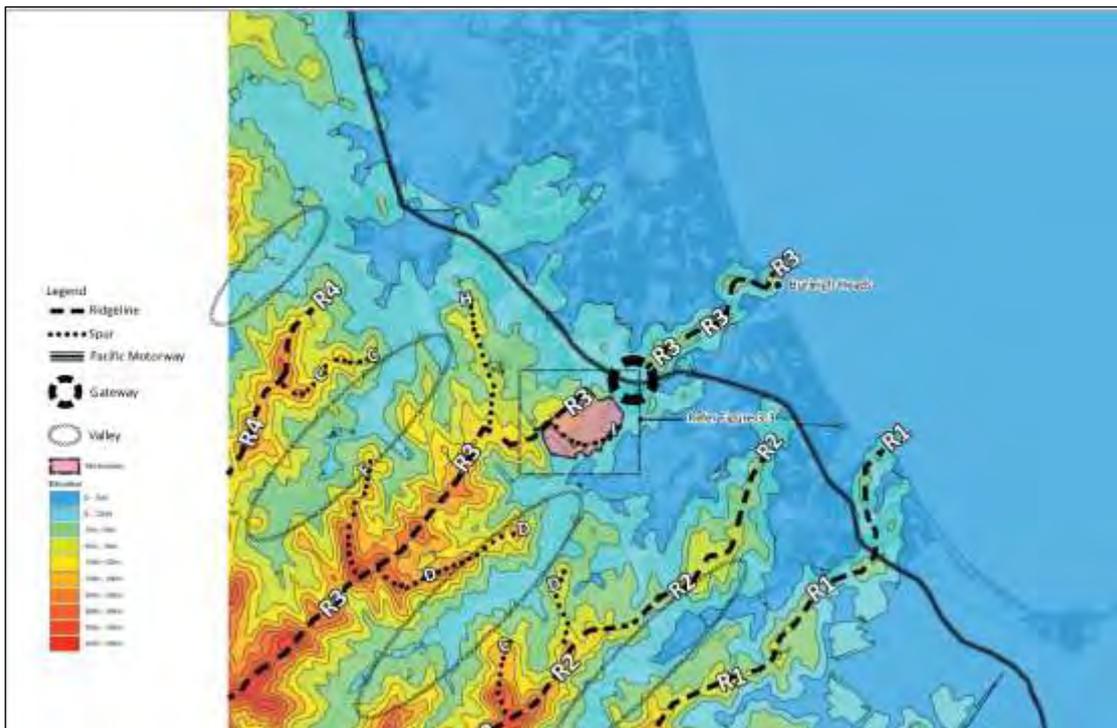
Varying between 150 m and 300 m above sea level, ridgeline '3' (R3) extends from the Springbrook Range all the way to the coast at Burleigh Heads. R3 was identified to have scenic importance to the southern Gold Coast area as the landform defines the Tallebudgera Valley and Burleigh Heads, and separates the Tallebudgera and Currumbin areas from the Burleigh–Robina area and the Guragunbah Floodplain to the north.

Ridge 2 (R2), separating the Tallebudgera Creek Valley from the Currumbin Creek Valley, also has a northeast alignment parallel to R3. Its closest point is 4–5 km to the south and south-east of the subject site.



**Figure 5.2 Site topography**

For the purposes of the assessment, local ridgelines and side-valleys were also presented. Figure 5.3 illustrates how the disturbance area of the quarry relates to the local geography.



**Figure 5.3 Regional topography**

In regard to visual exposure, Council’s mapping indicated that ridges I, J, J1 and the majority of R3, were likely to be highly exposed when viewed from road hierarchies and critical locations within the study area. However, in finer detail, the exposure mapping illustrated that the existing West Burleigh Quarry and Reedy Creek Landfill facility are largely hidden from view by natural landforms, as was the majority of the proposed quarry site.

The scenic amenity map combined the visual exposure and scenic preference descriptors to rate scenic amenity on a scale of 1–10. Findings from these maps identified that ridges surrounding the subject site exhibited high scenic amenity.

View corridor maps prepared by Council indicate exposure of parts of the Gold Coast landscape where views from a number of viewpoints are identified as significant for the character and image of the city. Within the study area, parts of ridge J and J1 appear to be visible from a limited number of significant viewpoints (Category 1 & 2), while Ridge ‘I’ knoll in the south-east corner is mapped as being visible from a greater number of viewpoints (Category 4). Although the south-east knoll (106 m AHD) is outside the disturbance footprint, there are small parts of ridge J within the disturbance footprint which were mapped as Category 2 and 3. In general, the disturbance footprint (and the broader study area) does not include landforms which are prominently visible within the view corridors.

### Viewshed analysis

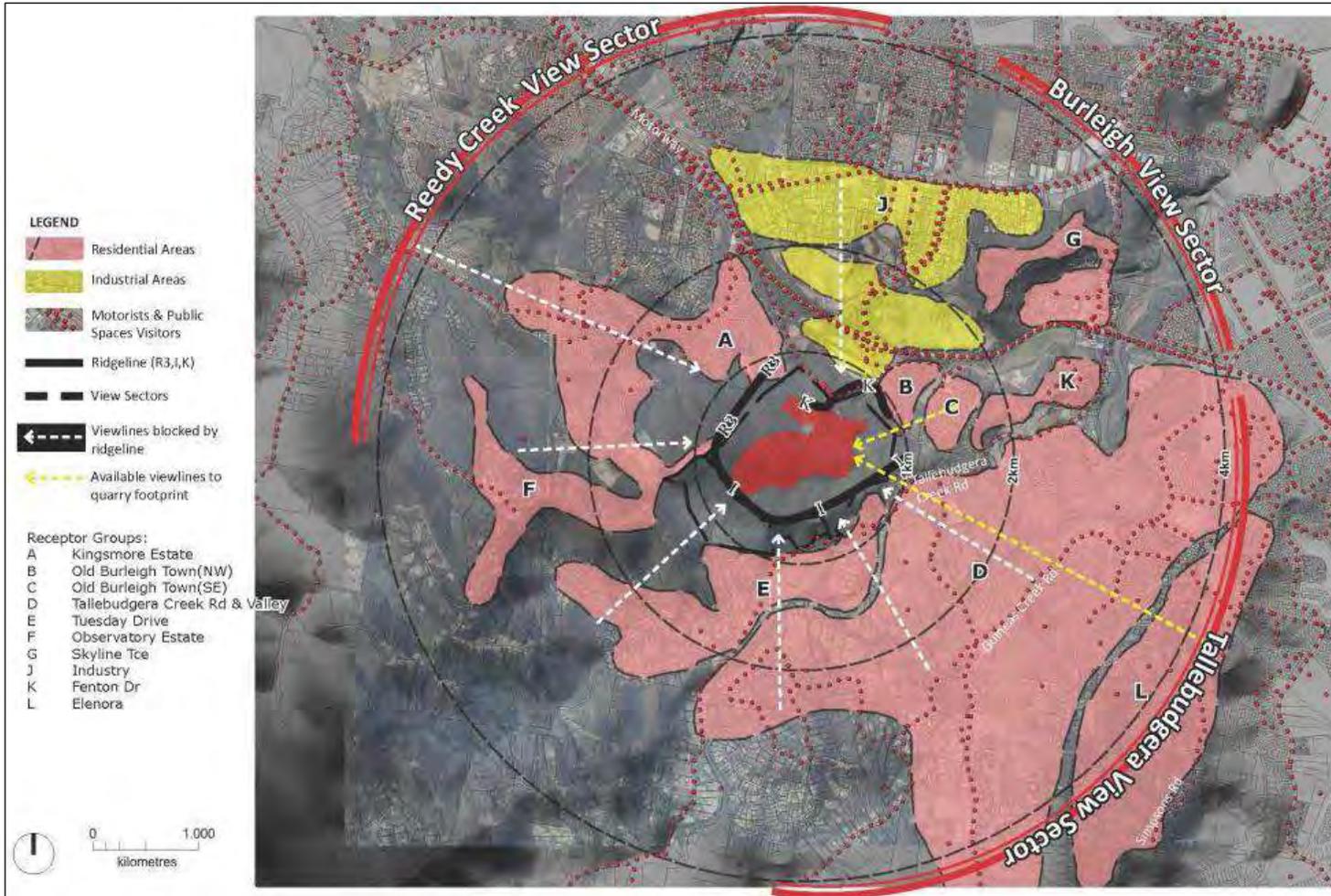
A Visual Impact Assessment report (Appendix S) was prepared as part of the EIS. The main potential for visual impacts of quarrying activities would arise from the near-vertical rock faces that may be visible from nearby residences and public places.

The quarry will progressively change approximately 30 per cent of the subject site over a period of around 40 years by converting a wooded ridge (J) and associated spurs and valleys into a quarry pit with rock faces and revegetated benches. Given the complex geology of the project site, it is intended that the proposed quarrying activities centred on ridge J will largely be sheltered by the utilisation of surrounding ridges identified as R3, K and I. However, in some instances, the quarry will affect the visible landscape when viewed from certain vantage points. This was found exacerbated in instances where exposed rock faces could potentially be visible as highly contrasting scars on the hillside.

In addition to the quarry rock faces potentially exposed to view, platforms with access roads, operating plant facilities and stockpiles were identified to be visible throughout numerous stages of the quarries construction, operation and rehabilitation. Particular instances included:

- infrastructure on the various quarry platforms such as the conveyor structures and buildings and stockpiles
- the construction of a main access road from Old Coach Road including a 15 m high cutting of approximately 200 m length into the side of Ridge 'K' (visible from Simpsons Road over the life of the mine)
- acoustic barriers (6 m in height) proposed to be constructed on the northern and western sides of the development footprint.

The viewshed analysis, combined with cross-sectional sightlines, assessed the extent to which quarry benches, rock faces and other development components are visible when viewed from surrounding receptor viewsheds. View sectors and potential receptor areas identified are described below in Figure 5.4, listed A-L. With the exception of the existing West Burleigh Quarry, receptor areas identified all corresponded to 'high' viewer sensitivity and were assessed with respect to their potential views of the proposed quarry and visual impacts.



**Figure 5.4 View sectors and potential receptor areas**

**Environmental impacts**

**Gold Coast Quarry::**

Coordinator-General's evaluation report on the environmental impact statement

Receptor viewsheds were grouped into three broad view sector areas described as:

- Reedy Creek View Sector—west and north west of the subject site (receptor areas A, F, H and K)
- Burleigh View Sector—north and north-east of the subject site (receptor areas J, B, C and G)
- Tallebudgera View Sector—south-east and south of the subject site (receptor areas E, D and L).

Within the identified viewsheds, three ridges within and adjacent to Lot 105 largely screen views from external visual receptors into the disturbance footprint area. The combination of topography and vegetation in the quarry separation area and in surrounding areas were identified to partially enclose the internal ridge and valleys and screen them from the most noticeable quarry views.

The visual assessment established that the only residential areas with potential views into the disturbance footprint area (through gaps between the ridges) are some elevated areas at Old Burleigh town (about 1 km to the east), some areas of Skyline Terrace (about 3 km to the north-east) and at Simpsons Road (more than 4 km to the south-east).

Additionally, the visual assessment determined that to the west and south (including Kingsmore Estate, Observatory Estate, Tallebudgera Creek Road and Tallebudgera Connection Road and Tuesday Drive) views into the disturbance footprint area would not occur. Such residential areas were found to be screened by the topography and vegetation on ridge R3 and ridge I. As such, these residential areas were not subject to a more detailed analysis by the proponent's viewshed, sectional analyses, visibility modelling or visualisations.

Six locations in the surrounding area were subject to a more detailed visual analysis included:

- (a) Fenton Drive, Old Burleigh Town
- (b) Sky Royal Terrace residences, Old Burleigh Town
- (c) Sky Royal Terrace vacant allotment, Old Burleigh Town
- (d) Simpsons Road/Gracilis Court, Elanora
- (e) Avocado Street, Elanora
- (f) Skyline Terrace.

Desktop analysis and field assessment of the identified potentially sensitive viewpoints indicated that without mitigation measures being implemented:

- in the Burleigh View Sector, the disturbance footprint area is likely to be visible at mid-ground view distances (1–2 km) from approximately 67 residences, depending on local screening by vegetation or buildings, as well as possible opportunistic glimpses whilst driving
- in the Tallebudgera View Sector, and primarily with Elanora Ridge, opportunities for views of the disturbance footprint area are limited and at greater distances (>4 km), but are likely to be an element in the background as seen from elevated residences and roads.

Of the 407 existing houses in Old Burleigh Town, approximately 42 currently have views overlooking the existing West Burleigh Quarry. Of those identified, approximately 18 were assessed to have views into parts of the Gold Coast Quarry. It is intended that by the time such views become available (after 25–30 years of quarrying) it is likely that the existing West Burleigh Quarry will be revegetated.

### Mitigation measures

The disturbance footprint and sequence of staging has taken potential visual impacts into consideration, and significantly avoided and reduced potential impacts. The proponent has committed to:

- retaining wide separation area buffers of 205–800 m width, which include the forested ridge 'I' parallel to the southern boundary of the subject site, restricting the disturbance footprint to an internal area (where most of the quarry will be below sight lines and only a few upper rock faces exposed) and effectively blocking all views from the south and south-west into the disturbance footprint
- retaining the eastern end of Ridge 'J' until Phase Q3, thereby screening most of the main western quarry pit from views from the east (Old Burleigh Town and Elanora) and allowing a long rehabilitation period for establishment of screening vegetation on the 'temporary' benches on Ridge J
- excavation of ridge 'J' from the south, working northwards into the hillside, thereby progressively lowering the forested ridgeline with minimal exposure and retaining a forested skyline and backdrop of Ridge R3
- staggered transition between phases (particularly Q4 and Q5), such that no parallel series of rock faces will be exposed in a single plane, but will instead be a mosaic of bench widths and face alignments with rehabilitated vegetation at varying ages and heights.

In addition, external to the subject site, the forested ridge 'K' along Old Northern Road and the band of trees behind the existing West Burleigh Quarry, limit views from the north. The wide separation areas ensure that the disturbance footprint is generally more than 500 m from sensitive visual receptors (the closet house is 350 m away) and the potentially visible rock faces are >2 km from residences. Furthermore, the main pit area has been orientated in such a way that the potentially visible upper rock faces have a generally southerly and easterly aspect. This will effectively cause shadow to fall on the upper most proportions during the day and effectively shield the majority of the operations from the western sun.

In the event that the proposed mitigation measures are not achieved during development of the site, further amenity treatment trials will be conducted to progressively soften views of active faces. This will be achieved through the use of camouflage netting and/or colouration (e.g. bitumen).

#### 5.1.4. Lighting

AS4282-1997 is the Australian Standard for the control of the obtrusive effect of outdoor lighting. This standard provides guidance on the amount of acceptable 'light spill' from an exterior lighting installation into a neighbouring property. The standard

specifically addresses the effects of the 'light spill' on nearby residents, users of adjacent roads and transport signalling systems, but does not consider the effects of ecological light pollution.

The EIS contained a Lighting Report at Appendix T, which provided an assessment of lighting impacts and proposed impact mitigation strategies to meet regulatory requirements.

The EIS proposed that, during construction, mobile light towers would be used to illuminate the specific areas of activity (during low light periods). The control and timing of the operation of this lighting would be designed to eliminate disturbance and 'light spill' to neighbouring properties.

Once initial construction is complete, permanent light fittings and fixtures, designed to minimise light spill into surrounding areas during normal operations, would be installed. Lighting will only be provided at specific locations and areas throughout the site, in accordance with the required operational use. A lighting control system will be used to eliminate disturbance to neighbouring properties and to conserve energy during low-use and non-operational times.

The lighting around the proposed buildings and on the processing plant will be designed to Australian Standards to provide enough lighting to allow personnel to safely access buildings and maintenance stations. The EIS stated that the proposed lighting design will pool downwards and locally, and not create spill that will generate a nuisance to neighbours or nocturnal fauna.

Because of the location of the buildings, isolux contours and level changes, no impacts on fauna in the proposed buffer area are anticipated.

## **5.1.5. Topography, geology and soils**

### **Topography**

The project site is located within the intermediate area of the Gold Coast which is topographically defined by the Lamington Plateau of the Gold Coast hinterlands to the west and the urbanised coastal areas of the Gold Coast to the east. This intermediate area is constituted by a complex group of ridges and intervening gullies containing several sub-catchments draining to the east of the project site.

Three ridgelines, each of which contain secondary spurs and steep slopes, predominantly border the site's perimeter. Heights of the surrounding ridgelines vary from approximately 10 m in the east to 187 m in the west.

### **Geology**

The geology of the site and surrounding areas is dominated by meta-greywacke rocks of the Neranleigh-Fernvale Beds. This geological unit hosts the majority of extractive industry resources in the area. The principal rock types on the site are meta-greywacke and argillite and both rock types are variably exposed in subcrop and sporadic outcrop across the site. By volume, greywacke accounts for approximately 85–90 per cent of the extractive resource on site.

On the basis of the geotechnical investigations that were completed, substantially more hard rock than the estimated 79 million tonnes could be extracted from the site. However, the extent of hard rock resource that can be extracted from the site is dictated by:

- the location of identified areas and species of ecological significance
- utilising the existing topography as much as possible to assist in minimising external views into the proposed quarry
- maintaining an extensive buffer area that will assist in achieving compliance with relevant state parameters in terms of acoustics and air quality.

The failure of a slope, namely a quarry bench (particularly through the use of explosives and rock durability) was identified as a potential risk to operations. A comprehensive geotechnical assessment was completed on the site pursuant to *AS1726 Geotechnical Site Investigation 1993*. This is described in detail in Appendix Q of the EIS.

The geotechnical assessment undertaken developed a series of limit equilibrium models for the main slopes. These models were then applied during various stages of quarry development to understand the minimum failure surface of each particular slope. From the mapping presented for each of the five phases of quarry development, landslide and/or slope failure was identified to present a low to moderate risk if no treatment was provided. This risk would be further reduced with slope treatment.

The risk of off-site landslides or slope failure occurring as a result of the quarry operations was assessed in the EIS. This assessment determined that the quarry operations were unlikely to cause vibration impacts which would destabilise any surrounding land. It was evaluated that separation distances provided in the buffer zone were more than adequate to almost fully attenuate vibration and any landslide response trigger.

### **Crystalline silica**

Silica is a component of hard rock (namely quartz) and overburden and is present in varying levels in both crystalline and non-crystalline forms.

Given the potential health risk respirable (breathable) silica presents for both workers and sensitive receptors in close proximity to the project, core samples were studied to determine what percentage of free silica was contained in the quarry's resource area.

Petrographic analysis of seven rock core samples indicated that 16–32 per cent of the resource may contain free silica of which grainsizes of crystalline quartz ranged from 0.01 to 1.5 mm.

### **Actinolite and other asbestiform minerals**

Actinolite is a member of the amphibole family of silicates that includes a wide-ranging group of minerals. It is common in greenstone (altered ocean-floor basalts and other mafic and ultramafic rocks) that can occur as part of the Neranleigh–Fernvale Beds and associated low-grade metamorphic ophiolites (including greywackes) in South East Queensland. Although the Gold Coast Quarry is located within the Neranleigh–

Fernvale Group, on a meta-greywacke hard rock resource, it does not exhibit the presence of greenstone and is not associated with asbestos mineralisation.

The Petrographic Reports attached to the Geological and Geotechnical Report at Appendix Q of the EIS, identified that actinolite constituted between approximately 1 per cent and 3 per cent of the total mineral composition of core samples assessed. These amounts were deemed as very low and it was determined that they did not pose a significant risk in regard to air quality.

I note advice from DEHP that asbestos containing rock would most likely be considered a hazardous contaminant under the EP Act and would be managed in accordance with the contaminated land provisions of the EP Act.

## Soils

Soils are degraded to varying extents across the project site as a result of clearing to support the previous agricultural land uses (primarily cattle grazing). As a result, soils were identified to be decomposed metasediments on the ridges with the occurrence of some alluvium in the valleys.

Nevertheless, the site supports some tall stands of open forest in some instances, particularly on the uncleared steeper slopes in the southern proportion of the site. The flatter areas of the site have been progressively cleared and allowed to regrow. As such, the site contains various areas of regrowth at varying heights. More recently, access tracks from trespassing recreational off road motorists has resulted in localised erosion. Such degradation occurs predominantly on the ridge lines and waterways where access tracks have been created.

During the construction and operational phases of the quarry, stormwater management systems are intended to function similarly to an urban construction site. As there will be a high proportion of cleared land, continual soil disturbance and sediment run-off during storm events is predicted. To reduce the impacts of particularity erosion and stormwater quality, an erosion and sediment control program described within the Stormwater Management Plan was prepared.

The Erosion and Sediment Control Program describes the:

- policies that are required to be adhered to as part of the ongoing erosion and sediment control program
- performance requirements that are to be met, including achievement of the water quality objectives identified in the Water Resource and Floodplain Management report
- process for adjusting performance indicators associated with erosion and sediment control, dust nuisance and complaint response
- procedures that are to be implemented during the relevant establishment and development phases of the project.

### 5.1.6. Contamination

A contamination report was prepared for the project and presented at Appendix U of the EIS. A search of the DEHP's Environmental Management Register (EMR) and

Contaminated Land Register (CLR) indicated that the site was not currently listed on either register.

Based on the past and present land uses of the site, the following potential contaminants were identified on the project site:

- Total Petroleum Hydrocarbons (TPH) and possible Polycyclic Aromatic Hydrocarbons (PAH) associated with the isolated drilling fluid leaks which occurred during the installation of the on-site groundwater monitoring wells and resource evaluation boreholes
- heavy metals and metalloids and TPH associated with isolated areas where vehicles, general rubbish, cans etc. have been incinerated
- asbestos sheeting associated with illegal dumping
- organochlorine pesticides and organophosphorous pesticides associated with the former nursery operation.

The EIS noted that, despite a number of potential contaminant sources being identified during the site inspection and site history review, it is unlikely that contaminant concentrations would exceed the health-based investigation levels for commercial/industrial land use. It was deemed that all general rubbish and asbestos could be transported off site to a licensed facility.

In addition to the existing site contamination, a number of potential sources of contamination were identified as a result of the quarry's development and operations. The greatest number of contamination sources and therefore, the highest risk to the project was detailed to occur during the operational stage of the quarry.

The unique potential sources of contamination during the quarrying operation stage included:

- bitumen emulsion (e.g. pre-coated aggregates—Amine Plus) and associated oil-water separator system
- distillate above-ground self-bunded storage tanks and associated spills during re-fuelling
- vehicle workshop and associated waste oil sump
- lubricant oil storage (engine oil, transmission oil) and associated waste oil sump/oil-water separator
- oil change area (1000 L lubricant) in the vicinity of the cluster of covered crushers
- spills and leaks associated with vehicle parking areas
- foam agent added into the crushing and screening process stream.

Management strategies for the potential sources of contamination are to be employed at both the pre-quarrying and quarrying stages of the project. The EIS presented measures to minimise the risk of contamination for each of the sources identified. The most significant hazards and risks associated with the project pertained to the usage, storage and transportation of flammable and combustible fluids.

Areas with the highest risk of being contaminated included workshop, refuelling and storage areas. To reduce the associated risks in these areas, the construction of impervious hardstand floors to contain associated spills and leaks is proposed. Such

floors will also be self-bunded to ensure significant spills of oils, fuels and other contaminants can be contained in centralised sumps and treated accordingly. It is estimated the sumps storing contaminated waste will be emptied every four to six weeks by a licensed waste contractor.

In relation to the storage of potential contaminants (80 000 L of diesel), it is proposed that distillate above-ground self-bunded storage tanks would be constructed. Specifically, the diesel tank will be double walled and built to contain the product should there be a leak. The tanks will be independently designed and fully certified to comply with all the design requirements, including overfill protection supplied with mechanical shutoff and audible/visual alarm.

### **5.1.7. Coordinator-General's conclusions**

The proponent's town planning assessment report detailed key planning instruments pertaining to both state and council interests. Within the assessment presented, and in conjunction with submissions received, I note significant conflicts between, on one side, the SPP 2013 and SEQRP and on the other side, the Gold Coast Planning Scheme. I note that the state planning requirements prevail over local planning schemes.

In evaluating the issues presented, I have considered the EIS, additional information to the EIS and various submissions received throughout the EIS process. In assessing the proponent's response to land use and planning matters, I am generally satisfied the EIS has adequately dealt with the land use impacts of the project and has suitably tailored the project's design to limit its impacts on surrounding land uses. Appendix 1 of this report contains conditions to address the general planning and land use aspects of the project.

Scenic amenity mapping of the Gold Coast region was conducted in 2010 by Gold Coast Regional Council and was central to the proponent's scenic amenity assessment. Although the proposed quarry has been designed and staged to minimise visual impacts, I acknowledge the spatial and operational requirements of the quarry will reduce scenic amenity of some of the surrounding viewsheds. The Burleigh view sector and Tallebudgera view sectors were assessed as potentially experiencing the greatest amenity losses, with views varying from approximately 1–2 and up to 4 km away respectively.

I also note that the surrounding topography of the site, particularly the disturbance footprint, is largely sheltered from viewpoints that were identified as significant to the character and image of the City of Gold Coast. Three ridges predominantly border the project site and the disturbance area is largely screened from external visual receptors.

Lighting impacts of the project were assessed throughout the life of the project. As no existing light sources were located in and around the site, the construction phase of the project would require temporary lighting structures to be erected. During the operational phases of quarry development, permanent lighting fittings and fixtures are proposed to attenuate light spill to surrounding areas. Additionally, an active lighting control system was proposed to be linked to the operational work hours and activities.

## 5.2. Nature conservation

### 5.2.1. Overview

This section of the report reviews the environmental assessment of, and where necessary includes conditions or recommendations to mitigate adverse impacts on, terrestrial and aquatic ecological values of state significance, which may be affected by the project. For further discussion on matters of national environmental significance (MNES) affected by the project, refer to Section 7 of this report.

#### Site context

The proposed project site has been formerly used for agricultural purposes, primarily cattle grazing. Agricultural use of the site ceased in the early 1980s. As a result, the project site has been extensively cleared, with only small areas of remnant vegetation remaining in the north-western portion and southern central portion of the site. Since the cessation of agricultural use the site has returned to a predominantly natural condition with the native vegetation regeneration reclaiming much of the site. However, the regrowth is considered to be less diverse and structurally less complex than the patches of remnant vegetation. The study area with the extent of clearing is illustrated in Figure 5.5.



Figure 5.5 The extent of clearing and waterways in the project site

The project site is along continuous ridges that are oriented to the north-east and run down from the Lamington Plateau in the Gold Coast Hinterland. The quarry site is located in a slightly widened ridge area formed by a series of side spurs and a bushland hill complex. Drainage on site runs in a roughly west to east direction.

In terms of water flow, there are three catchments on the site—a northern catchment which discharges into the Nerang River, and mid and southern catchments which both drain to Tallebudgera Creek.

There are numerous mapped waterways within the catchments (see Figure 5.6), all of which are typically dry with flow occurring only during and following significant rainfall events.

The land contains two main ephemeral watercourses pursuant to the *Water Act 2000* (see Figure 5.7, Water Resources Chapter): the southern watercourse flows to the south of the disturbance footprint (mid catchment waterway) and the north-eastern watercourse flows downstream of the northern boundary of the disturbance footprint (northern catchment waterway) on Lot 105. Overall, Lot 105 presents steep topography, with waterways of an ephemeral nature which do not sustain persistent flow. The study incorporated desktop assessment literature review, and field surveys. A number of database and literature searches included:

- Commonwealth's EPBC Online Protected Matters Search Tool (SEWPAC 2012)
- Queensland Herbarium's HerbreCs (Queensland Herbarium 2012).
- Regional Ecosystem mapping ver. 6.1 (Queensland Herbarium 2009)
- PMAV for Lot 105 on SP144215
- The Wildnet database (EHP, 2012)
- DDW Fauna Assessment 2005
- Gold Coast Botany Flora Assessment 2005

The desktop assessment indicated a variety of species of conservation significance that are likely to be present within the study area. Site investigations were primarily undertaken in a number of phases during both dry season and wet season sampling periods (June/August 2012 and November/December 2012) to allow for seasonal variations in flora. Fauna field investigations were undertaken in accordance with approval permits.

Approximately 30 per cent of the total area of Lot 105 will be subject to vegetation clearing due to the proposed quarry development, which equates to an area of 65 ha (2 ha of which is already devoid of vegetation). Approximately 70 per cent of the land area will be retained as undisturbed.

The site contains a small proportion of 'Of Least Concern' remnant vegetation under the VM Act. The RE and remnant vegetation mapping also details remnant vegetation containing endangered regional ecosystems on the site.

Submissions received on the EIS and additional information material raised a number of issues in relation to terrestrial and aquatic ecological values, including:

- impacts on conservation values of the identified Springbrook to Burleigh Heads Bioregional Corridor study area

- habitat fragmentation, animal safety and welfare, particularly around the site access road
- impacts associated with vegetation clearing, including alteration to habitat structure, connectivity and composition of species
- weed and pest animal management
- offsets for significant residual impacts on vegetation communities, and listed flora and fauna species.

## 5.2.2. Terrestrial flora

From a review of databases and reports 26 species listed as threatened flora under the NC Act are anticipated to occur in the study area. The flora field work used standard Queensland Herbarium methodologies and the study identified 7 flora species that were listed as threatened under the NC Act. These species are tabulated below (Table 5.1). However, none of those species were identified as occurring within areas directly impacted by the proposed project activities. Nine species of local significance are presented during the study while only Coil Pod Wattle (*Acacia cincinnata*) occurred within the disturbance footprint.

**Table 5.1 Threatened species within project area**

Species	NC Act Status
Silver leaf ( <i>Argophyllum nullumense</i> )	Near Threatened
Long-leaved Tuckeroo ( <i>Cupaniopsis newmanii</i> )	Near Threatened
Ball-fruited walnut ( <i>Endiandra globosa</i> )	Near Threatened
Slender milkvine ( <i>Marsdenia coronate</i> )	Vulnerable
Birdwing butterfly vine ( <i>Pararistolochia praevenosa</i> )	Near Threatened
<i>Rhodamnia maideniana</i>	Near Threatened
Durobby ( <i>Syzygium moorei</i> )	Vulnerable

The REs mapping indicates 4 REs, one of which includes two major vegetation communities in the project area, as listed in Table 5.2.

**Table 5.2 Regional ecosystems within project area**

Regional ecosystem classification	Description (DEHP, 2012d)	Vegetation Management Act status	Total area (ha)	Disturbance Footprint area (ha)
12.3.11	<i>Eucalyptus siderophloia</i> , <i>E. tereticornis</i> , <i>Corymbia intermedia</i> open forest on alluvial plains usually near coast.	Of concern	0.01	nil
12.11.3	Open forest generally with <i>Eucalyptus siderophloia</i> , <i>E. propinqua</i> on metamorphics +/- interbedded volcanics	Least concern	7.9	nil
12.11.5a	Open forest of <i>Eucalyptus tindaliae</i> , <i>Eucalyptus carnea</i> +/- <i>Corymbia citriodora</i> subsp. <i>variegata</i> , <i>Eucalyptus crebra</i> , <i>Eucalyptus major</i> , <i>E. helidonica</i> , <i>Corymbia henryi</i> , <i>Angophora woodsiana</i> , <i>C. trachyphloia</i> (away from the coast) or <i>E. siderophloia</i> , <i>E. microcorys</i> , <i>E. racemosa</i> subsp. <i>racemosa</i> , <i>E. propinqua</i> (closer to the coast). Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	Least concern	13.5	1.11
12.11.5k	Open forest of <i>Corymbia henryi</i> and/or <i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> +/- <i>C. citriodora</i> , <i>Angophora leiocarpa</i> , <i>E. carnea</i> , <i>E. tindaliae</i> , <i>E. acmenoides</i> , <i>E. helidonica</i> , <i>E. propinqua</i> , <i>C. intermedia</i> . Includes patches of <i>E. dura</i> . Occurs on drier ridges and slopes in near coastal areas on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	Least concern	0.07	nil
12.11.23	Tall open forest of <i>Eucalyptus pilularis</i> open forest on metamorphics and interbedded volcanics	Endangered	2.8	0.34

Aerial photography from 1973–2013 shows that much of the site has experienced progressive regrowth of vegetation. Parts of the site contains remnant vegetation which is approximately 26.83 ha (12 per cent of the site) under the VM Act.

## Vegetation clearing and mitigation measures

A total of 63 ha of terrestrial vegetation in Lot 105 will be cleared progressively in a staged approach during the life of the proposed quarry development. Most (approximately 70 per cent) of the vegetation on Lot 105 is relatively undisturbed and has good ecological value and function. To mitigate the loss of this terrestrial area, the proponent has proposed to rehabilitate, restore and manage the buffer area to enhance the habitat and corridor values. Management measures are to be developed to minimise the impacts on, and provide protection to, the identified threatened and other potentially occurring flora species. These management measures include:

- Landscape Rehabilitation Plan
- Sediment and Erosion Control Plan
- Stormwater Management Plan
- Waste Management Plan
- Bushfire Management Plan.

These plans are incorporated into the draft EMP to address mitigation of direct and indirect impacts during establishment, development, construction and operational stages of the project.

### 5.2.3. Terrestrial fauna

Fauna field investigations were undertaken by a range of survey techniques and a total of 109 terrestrial fauna species are presented at the site under the EPBC Act or the Nature Conservation (Wildlife) Regulation 2006 (NC(W)R) as 'significant', comprising of the following:

- 12 native species of mammals
- 11 native species of reptiles
- 9 species of frogs
- 63 species of birds
- 3 non-native species of mammals
- 1 exotic species of amphibians.

One non-native mammal European Red Fox (*Vulpes vulpes*) is listed under the Land Protection Act as a Class 2 pest.

The EIS and additional information identified two terrestrial species occurring on Lot 105 listed under the NC Act. These are the koala (*Phascolarctos cinereus*) and glossy-black cockatoo (*Calyptorhynchus lathami*)

#### Koala (*Phascolarctos cinereus*)

The koala, listed as 'vulnerable' under both the NC Act and EPBC Act, is the only species to have a high probability of using the project area. Essential habitat for the species (*Phascolarctos cinereus*) is noted in the areas of RE 12.11.5 and RE 12.3.11. The species was not recorded during field surveys, but has been recorded in the area previously. A site survey confirmed koala activity in several locations as evident by

scats and scratches. It is noted that 63 ha of koala habitat on Lot 105 will be removed in order to facilitate the proposed development footprint.

Potential impacts to the koala from the project include injury and death from vehicle incidents during clearing operations, a risk of increase in wild dog activity, and bushland habitat loss from vegetation clearing for construction of the project. To mitigate the potential impacts, the proponent has committed to achieving a net benefit for koalas through rehabilitation and offset works. The proposed response to impacts on koala habitat is to implement Buffer Area Management and Riparian Management plans which include restoring the immediate riparian fringe to rainforest species (25 per cent of the area) and the balance is planted to optimised koala food trees.

### **Glossy-black cockatoo (*Calyptorhynchus lathamii*)**

The glossy-black cockatoo is listed as vulnerable under the NC Act. The species has been widely recorded in the Reedy Creek area. Individual glossy black-cockatoos and feeding signs (orts) were identified as occurring in the project area. The species inhabits certain species of *Allocasuarina* and showed preference of selected feed trees. Only three feed trees were confirmed outside of the proposed disturbance footprint. However, it is likely that other feed trees are located within the proposed disturbance footprint.

#### **Potential impacts and mitigation measures**

The project area is part of a 5km wide state significant Burleigh Heads/Springbrook NP terrestrial corridor which provides coast-inland connectivity, and therefore there is some suitable habitat for these species adjacent to the site. The 152 ha buffer will be retained and managed including propagating seed from a number of known glossy-black cockatoo feed trees for use in restoration activities.

The measures the proponent proposes to implement to avoid and mitigate impacts on protected flora species would apply equally to threatened fauna species and also benefit common species. Management measures are developed to minimise the impacts on, and provide protection to, the identified threatened and other potentially occurring flora species. These management measures include:

- Landscape Rehabilitation Plan
- Sediment and Erosion Control Plan
- Stormwater Management Plan
- Waste Management Plan
- Bushfire Management Plan.

These plans are incorporated into the draft EMP to address the mitigation from direct and indirect impacts during establishment, development, construction and operational stages of the project.

#### **5.2.4. Aquatic ecology**

The project area is within the Nerang River and Tallebudgera Creek catchments in the South Coast basin. The aquatic habitat, plant and animals surveys provide information on aquatic ecology for the EIS. Surveys were undertaken in the pre-wet season in 2012

at 15 sites and confirmed the biological values of the aquatic ecosystems within the survey area are in a moderate to good condition.

A total of 15 habitat areas were selected within the disturbance footprint, inside and outside the boundaries of Lot 105. The in-survey area is generally of a low biodiversity of aquatic plants, fish and macroinvertebrate communities, which is a result of typically ephemeral waterways. Water quality measured in situ by surveys was characterised as poor with low pH, high turbidity and electrical conductivity.

### **Aquatic macroinvertebrates and vertebrates**

Aquatic macroinvertebrate communities are dominated by non-biting midge larvae (sub-families Chironominae and Tanypodinae), freshwater shrimps (family Atyidae), mayflies (family Leptophlebiidae), and phantom midges (family Chaoboridae). The field surveys indicate a relatively poorer habitat and water quality condition in the survey area than communities sampled from other sites within the same catchment.

Aquatic vertebrates including fish communities are sampled in the survey area. A total of 7 fish were present during the on-site surveys. It is discovered a low abundance of fish is found compared with sites downstream. Fish species richness is moderate to low at each site due to ephemeral waterways and poor connectivity to other water bodies. One turtle was caught during the site surveys and this species is common throughout Queensland.

Biodiversity in Lot 105 is comparatively low, with only fish and macroinvertebrate species that are tolerant of the varying and often harsh conditions inhabiting the survey area. Aquatic plant cover was low to nil at most sites of the field surveys.

There are no endangered, vulnerable, or near-threatened species of aquatic plants or animals listed under state or Commonwealth legislation, which have been recorded from or potentially occur in the waterways within Lot 105.

### **Potential impacts and mitigation measures**

Construction and operational activities required during the quarry development will give rise to a low level of impact to the local aquatic environments of the site, and minor regional impacts. The proponent will clear vegetation in stages during the life of the project. Several mitigation measures are proposed to minimise the impact of the project on the species, including the following:

- capturing and re-using runoff within the site to minimise the contamination of water
- developing an appropriate erosion and sediment control plan and an accompanying staged clearing plan
- providing a flocculation and dewatering strategy for the quarry dam and sedimentation pond
- implementation of an appropriate sewerage infrastructure to prevent discharge of raw or treated sewage to watercourses
- where necessary, the release of water from the site meets the acceptable water quality objectives.

### 5.2.5. Weeds and pest management

There are 56 pest species occurring within the project area, 9 of which were declared under the *Land Protection (Pest and Stock Route Management) Act 2002*. Most species are concentrated in areas of current or previous disturbance especially the occurrence of *Ambrosia artemisiifolia* which is recognised as Class 2 weed. The proponent will implement a pest management plan to mitigate impacts on fauna species. A commitment to implement ongoing weed management is listed as item 12 of Appendix 2.

### 5.2.6. Offsets

Due to the unavoidable clearing of waterway vegetation, endangered regional ecosystem vegetation and essential habitat for koala, the proponent has proposed environmental offsets. The requirements of the South East Queensland Koala Conservation State Planning Regulatory Provisions (SEQ Koala Conservation SPRP) will be complied with in offsetting loss of koala habitat. Impacts on vegetation require an offset under the VM Act. The impact area is shown in Table 5.3.

**Table 5.3 Offset required under the VM Act of vegetation clearing**

Regional ecosystem classification	Portion of areas that is regarded as endangered regional ecosystem (ha)	Portion of areas that is regarded as Essential Habitat for Koala (ha)	Portion of area that is within 10m of a watercourse defined under the VM Act (ha)
12.11.5	0	1.11 (Least concern)	0.11 (Least concern)
12.11.23	0.34 (Endangered)	0	0.05 (Endangered)
<b>Impact Area</b>	0.34	1.11	0.16

### 5.2.7. Coordinator-General's conclusions

The proposed development footprint will lead to the progressive loss of 63 ha of habitat over the quarry life. I accept that the proposed vegetated buffer will provide for fauna movements and habitat areas as well as preserving the threatened vegetation species that exists on the site. I state a condition in this report to maintain the buffer area and minimise disturbance to wildlife and to ensure the disturbance area does not cause loss of conservation values.

The proponent has indicated that identified areas of endangered REs on Lot 105 will not be cleared. I have stated a condition requiring offsets for vegetation clearing to be provided. I have also stated a condition requiring an interface management plan for the disturbance footprint and the vegetation buffer area.

## 5.3. Water resources

### 5.3.1. Surface water

#### Context

The climate for the Gold Coast region is sub-tropical and sub-humid. Rainfall distribution is dominated by summer falls from October to February and is highly variable due to local thunderstorms.

The project site covers three main water catchments, comprising a northern catchment which drains to a series of brackish lakes before discharging to the Nerang River together with mid and southern catchments which ultimately drain to Tallebudgera Creek. The southern catchment lies outside of the disturbance footprint while both the northern and mid catchments will be directly impacted by the project. All waterways are ephemeral. Figure 5.6 shows the extent of waterways on site.

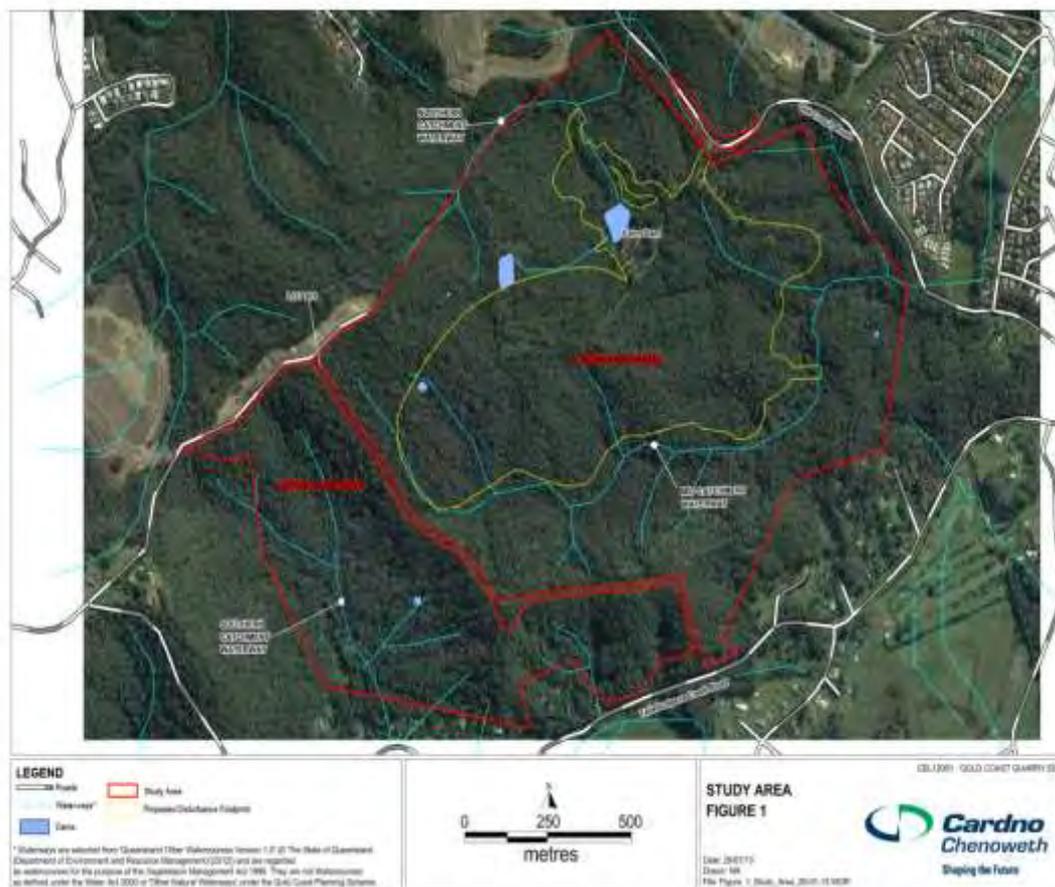


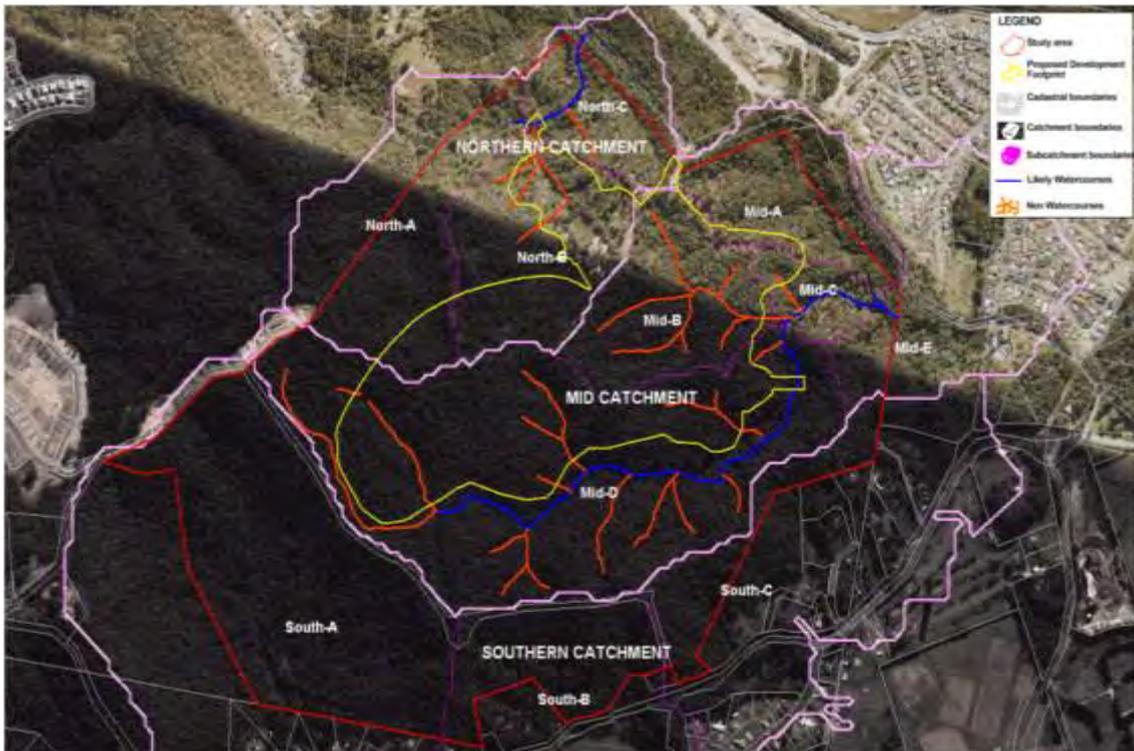
Figure 5.6 Site waterways

The project site contains two watercourses as defined under the *Water Act 2000*—one in the southern catchment and one in the northern catchment—and both lie outside of the project disturbance zone (see Figure 5.7). Water from the quarry site will ultimately discharge to both watercourses.

#### Environmental impacts

##### Gold Coast Quarry:

Coordinator-General's evaluation report on the environmental impact statement



**Figure 5.7 Site watercourses**

The project site was previously used for rural purposes (mainly grazing) but with the cessation of rural activities, ‘scattered to dense’ regrowth vegetation has re-established across most of the site. Patches of remnant vegetation also feature in a number of locations.

The site contains numerous four wheel drive and off-road motorbike tracks through unlawful use and although most of the vegetation across the site remains unaffected by these uses, widespread damage to the site’s natural assets has occurred where tracks have been formed. Damage is most evident on steep slopes and in waterways, particularly in the lower areas of the catchments on the northern part of the site.

### Impacts

The potential impacts of the project in relation to surface water fall into three categories:

- (a) floodplain management impacts
- (b) receiving water hydrologic impacts
- (c) receiving water quality impacts.

### Flood management

The proponent addressed flood management at Section 4.4 (Water Resources) and at Appendix CC (Water Resources and Floodplain Management Report) of the EIS. Detailed flood modelling was conducted for a series of rainfall events ranging from the 50 per cent AEP to the Probable Maximum Flood. Flooding studies were undertaken

for the project at various development stages ranging from the establishment, development and construction stages up to the full production quarrying stage.

The modelling found that for the range of floods considered, there was no significant increase in flood level, discharge, velocity or duration as a result of the development, either onsite or downstream. The modelling also found that there was significant additional storage of floodwater during the construction and operational phases of the quarry afforded by the water supply dam, sediment basin and the quarry pit, leading to a significant reduction in peak flood outflows at these stages of the project's development.

The EIS found that the project would comply with the requirements of the former State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide and the Flood Affected Areas Code of the *Gold Coast Planning Scheme 2003*, even though the codes do not apply to development on the site as the 'defined flood event' for the planning scheme (1 per cent AEP) does not cover the project site.

The EIS found that the early development phases of establishment are more likely to have the greatest risk of offsite flood impacts largely through increased runoff from vegetation clearing, soil compaction and establishment of impervious surfaces. The proponent has committed to minimise this flooding risk through limiting the removal of vegetation and stripping of overburden to outside of the wet season where practicable, during the establishment stage. No additional flood mitigation measures are proposed.

### **Receiving water hydrologic impacts**

The EIS found that the elements of the project which have the potential to generate adverse hydrologic or water quality impacts on receiving waters can be broadly categorised as:

- changes to hydrologic characteristics including:
  - a reduction of flows for all waterways downstream of the disturbance footprint within the northern and mid catchments with the exception of waterways downstream of the quarry dam where flows are predicted to increase
  - reductions in dry season flows downstream of the disturbance footprint, except immediately downstream of the sediment basin
- vegetation clearing and mulching
- earthworks associated with construction and operation
- overflow and controlled releases from the sediment basins and quarry dam
- bushfire and vegetation management activities.

The proponent proposes a management hierarchy approach to reduce the risk of impacts to surface water values ranging from avoidance, impact reduction, water recycling, treatment, and controlled releases offsite. Particular mitigation details are contained in Appendix CC (Water Resources and Floodplain Management Report) of the EIS and include:

- Minimising the disturbance footprint so as to avoid approximately 152 ha (70 per cent) of the site. Within this proposed conservation buffer area, a range of offset

rehabilitation activities are proposed to rehabilitate the land from historic agricultural use and damage from off road vehicles.

- Reducing the volume of future sediment loads discharging from the site (and minimising flood risk) by requiring all vegetation and overburden removal to be undertaken in accordance with an Erosion and Sediment Control Plan (ESCP) and, as far as practicable, outside of the wet season.
- Recycle, re-use, recover philosophy to meet onsite water demands. Modelling has indicated that site water demands for dust control, dust suppression and process water can be met by the recovery and re-use of stormwater.
- Sediment loads will primarily be treated in accordance with the ESCP which will form part of the overall EMP. The treatment of sediment laden stormwater will also assist in the removal of a range of other pollutants.

The proponent has prepared a Stormwater Quantity Management Plan and a Stormwater Quality, Hydrology and Water Cycle Management Plan in accordance with the Gold Coast City Council's *Land Development Guidelines* and *Water Sensitive Urban Design Guidelines*.

## **Water quality**

### *Receiving waters*

Water quality was addressed at Section 4.4 (Water Resources) and at Appendix CC (Water Resources and Floodplain Management Report) of the EIS.

The EIS found that the water quality of downstream receiving environments including the Nerang River and Tallebudgera Creek freshwater reaches and estuaries are generally in good to excellent health.

Water quality monitoring of stormflow events on site was undertaken at three sites for a period of over eight months during the preparation of the EIS. Seven stormflow events were sampled during this period and a range of parameters tested including physical parameters, bacteria, sediments, nutrients, metals and hydrocarbons. The results found that concentrations of a number of water quality parameters typically failed to meet receiving water quality objectives (WQOs) under existing site conditions.

Modelling was undertaken for the project at the construction and quarrying stages to assess the surface water pollutant loads that are predicted to leave the site. The modelling focused on total suspended solids (TSS) loads because it is was judged to be the key pollutant from the site in its existing state and under quarry operating conditions.

The modelling found that having regard to the proposed stormwater management plans, the project is unlikely to have a significant adverse impact on water quality as a result of sediment, acidity, salinity or other pollutants. The EIS reported that the project is expected to decrease stormwater pollutant loads discharging from the project site compared to existing conditions, thus leading to an improvement in water quality in receiving waters.

The proponent has committed to prepare and implement a water quality monitoring program aimed at further characterising baseline water quality conditions in receiving

waterways prior to development. It has also committed to assess the effectiveness of management strategies for protecting water quality during the construction and operational phases of the project. The monitoring program will comply with the *Queensland Water Quality Guidelines*.

#### *Lake water quality*

Three potential waterbodies will exist when quarry operations cease—the sediment pond, quarry dam and the quarry pit. The quarry dam will be removed as part of the decommissioning process to reduce the potential flooding hazard that could occur if the dam wall had a major failure. The quarry pit could be developed as a water body, depending on final rehabilitation and, if so, would take approximately 14 years of rainfall for the pit to fill. Overflow waters from the quarry lake would flow via a channel to the sediment pond which would be used for monitoring and, if necessary, treatment of waters before being released into the environment. The EIS outlined a broad management strategy for the lake's waters.

### **5.3.2. Groundwater**

#### **Context**

The geology of the Reedy Creek area is dominated by the Neranleigh-Fernvale Beds which generally consist of greywacke, argillite (shale and mudstone), arenite, jasper, chert, quartzite and greenstone. Within the quarry site, the main geological units are typically a fine to medium grained siliceous sandstone, which has undergone regional metamorphism and has been folded and fractured to a steeply inclined, meta-sedimentary strata sequence. The prime source rock is meta-greywacke.

Two broad aquifer systems occur at the project site—a fractured rock aquifer of the Neranleigh-Fernvale Beds which extends under the entire site and a restricted Quaternary alluvial system associated with the Tallebudgera Valley to the immediate south of the site.

#### **Impacts**

The EIS found that the groundwater system depends primarily on rainfall for recharge. Reported experience at the proponent's West Burleigh Quarry, indicates that minor groundwater seepage is observed in the pit walls after heavy rainfall and primarily in the upper 20 m to 30 m section, which includes the weathered zone (regolith) and upper part of the fresher rock. At depth, where the rock is fresh and the joints are tight, seepage is not observed.

The EIS determined that groundwater on the project site, flows from the ridge areas towards the creeks primarily through open fractures in the regolith and along the interface with fresh rock. Groundwater discharge to the creeks maintains creek flow for some time; however, pools in the creek bed are reported to be ephemeral. The study indicated that the regolith drains reasonably quickly and that discharge to the creeks and alluvium diminishes and stops during drier periods.

Groundwater water quality monitoring was undertaken at a number of bores on the site and indicated that electrical conductivity (EC) was generally lower at elevated ridge

lines and in deeper bores but was higher in the thin alluvium and extremely weathered greywacke in the creeks. It was concluded that the minerals in the weathered zone are more readily dissolved with groundwater flow. The EC generally exceeds the Australian and New Zealand Environment Conservation Council 99 per cent protection trigger level for protection of aquatic ecosystems in lowland rivers of south-east Australia. Natural background metal concentrations were found to randomly exceed the trigger values for aquatic ecosystems as prescribed by the *Australian Water Quality Guidelines*.

The EIS identified the following potential impacts from the project.

### **Existing groundwater users**

Dewatering of the quarry pit will lead to a cone of depression in the water table after 30–40 years that will extend outwards for up to 1.64 km. The closest registered bore is RN124068, located in a GCCC sports field, approximately 0.8 km to the south-east of the proposed quarry. The bore is shallow, low yielding and is situated in the regolith which appears to form a perched aquifer on the fresh rock. As drawdown from quarry dewatering will primarily be in the fresh rock, the EIS concluded that there should be no or minimal impact on this particular bore. The next closest bores are at the extremity of the radius of influence and should not be impacted as a result of the proposed quarry development.

### **Creeks and groundwater-dependent ecosystems**

The prime source of groundwater discharge to the creeks is from the regolith aquifer which will be removed over the area of the quarry footprint. Removal of the regolith and lowering of the water table in the rock mass due to dewatering of the quarry pit has the potential to impact ecosystems along the creeks that are partially dependent on groundwater discharge. The EIS flora and fauna impact assessment found that none of the ecosystems present within the study area are identified as communities that are dependent on groundwater—refer to Section 5.2.

The EIS further concluded that groundwater discharge to the creeks will continue from the regolith in the catchments to the south, west and north of the disturbance footprint outside of the dewatering zone of influence. In addition, pools in the creeks will continue to be maintained to some extent from surface runoff.

### **Groundwater quality**

During the quarrying stage, groundwater within the depression zone will flow to the pit and any water that collects within in-pit sumps will then be pumped into the surface water management system—quarry dam. The EIS reported that data collected indicates groundwater in the deeper fractured rock aquifer is fresh to slightly brackish with low levels of selected trace metals. The presence of the trace metals is assumed to be due to dissolution of minerals in the aquifer matrix and the metals are therefore naturally occurring. It is reported that little if any groundwater will be stored in on-site storages as most groundwater inflow will be evaporated from the pit walls due to the predicted slow rate of seepage. The EIS concluded that the project will not have an impact on groundwater quality.

## Issues

The EIS concluded that relevant groundwater environmental values are limited to biological integrity of ecosystems and agricultural (irrigation) uses and that the project would not have any significant impact on these values. DNRM advised that a groundwater management and monitoring plan should be implemented to provide further baseline data to inform the EMP prior to quarrying commencing. DNRM also seeks additional information on:

- connectivity between groundwater levels in the alluvium and regolith aquifers and creek base flows
- a survey of existing bores in the drawdown area including those not registered on the DNRM database
- supporting information for the concept of decreasing permeability with depth at the quarry site.

### 5.3.3. Coordinator-General's conclusions

The EIS has identified the surface water environmental values likely to be impacted by the project and outlined measures to manage these impacts. It has found that the project will not exacerbate flooding and that water quality in receiving waters may be improved through the proposed integrated management measures involving rehabilitation of conservation buffer areas, on-site water recycling, water treatment and water quality monitoring. The proponent has prepared a Stormwater Management Plan to address these issues.

I note the proponent's commitment to supply information on WQOs, discharge limits and soil parameters. Accordingly, I have stated a condition for the environmental authority for an ESCP to be prepared in accordance with the guideline, *Best Practice Erosion and Sediment Control*.<sup>6</sup> I have also stated a condition for the preparation of a suitable water quality monitoring program.

In regard to the water quality management plan for any future quarry lake, I have stated a condition for a decision to be made on the quarry pit end use no later than five years prior to the cessation of quarrying operations.

The EIS has assessed the likely impacts to relevant environmental values of groundwater as required under the Environmental Protection (Water) Policy 2009 and found that there would be no significant impacts. However I am cognisant of the advice provided to me by DNRM in regard to the need for the development of and implementation of a groundwater management and monitoring plan and additional information on groundwater-surface water interconnectivity and survey of existing bore water users. I note the proponent has committed to provide this information to DNRM and I endorse this approach. The commitment has been included in the list of proponent's commitments at Appendix 2 of this report.

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<sup>6</sup> Erosion and Sediment Control Association.

## 5.4. Air quality

### 5.4.1. Overview

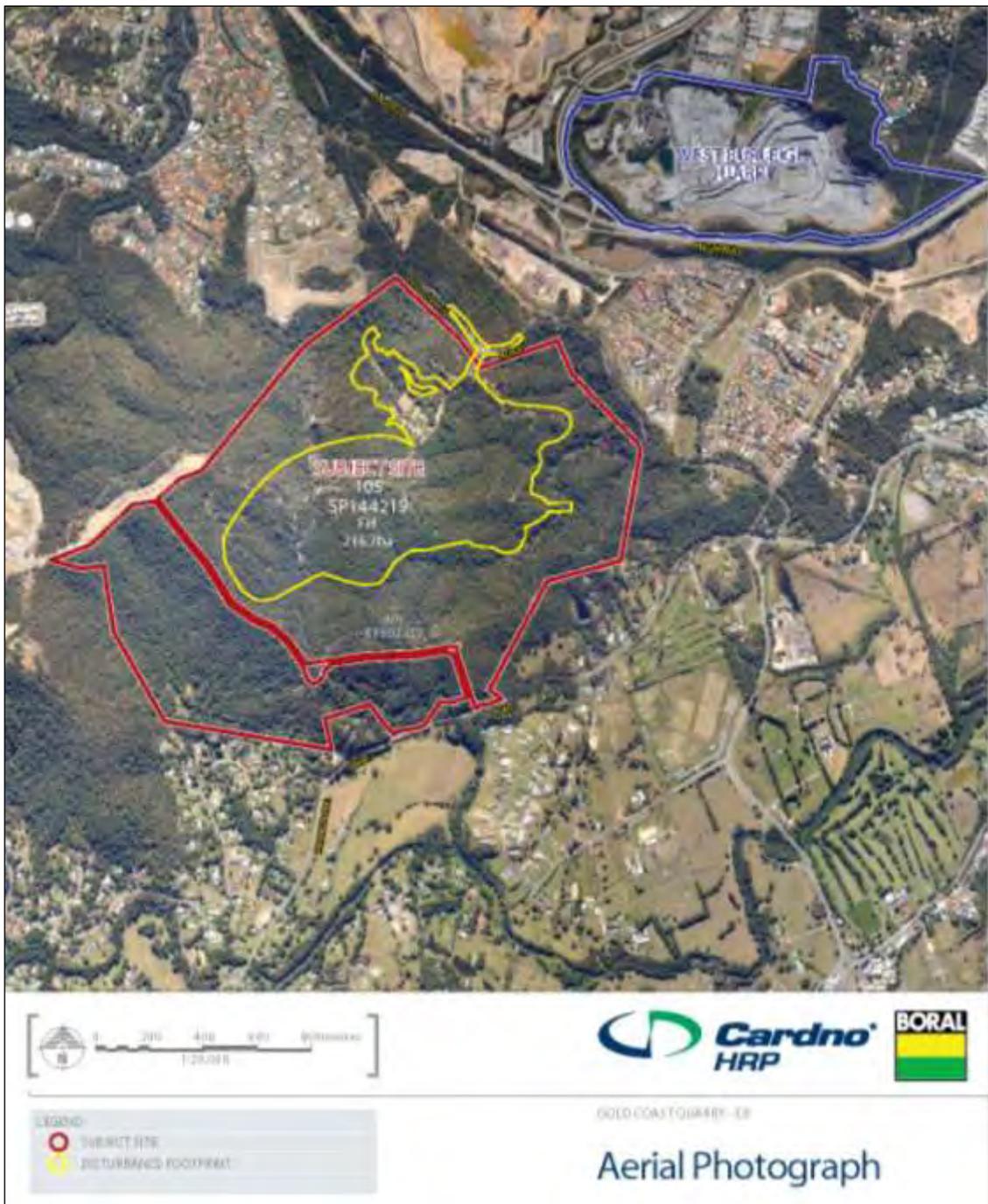
The existing air quality environment in the Reedy Creek area is broadly representative of an urban setting and is influenced by the land uses in the surrounding region. These land uses are the main source of pollutants and result from industrial activity to the north of the project site, including the existing West Burleigh quarry, the Reedy Creek Landfill, the Elanora wastewater treatment plant, the Burleigh Heads Bakery and exhaust emissions from vehicles travelling along the Pacific Motorway.

Other land uses in the region include low-density, semi-rural residential development to the south-west, which is the start of the Gold Coast Hinterland extending away from the coastline, and higher density residential development to north and east approaching the coastline which is approximately 5 kilometres away.

In addition to anthropogenic sources, climate and atmospheric conditions, and topography in the local area has an effect on air quality.

The terrain in the region is complex with the flat coastal zone of the Gold Coast to the east and the elevated terrain of the Gold Coast Hinterland to the west. The elevated terrain of the hinterland comprises mountain ranges that form part of the Great Dividing Range. The most prominent peak, Springbrook Mountain, rises to 900 metres in elevation at around 18 kilometres south-west from the project site. The coastline in the region generally faces east-northeast to the Pacific Ocean.

The Gold Coast Quarry site is located in the foothills of the Gold Coast Hinterland at the bottom of the Tallebudgera Valley, on a site that is made up of ridges and gullies. A map detailing the land-use and topography of the region is provided in Figure 5.8.



**Figure 5.8** Surrounding land uses—airial photograph

## 5.4.2. Climate and sensitive receptors

Weather and climatic conditions have a key effect on air pollution levels.

- The predominant coastal climate of sub-tropical Queensland is one governed by the southeast trade winds and their variations between seasons. These trade winds bring moist oceanic air masses to the coastal regions of eastern Australia and are the main drivers of weather and climate.
- The prevailing climatic conditions of the Gold Coast region have been taken from meteorological observations at the Bureau of Meteorology (BoM) weather monitoring station at Coolangatta Airport, which is approximately 11 kilometres south-east of the project site.

Meteorological data collected at Coolangatta Airport and used in the air quality impact assessment, include temperature, rainfall, relative humidity, solar exposure, and wind speed and direction. However, the climatic conditions at Coolangatta Airport are not completely representative of the climatic conditions at the proposed quarry site due to the airport being on an open plain close to the coast compared to the relatively complex terrain of the quarry site with numerous peaks and valleys further inland. Given this variability in climatic conditions and the fact that there is no meteorological monitoring conducted at the proposed quarry site, meteorological modelling was undertaken to generate site-specific meteorological data for input into pollutant dispersion modelling.

Due to the large number of potential sensitive receptors surrounding the project, sensitive receptors have been grouped by locality and type. A description of the sensitive receptors and locations is provided in Table 5.4 and Figure 5.9.

**Table 5.4 Sensitive receptors**

Area	Description/Location	Receptor Type	Minimum distance from edge of quarry disturbance footprint (metres)
A	Kingsmore Estate	Residential	290
B	Old Burleigh Town (NW)	Residential	245
C	Old Burleigh Town (SE)	Residential	501
D	Tallebudgera Creek Road	Residential	207
E	Tuesday Drive	Residential	503
F	Stocklands Observatory Estate	Residential	724
G	Skyline Terrace	Residential	1 550
H	Chesterfield Drive	Residential	801
I	Stocklands Observatory Estate (Stage 20)	Future Residential	205
J	Industry	Industrial	726
K	Other (schools, aged care homes and commercial places)	Residential and Commercial	1 100 (east) – 1 422 (north-west)
L	Vegetated buffer zone (sensitive flora and fauna)	Ecological	N/A

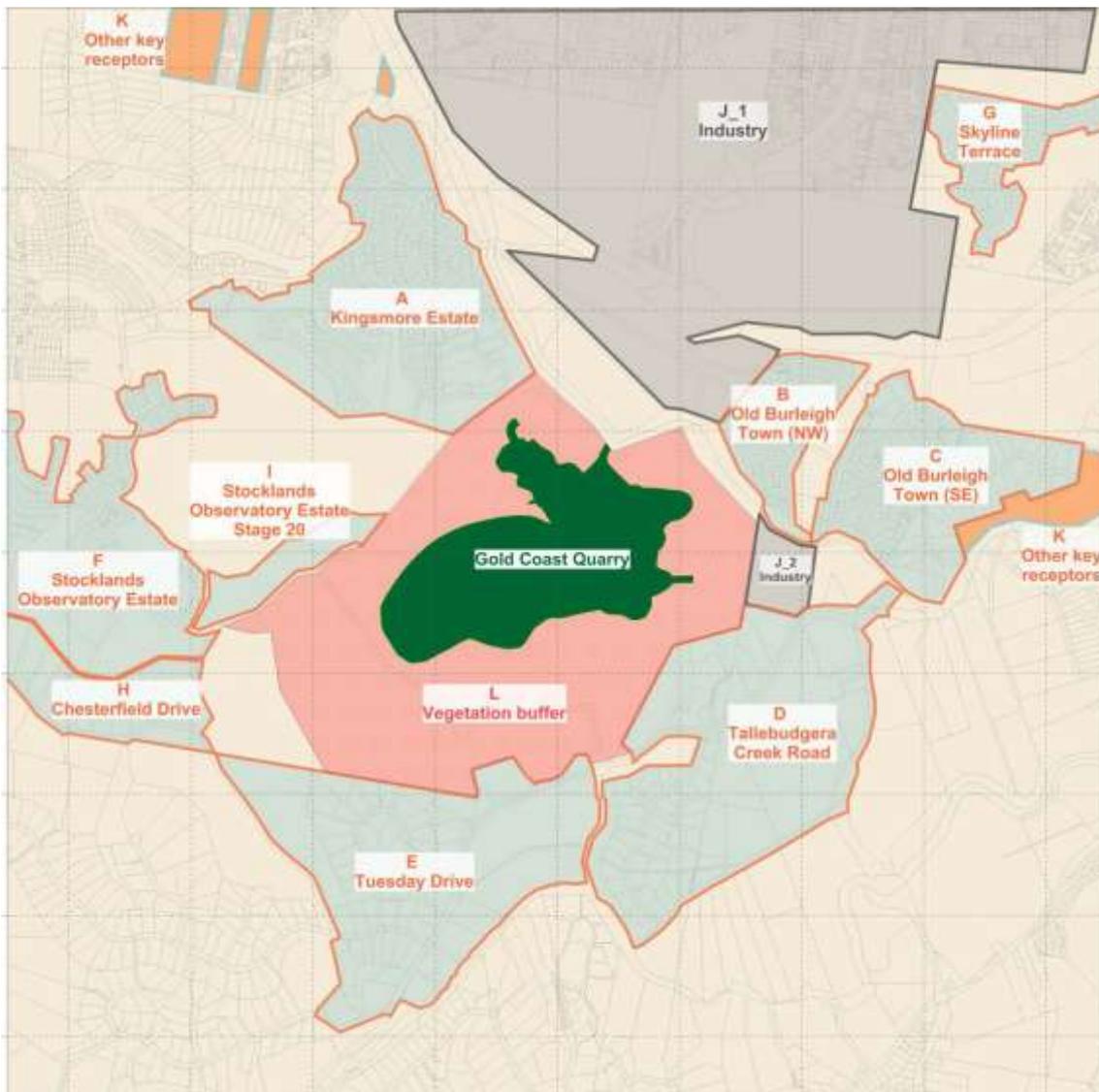


Figure 5.9 Sensitive receptor locations

### 5.4.3. Dust and other particulates

#### Assessment methodology

The air quality impact assessment was conducted in accordance with industry recognised techniques for dispersion modelling and emissions estimation. Site specific source characteristics and air pollutant emission rates, combined with site specific meteorology was used to predict the concentrations of air pollutants within the project area, specifically at the sensitive receptors above.

The project's dust generating activities were assessed against the air quality objectives in the *Environmental Protection (Air) Policy 2008* (EPP Air) for the potential impact on air quality by predicting the ground-level concentrations (GLCs) and deposition rates at each of the sensitive receptor areas.

The air quality impact assessment focused on those air pollutants identified as most critical in terms of potential impacts to air quality from typical quarry activities, namely dust in the form of TSP, PM<sub>10</sub> and PM<sub>2.5</sub>. Dust deposition rates have also been assessed. In addition, the potential for the emission of crystalline silica has been considered in this assessment.

Emission estimates for pollutants associated with the Gold Coast Quarry were sourced from the following databases:

- emission factors published by the United States Environmental Protection Agency (USEPA) in the AP-42 documents and by the National Pollutant Inventory (NPI) in their emission factor handbooks
- operating parameters, such as daily and annual production rates, plant and ancillary equipment types, stockpile dimensions, locations of plant and ancillary equipment and the utilisation of such equipment
- free silica content determined from Gold Coast Quarry petrographic reports (Geochempet, 2005).

The dust control measures and treatments proposed by the proponent for the project have been accounted for as far as practically possible in the dust emissions inventory by using known reduction efficiencies published in the literature. The reduction efficiencies of dust controls to be used at the Gold Coast quarry can be found in Table 12 of Appendix GG to the EIS.

As there was no site specific meteorological data available, a three dimensional meteorological file was generated using the coupled TAPM/CALMET meteorological modelling system to represent the project site. Meteorological parameters that are important for the dispersion of air pollutants include wind speed and direction, atmospheric mixing heights and atmospheric stability.

These meteorological parameters, together with other site specific terrain and land-use conditions were incorporated into the coupled TAPM/CALMET modelling system to simulate synoptic (large) and regional scale meteorology for input into the CALPUFF dispersion model. Twelve months of modelled meteorological data was used as input for the dispersion modelling. This encompassed all weather conditions likely to be experienced in the region during a typical year.

Representative background concentrations for all likely pollutants in the project area were estimated based on available monitoring data collected by the Department of Environment and Heritage Protection (DEHP) at Springwood (62 kilometres to the north of the project site) and Arundel (20 kilometres to the north of the project site) and by Boral at the West Burleigh quarry. The background dust level is generally defined as the level of dust that would exist in the absence of anthropogenic sources.

The ambient or background concentration was added to the predicted concentrations associated with the project activities. The operational stage of the project represents the largest potential dust generation capacity and has the largest dust emissions inventory, being over double the inventories for any other stage of the project. The dust concentrations from the operational stage of the project were used to estimate the

cumulative (ie plus an ambient background) dust concentrations at sensitive receptor locations for assessment against relevant air quality guidelines.

The EPP Air sets air quality objectives which are based on human health criteria, and which are more stringent than the levels at which measurable impacts on the natural environment would be expected. The effect of dust on vegetation is principally through interception of light by leaves and the consequential effects on the rates of photosynthesis and plant health and growth. In the absence of dust assessment criteria for ecological receptors (vegetation and biodiversity of ecosystems), ecological receptors have been qualitatively assessed against dust deposition guidelines that are used for the protection of human amenity impacts.

The dispersion modelling has not accounted for the effect of vegetation on dust emissions. Vegetation will trap dust emissions from the site and dust levels measured at sensitive receptors should be lower than that predicted by the dispersion modelling.

### Potential impacts

The following project activities have the potential to generate dust emissions:

- material handling by site machinery such as bulldozers/front end loaders/scrapers
- drilling of blast holes within the pit area
- blasting within the pit area
- excavation of raw material
- processing of raw material (crushing and screening) by both mobile and fixed plant
- wheel generated dust associated with haulage of raw material and product
- wind erosion of raw material and product stockpiles
- wind erosion of exposed areas (pit and plant areas).

Given the nature of the activities—fracturing, crushing, screening and transport of hard rock—the air quality impact assessment has focused on air pollutants in the form of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> as typical emissions from quarrying activities. Dust deposition rates have also been assessed. The potential for the emission of crystalline silica has also been considered in this assessment and is discussed in further detail below. The potential for the emission of asbestiform minerals has also been considered and is discussed in further detail below.

Other air pollutants, such as oxides of nitrogen (NO<sub>x</sub>), carbon monoxide and sulphur dioxide, may also be emitted from project activities including blasting and equipment and vehicle operations. However, the emissions of these pollutants are relatively small and as such are considered to be a low risk to human health and wellbeing.

An inventory of potential dust emissions during each stage of the Gold Coast quarry has been calculated. This inventory indicates that the operational stage of the project with fixed crushing and screening plants operating at maximum capacity producing 2 Mtpa of product per annum results in the largest dust inventory and therefore has the highest potential to cause off-site impacts at nearby sensitive receptors and has been used in the impact assessment.

The dust mitigation measures proposed by the proponent and discussed further below have been accounted for in the dust emissions inventory by using known reduction efficiencies published in the literature.

The maximum average GLCs of particulate matter at each sensitive receptor predicted by the dispersion modelling, with background concentrations of 37 µg/m<sup>3</sup> for TSP, 18.5 µg/m<sup>3</sup> for PM<sub>10</sub> and 6.2 µg/m<sup>3</sup> for PM<sub>2.5</sub> derived from measurements at Springwood EHP station, and reported against EPP Air criteria is presented in Table 5.5.

**Table 5.5 Predicted maximum average ground-level concentrations**

Receptor Area	TSP (µg/m <sup>3</sup> ) Annual average		PM <sub>10</sub> (µg/m <sup>3</sup> ) 24-hour average		PM <sub>2.5</sub> (µg/m <sup>3</sup> ) 24-hour average	
	Predicted (cumulative)	EPP Air objectives	Predicted (cumulative)	EPP Air objectives	Predicted (cumulative)	EPP Air objectives
A	44.5	90	37.5	50	8.9	25
B	43.3	90	47.1	50	10.5	25
C	39.7	90	45.8	50	9.9	25
D	42.0	90	46.6	50	10.2	25
E	39.1	90	28.3	50	7.6	25
F	38.0	90	30.3	50	7.9	25
G	38.1	90	29.0	50	7.8	25
H	37.7	90	25.4	50	7.2	25
I	42.0	90	54.7	50	11.5	25
J	41.6 – 46.5	90	49.7 – 53.5	50	10.9 – 11.1	25
K	38.5	90	33.5	50	8.3	25
L	N/A	N/A	N/A	N/A	N/A	N/A

The predicted maximum ground-level concentrations of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> resulting from the project activities are below the relevant Air EPP objectives at all sensitive receptors with the exception of areas I and J. However, it is standard in the assessment of PM<sub>10</sub> concentrations to consider 5 exceedances per year as acceptable. The modelling results indicate the 6<sup>th</sup> highest per centile predicted maximum 24-hour average ground-level concentration of PM<sub>10</sub> at sensitive receptors I and J are 30.9 µg/m<sup>3</sup> and 38.5 – 39.4 µg/m<sup>3</sup>, respectively, which are below the EPP Air criteria.

There are currently no ambient air quality guidelines in Queensland for deposited dust. In the absence of Queensland objectives, measured deposited dust levels were compared against dust nuisance background concentrations of 120 mg/m<sup>2</sup>/day (over a 30 day averaging period) in *Australian Standard AS 3580.10.1, 2003* and 130 mg/m<sup>2</sup>/day (over a 365 day averaging period) adopted by the NSW Office of Environment and Heritage (OEH) in its *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW DEC, 2005).

The predicted monthly maximum and annual average dust deposition rates at each sensitive receptor predicted by the dispersion modelling and reported against AS 3580.10.1 and NSW OEH criteria is presented in Table 5.6.

**Table 5.6 Predicted monthly maximum and annual average dust deposition rates**

Receptor area	Dust deposition rate (mg/m <sup>2</sup> /day) Monthly maximum		Dust deposition rate (mg/m <sup>2</sup> /day) Annual average	
	Predicted (cumulative)	AS 3580.10.1 objectives	Predicted (cumulative)	NSW OEH objectives
A	118.4	120	88.6	130
B	79.8	120	52.7	130
C	53.2	120	44.2	130
D	94.7	120	59.1	130
E	78.3	120	49.6	130
F	49.6	120	42.8	130
G	44.7	120	39.7	130
H	43.8	120	41.0	130
I	109.9	120	72.4	130
J	66.3 – 115.9	120	50.0 – 75.6	130
K	51.0	120	44.8	130
L	339.3	N/A	254.7	N/A

The predicted dust deposition rates resulting from the project activities are well below the relevant Air EPP objectives at all sensitive receptors with the exception of area L, which is the vegetated buffer zone. While some areas of the vegetation buffer zone receive high dust deposition rates when evaluated against human health and wellbeing amenity criteria, these are not considered large enough to adversely affect vegetation.

### Mitigation measures and offsets

The proponent has proposed a number of dust control measures and treatments to manage the project’s dust emissions, including:

- operation in daylight hours only (6:00 am to 6:00 pm)
- use of water trucks to wet down working roads and pads
- drill rigs fitted with integral dust collectors
- use of water trucks to wet down blast surface prior to firing
- installation and use dust suppression systems on the plant and equipment
- internal access road from intersection to car park will be sealed (concrete/asphalt/bitumen sealed)
- use of water truck/s to wet down working roads and pads – including application of polymer additives for efficient use of water, and longer retention time
- plant enclosures and hi-pressure dust suppression systems
- all external conveyors to be fitted with rain/wind covers
- contained storage in ‘toast-rack’ bunkers. Dust bunkers to be fitted with retractable covers

- majority of high turnover aggregate products will be despatched into trucks from overhead load out bins with automated weigh-feeders to control product discharge
- diligent use of water truck/s to wet down aggregate product stockpiles located at the northern area of the facilities pad
- the main quarry access road (including weighbridge area) will be sealed. A street sweeper will be employed to periodically sweep the internal roads and turnout areas to Old Coach Road
- all product despatch trucks will pass through wheel wash units
- covering of truck loads when transporting material.

In addition to the mitigation measures above, the strategic design of the quarry footprint and the shielding effect provided by the vegetated buffer zone, will assist in mitigating the impacts of air pollutants from the project.

#### 5.4.4. Crystalline silica

The likely presence of silica in the hard rock resource was discussed in Section 5.1.5 of this report.

Silica dust can be created at any point during cutting, drilling, blasting or processing of hard rock and overburden, and from wheel action on the haul roads.

Prolonged exposure to respirable crystalline silica at elevated levels may impact human health adversely. Crystalline silica must be in the form of very fine particles, generally with an aerodynamic diameter less than three or four micrometres ( $\mu\text{m}$ ), for it to be drawn into the lungs (respirable).

Presently, there are no air quality objectives in Queensland specifically for respirable crystalline silica. Accordingly, objectives from the Victorian Environmental Protection Agency (VIC EPA) of  $3 \mu\text{g}/\text{m}^3$  (annual average) have been used to report respirable crystalline silica in  $\text{PM}_{2.5}$ .

If respirable crystalline silica is produced by the activities of the Gold Coast Quarry, concentrations would be greatest in close proximity to the source of emissions. Therefore, the risk of exposure to respirable crystalline silica will be greatest for those working in close proximity to dust producing activities. This exposure will be managed under the *Mining and Quarrying Safety and Health Act 1999*. In this regard, the proponent has committed to conducting routine monitoring of the exposure of its workforce to respirable crystalline silica throughout the lifetime of the quarry.

The assessment of respirable crystalline silica has used the maximum free silica content measured in the Petrographic analysis reported in Section 5.1.5 of this report and assumed that 32 per cent of respirable dust generated from the quarry would be in the form of crystalline silica.

Dispersion modelling of respirable crystalline silica dust in  $\text{PM}_{2.5}$  has been undertaken for the project operating at maximum capacity producing operation of the project at 2 Mtpa.

In Queensland, crystalline silica is controlled and monitored as part of  $\text{PM}_{2.5}$  and can generally be adequately managed through  $\text{PM}_{10}$  control measures. The EIS assessed the level of crystalline silica to be below the relevant regulatory limits at all residential

sensitive receptors. The maximum annual average GLCs of PM<sub>2.5</sub> at each sensitive receptor predicted by the dispersion modelling, with a background concentration of 5.5 µg/m<sup>3</sup> derived from measurements at Springwood EHP station, and reported against EPP Air criteria is Table 5.7.

The predicted annual average GLCs of respirable crystalline silica in PM<sub>2.5</sub> at each sensitive receptor and reported against VIC EPA criteria is presented in Table 5.7.

**Table 5.7 Predicted annual average ground-level concentrations**

Receptor Area	Respirable crystalline silica (µg/m <sup>3</sup> ) Annual average		PM <sub>2.5</sub> (µg/m <sup>3</sup> ) Annual average (cumulative)	
	Predicted	VIC EPA objectives	Predicted	EPP Air objectives
A	0.15	3.0	6.0	8.0
B	0.18	3.0	6.1	8.0
C	0.07	3.0	5.7	8.0
D	0.12	3.0	5.9	8.0
E	0.05	3.0	5.6	8.0
F	0.02	3.0	5.6	8.0
G	0.03	3.0	5.6	8.0
H	0.01	3.0	5.5	8.0
I	0.09	3.0	5.8	8.0
J	0.25	3.0	6.3	8.0
K	0.12	3.0	5.9	8.0
L	0.04	3.0	5.6	8.0

The predicted concentrations of respirable crystalline silica in PM<sub>2.5</sub> from project operations are well below VIC EPA assessment criterion at all sensitive receptors.

The predicted maximum ground-level concentrations of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> resulting from the project activities are below the relevant Air EPP objectives at all sensitive receptors

Based on the findings of this assessment, the emissions of respirable crystalline silica from the Gold Coast Quarry do not present a risk to human health to the residents who live in communities adjacent to the proposed quarry.

#### **5.4.5. Asbestiform minerals**

The likely presence of actinolite and other asbestiform minerals in the Gold Coast quarry hard rock resource was discussed as part of the geological and geotechnical assessment of the project in Section 5.1.5 of this report.

The risk to human health from asbestiform minerals in the Gold Coast Quarry hard rock resource was raised by the community with the Gold Coast City Council during the advisory agency comment period on the additional information to the EIS. The Gold Coast City Council raised this matter with the Coordinator-General as part of its

submission on the additional information. In response to these concerns the proponent provided the results of further analysis of rock drill core samples undertaken by the Queensland University of Technology (QUT).

Seven core samples of greywacke were analysed using Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), X-Ray Diffraction (XRD) and Polarized Light Microscopy (PLM). The seven 50 mm diameter core samples represented a depth ranging from 28.7 metres to 101.0 metres.

The *Analysis of Quarry Core Samples for the Presence of Asbestos Fibre* report confirmed that no actinolite was discovered in any of the analysed core samples. X-ray diffraction analysis of the core samples determined the rock cores comprised predominantly quartz, albite, muscovite, chlorite and calcite. No amphibole minerals including actinolite and tremolite were detected and no serpentine minerals (precursors to chrysotile asbestos) were identified.

PLM analysis of the crushed rock samples did not detect the presence of any acicular amphibole minerals and no fibrous minerals similar to asbestos were detected in any of the core samples.

SEM and TEM analysis did not detect the presence of any asbestos minerals in the core samples. No prismatic tremolite or actinolite was observed in the additional study.

I note that should asbestiform minerals become airborne that concentrations would be greatest in close proximity to the source of emissions. Those working in close proximity to dust producing activities would be at greatest risk of exposure to asbestiform minerals. This exposure will be managed under the *Mining and Quarrying Safety and Health Act 1999*.

Based on the findings of this assessment, the emissions of asbestiform minerals do not present a risk to human health to the residents who live in communities adjacent to the proposed quarry.

#### **5.4.6. Coordinator-General's conclusions**

The results of the predictive modelling presented in the EIS found that the maximum concentrations of oxides of nitrogen (NO<sub>x</sub>) (resulting from explosives used in blasting) and particulate matter as TSP, PM<sub>10</sub> and PM<sub>2.5</sub> do not exceed the relevant standard and guidelines set out in EPP Air at all residential sensitive receptors, with the exception of two locations for PM<sub>10</sub>.

The dust control measures and treatments committed to by the proponent to manage the project's dust emissions, together with the site specific meteorology, terrain and land-use (i.e. vegetated buffer zone), demonstrate that the predicted dust emissions from project activities would not cause a risk to human health and not cause nuisance to the community.

It is noted that the ground-level concentrations of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> would exceed the regulatory limits in limited areas of the buffer zone to the north and south of the quarry operating pit. However, these exceedances are not considered large enough to adversely affect vegetation and related flora and fauna, and are not considered a threat to human health.

A number of conditions have been stated to ensure mitigation measures are implemented and air quality is protected at sensitive locations around the proposed quarry (refer to Appendix 1).

## 5.5. Noise and vibration

### 5.5.1. Overview

The EIS provided a site evaluation, which included measurement of current ambient noise levels, determination of source sound power levels of plant and equipment at the quarry and prediction of the impact of noise from the quarry during the pre-operations and operations phases of the project.

A blasting impact assessment was conducted to provide an assessment of vibration and overpressure issues associated with development and operation of the proposed quarry.

### 5.5.2. Existing environment

Noise monitoring stations were established throughout the project area and located near noise sensitive receptors.

Using this data, a comprehensive acoustic assessment (addressing blasting, operational, road traffic and maintenance noise) was prepared as part of the EIS and enabled comprehensive assessment and appropriate recommendations for management of the acoustic climate in the locality.

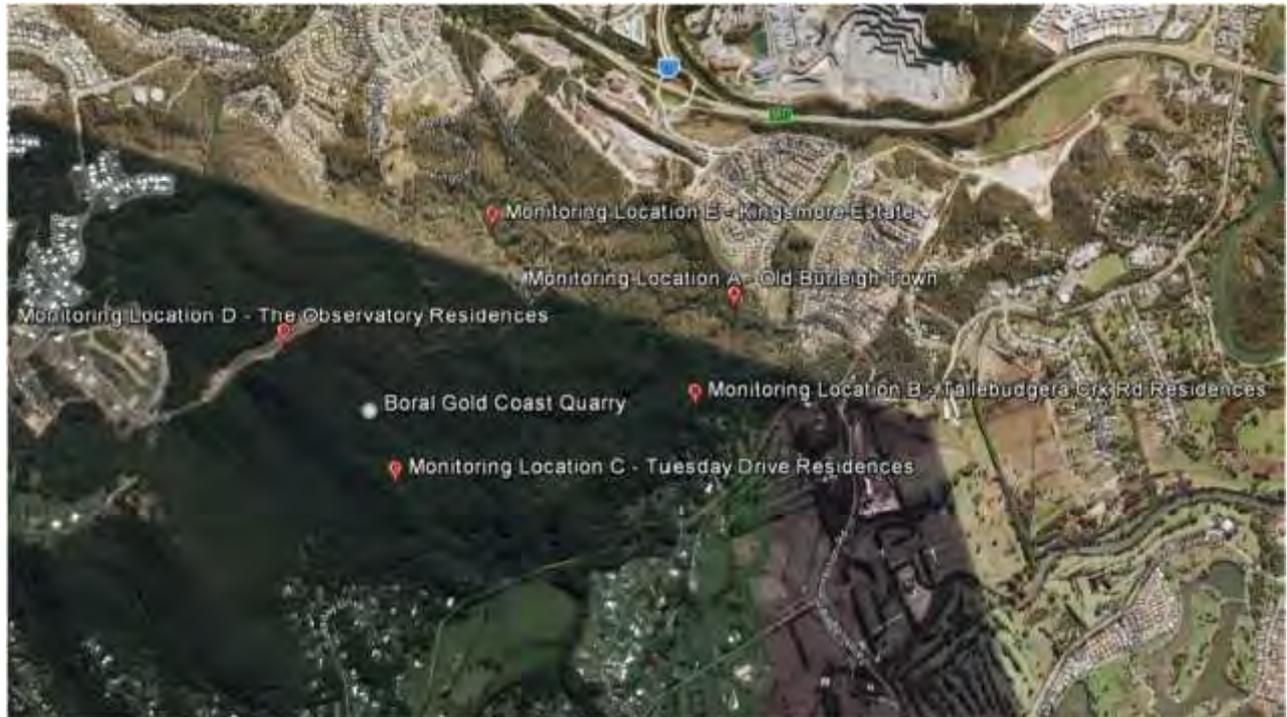
The background noise levels in the Reedy Creek area are broadly representative of a semi-rural, residential area, with the main source of noise being road traffic from the nearby Pacific Motorway.

The acoustical assessment established limits for noise emissions from the project with regard to current ambient noise levels. A set of criteria is provided in Table 5.8.

**Table 5.8 Limits for noise emissions for project stages**

Location	Pre-operations stage (establishment, development and construction stages)	Operations stage (quarrying)
Old Burleigh Town (Location A)	43dBA	43dBA
Tallebudgera Creek Road (Location B)	43dBA	42dBA
Tuesday Drive (Location C)	33dBA	32dBA
The Observatory, Stage 20 (LocationD)	38dBA	35dBA
Kingsmore Estate (Location E)	40dBA	40dBA

To estimate and quantify ambient and typical background noise levels, five representative noise monitoring locations were identified as the likely most sensitive noise receptors. All sensitive noise receptors were future and existing residential premises. These locations were situated within 2 km of where the operation of major items of noise generation will occur on the project site. Figure 5.10 identifies the locations of designated sensitive noise receptors.



**Figure 5.10** Logger locations

The EIS reported that the quarry is proposed to operate from 6.00 am to 6.00 pm, six days per week Monday to Saturday. During the pre-operations phases, construction activities and site works will commence at 6.30am, Monday to Saturday. Mobile crushing and screening activities will operate from 7.00 am to 6.00 pm, Monday to Saturday. Blasting activities will occur between the hours of 9.00 am to 5.00 pm, Monday to Friday.

When the quarry is fully operational, extraction, crushing and screening activities will operate from 6.30am to 6.00pm, Monday to Saturday. Blasting activities during the quarry operational phases will occur between the hours of 9.00 am to 5.00 pm, Monday to Friday.

### **5.5.3. Impact assessment**

Construction and operation of the proposed quarry will introduce noise sources that are not currently present, including:

- the operation of mobile and fixed crushing and screening plant and related equipment such as conveyors

- the operation of earthmoving equipment such as excavators, graders, front end loaders, bulldozers, compactors, articulated dump trucks, water trucks
- road traffic noise from haulage trucks travelling to and from the quarry via Old Coach Road
- heating, ventilating and air conditioning (HVAC) equipment for the temporary and permanent buildings including site administration office, employee facilities, maintenance workshop
- rock drilling and blasting.

**Table 5.9 Highest predicted Free Field Noise Levels and Noise Levels Limits – Quarry Pre-operations Phase (Establishment Stage 3)**

Sensitive receptor area	Highest predicted free field noise level, $L_{Aeq,adj,T}$ (dBA)	Applicable noise level limit (dBA)	Meets limit
Kingsmore Estate	32	40	Yes
Old Burleigh Town (NW)	35	43	Yes
Old Burleigh Town (SE)	44	43	No
Tallebudgera Creek Road Rural Residential	38	43	Yes
Tuesday Drive Rural Residential	<25	33	Yes
Stockland observatory Estate	<25	38	Yes
Skyline Terrace	<30	43	Yes
Chesterfield Drive	30	33	Yes
Approved Stage 20 at the Observatory	39	38	No

The EIS modelling results presented in Table 5.9 show a likely worse-case for the pre-operations phase (establishment stage 3) and reveal that noise level limits will be met at all sensitive receptor areas other than in the Old Burleigh Town (SE) Sensitive Receptor Area and Sensitive Receptor Area I (Approved Stage 20) at The Observatory where maximum noise levels 1 dBA higher than the desirable target may be encountered.

Figure 5.11 identifies the potential sensitive receptor areas in proximity to the project site.

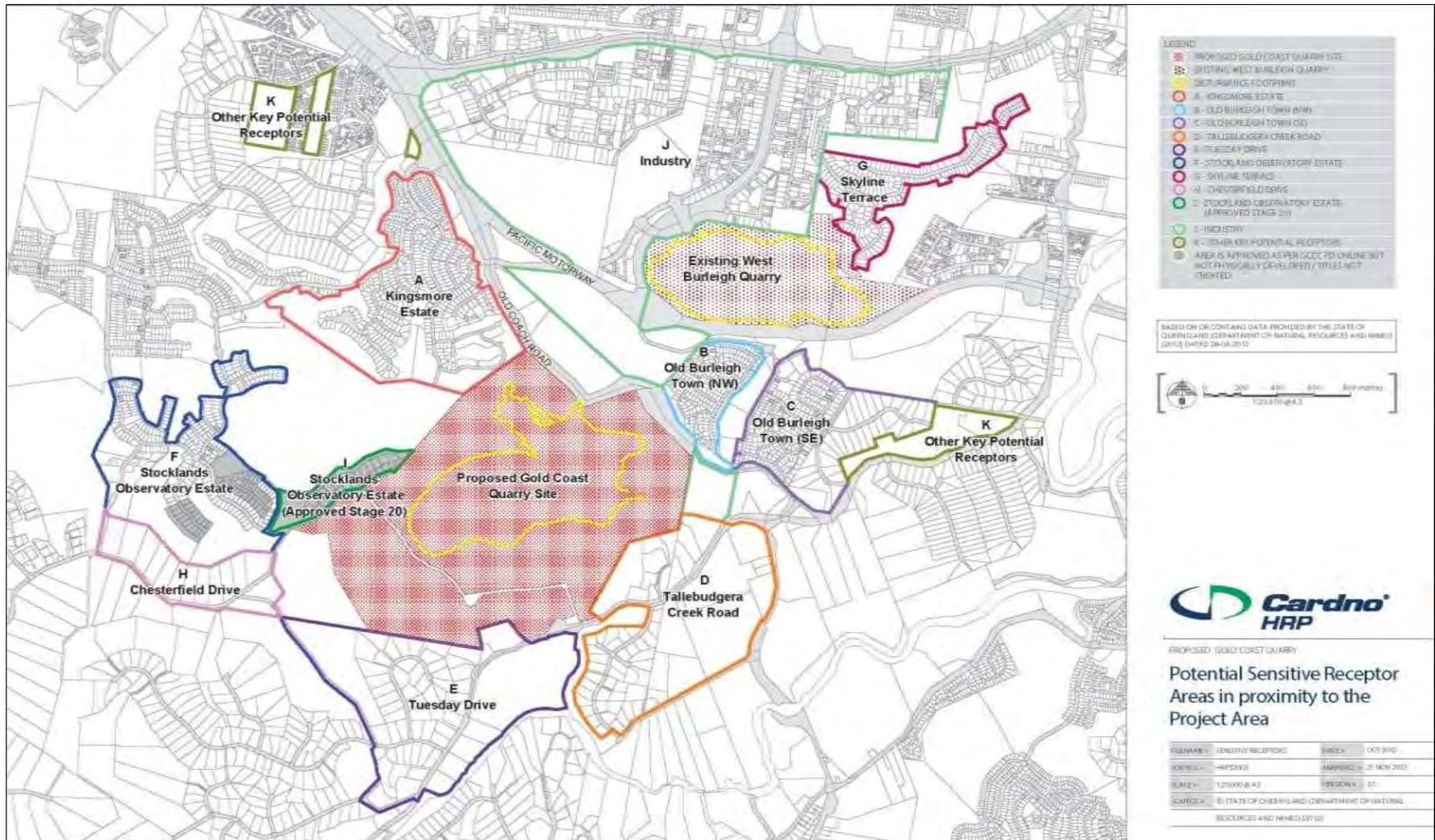


Figure 5.11 Sensitive receptors

From the modelling results, an analysis provided in the EIS (Appendix II) outlined requirements for noise control at certain sensitive receptors. The proponent recognised certain deficiencies in meeting noise level limits at the sensitive receptor areas and made a commitment to implement noise control measures at the pre-operations and quarrying operations phases which include:

- Pre-operations phase:
- the strategic placement of items of major noise generating plant to maximise the beneficial shielding provided by the retained high ground
- the construction of a 3 m high noise barrier along the outer rim of the sedimentation pond at pre-operations phase (establishment stage 3)
- the construction and deployment of 5 m high moveable modular barriers close to one or more of the mobile primary crushers from the commencement of pre-operations phase (establishment stages 2 and 3)
- the deployment of a 5 m high moveable modular barrier located in close proximity to the single mobile primary crusher to be deployed throughout pre-operations phase (construction stages 1 and 2)
- the erection of an 8 m high, 176 m long barrier/earth mound combination constructed along the high ground immediately to the west of western extent of pre-operations phase (construction stage 2) together with a 6 m high, 111 m long barrier/earth mound combination constructed along the northern edge of pre-operations phase (construction stage 2).
- Quarrying operations phase:
- the full enclosure of all fixed crushing and screening plant, with openings let into the enclosures for the entry and passage of product and conveyors only
- at, or prior to, the commencement of operation phase stage 5, the construction of a 6 m high, 150 m long barrier fixed acoustic barrier along a line parallel to and set back 6 m from the common boundary with The Observatory Stage 20
- rock drilling to be carried out using a 'low noise' rock drill and, where necessary, screened using moveable modular barriers located at appropriate elevated positions between the operating drill rig and the nearest residences.

### Road traffic noise

Noise from truck movements on haulage routes was addressed in the EIS. Given the close proximity of Old Coach Road to residences at the eastern extent of the Kingsmore Estate, it is clear that introducing project-related road trucks onto the public roads will create an adverse impact. Adverse effects will be experienced at these residences and under circumstances where all truck traffic uses Old Coach Road (northbound), rather than the proposed Bermuda Street Connector link.

Having regard to both the Gold Coast Planning Scheme's Constraint Code for Road Traffic Noise Management and the Department of Transport and Main Roads' Road Traffic Noise Management: Code of Practice, the objective limit for road traffic noise intrusion is 63 dBA L<sub>10</sub>(18-hour) facade-corrected.

The EIS identified that the level of road traffic noise intrusion is predicted to be greater than 63 dBA with or without quarrying operations. The external noise levels at each of

the residences located in close proximity to Old Coach Road revealed a level of 64.8–67.2 dBA (with quarrying) and 64.5–66.9 dBA (without quarrying). The analysis revealed that the dominant source of road traffic noise for residences on Old Coach Road is traffic on the Pacific Motorway.

The EIS concluded that introduction of the quarrying traffic will not precipitate this exceedance.

### **Mitigation**

The location and topography of the site and its surrounds provides valuable opportunities to effectively manage noise. The EIS found that the project will be able to achieve compliance with regulatory limits because the separation between the source and receiver is provided with the retention of vegetated buffers.

For each of the project phases, the assessment of potential noise impacts, the EIS detailed mitigation measures to be implemented. The proponent has committed to undertake appropriate mitigation action to properties adversely impacted by road traffic noise from the quarry.

### **5.5.4. Vibration**

Potential sources of vibration from the project include earthmoving activities, processing of raw material, haulage trucks and blasting, and if excessive, may cause damage to nearby buildings and structures and affect human comfort.

#### **Blasting vibration**

Vibrations are an inevitable outcome of the use of explosives for rock breaking. The intensity of both ground and air-borne vibrations decreases rapidly with the distance from propagation.

The main control for blasting practices is the requirement to maintain compliance with regulatory limits for ground vibration and air-borne vibration (known as overpressure), irrespective of production rates and blast frequency.

The blasting designed for the project aims to comply with regulations and limits in the EP Act, Australian Standard (AS 2187.2:2006) and the *Queensland Ecoaccess Noise and vibration from blasting Guideline 2006*. The blasting will:

- limit ground vibrations to less than or equal to 5 mm/s and not greater than 10 mm/s peak particle velocity at any time for 9 out of 10 consecutive blasts
- limit overpressure to less than or equal 115 dBL for at least 9 out of any 10 consecutive blasts.

In addition, no vibration levels are to exceed 10 mm/s peak particle velocity and no overpressure levels are to exceed 120 dBL at any affected residence.

The Ecoaccess 2006 guideline and AS 2187.2:2006 are the most stringent of all known international standards regarding permissible levels of ground and air-borne vibrations and address personal amenity. The EIS noted that new criteria guidelines were more onerous on this project than the nearby West Burleigh Quarry.

The EIS reported that as a result of modelling undertaken, the impacts from blasting at the proposed project site are expected to be less than those from the West Burleigh Quarry, due to the greater separation distances from the sensitive receptors afforded by the site.

### **Mitigation**

The assessment of blasting impacts and operations undertaken as part of the EIS nominated the blasting techniques that will be employed by the proponent to ensure that blasting activities comply with the relevant limits for noise, ground vibration and overpressure, and appropriately control the risk of flyrock.

The assessment also provided a summary of blasting-induced effects as a function of separation distance, for normal quarrying operations with 10–15 metre bench faces.

Overpressure levels from blasting are affected primarily by a combination of the weight of explosive, and the distance from the blast holes, but also by local topography. For any particular blast, levels of induced overpressure are expected to be highest at the nearest residence. The modelling conducted at the nearest property in each of the seven sensitive receptor areas for each phase revealed that at no stage will peak vibration and overpressures levels exceed 10 mm/s and 120 dBL respectively at any private property boundary.

The proponent has made a commitment to ensure vibration and overpressure activities are appropriately mitigated (refer Appendix 2).

The proponent has also made a commitment for ongoing monitoring of blasting practices and if vibration and overpressure measurements approach the regulatory limits, the proponent will review the blast design regime and adjust practices to ensure compliance.

The assessment of blasting activities revealed that the project site will be compliant with relevant guidelines but blasting may still be perceptible at some locations in the surrounding area. The proponent therefore proposed in its EIS to carry out blasting on a weekly basis (that is, on average, once every seven days). Blasting will generally be carried out in the middle of a regular weekday to minimise any disturbance to the surrounding area. The vibration and overpressure impacts for each weekly event/s will have a duration of around two seconds.

The EIS noted that blasting will be conducted by highly trained and experienced shot-firers in strict accordance with both regulatory requirements and well-tested operational procedures. No explosives will be stored at the site.

### **Pre-construction building surveys**

The EIS investigated the changes in the condition of structures that may be attributable to new quarrying activities, particularly blasting. The EIS determined that the acceptability of criteria for vibration levels imposed by the relevant guidelines was much lower than the level of vibration that would induce crack formation. Compliance with the regulatory limits effectively ensures a very low chance of damage to residential or commercial structures.

However, the proponent has committed to undertake pre-construction building condition surveys to a limited number of houses in the surrounding area prior to the commencement of works at the site, currently scheduled for 2016.

The condition surveys will only be conducted if the property owners give the necessary consent. These surveys will provide the basis for any claims for damage to buildings caused by vibration associated with the project.

If residential structures are erected in Stage 20 of the Observatory prior to commencement of works at the site, the nearest structure to the quarry would be included in the condition survey offer. Detailed internal and external examinations and review of ground conditions around the house foundations will be undertaken by structural engineers.

### **Environmental management plans**

Draft environmental management plans (EMPs) for noise and blast vibration for the pre-operations and quarrying operations phases were prepared as part of the EIS for the project and their purpose is to provide a range of measures for implementing any environmental management strategies presented in the EIS.

The draft EMP documents the proposed environmental management objectives, implementation strategies, corrective actions and monitoring for the benefit of quarry employees, government regulators, contractors and consultants, community groups and members of the public.

On approval of the project, the draft EMP will be revised to become the EMP that specifies environmental management requirements and procedures for the life of the quarry. The revision of the draft EMP is necessary to include any proposed environmental conditions that are attached to an environmental approval.

### **5.5.5. Coordinator-General's conclusions**

The EIS identified that the project can be configured to be compliant with regulatory limits for noise emissions such that no unacceptable nuisance will affect residential dwellings or other sensitive areas over the course of the project. The EIS also demonstrated that blasting and vibration impacts will be perceptible but will not significantly affect sensitive areas and the surrounding area.

I have considered the EIS submissions and how the proponent has responded to the issues presented. I am satisfied the EIS has adequately assessed noise and vibration impacts for the project, in particular the acoustical assessment, which detailed the ways in which excessive noise levels can be controlled and mitigated throughout the lifetime of the quarry. I am confident that noise levels at nearby noise sensitive receptors will not exceed relevant environmental guidelines and I believe proponent commitments in relation to noise will be effective. In addition to the commitments specified in Appendix 2, the proponent must also meet the environmental conditions for all noise sources relevant to the noise sensitive receptors. These are stated in Appendix 1 of this report.

A comprehensive blasting impact assessment was also prepared to assess the vibration and overpressure issues associated with the development and operation of

the quarry. I am satisfied with the scope of this assessment and note that one blasting event per week is proposed during operation. I acknowledge and support the proponent's commitment to undertake a limited number of pre-construction building condition surveys. I also acknowledge the proponent's commitment to stringent vibration and overpressure mitigation practices and its commitment to prepare blasting management plans that would be revised throughout the quarry's development. I state conditions in this report pertaining to vibration, specifically blasting.

## **5.6. Transport**

### **5.6.1. Existing road network**

The road network in the vicinity of the project site includes local roads controlled by GCCC and state-controlled roads which are managed by TMR.

The project site contains frontages to three constructed roads: Chesterfield Drive to the site's north-west, Tallebudgera Creek Road to the south and Old Coach Road to the east. Access to the project site is via Old Coach Road which provides a single traffic lane in each direction and connects the site to the Pacific Motorway via an existing interchange to the north. Figure 5.12 shows the location of the road network in proximity to the project site.



**Figure 5.12** Location map of site

TMR and GCCC are currently considering a connection linking the Pacific Motorway and Old Coach Road at the Bermuda Street Interchange (Exit 87). These works have been identified in the *Gold Coast City Transport Strategy 2031*.

TMR's future Bermuda Street connection is not linked to the Gold Coast Quarry project and is being separately investigated by road authorities. Potential impacts of the project-generated traffic on the surrounding road network were both considered in the EIS with and without the proposed Bermuda Street connection. The proposed connection is currently unfunded and timing is uncertain.

The project site is classified as a KRA by SPP 2013. This classification aims to protect the potential extractive resource from future incompatible development, which constrains future extraction. Old Coach Road, TMR's future Bermuda Street connection project and Bermuda Street have been designated as KRA transport routes. The use of these proposed routes by project traffic is reflected in the SPP Guideline: *State interest-mining and extractive resources, Key Resource Area maps and Reports*.

Traffic surveys were undertaken to capture existing peak hour volumes at key intersections that will be used by project haulage trucks. The traffic volume at the Old Coach Road and Kingsmore Boulevard roundabout recorded 1812 vehicles per hour during peak times.

### **5.6.2. Transport tasks**

A Road Impact Assessment (RIA) was undertaken for the project. The RIA, which was carried out in accordance with TMR's *Guidelines for Assessment of Road Impacts of Development*, examined the potential operational impacts that project traffic may have on the surrounding road network.

The RIA divided the project into a pre-operations phase (covering establishment and construction of the quarry) and an operations phase (covering the ongoing operation of the quarry and sales of quarry product).

#### **Workforce**

Traffic demands generated by the project include quarry employees travelling to and from the project site. All staff are expected to arrive in the first hour of daily operations and depart in the final hour. All staff movements will take place by private vehicles.

Based on intersection survey data obtained at each of the study intersections between Old Coach Road and the Pacific Motorway, the adopted road peak periods were identified to be 7.45 am to 8.45 am and 3.00 pm to 4.00 pm. The quarry staff peak periods were taken to be 6.00 am to 7.00 am and 5.00 pm to 6.00 pm).

During the pre-operations phase, the workforce will peak at 81 FTE staff in 2019. During the project's operation phase, the workforce will consist of 24 FTE staff.

During the pre-operations phase, 104 daily staff trips were predicted to occur during the quarry AM and PM peak periods. For the operations phase, 36 daily staff trips were predicted to occur during the quarry AM and PM peak periods.

During the pre-operations phase, temporary parking facilities will be provided within the project site, which will accommodate all associated vehicles.

Fifty parking spaces will be provided on site during the operations phase to cater for staff, visitors and disabled access. Vehicle parking will be designed to relevant Australian Standards.

#### **Volume of materials**

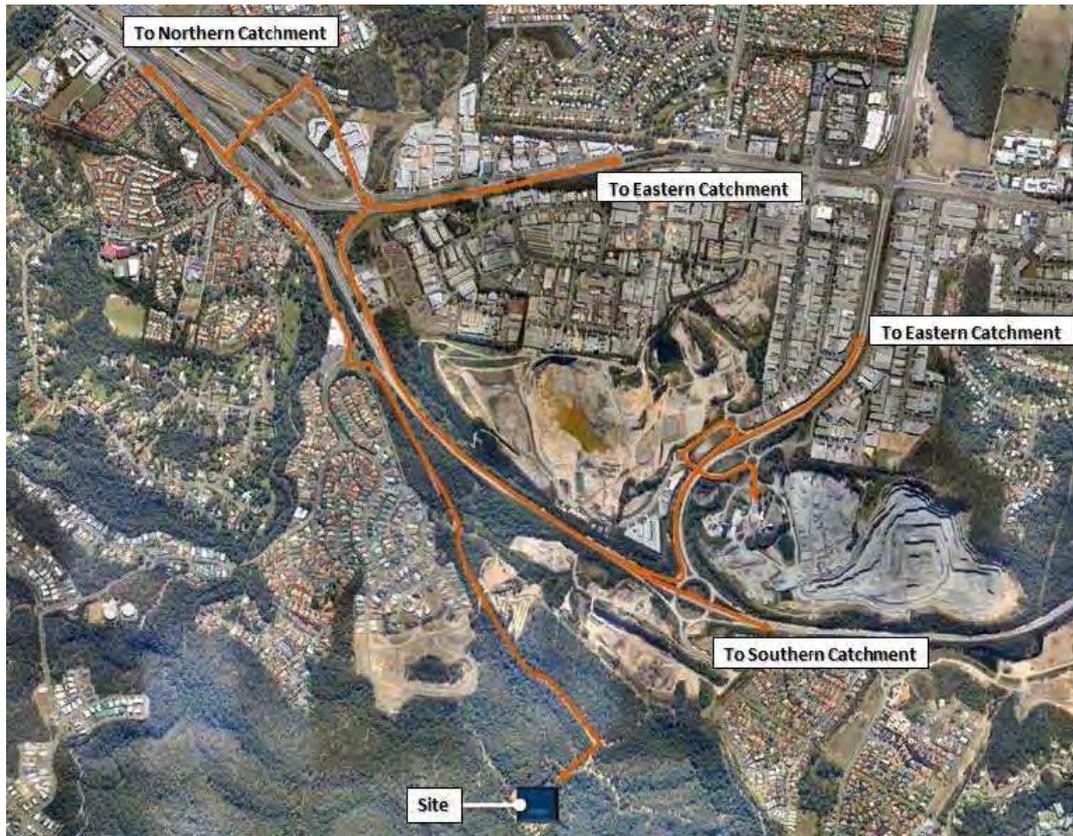
A peak annual haulage of approximately 2.28 Mtpa of overburden and product over the pre-operations phase (January 2016 – June 2020) and approximately 2.0 Mtpa product haulage is expected over the 40-year-plus quarry life.

The distribution of the entire overburden material from the project will be hauled to the West Burleigh Quarry during the pre-operations phase. Quarry product will be distributed to clients during both the pre-operations and operations phases.

## Haulage routes

Haulage movements from the project site to West Burleigh Quarry (i.e. during the pre-operations phase) will occur constantly throughout the day, 6:30 am to 6:00 pm Monday to Saturday. Haulage movements from the project site to clients (i.e. sales) will occur periodically throughout the day, 6:30 am to 6:00 pm, Monday to Saturday.

Figure 5.13 outlines the heavy vehicle haulage route available to provide access to and from the Pacific Motorway without the proposed Bermuda Street Connection.



**Figure 5.13 Assumed haulage routes—without Bermuda Street connection**

There are four schools located within proximity to the project site as identified in Figure 5.14.



**Figure 5.14 Location of schools**

The EIS concluded that project traffic will not travel along the frontage of the identified schools and will have no significant impacts on school operations. Minor local deliveries of product could be expected from time to time. The EIS reported that generally, peak project traffic generation is anticipated to occur outside school operating hours.

### **5.6.3. Impacts**

Key issues raised during the EIS process related to:

- validation of the methodology and calculations used to determine the pavement impact
- clarification and further review on the extent of the proposed road works around the site access point necessary to meet relevant standards and addressing existing deficiencies in pavement condition and alignment
- details of the proponent's site access alternatives information which demonstrates the proposed site access is the best location
- an updated road safety review addressing impacts of increased heavy vehicle usage on other road corridor users at intersections and roundabouts
- address geometric constraints and demonstrate the proposed works can fit within the Old Coach Road and Bridgman Drive existing road infrastructure and that safety design parameters will be met.

The proponent addressed these issues in response to requests from the Coordinator-General for additional information to the EIS.

## Road links—capacity

The proponent reported that the project is expected to increase annual average daily trips during the peak pre-operations and operations periods along Old Coach Road by the amounts detailed in Table 5.10.

Following the EIS, additional information was provided to clarify the likely project truck movements and volume projections on Old Coach Road (between the project's proposed site access and the Kingsmore Boulevard roundabout) for the pre-operations and operations phases.

These figures relate to haulage truck movements only and are not inconsistent with the traffic data presented in the EIS. The truck volume projections contained in the table did not include staff and or delivery vehicle movements.

The traffic data presented found that during the peak pre-operations phase, 454 daily project truck movements were forecast along Old Coach Road. With the additional project truck movements, this resulted in an approximate increase of 8 per cent on daily traffic movements along Old Coach Road for a period of approximately 2–2.5 years over the 40-year operational life of the quarry.

The traffic data also revealed that at peak quarry production of 2.0 Mtpa during the operations phase, 560 daily project truck movements were forecast. The prediction indicated an increase of approximately 7 per cent of project truck movements along Old Coach Road between the proposed project site access and the roundabout at Kingsmore Boulevard. The EIS found that, based on the analysis and data provided, the project is anticipated to have an insignificant impact of the efficiency of the road network.

**Table 5.10 Traffic Volume Projections on Old Coach Road (Kingsmore Boulevard to proposed project site access)**

Time Period	Pre-Operations Phase (2020)				Operations Phase (2030)					
	Background Movements (all vehicle types)	GCQ Haulage Truck Movements Only (excl. auxiliary and staff vehicles)		Background Movements (all vehicle types)	GCQ Haulage Truck Movements Only (excl. auxiliary and staff vehicles)					
					1.5mtpa		1.7mtpa		2.0mtpa	
		IN TRIP	OUT TRIP		IN TRIP	OUT TRIP	IN TRIP	OUT TRIP	IN TRIP	OUT TRIP
Peak Minute	10.43	0.45	0.45	14.02	0.37	0.37	0.42	0.42	0.48	0.48
Peak Hour	626	27	27	841	22	22	25	25	29	29
Daily	5706	227	227	7,668	208	208	237	237	280	280
Annual	2 082 519	101 189	101 189	2 798 732	75 884	75 884	86 341	86 341	102 036	102 036

**Notes**

The 'count' location is between the proposed access and the Kingsmore Boulevard roundabout.

Peak Hour is the AM Road Peak.

The quoted peak hour trips are the specific peak for each component and do not necessarily coincide (i.e. GCQ peak may be earlier than background peak etc.).

The GCQ movements are truck movements only (i.e. no staff or auxiliary movements).

The daily background trips have been multiplied by 365 days to get annual average daily trips.

The daily GCQ movements have been multiplied by 365 days to get annual average daily trips (i.e. this does not take into the operational profile of the quarry).

Definition of 'trip' – A one way vehicular movement past a specific point.

Definition of 'movement' – Two-way vehicle travel from an origin to a destination, and back to the origin.

## Intersections

The RIA looked at key intersections in the area to determine the impact of project-generated traffic demands on the performance and safety of the road network.

The assessment identified locations at which traffic associated with the project had the potential to significantly increase traffic demands at locations requiring a detailed assessment. TMR guidelines stipulate that all state-controlled intersections and links where project demands exceed five per cent of traffic demands should also be assessed.

The EIS found that from an analysis of 13 key intersections, two intersections required upgrade works as it was considered that those intersections may exceed TMR thresholds. Intersections at the quarry site access and the Old Coach Road/Bridgeman Drive/Pacific Motorway on-ramp were identified to be upgraded to accommodate project traffic demands.

## Road safety

Without mitigation measures, the exposure to accidents would increase due to the increase of traffic volumes along Old Coach Road.

The increase of heavy vehicles associated with the project may also increase the severity of any accidents, due to the narrow pavement formation and alignment. A requirement was identified to upgrade Old Coach Road to a suitable standard to correct deficiencies in pavement condition and road alignment.

Potential safety impacts associated with the site access proposed in the EIS were identified. Additional information on site access alternatives was provided to demonstrate the best location for the proposed site access.

## 5.6.4. Mitigation

### Haulage roads

The proponent has committed to provide monetary contributions towards the maintenance of the pavement of the road network. The contribution will be required for maintenance and rehabilitation works from the use of project haulage vehicles on Kingsmore Boulevard roundabout, northbound and southbound M1 on-ramp and Burleigh Connection Road.

Old Coach Road (between the proposed site access and the Kingsmore Boulevard roundabout) will require an upgrade to a two-lane rural road standard. An upgrade of Old Coach Road from the proposed site access location to the Kingsmore Boulevard roundabout (including any intersection upgrades between Kingsmore Boulevard and Stapley Drive) will also be required.

If the 'Old Coach Road Connector' is built as part of the future Bermuda Street interchange, the section of Old Coach Road between the site access and the 'Old Coach Road Connector', appropriate upgrades will need to be undertaken.

Appropriate noise mitigation measures will need to be implemented along the haulage route at sensitive receptors if predicted noise levels are exceeded.

During the construction and commissioning of any site accesses and or other related road works, a Traffic Management Plan (TMP) is to be implemented to manage the ongoing safety, efficiency and existing condition of the road network.

The proponent will make proportionate infrastructure contributions toward pavement upgrades to meet industrial street standards and relevant guidelines in the absence of the proposed Bermuda Street Connection.

DTMR has calculated the proponent's contribution to road pavement maintenance of the SCR network at \$947 533 which equates to \$23 688 per year.

### Site access and intersections

Both GCCC and DTMR considered the proposed location and layout of the site access would significantly impact on the road network.

The proponent will construct the proposed site access at the intersection of Old Coach Road in accordance with *Austrroads Guide to Road Design* standards.

DTMR considered the impacts of the increased heavy vehicle usage on other road corridor users, particularly around conflict points such as key intersections and roundabouts. DTMR advised that the existing key intersections and roundabouts will require upgrades.

The proponent will upgrade certain intersections including: Old Coach Road/Bridgman Drive/Pacific Motorway off-ramp roundabout with appropriate road safety related devices and structures to be implemented.

### 5.6.5. Coordinator-General's conclusions

I am satisfied that the EIS assessment process has investigated the potential impacts of the project on the local and state-controlled networks and that these impacts can be adequately managed. I acknowledge the proponent's conclusion that traffic generated by the project would not have a significant impact if proposed road network upgrades are undertaken, irrespective of the timing of TMR's future Bermuda Street connection.

I state conditions for the proponent to prepare an impact mitigation program (in conjunction with DTMR and GCCC) that must be implemented at least three months prior to construction commencing.

I consider that, prior to completion of the proposed Bermuda Street Connection, there should be a prohibition on all heavy vehicle movement between the quarry site access and Tallebudgera Creek Road via the southern end of Old Coach Road at all times.

I require the upgrading of Old Coach Road between the proposed site access and the Kingsmore Boulevard roundabout to a standard for a two-lane rural road; intersection upgrades between Kingsmore Boulevard and Stapley Drive; and proponent funding for pavement and other associated road works.

With regard to the proposed haulage route, I support GCCC's view that the proponent should undertake appropriate noise mitigation measures along the haulage route in compliance with relevant traffic noise management criteria.

Should the Bermuda Street Connection proceed to construction, then it is my view that quarry traffic should utilise this link in preference to Old Coach Road northern route.

## 5.7. Waste

### 5.7.1. Overview

This section of the report evaluates potential impacts and mitigation measures associated with the type, volume and nature of waste that may be generated by the project.

The EIS noted that throughout the project's life cycle, a variety of waste streams will be generated. These streams will be produced during different phases of the project's preparation, construction, operation and decommissioning.

The waste management process that will be implemented for the project will involve waste management procedures, monitoring and tracking wastes. A strategy for managing wastes generated during all phases of the proposed quarry has been developed in accordance with the principles of the waste management hierarchy specified in the Environmental Protection (Waste Management) Policy 2000 and the Environmental Protection (Waste) Regulation 2000.

The project will incorporate waste management measures such as; waste avoidance, waste reuse, waste recycling, energy recovery and waste disposal. Tables 4-31 and 4-32 of the EIS identified the estimated volumes of waste types and quantities that are generated during construction and operation project phases based on other typical quarries operated by Boral.

### 5.7.2. Potential impacts and mitigation

The EIS reported that potential waste types generated by the project during construction and operation will comprise:

- regulated waste including paints, resins, oil, pre-coat emulsions, pre-coated aggregates, diesel, solvents, tyres for light vehicles & quarry earthmovers, vehicle batteries, lubricants, screen cloths and crusher wear liners
- general waste including food waste, packaging and food containers
- recyclable waste including paper, cardboard, plastics, glass, scrap metal and aluminium cans
- sewage sludge
- quarrying wastes (cleared vegetation, soil and overburden). The operational stage of the project will generate a range of solid, liquid and gaseous wastes.

The EIS indicated that the amount of material brought on-site for the construction and operation of the quarry will be minimised and reducing the volume of waste generated. The management and storage of wastes will prevent on-site and off-site pollution and improve the opportunities for reuse.

Waste will be segregated and collected on-site and stored in containers for removal to approved facilities. It is anticipated that a portion of all construction materials used at

the quarry will be recycled. The construction and operational solid wastes that cannot be recycled or reused will be disposed of by a commercial waste contractor at an appropriate waste and recycling facility.

A sewage treatment plant will also be located on site to treat generated waste. Wastes will be treated in the treatment plant and sewage sludge will be transported off site to a regulated landfill facility.

Putrescible waste will be generated through day to day activities of the site office facilities and kitchen waste and amenities. The putrescible waste will be stored in sealed containers and then transported off-site on a regular basis.

The EIS concluded that the potential environmental impacts that may result from generation and disposal of waste will be effectively managed and reduced by implementation of specific waste management procedures.

### **5.7.3. Coordinator-General's conclusions**

I consider that the assessment contained in the EIS adequately demonstrates that the impacts of the project activities on waste will be effectively managed to avoid adverse impacts on environmental values and associated ecosystems surrounding the quarry.

I have stated conditions in Appendix 1, Schedule 3 and in Appendix 1, Schedule 4 which ensure that all waste generated by the project's activities would be appropriately managed in accordance with appropriate standards..

I am satisfied that the proponent's commitments which includes a system to track all regulated waste and the standards and procedures of the project's waste management plan be implemented.

## **5.8. Cultural heritage**

### **5.8.1. Indigenous cultural heritage**

An Indigenous cultural heritage survey conducted in 2012 documented a single site complex (B SC13). The site is outside of the proposed disturbance footprint but within the project boundary. Aboriginal place B SC13 was defined as of high Aboriginal cultural significance and moderate scientific significance as defined under the Burra Charter.

Pursuant to sections 91 and 93 of the Aboriginal Cultural Heritage Act (ACH) the development of a Cultural Heritage Management Plan (CHMP) was commenced with written notifications being sent to the CEO of the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA), relevant landholders and Jabree Limited as the Aboriginal cultural heritage body for the Gold Coast native title claimants. Jabree Limited responded to the notification and on 29 October 2012, a CHMP was executed by relevant parties and approved by the Director of Cultural Heritage, DATSIMA. Land tenure research indicates that native title has been extinguished in the project area.

Jabree Limited has advised that, despite the existence of Aboriginal place B SC 13 on the site, it has no objections to the project proceeding subject to the terms of the agreed CHMP.

### **5.8.2. Non-Indigenous cultural heritage**

Chapter 4.11 of the EIS stated that a review of statutory non-Indigenous Cultural Heritage (NICH) registers revealed that no NICH sites were located within the proposed project site.

As part of the social impact assessment conducted as part of the EIS, a landowner advised of an historic cemetery situated in the vicinity of the Maryville Homestead—a dwelling that was constructed in the late 1800s. The homestead is located on the property that adjoins the southern boundary of the project site. The cemetery is reported to contain 29 graves, including one military grave. As the Maryville Homestead and cemetery is located outside the boundary of the project site, field work has not been undertaken on this site.

The proponent has also determined that a section of Old Coach Road, which is to be used as the entry road for the quarry, follows roughly the alignment of the route established by Cobb & Co in the 1880s. Old Coach Road has been determined to be 'locally significant'.

Old Coach Road is highly likely to be impacted as a result of establishing the access road associated with the proposed quarry development.

The proponent states that while the potential is low, there is a chance that additional 'currently undiscovered' sites of cultural heritage significance may exist within Lot 105.

The proponent has agreed to put in place the following mitigation measures in relation to Old Coach Road and general mitigation recommendations to manage unknown and unexpected NICH within, or in the vicinity of Lot 105.

**Table 5.11 Mitigation measures**

<b>Recommendation/measure</b>	<b>Mitigation</b>
Avoidance of sites	Avoid impact on sites and places of significance.
Mitigation for Old Coach Road	All staff and contractors to be informed prior to commencement of work of the cultural heritage significance of the road and will receive a “tool box” talk.  An archaeologist will be appointed “on call” for the duration of the works.  Any discovery or finds should be managed in accordance with the incidental finds procedure.
Management of Lot 105	NICH Induction Booklet to be developed with specific instructions for staff and contractors on what constitutes a NICH, and what to do if they do find a NICH.
Unexpected Finds	All work at the location of the potential material must cease and reasonable efforts to secure the site should be made.  Work can continue at a distance of 20 metres from a find area  Historical archaeologist will be notified and will liaise with DEHP
Potential Heritage Places	Potential heritage places that exist within the vicinity of Lot 105 such as Maryville Homestead and potential historic cemetery will be managed to ensure that no unacceptable impacts occur as a result of the project.

### **5.8.3. Coordinator-General's conclusions**

I am satisfied that the proponent has thoroughly invested the Indigenous and non-Indigenous cultural heritage aspects of this project and that the mitigation measures will avoid the impacts on the places of significance associated with the project.

## 6. Social and economic impacts

The Queensland Government has committed to streamlining regulatory and approval processes, including the cost and complexity of the EIS process for coordinated projects, as a means of reducing costs to industry, clearly identifying specific outcomes and helping to grow a four-pillar economy.

In support of these objectives, I have developed a new SIA Guideline to assist proponents to effectively identify, assess and propose measures to mitigate the social impacts of coordinated projects. Under the guideline, the requirement to complete a SIA as part of the EIS process remains unchanged.

The components of a SIA include:

- community and stakeholder engagement
- workforce management
- housing and accommodation
- local business and industry content
- health and community wellbeing.

The guideline is available on the Department of State Development, Infrastructure and Planning website at: [www.dsdip.qld.gov.au/assessments-and-approvals/social-impact-assessment.html](http://www.dsdip.qld.gov.au/assessments-and-approvals/social-impact-assessment.html)

My assessment of the potential social impacts of the Gold Coast Quarry project reflects current Government policy in relation to social impact assessment, which is risk-based and outcome-focused.

The area immediately surrounding the project site is a mixture of residential housing estate allotments to the north and east of the site, and semi-rural acreage properties on the southern and western side of the site. The attributes of the location such as attractive views of the coast from the hinterland in and around Reedy Creek, and proximity to other major suburban developments such as Robina has helped spur development in recent times.

The Gold Coast economy has traditionally been underpinned by the tourism and construction industries. The Gold Coast encompasses a number of large infrastructure facilities such as the Gold Coast Airport, as well as significant employment nodes such as the Yatala Enterprise Area offering the opportunity to expand, diversify and grow the Region's economic base.

The EIS analysed the potential impacts of the project on the social and economic environment and public amenity of the area for both the construction and operation phases of the project. Submissions to the EIS raised a number of key issues in relation to the social and economic impacts over the life of the project, including:

- decline in the rural character of the area and reduction in visual amenity
- decrease in property values
- increased traffic generation resulting in increased congestion and reduction in road safety

- dust emissions, noise emissions and vibration transmission.

The environmental impacts of the traffic, dust, noise and vibration activities of the project have been considered elsewhere in this report and where required, recommendations have been made and conditions set to ensure the impacts are acceptable. However, other factors relating to the social and economic environment need further scrutiny to ensure the impacts are fully appreciated and are discussed in further detail below.

## 6.1. Community and stakeholder engagement

As part of the EIS process, the proponent conducted a community consultation and communication program which involved a variety of community activities and tools, including one-on-one interviews with local residents and businesses, holding community information sessions and stakeholder briefings, conducting site tours, distributing newsletters, conducting focus groups, establishing a project website, providing multiple avenues for comment such as free call phone number, email, post, website, feedback forms and static displays at shopping centres.

The purpose of the community consultation and communication program was to inform the community and stakeholders of the project and its impacts, and to seek public comment and feedback which provides an opportunity to provide input and influence the design and operations of the project.

The community consultation and communication program is described in further detail in Appendix I of the EIS.

The proponent has committed to establishing a Community Liaison Group and a Community and Stakeholder Engagement Plan for the project to ensure a good understanding of the project by the community and to ascertain individual requirements and address issues expediently as they arise.

The Community and Stakeholder Engagement Plan will include:

- a detailed communication strategy to ensure that community members are informed of the project status in a timely manner and on a regular basis
- the availability of project contact details (free call) where more information can be sought and feedback provided
- an enquiry and complaints management system which responds quickly and effectively to complaints within 2 business days.

The Community Liaison Group and the Community and Stakeholder Engagement Plan are the key avenues through which the social impacts of the project and compliance with proponent commitments will be monitored. These two actions will ensure an effective communication and complaints resolution mechanism is available at all times throughout the life of the project by:

- keeping the local community and regulators informed of project activities and operational issues where required
- responding quickly and effectively to issues and complaints

- ensuring that statutory requirements and corporate standards are met by monitoring and reviewing operations, including blast activities and design, among other matters.

## 6.2. Local character and visual amenity

The project is surrounded by West Burleigh, Tallebudgera and Reedy Creek. The landform of these areas is one of forested ridges and hills, which forms part of the interface between the urban and hinterland parts of the City of Gold Coast, and which have been altered by urban residential and industrial development.

The character of the local area could be described as fragmented, with no single, local identity evident due to a mixture of residential and industrial areas. To the east of the proposed quarry site is a land fill site and the existing West Burleigh quarry, with low-density, rural residential allotments to the south-west and higher density residential development to the north and east.

The site of the proposed quarry is characterised by steeply undulating topography ranging between approximately 10 metres AHD and 150 metres AHD and occupies a complex arrangement of ridges, spurs and side valleys between Old Coach Road and Tallebudgera Creek Road.

The existing topography and vegetated state of the proposed quarry site contributes to the local character of the Reedy Creek area. This area, particularly in and around Tallebudgera Creek Road with acreage style residential allotments is semi-rural in character with a dominance of the natural environment and wildlife over the built environment.

This semi-rural/bushland environment, whilst still in close proximity to a major urban centre with a mixture of tourism, leisure, health and well-being industries and educational and aged care services, presents amenity, lifestyle, ecological and biodiversity values which are highly sought after by the people residing in the area. There is a strong desire in this community to maintain the existing amenity and character of the local area and a concern that industrial development would erode these values.

The forested ridges and hills frame the background to local views and divide and distinguish each residential precinct. However, the proposed quarry would have limited impact on these views.

The existing and retained forested ridges and other vegetation within the separation area, in combination with the undulating topography of the local area helps to enclose and screen from view the quarry footprint and most parts of the quarry operations and plant from external view. Only a limited number of residences in elevated areas would have limited views, either through gaps between the ridges or over the adjacent screening trees, of the quarry operations. Other residences will not have views into the disturbance footprint area due to the screening effect of the topography and vegetation on ridges in the separation area.

The predominant view from the residences in the elevated areas will be of quarry faces and plant infrastructure, including conveyor structures and buildings up to 20 metres

tall, a cutting for the site access road and acoustic barrier fences on the northern and western sides of the site. The quarry faces will not be exposed in a continuous plane of bare rock due to the progressive staggered transition of quarry operations in benches which will be progressively revegetated thereby reducing the visual impact. The quarry faces could become visible around 20 years after the commencement of operations.

The topographical characteristics of the site, quarry design, operational processes proposed, commitments made and mitigation measures adopted will ensure that the character and visual amenity of the local area will be largely retained with the introduction of the proposed quarry. These actions include:

- semi-enclosing the quarry disturbance footprint within existing forested ridges which will be retained in a buffer zone
- restricting the disturbance footprint to an internal area (where most of the quarry will be below sight lines and only a few upper rock faces exposed) of the site, effectively limiting views from the south and south-west into the disturbance footprint
- operational sequencing which retains the internal ridge to the east and the north for as long as possible, thereby screening from view most of the extraction area for as long as possible and allowing a longer rehabilitation period for establishment of screening vegetation
- retaining approximately 70 per cent of the site as vegetated buffer zone
- staged rehabilitation of exhausted quarry benches and faces.

### 6.3. Property values

Some residents raised concerns about the impact of the quarry on property values.

The EIS assessed the impact on property values of the adjoining residential communities as a result of the proposed Gold Coast Quarry by analysing property sales data for communities surrounding existing operating quarries, with Nerang and West Burleigh quarries used as a representative samples.

Both of these quarries have been operating for over 30 years during which residential encroachment has occurred. An analysis of property sales data over this period indicated that the impact on property prices decreased the further removed a property was from the quarry operations and haulage route. The EIS concluded that properties situated over 500 metres from the quarry operations and haulage route recorded no adverse impact on property prices.

Based on the analysis of the sales data for the Nerang and West Burleigh quarries and considering the proposed Gold Coast quarry design, which incorporates a vegetated buffer zone of between 205 metres to 800 metres between the edge of the proposed quarry disturbance footprint and residences, approximately 130 residential properties fall within 500 metres of the proposed quarry disturbance footprint and haulage route.

An analysis of residential property sales data for the residential areas surrounding the proposed Gold Coast quarry over a five year period from 2007 indicate that since the proposed quarry was announced in late 2010, median house prices in Old Burleigh Town Northwest decreased by 2 per cent more than the overall Gold Coast residential

price falls, while Old Burleigh Town south-east house prices increased over the same period. Price movements in The Observatory and Kingsmore Estate reflected a 37 per cent increase and the Gold Coast average (a fall of 11 per cent), respectively over the same period.

Based on the analysis above, there is no conclusive evidence of a positive correlation between a quarry and property values.

## 6.4. Traffic

The four to five years pre-operating (site establishment, development and construction) phase of the project is estimated to generate up to an average of 280 truck movements per day, six days a week during peak periods on the roads surrounding the quarry.

The forty year operating phase of the project is estimated to generate up to an average of around 230 truck movements per day, six days a week during peak periods on the roads surrounding the quarry.

The road network to be used by haulage vehicles, includes Old Coach Road (Reedy Creek), Pacific Motorway, Stapley Drive, Scottsdale Drive, Reedy Creek Road, Bermuda Street (Burleigh Heads-Varsity Lakes).

These additional truck movements have the potential to result in increased traffic congestion, particularly at peak times, and increased traffic accidents.

The proponent has committed to preparing and updating its road safety review as part of a revised Traffic Impact Assessment (TIA), the results of which will be incorporated into a Traffic Management Plan (TMP) and a Road-use Management Plan (RMP) for the project.

These management plans will ensure traffic impacts are adequately managed through the adoption of the following measures:

- an upgrade of Old Coach Road between the site access and Kingsmore Boulevard roundabout to a two lane rural road, industrial collector street standard
- dedicated site access off Old Coach Road
- limiting of truck movements to a designated haulage route which includes Old Coach Road, Pacific Motorway, Stapley Drive, Scottsdale Drive, Reedy Creek Road, Bermuda Street (no other local roads will be used)
- ensuring adequate distance (time) between trucks to allow safe passing by other road users
- all drivers will undergo a site specific induction, which also includes traffic routes, local road usage information and site specific safety management procedures.

## 6.5. Dust, noise and vibration

The following project activities have the potential to generate dust and noise emissions, and vibration over the life of the project which may impact on the amenity of the local community, particularly residents:

- wind erosion of raw material and product stockpiles
- wind erosion of exposed areas (pit and plant areas)
- wheel and load generated dust associated with haulage of raw material and product
- material handling by site machinery such as bulldozers, front end loaders, scrapers
- excavation of raw material
- processing of raw material (crushing and screening) by both mobile and fixed plant
- road traffic noise from haulage trucks
- drilling of blast holes within the pit area
- blasting within the pit area.

### **6.5.1. Dust**

It is usually larger dust particles (ie with an aerodynamic diameter greater than 30 micrometres ( $\mu\text{m}$ )) that can cause nuisance or impact on amenity. These larger particles are commonly deposited in close proximity to the source, which is generally within 100 metres, depending on site characteristics. Intermediate (ie  $10\mu\text{m}$  to  $30\mu\text{m}$ ) and smaller sized particles (ie less than  $10\mu\text{m}$ ) are of greater concern for human health and these particles generally travel further (up to 500 metres or are not deposited at all).

The main adverse nuisance impact of fugitive dust emissions is the coating and soiling of surfaces such as homes and vehicles, which leads to the need to clean surfaces more frequently. Nuisance is dependent on perception, which is subject to considerable variation. Generally, dust is considered to be a nuisance in the community when the rate of dust accumulation on surfaces is sufficiently rapid to cause noticeable fouling, discolouration or staining.

As discussed in the Air Quality section of this report, the topography of the site, project design parameters, operating practices, proponent commitments and mitigation measures, ensure the predicted dust deposition rates due to the project are below the relevant objectives and assessment criteria in all residential areas and at all sensitive receptors. Specifically, the following actions will ensure that dust emissions due to project activities do not cause nuisance in the community:

- vegetated buffer zones of 205 metres to 800 metres between the edge of the proposed quarry disturbance footprint and residences will provide an effective screen and will effectively limit dust concentrations in surrounding residential communities
- the location and screening of plant to minimise dust dispersal
- the sealing of internal roads as necessary
- the watering of work areas, internal access roads which are not sealed and material stockpiles
- wheel washing of all trucks prior to leaving site
- covering of truck loads when transporting material
- the limited use of local roads through use of a designated truck haulage route along Old Coach Road to the Pacific Motorway.

Accordingly, the emission of dust, including respirable crystalline silica, from the Gold Coast quarry does not present a risk to human health and would not compromise the amenity of local residents.

### **6.5.2. Noise**

Within the community, there is generally a wide variety of human reactions to noise. Some members of a community are more sensitive to noise than others. The more noise sensitive members of a community have an expectation of very low environmental noise levels and will react to the introduction of noises which would otherwise be described as barely audible within the overall background noise environment.

On the other hand, there are those within the community who find living in noisy environments, such as near major industry, on main roads or under aircraft flight paths, an acceptable situation. The bulk of the population lies within these two extremes, with the majority being unaffected by low levels of noise and being prepared to accept levels of noise that are commensurate with living in an urban, industrialised society.

The background noise levels in the Reedy Creek area are broadly representative of a semi-rural, residential area, with the main source of noise being road traffic from the nearby Pacific Motorway.

The introduction of the proposed quarry into this local area will introduce noise sources which are not currently present, including:

- the operation of mobile and fixed crushing and screening plant and related equipment such as conveyors
- the operation of earthmoving equipment such as excavators, graders, front end loaders, bulldozers, compactors, articulated dump trucks, water trucks
- road traffic noise from haulage trucks travelling to and from the quarry via Old Coach Road
- heating, ventilating and air conditioning (HVAC) equipment for temporary and permanent buildings including the site administration office, employee facilities, and maintenance workshop
- rock drilling and blasting.

The noise emitted by these activities will be attenuated by the following mitigation measures:

- the strategic placement and orientation of items of major noise generating plant to maximise the beneficial shielding provided by the retained high ground and vegetated buffer zone
- full enclosure of all fixed crushing and screening plant, with openings in the enclosures for the entry and passage of product and conveyors only
- rock drilling to be carried out using a 'low noise' rock drill only, which is to be operated for the minimum time feasible and, where necessary, screened using moveable modular barriers

- the deployment of acoustic barrier fences (moveable and fixed) and mounds to ameliorate noise intrusion at sensitive receptors
- decreased truck speeds around private dwellings, particularly in the vicinity of Kingsmore Estate, to minimise noise intrusion.

With the sensitive design approach adopted by the proponent, combined with the implementation of the noise attenuation measures described above, noise would be managed to acceptable levels within acoustic quality regulatory limits and it is considered unlikely that the majority of people in the surrounding community would consider the resultant noise levels intrusive, unpleasant or excessive.

### **6.5.3. Vibration**

Potential sources of vibration from the project include earthmoving activities, processing of raw material, haulage trucks and blasting, which if excessive can cause damage to nearby buildings and structures, and human comfort.

Vibration from use of earthmoving equipment, crushing and screening plant, and the operation of haulage trucks is not predicted to be at a level which would adversely affect human comfort or cause damage to property.

Blasting activities generate two types of impacts—air overpressure and ground vibration. Excessive levels of either can result in damage to property and adversely affect human comfort.

The intensity of the impacts is controlled principally by the separation distance between the blasting activity and the receptor, and the size of the explosive charges. Site conditions and topography also play a part in controlling overpressure and ground vibration levels. Vibration levels can be adjusted as required at any fixed receptor, by reducing the weight of explosive used in each blast hole. This is achieved by various means including the use of blast holes of reduced diameter, the use of multiple small and independent charges within each hole, or a reduction in the length of blast holes (that is, a reduction in bench height).

Ground vibration and air blast overpressure levels which cause human discomfort are generally lower than the recommended structural damage limits. This is because people are generally able to detect vibration at levels much lower than those required to cause even superficial damage to the most susceptible structures.

Compliance with regulatory limits applicable to human comfort generally ensures that the potential to cause structural damage to buildings is minimal.

Blasting activities at the site will be fully compliant with relevant regulatory limits. However, blasting may be perceptible at some locations in the surrounding area. The project is able to achieve compliance with the regulatory limits because of the following measures which have been developed specifically in response to local circumstances:

- the separation distance between source and receiver provided, through the retention of vegetated buffer zones
- the project design parameters including the location and staging of development areas

- the proponent's commitment to adopt blast designs and operational practices that have been developed in specific response to the local circumstances.

In particular, the proponent proposes to carry out blasting on a weekly basis (that is, on average, every seven days), generally in the middle of a regular weekday to minimise any disturbance to the surrounding area. This blasting activity will result in vibration and overpressure impacts which will have a duration of around two seconds each week.

The proponent has committed to the vibration mitigation measures above in the Blasting Management Plan.

The proponent further proposes to offer building condition surveys to a limited number of houses in the surrounding area, prior to the commencement of works at the site, currently scheduled for 2016. The condition surveys will only be conducted if the property owners provide the necessary consent. These surveys will provide important information to input into any claims for damage to buildings caused by vibration associated with the project.

The project can achieve compliance with the regulatory limits, with air blast overpressure and ground vibration levels from blasting activities not expected to cause nuisance to any residents and properties. Vibration from earthmoving equipment, crushing and screening plant, and haulage trucks will not adversely affect human comfort or cause damage to property.

## 6.6. Coordinator-General's conclusions

The project will generate a number of economic benefits for the Gold Coast and for the South East Queensland region, including:

- additional long term hard rock resource supply security, producing primarily asphalt aggregates, road base and concrete aggregates which would support regional economic development and activity in the building and construction industry
- short-term (construction) and long-term (operations) direct and indirect employment generation and increased industry output through the demand for goods and services.

It is estimated the project would generate direct employment opportunities for 246 FTE positions over the five to six year site establishment, development and construction stages and would provide direct ongoing employment for 24 FTE persons over the 40 year operating period of the quarry. These operating jobs are a direct substitute for the employment generated by the operation of the existing West Burleigh quarry which is scheduled to cease operations between 2019 and 2022.

In addition, it is estimated that the project would generate indirect flow-on employment in the broader Queensland economy of up to 490 FTEs during site establishment, development and construction and up to 65 FTEs during operation, the majority of which will be retained in the Gold Coast region.

The EIS estimated that the \$140–\$160 million (2012 dollars) capital cost of the project would contribute over \$700 million in direct and indirect benefits to Gross State Product (GSP), while the operation of the project would inject \$43.5 million annually into the

Queensland economy, the majority of which would be within the local Gold Coast economy.

A cost benefit analysis prepared as part of the EIS found that the project is expected to deliver a positive net state benefit with a Net Present Value of \$594.7 million, of which \$91.8 million is attributable to the Proponent and \$502.9 million is attributable to all other stakeholders.

The proposed quarry offers a secure, long-term building and construction materials resource for the Gold Coast and is the only quarry capable of directly substituting for the loss of the West Burleigh Quarry. The project would enhance building and construction materials supply flexibility in the wider South East Queensland region by allowing the northerly Gold Coast quarries to continue to serve the needs of areas beyond the Gold Coast, such as the cities of Brisbane, Logan and Ipswich.

While the quarry will result in a change of use and character of what is an undeveloped area of bushland, the design of the project and proponent commitments and conditions set in this report has the effect of minimising the impacts of the project on the surrounding community. Overall, the project maximises the use of the existing topography of the site with ridgelines and a large vegetated buffer zone around quarry operations retained, and limits the hours of operation for quarry extraction, crushing and screening activities to between 6:30 am and 6:00 pm, Monday to Saturday and blasting activities of 2 seconds per week on average.

Proponent commitments in the form of a Community and Stakeholder Engagement Plan and a Community Liaison Group will ensure community concerns with the quarry are addressed as they arise.

I conclude that the economic benefits of the project proceeding outweigh the socio-economic and other environmental costs of the project, which in any case have been minimised by practices and actions committed to by the proponent.

## 7. Matters of national environmental significance

This section of the report addresses the requirements of the Queensland Government's assessment as specified by Schedule 1 of the bilateral agreement and Part 13 of the State Development and Public Works Organisation Regulation 2010 (SDPWO Regulation).

### 7.1. Project assessment and approvals

On 25 November 2010, the proponent referred the Gold Coast quarry project to the Commonwealth Environment Minister (referral number 2010/5757) for a determination as to whether the project would constitute a 'controlled action'<sup>7</sup> with respect to potential impacts on 'matters of national environmental significance' (MNES) under sections 75 and 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

The EPBC Act establishes an Australian Government process for assessing proposed actions that are likely to have a significant impact on MNES.

On 21 December 2010, the minister determined that the project is a 'controlled action' under the EPBC Act, and that it would be assessed for approval through an EIS process under the EPBC Act. The relevant controlling provision under the EPBC Act is Sections 18 and 18 A listed threatened species and ecological communities.

The Australian Government has accredited the State of Queensland's EIS process, conducted under the SDPWO Act, under a bilateral agreement between the Australian and Queensland governments. The agreement (made under section 45 of the EPBC Act), provides for a controlled action which is a coordinated project and for which an EIS is required to be assessed under the SDPWO Act rather than assessment under Part 8 of the EPBC Act. The agreement enables the EIS to meet the impact assessment requirements of both Commonwealth and Queensland legislation.

Under Part 4 of the SDPWO Act and section 36 of the SDPWO Regulation, the Coordinator-General must ensure the assessment report evaluates all relevant impacts that the action has, will have, or is likely to have, and provide enough information about the action and its relevant impacts to allow the Commonwealth minister to make an informed decision whether or not to approve the action under the EPBC Act.

The controlled action may be considered for approval under section 133 of the EPBC Act, once the Commonwealth minister has received the Coordinator-General's EIS evaluation report (prepared under section 35 of the SDPWO Act).

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<sup>7</sup> For a definition of 'controlled action', refer to the Glossary on page 33 of this report.

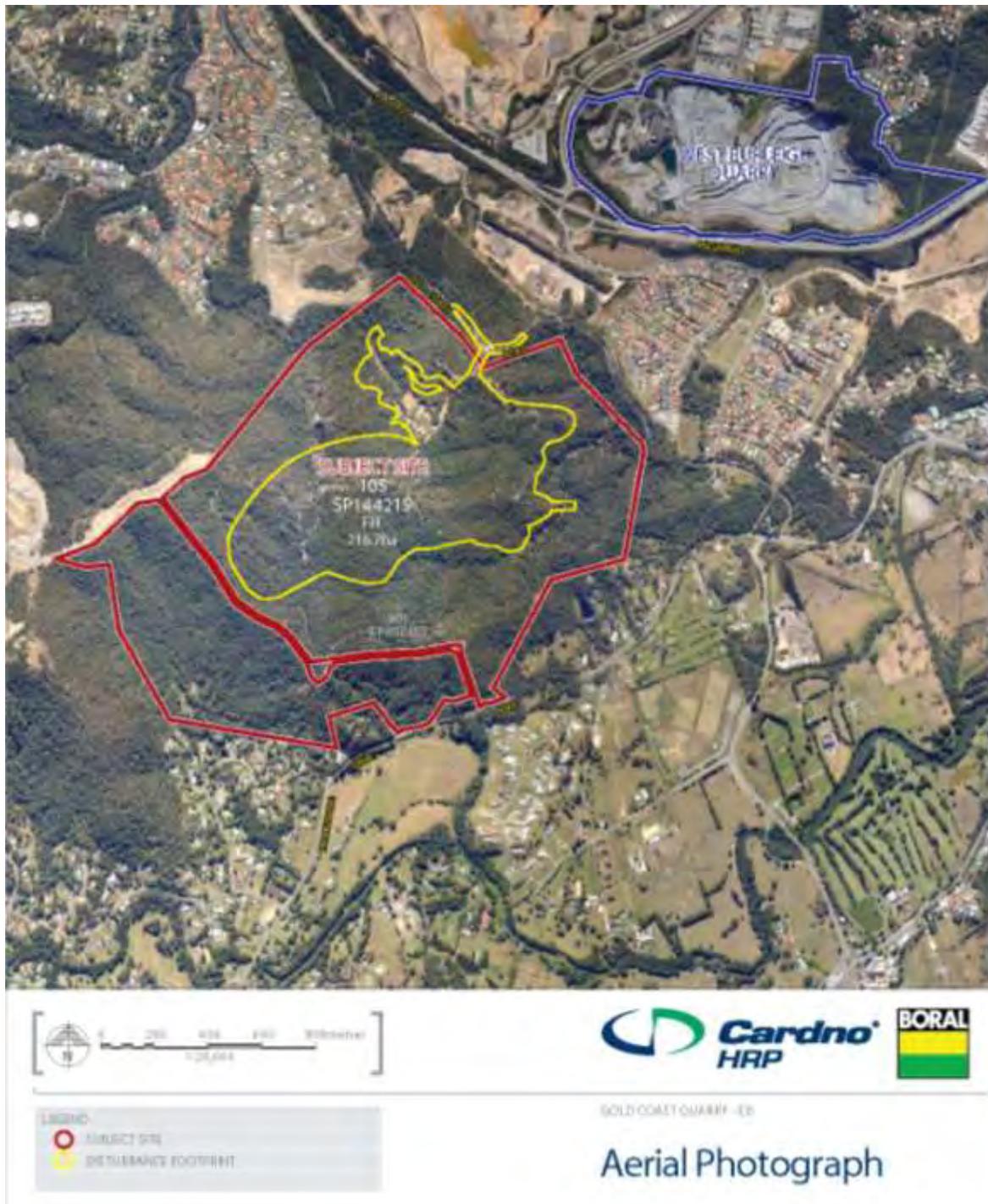
## 7.2. Description of the proposed action

The proponent is proposing to establish a hard rock quarry on a 217 hectare greenfield site in the Tallebudgera Valley at Reedy Creek on the Gold Coast (refer Figure 7.1).



Figure 7.1 Site regional locality plan

The total area of disturbance for the project (quarry pit and associated infrastructure and works) is 65 hectares (2 hectares of which is devoid of vegetation) or 30 per cent of the total site area, with the remaining 152 hectares or 70 per cent of the site area to be retained in its existing vegetated state to protect its ecological and biodiversity values and to enhance the connectivity of the Springbrook to Burleigh bio-regional corridor (refer Figure 7.2).



**Figure 7.2** Project-site locality plan

The proposed quarry has an estimated resource of 79 million tonnes of meta-greywacke hard rock which will be extracted and processed over 40 years at an annual rate of up to 2 million tonnes per annum. The proposed quarry would produce primarily asphalt aggregates, road base and concrete aggregates which will be used for the manufacture of concrete, asphalt, drainage material, road base, bricks, pavers, pipes and landscape supplies for the building and construction industry.

In addition to the meta-greywacke hard rock resource, up to 6 million tonnes of material will be removed from the site to allow the quarry and related plant to be established.

The following components (refer Figure 7.3) will be developed on the site:

- a quarry pit excavated to a maximum depth of –66 metres Australian Height Datum (AHD)
- product processing areas for plant and stockpiling of material, including run of mine (ROM) pad and ROM ramps
- mobile and fixed crushing and screening plant with processing capacity of between 750 tonnes per hour (tph) and 900 tph
- mobile fleet comprising excavators, graders, front end loaders, bulldozers, compactors, articulated dump trucks, water trucks and haulage trucks (Tandem Rear Axle, Tri Rear Axle Semi, Tandem Rear Axle Truck and Quad Dog)
- weighbridge and wheel wash area
- a water storage dam, 200 metres long and 120 metres wide, with a maximum water storage capacity of 89.5 megalitres (ML), an average depth of 2.2 metres and a maximum depth of 11 metres, located in the northern portion of the site
- a sediment pond, 100 metres long and 60 metres wide with a maximum water storage capacity of 11.5 ML, an average depth of 4.5 metres and a maximum depth of 4.7 metres
- temporary and permanent buildings including site administration office, employee facilities, maintenance workshop, and a vehicle parking area
- external access road and associated intersection (from Old Coach Road)
- internal access and maintenance roads.



The project includes the following key environmental design features:

- a disturbance footprint which avoids any vegetation species of national significance, endangered regional ecosystems, the nesting tree of a White-bellied Sea Eagle and a number of feed trees for the Glossy-Black Cockatoo
- buffer zones of: 104 metres to 611 metres, between the edge of the proposed disturbance footprint and the boundaries of Lot 105; 224 metres to 735 metres, between the edge of the quarry operations pit and the boundaries of Lot 105; 205 metres to 800 metres, between the edge of the proposed disturbance footprint and residences; and 395 metres to 1,100 metres, between the edge of the quarry operations pit and residences
- progression of the pit development in a manner that reduces potential external views for the longest period possible and incorporates staged rehabilitation of terminal quarry benches and faces.
- acoustic barrier mounds and fences of up to 8 metres high.

The site will be developed in a sequence of discrete stages, including:

- establishment
- development and construction
- quarrying operation
- rehabilitation and decommissioning.

The establishment stage involves activities required to gain access to and around the site and to the quarry plant pad floor, including:

- construction of external and internal access roads
- vegetation clearing
- earthworks (cut and fill) for infrastructure, facilities, plant and equipment pads
- construction of weighbridge and wheel wash facilities
- construction of a sedimentation pond, and water storage dam embankment wall and associated spillway
- construction of temporary buildings.

This stage is anticipated to take approximately 12 months.

The development and construction stage involves activities required to prepare the future crushing plant ROM pad and main platform floor, and construction of permanent crushing plant, support buildings, workshop and infrastructure, including:

- further earthworks for the plant pad
- creation of ROM pad and ROM ramp, and stockpile area
- erection of crushing plant
- construction of permanent buildings (site office, employee facilities, workshop).

This stage is anticipated to take approximately four to five years.

The quarry operation stage involves:

- extractive activities, including blasting, crushing, screening

- rehabilitation of benches.

This stage is anticipated to take approximately 40 years.

The rehabilitation and decommissioning stage involves:

- rehabilitation and revegetation of benches on a progressive basis during quarry operations
- dismantling and removal from the site of plant and equipment on completion of quarry operations
- conversion of the quarry pit into a lake.

The quarry lake is estimated to have a capacity of 9,000 mega litres and will take approximately 14 years to fill.

Site establishment and construction is scheduled to commence in 2016.

Infrastructure and service requirements associated with the proposed quarry include:

- access to the road network via an intersection at Old Coach Road and use of the local and state controlled road network for haulage of quarry plant and equipment, and material during all stages of the project's life
- telecommunications infrastructure via fibre-optic cable in dedicated conduits and pits
- connection to the local electrical mains infrastructure

The project will not be connected to the trunk water reticulation system or the local trunk sewerage network. All water used on site will be captured in the project's water storage dam and treated to the appropriate standard depending on the usage. An on-site sewage treatment plant system will be provided to dispose of sewage.

## 7.3. Threatened species and ecological communities

### 7.3.1. Threatened flora species

Threatened flora are plants that have been assessed as being at risk of extinction. The EPBC Act lists flora considered to be threatened. Their recovery is promoted using conservation advice, recovery plans, and the EPBC Act's assessment and approval provisions.

The EIS identified 25 flora species listed as threatened under the EPBC Act as potentially occurring in the project area.

Of the 25 flora species listed as threatened, nine are known, based on habitat requirements and previous studies, records and literature review, to occur in the project area:

- Small-leaved tamarind (*Diploglottis campbellii*) – endangered
- Floyd's walnut (*Endiandra floydii*) – endangered
- Rusty Rose Walnut (*Endiandra hayesii*) – vulnerable
- Sweet myrtle (*Gossia fragrantissima*) – vulnerable

- Monkey nut (*Hicksbeachia pinnatifolia*) – vulnerable
- Slender Milkvine (*Marsdenia coronata*) – vulnerable
- Smooth-barked rose apple (*Syzygium hodgkinsoniae*) – vulnerable
- Durobby (*Syzygium moorei*) – vulnerable
- Ribbon Orchid (*Taeniophyllum muelleri*) – vulnerable.

Field surveys of the project area, conducted over two periods – winter/dry season and summer/wet season – to take account of seasonal variation, recorded the presence of only two EPBC Act listed flora species:

- Durobby (*Syzygium moorei*) – vulnerable
- Ribbon Orchid (*Taeniophyllum muelleri*) – vulnerable.

Both of the flora species recorded in the project area occur outside the proposed quarry disturbance footprint, with the closest specimen (Ribbon Orchid) occurring 50 metres from the edge of the proposed quarry disturbance footprint.

### Durobby (*Syzygium moorei*)

Durobby is a tree that grows up to 40 metres in height and has a dense canopy. Leaves are thick, dark, green and glossy, borne in opposite pairs and are oval to elliptical usually with a rounded tip. Bark varies in colour from red-brown to light or pink-grey, with soft, papery scales. Flowers have pink to red stamens, which are clustered on older leafless branches and often on the trunk, and fruit are white and fleshy.

Durobby inhabits warm, protected, fertile soils in riverine and gully rainforests at low altitudes. It is known to occur along sections of the Richmond, Brunswick and Tweed Rivers in north-east New South Wales, as well as at three sites in Upper Mudgeeraba Creek and Upper Tallebudgera Creek in south-east Queensland.

During surveys, a total of eight individuals were recorded in the project area, within a waterway in the southern portion of the site (refer Figure 7.4).



No specimens were recorded within the proposed quarry disturbance footprint. The nearest specimen is located approximately 103 metres from the edge of the proposed quarry disturbance footprint.

Conservation advice for the Durobby (*Syzygium moorei*) sets out a number of actions which can be implemented to support the recovery of the species, including:

- Monitoring sites to identify key threats and adapting management actions in response
- Controlling access to sites
- Protecting areas from clearing or development
- Minimising disturbance type activities
- Managing disruptions to water flows or hydrology
- Managing invasive weeds
- Developing a fire management strategy
- Undertaking seed collection and storage.

There is no recovery plan for the Durobby (*Syzygium moorei*).

### **Ribbon Orchid (*Taeniophyllum muelleri*)**

Ribbon Orchid is a leafless, epiphytic or lithophytic orchid that forms tangled colonies on trees or shrubs. Roots are thin, green and round in cross-section, with leafless stems are 0.1 centimetre long. Inflorescences are comprised of five to twelve yellowish-green flowers.

Ribbon Orchids grow on shrubs and trees in rainforests, sheltered areas of open forests, humid gullies and streamside vegetation.

It occurs in Queensland from Cape York Peninsula, south to Wilson River in New South Wales.

The Ribbon Orchid was recorded in two drainage lines in the project area, with individual plants or colonies being located on 13 host plants. The populations are external to the proposed quarry disturbance footprint, with the nearest specimens located approximately 50 metres from the edge of the proposed quarry disturbance footprint.

The species does have an approved conservation advice.

### **Project impacts**

Key project-related impacts on the two flora species recorded in the project area are:

- Vegetation and habitat clearing
- Habitat fragmentation and edge effects
- Changes to hydrology
- Introduction of exotic weed species.

### *Vegetation and habitat clearing*

Historically, the site was used for rural purposes (particularly grazing), but with the cessation of rural activities, scattered to dense regrowth vegetation has re-established across most of the site. Patches of remnant vegetation also feature in a number of locations.

It is unavoidable that some vegetation will be required to be removed in order to facilitate the proposed development within the disturbance footprint. The total area of vegetation to be cleared for the project is 63 hectares. Of the vegetation that will be removed 1.45 hectares is remnant vegetation.

The clearing will not result in the direct loss of, or have any indirect impact on, the species listed as threatened under the EPBC Act and which are present on the site.

### *Habitat fragmentation and edge effects*

The proposed quarry disturbance footprint of 65 hectares is central to the 217 hectare site. Accordingly, a continuous band of 152 hectares will be retained around the proposed quarry disturbance footprint, with the exception of the proposed site access road and the existing fire trail network.

The design of the project will not result in the fragmentation of the flora species listed as threatened under the EPBC Act which are present on the site.

Edge effects, including increased dust deposition rate and changes to wind movement, are likely to be experienced as a result of the project. As the nearest flora species listed as threatened under the EPBC Act and present on the site is 50 metres from the edge of the proposed quarry disturbance footprint, edge effects are not expected to adversely impact any of the threatened flora species.

### *Changes to hydrology*

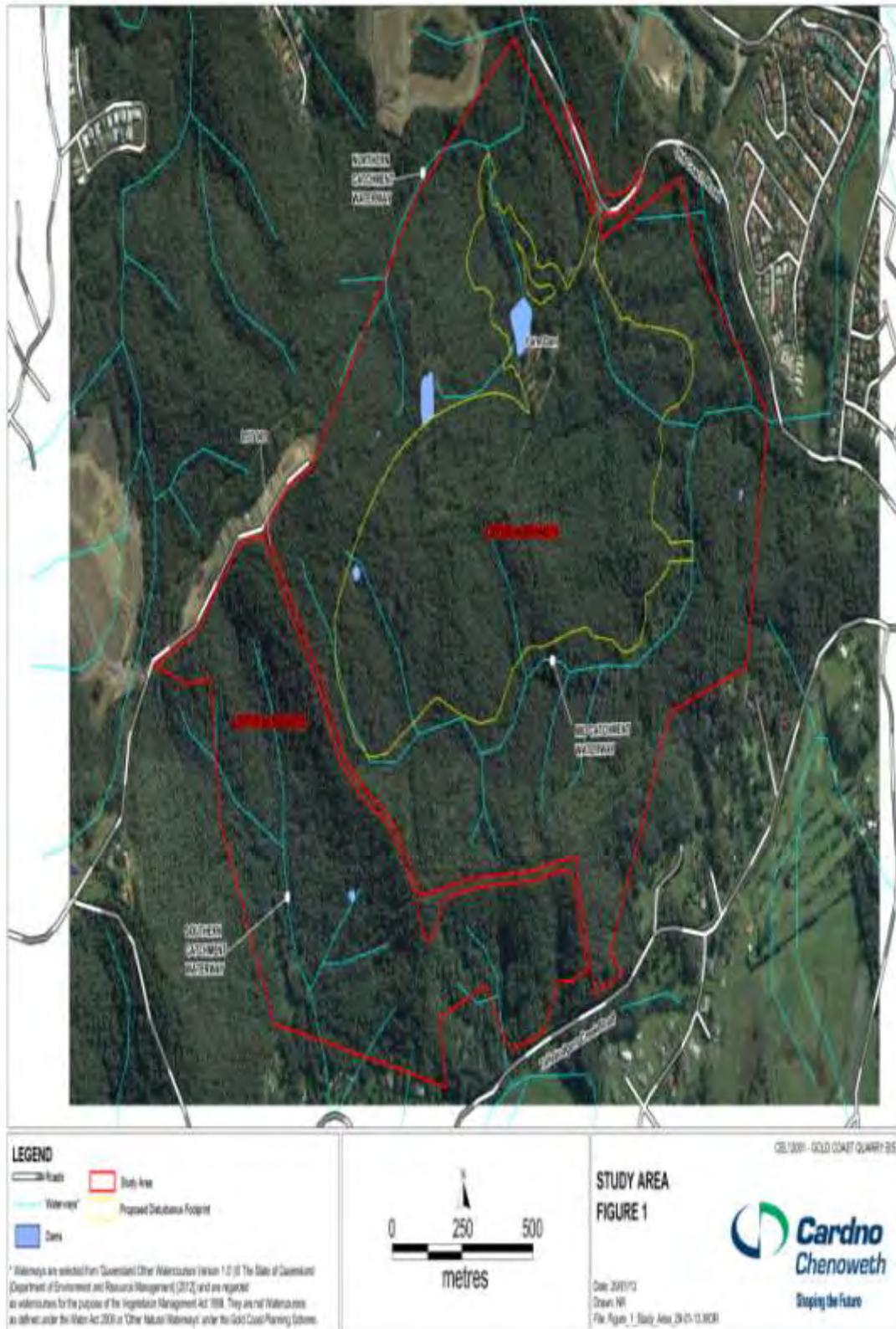
The clearing of vegetation has the potential to impact surface hydrology, particularly an increased risk of erosion and sedimentation.

Changes in surface and groundwater flows that can be attributed to the creation of the proposed quarry pit and water harvesting for the water storage dam may adversely affect soil moisture in the vegetation buffer zones in the project area and downstream riparian habitats.

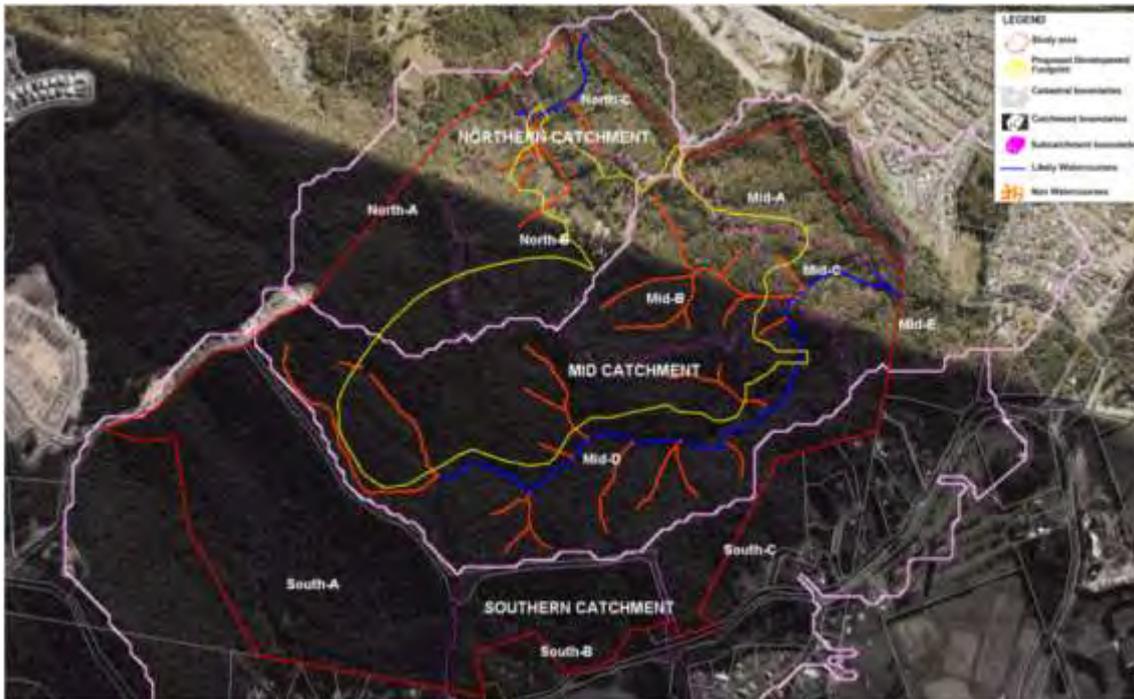
In terms of water flow, there are three water catchments on the site - a northern catchment which discharges into the Nerang River, and mid and southern catchments which both drain to Tallebudgera Creek.

There are numerous mapped waterways within the catchments (refer Figure 7.5), all of which are typically dry with flow occurring only during and following significant rainfall events. Of the waterways, two are considered to be watercourses pursuant to the *Water Act 2000* (refer Figure 7.6):

- an ephemeral stream that traverses the site to the south of the disturbance footprint (mid catchment watercourse)
- an ephemeral stream that traverses the site downstream of the northern edge of the disturbance footprint (northern catchment watercourse).



**Figure 7.5 Site waterways**



**Figure 7.6 Site watercourse**

The disturbance footprint has been specifically designed and sited to preserve both watercourses.

The proposed quarry dam is located in the north of the project site and will harvest water from the northern catchment watercourse. The mid catchment watercourse is not impacted by project water harvesting activities.

The Durobby is present in the southern (or mid catchment watercourse) catchment only and is not impacted by water harvesting for the quarry dam.

Overall, it is estimated that the project will result in a relatively minor (around 7 per cent) decrease in flows throughout the year and a minor increase (around 6 per cent) in flows in the dry season.

As the existing watercourses within the project area are ephemeral and do not sustain persistent flow, the change in hydrology will not have a significant impact on downstream riparian vegetation, including EPBC-listed threatened species Durobby (*syzgium moorei*).

The change to the hydrological regime will be unlikely to threaten the microclimate of Durobby and Ribbon Orchid growth and the extent of the populations.

#### *Introduction of exotic weed species*

A number of weed species is known to occur in the project area. The project has the potential to increase weed abundance and facilitate weed dispersal, primarily through construction traffic movement and bulk earthworks.

## Mitigation measures and management commitments

Both of the EPBC Act listed threatened flora species recorded in the project area occur outside the proposed quarry disturbance footprint and will not be directly impacted by the project.

However, the threatened flora species are vulnerable to indirect impacts of the project as described above. The proponent has developed management measures to minimise the impacts on, and provide protection to, identified protected flora species. These management measures include:

- Landscape Rehabilitation Plan
- Sediment and Erosion Control Plan
- Stormwater Management Plan
- Bushfire Management Plan.

The Landscape Rehabilitation Plan addresses vegetation and non-vegetation (eg visual amenity) matters over the 40 plus years of the project. Specifically, it provides for:

- management of the restoration of plant communities in the buffer zone
- rehabilitation of quarried areas with native vegetation
- mitigation of visual impacts and protection of water quality.

An important part of the Landscape Rehabilitation Plan involves strategies to enhance the overall ecological condition and quality of habitat in the buffer zone and in the waterways which will benefit the Durobby and fauna species, such as the Glossy-black cockatoo and the Koala. The Landscape Rehabilitation Plan will also strengthen ecological linkages within the Springbrook – Burleigh Heads bio-regional corridor. The proponent has also proposed to enhance habitat within the buffer through the management of weeds, which is to be undertaken in accordance with the Landscape Rehabilitation plan. This is not inconsistent with the conservation advice for the Durobby which includes managing invasive weeds as priority action to support the recovery of this species.

The purpose of the Sediment and Erosion Control Plan is to reduce the volume of potential future sediment loads from the site, and to mitigate the hydrological impact of change flows from the quarry sedimentation pond. It provides strategies to prevent and control soil erosion, and the potential for transport of sediment downstream adversely affecting downstream water quality. The Erosion and Sediment Control Plan and the Stormwater Management Plan are closely integrated.

The Stormwater Management Plan details the required stormwater infrastructure required on the site and a plan of actions to ensure the release of the water from the site complies with the water quality objectives. The report addresses the methods to provide stormwater drainage, stormwater storage and sediment control during all stages of the project's life cycle.

The measures outlined in the stormwater management and erosion and sediment control plans would be effective in ensuring that environmental flows on the site are not altered, so that no adverse impacts occur on downstream riparian vegetation, including the Durobby.

A Bushfire Management Plan is proposed for all project stages to ensure potential impacts associated with bushfires are properly identified and mitigated. All plans need to be updated according to the project progress. The mitigation measures outlined in the Bushfire Management Plan are not inconsistent with the conservation advice for the Durobby which includes developing fire management strategies, as a priority action to support the recovery of this species.

As there are no residual impacts to EPBC Act identified protected flora species subsequent to the implementation of the mitigation measures described above, no environmental offsets are required.

Conditions stated in this report include requirements for the rehabilitation and long-term protection of the buffer zone including management of weeds, bushfire, erosion and sediment control and stormwater.

### **7.3.2. Coordinator-General's conclusions—threatened flora species**

I have reviewed the EIS and additional information to the EIS, and conclude that the proponent has adequately assessed impacts on threatened flora species on site (specifically, *Syzygium moorei* (Durobby) and *Taeniophyllum muelleri* (Ribbon Orchid)) under the EPBC Act. I have acknowledged that buffer zones in excess of 50 metres will be in place to protect these species.

In addition to the proposed mitigation measures outlined in the EIS material, I note the proponent has made commitments to prepare and implement a number of management plans, including a Landscape Rehabilitation Plan, Sediment and Erosion Control Plan, Stormwater Management Plan and a Bushfire Management Plan, which include measures to be undertaken to avoid adverse impacts on EPBC Act listed species. I consider that the proposed mitigation measures, provided in the management plans, are not inconsistent with the *Approved Conservation Advice for Syzygium moorei* (Durobby).

I consider that the proposed development is unlikely to have an unacceptable impact on threatened flora, provided the proponent avoids and mitigates potential impacts in accordance with the management plans, as conditions of approval.

### **7.3.3. Threatened fauna species**

Threatened fauna are those species and subspecies of birds, fish, frogs, insects, mammals, molluscs, crustaceans and reptiles which have been assessed as being at risk of extinction. The EPBC Act lists threatened fauna species and promotes their recovery using conservation advice, recovery plans, and assessment and approval provisions.

The EIS identified 32 fauna species listed as threatened under the EPBC Act as potentially occurring in the project area.

Of those 32 fauna species, the habitat in the project area is considered sub-optimal for most of the species other than those discussed in further detail below.

One EPBC Act listed threatened mammal species was recorded during surveys of the project area: a single Grey Headed Flying Fox (*Pteropus poliocephalus*) was observed

feeding on blossoming Eucalyptus and Corymbia species on the site. This species is listed as Vulnerable under the EPBC Act. However, no roosting sites are mapped by the Queensland Parks and Wildlife in the vicinity of the project area and no 'camps' were found within the project area.

There is currently no approved conservation advice available for this or relevant threat abatement plans. While a recovery plan has not been progressed beyond draft form, the New South Wales government has listed a number of priority actions aimed at ensuring the recovery of this species.

In addition, the surveys identified potentially suitable habitat in the project area for two EPBC Act listed threatened bird species:

- Swift Parrot (*Lathamus discolor*) – endangered
- Regent Honeyeater (*Anthochaera Phrygia*) – endangered.

### Project impacts

Given that only an individual Grey Headed Flying Fox was observed feeding on the site during the survey period, the project area does not support a 'camp' and the highly mobile nature of the species, the habitat does not represent an important resource for the species and the project is not likely to have a significant impact on the species.

The EIS indicated that the site contains vegetation species that are considered to be suitable foraging species for the grey-headed flying-fox. Suitable foraging species including Eucalyptus and Corymbia species were identified in the areas to be cleared and within the proposed buffer zone. Approximately 63 ha of vegetation is proposed to be removed from the site, which is likely to include vegetation that is considered to be suitable for the grey-headed flying-fox. Impacts on this species would be reduced by retaining suitable foraging species within the 152 ha buffer zone. Rehabilitation and revegetation works including the planting of foraging species suitable for the grey-headed flying-fox, as proposed in the Landscape Rehabilitation Plan would enhance habitat values in the buffer areas for this species.

The project is not expected to have an unacceptable impact on the grey-headed flying fox and would not be inconsistent with the recovery plan *Draft National Recovery Plan for Grey-Headed Flying Fox*, provided that measures are undertaken to retain and improve potential foraging habitat.

As no critical habitat for any EPBC listed threatened fauna species has been recognised as occurring in the project area and noting that the Swift Parrot and the Regent Honeyeater are more likely to be transient rather than resident species.

The assessment found that the project area does not support 'important habitat' for any listed species, nor does it support an ecologically significant population of these species. It is likely that the habitats contained within the project area would be utilised infrequently and on a transitory basis because of the ephemeral nature of important food and habitat resources and the extent of similar and comparable habitat.

The project is not likely to have a significant impact on any EPBC Act listed threatened fauna species.

## Mitigation measures and management commitments

The mitigation measures the proponent proposes to implement to avoid and mitigate impacts on protected flora species would apply equally to threatened fauna species and also benefit common species.

An Environmental Management Plan is proposed to address the mitigation from direct and indirect impacts during establishment, development, construction and operational stages of the project and will be continually updated to reflect future potential operational works approvals for the project.

### 7.3.4. Coordinator-General's conclusions—threatened fauna species

I have reviewed the EIS and additional information to the EIS, and conclude that the proponent has adequately assessed impacts on threatened fauna species under the EPBC Act.

In addition to the proposed mitigation measures outlined in the EIS material, the proponent has made commitments to prepare and implement a number of management plans, existing plans including a Landscape Rehabilitation Plan, Erosion and Sediment Control Plan, Stormwater Management Plan and a Bushfire Management Plan. The proponent has also committed to develop a Wildlife Management Plan. These management plans will avoid and mitigate impacts on protected fauna species.

The proposed development is considered unlikely to have an unacceptable impact threatened fauna, provided the proponent avoids and mitigates potential impacts in accordance with the conditions stated in this report.

### 7.3.5. Threatened ecological communities

An ecological community is a naturally occurring group of plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability. An ecological community becomes threatened when it is at risk of extinction.

The EIS identified one threatened ecological community that may occur in the project area: Lowland Rainforests of Subtropical Australia.

While field surveys recorded four distinct vegetation community types in the project area, all of which were described to be open rainforests dominated by various Eucalypts, none of the vegetation communities were found to be analogous to an EPBC Act listed threatened ecological community.

## Project impacts

The Gold Coast quarry will not impact on EPBC Act listed ecological communities because there is no vegetation communities that is congruous with the EPBC-listed ecological communities present within the study area and in the immediate precinct of the site.

### **7.3.6. Coordinator-General’s conclusions—threatened ecological communities**

I have reviewed the EIS and additional information to the EIS with respect to MNES material and conclude that the proponent has adequately assessed impacts on threatened ecological communities under the EPBC Act.

### **7.3.7. Cumulative impacts—threatened species and ecological communities**

Cumulative impacts are those impacts which are generated by the combined incremental changes on the local environment caused as a consequence of the Gold Coast quarry, together with other past, present or reasonably foreseeable future actions.

Apart from the West Burleigh quarry, there are no known or planned developments of a scale and in proximity of the proposed Gold Coast quarry which would, when assessed in combination with the proposed Gold Coast quarry, have any additional impact on the surrounding environment in addition to the impacts of the Gold Coast quarry in isolation.

The existing West Burleigh quarry is approximately 500 metres to the east of the proposed Gold Coast quarry site and is anticipated to exhaust its reserves of meta-greywacke hard rock and cease operations between 2019 and 2022.

### **7.3.8. Other threatened species**

The field surveys conducted to determine the presence of EPBC Act listed threatened species and communities recorded the widespread evidence of Koala (*Phascolarctos cinereus*) use (scats and scratches) and the presence of the White-bellied Sea-eagle (*Haliaeetus leucogaster*), an EPBC Act listed migratory fauna species.

#### **Koala (*Phascolarctos cinereus*)**

While the Koala was recorded in the project area, it was not listed as a threatened species at the time of the controlled action determination. However, the proponent has committed to appropriate mitigation measures and offsets through the implementation of a Koala management plan.

The Koala management plan will result in a net benefit for koalas with the planting of additional food source trees that will cater for the species.

#### **White-bellied Sea-eagle (*Haliaeetus leucogaster*)**

A nest tree used by the White-bellied Sea-eagle was recorded in the project area. White-bellied sea eagles are known to be sensitive to human disturbance in the vicinity of their nesting sites.

However, listed migratory species was not a controlling provision for the proposed action.

Despite this, the proponent has committed to a number of mitigation and management measures to minimise the impact of the project on the species, including:

- providing and maintaining a vegetated buffer zone of 30 metres between the nest tree and the edge of the proposed quarry disturbance footprint, which will provide a screen from quarry operations
- Covering the nest during the nesting season to discourage use during quarry construction activities.

Within their range breeding pairs often use several nests in rotation (Morcombe, 2004; DSEWPaC, 2012), but frequently use the same nesting sites throughout their life (Dennis *et. al.*, 2011).

Accordingly, it is considered the project will not result in a significant impact on the white-bellied sea-eagle.

## 8. Conclusion

In undertaking my evaluation of the EIS, I have considered the following:

- the EIS and additional information prepared for this project
- submissions on the EIS and additional information, including agency advice.

I am satisfied that the requirements of the SDPWO Act have been met and that sufficient information has been provided to enable the necessary evaluation of potential impacts, and development of mitigation strategies and conditions of approval.

The environmental assessment commenced with the declaration of this project in November 2010 and has involved a comprehensive body of work by the proponent. More detailed work will occur in the detailed design phase of the project.

The potential impacts identified in the EIS documentation and submissions have been fully assessed. I consider that the mitigation measures adopted by the proponent and required by the conditions stated in this report would result in acceptable overall outcomes and management of impacts.

Based on the information provided by the proponent and outlined in Section 6, I conclude that the material produced in the quarry is necessary to support the demands of the building and construction industry and will provide employment growth to the region. Accordingly, I recommend the Gold Coast Quarry project be approved, subject to the conditions in the appendices of this report. In addition, I expect the proponent's commitments to be fully implemented as presented in the EIS documentation and summarised in Appendix 2 of this report.

To proceed further, the proponent will be required to:

- obtain the relevant development approvals under the *Sustainable Planning Act 2009*
- finalise the environmental offsets package.

If there are any inconsistencies between the project (as described in the EIS documentation) and the conditions in this report, the conditions shall prevail. The proponent must implement all the conditions of this report.

Section 7 of this report (page 104) describes the extent to which the material supplied by Boral Limited addresses the actual or likely impacts on MNES of each controlled action for the project.

Copies of this report will be issued to:

- Gold Coast City Council
- Department of Environment and Heritage Protection
- Department of Transport and Main Roads
- Commonwealth Minister for the Environment
- Department of the Environment

A copy of this report will also be available on the Department of State Development, Infrastructure and Planning's website at [www.dsdip.qld.gov.au/gcq](http://www.dsdip.qld.gov.au/gcq)

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This report will generally lapse three years from the date it is published on the department's website, or when an approval application is decided for the project, unless a later time is subsequently decided by the Coordinator-General.

# Appendix 1. Stated conditions

This appendix includes the Coordinator-General's stated conditions, stated under sections 39 of the SDPWO Act.<sup>8</sup>

## Schedule 1. Stated conditions for Material Change of Use of premises for an extractive industry – Gold Coast City Council

Conditions stated for assessment manager Gold Coast City Council

### Condition 1. Extraction of Material

- (a) The extraction of quarry material must be within defined limits.
- (b) No extraction of material is permitted in areas outside of the disturbance footprint shown on plan B12119-SK-294 Rev. F.
- (c) No extraction or disturbance is permitted below Reduced Level (RL) - 66 metres Australian Height Datum (AHD), other than for the construction of a sump, measuring approximately 100 metres long and 100 metres wide excavated 12 metres into the floor of the quarry pit, for the express purposes of collecting and storing water runoff in the base of the extraction area to facilitate dewatering of the quarry pit.

### Condition 2. Hours of operation

- (a) Hours of operation of the quarry must be such that they do not create a disturbance.
- (b) All activities associated with the use of the quarry must occur within the following hours:
  - (i) Establishment, Development and Construction Stage
    - (A) Access: 6:00am – 6:00pm Monday to Saturday (except for maintenance access as stated in (v) below)
    - (B) Construction and site works: 6:30am – 6:00pm Monday to Saturday. No construction and site works on Sunday
    - (C) Sales and dispatch: 6:30am – 6:00pm Monday to Saturday. No sales and dispatch on Sunday
    - (D) Mobile crushing and screening: 7:00am – 6:00pm Monday to Saturday. No mobile crushing and screening on Sunday
    - (E) Maintenance: 24 hours Monday to Saturday. 8:00am – 6:00pm Sunday
    - (F) Blasting: 9:00am – 5:00pm Monday to Friday. No blasting on Saturday or Sunday
    - (G) No activities permitted on public holidays.
  - (ii) Quarrying Operational Stage

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<sup>8</sup> For a definition of 'stated conditions', refer to the Glossary on page 138 of this report.

- (A) Access: 6:00am – 6:00pm Monday to Saturday (except for maintenance access as stated in (v) below)
- (B) Extraction works: 6:30am – 6:00pm Monday to Saturday. No construction and site works on Sunday
- (C) Sales and dispatch: 6:30am – 6:00pm Monday to Saturday. No sales and dispatch on Sunday
- (D) Crushing and screening: 6:30am – 6:00pm Monday to Saturday. No crushing and screening on Sunday
- (E) Maintenance: 24 hours Monday to Saturday. 8:00am – 6:00pm Sunday
- (F) Blasting: 9:00am – 5:00pm Monday to Friday. No blasting on Saturday or Sunday
- (G) No activities permitted on public holidays.

**Condition 3. Quarry end use**

- (a) The end use of the quarry must be consistent with the planning scheme intent for the area in effect at that point in time.
- (b) The proponent must meet with Gold Coast City Council planning officers 5 years prior to the quarry ceasing operation to commence discussions in relation to draft concept plans for possible end use of the site and the concept plan's consistency with the planning intent for the locality.

**Part A. Wastewater**

**Condition 4. Sewerage**

- (a) The method and standard of sewage disposal is to be approved by Gold Coast City Council or other relevant authority.
- (b) The proponent is to submit a report to Gold Coast City Council prepared by a RPEQ prior to, or as part of, a future application for a development permit for carrying out operational work, that:
  - (i) makes a summation of the sewer loads from first principles for both the construction and operational stages
  - (ii) assesses the "Equivalent Person" load in accordance with the Environmental Protection Regulation
  - (iii) determines the quality of water that is to be produced by the sewerage treatment plant and whether or not it will be disinfected
  - (iv) completes a MEDLI (Model for Effluent Disposal by Land Irrigation) or similar assessment of the proposed system over a long time period to determine:
    - (A) an appropriate land irrigation area
    - (B) an appropriate wet weather storage size
    - (C) the likelihood of treated effluent discharge to receiving waters, the number of times per year this is likely to occur and the circumstances when it would occur.

## **Part B. Ecology**

### **Condition 5. Buffer area**

- (a) The development must provide a 152 hectare buffer around the quarry disturbance footprint, as defined the B12119-SK-294 Rev F, dated 1 February 2013.
- (b) The proponent must rehabilitate, revegetate and maintain the buffer, generally in accordance with the Landscape Rehabilitation Plan, Appendix N of the EIS, dated April 2013.
- (c) The proponent must ensure that the buffer is protected generally in accordance with Bushfire Management Plan (Appendix RR of the EIS), Sediment and Erosion Control Plan (Appendix W of the EIS) and Stormwater Management Plan (Appendix EE of the EIS).

### **Condition 6. Disturbance footprint interface with buffer area**

- (a) The proponent must demonstrate to the satisfaction of the Gold Coast City Council, as part of any application for a development permit for carrying out operational work, the management of the interface between the disturbance footprint and the buffer area to protect the buffer area from disturbance.
- (b) The interface management will provide for the following matters:
  - (i) no fill, batter/cut area, retaining wall or structure, or any form of benching to encroach into the buffer area along the entire frontage /interface, except where approved by Gold Coast City Council
  - (ii) finished site levels for the interface treatment area
  - (iii) measures to limit fauna access into the quarry and to restrict vehicle access into the buffer area
  - (iv) demonstration that all illumination (lighting) associated with the development and site access is designed and constructed so that the resulting level of illumination does not exceed the existing illumination levels within the buffer area between 6:00pm and 6:00am (this may include alternative lighting options or the use of deflectors).

### **Condition 7. Wildlife movement at quarry entry point**

- (a) The proponent must design the quarry entry point to ensure the least disturbance to wildlife.
- (b) The proponent is to submit a detailed design for the wildlife crossing to Gold Coast City Council prior to, or as part of, a future application for a development permit for carrying out operational work. The detailed design for these structures is to be in the form of scaled plans and supporting documentation that includes at least the following information:
  - (i) scaled cross-sections and plans including (but not limited to) design of structures, existing and proposed contours, location of retained trees
  - (ii) associated fauna exclusion fencing
  - (iii) rehabilitation around crossings and road verge
  - (iv) vegetation management

- (v) location of lighting and light spill.
- (c) The designs are to be prepared by a suitably qualified and experienced expert in fauna movement crossing infrastructure.
- (d) The proponent is to comply with either (i) or (ii) below, depending on the expected use of the fauna crossing:
  - (i) Where use of the fauna crossing is expected to be adequate, the proponent is to submit a Post-Construction Fauna Monitoring Management Plan to Gold Coast City Council prior to, or as part of, a future application for a development permit for carrying out operational work. The management plan is to include at least the following information:
    - (A) process to monitor the use and effectiveness of the fauna crossing/s including timeframes
    - (B) monitoring methodology and objectives
    - (C) personnel undertaking the monitoring
    - (D) monitoring of 'road kills' numbers.
  - (ii) Where fauna use of crossing structures and site is limited, the proponent is to submit to Gold Coast City Council prior to, or as part of, a future application for a development permit for carrying out operational work:
    - (A) measures to improve crossing use and implement improvements or
    - (B) evidence to demonstrate why the wildlife crossing is not achievable or needed and that it should be removed from the design. If the wildlife crossing at the entry point is removed from the design, the proponent must demonstrate how wildlife movement has been improved elsewhere.

## **Part C. Traffic and transport**

### **Condition 8. Site access**

- (a) The proponent must design and construct the site access so that it is safe for all users.
- (b) The proposed site access at the intersection with Old Coach Road is to be designed to a priority controlled intersection standard or suitable alternative, pursuant to *Austroads Guide to Road Design*.

### **Condition 9. Haulage route**

- (a) The proponent must design and construct the haulage route on Old Coach Road so that it is safe for all users.
  - (i) Old Coach Road (between the proposed site access and the Kingsmore Boulevard roundabout) is to be upgraded to a standard that conforms with Gold Coast City Council's cross-section for a Two Lane Rural Road, in accordance with Standard Drawing Number 05-02-002 (minimum pavement width of 11 metres). The roadway is to accommodate all road users, including light and heavy vehicles and cyclists.
  - (ii) The pavement of Old Coach Road is to be upgraded and designed to meet the requirements of Gold Coast City Council's Industrial Collector Street

standard, in accordance with Standard Drawing Number 05-02-002 and Planning Scheme Policy 11 – Land Development Guidelines.

- (iii) The proponent is required to install any intersection upgrades required between Kingsmore Boulevard and Stapley Drive as a result of the impacts of development traffic.
  - (iv) If the Bermuda Street Connection (Old Coach Road Connector) to the Pacific Motorway is built in future, due regard is to be given to the section of Old Coach Road between the site access and the Bermuda Street Connection, with respect to road formation and pavement design.
- (b) To the degree the above or any other necessary works to the haulage route serve a trunk function, the associated costs will be offset against the applicable infrastructure charges payable under Gold Coast City Council's Adopted Infrastructure Charges Resolution (or its equivalent in force at the time the relevant application is decided). To the degree the above or any other necessary works to the haulage route serve a non-trunk function, the proponent is wholly responsible for the associated costs, which are to be paid prior to the commencement of the approved use.
- (c) The above works may be undertaken by the proponent or by way of a proportionate contribution, as agreed with the Gold Coast City Council, to be paid towards the cost of the works.

**Condition 10. Transport management plan**

- (a) The proponent must provide for safe operation of the haulage road.
- (b) A Transport Management Plan (TMP) for the local government road (LGR) network is to be submitted as part of an operational works application. The TMP-LGR should address (but not be limited to) the following items:
  - (i) access by emergency vehicles to the site
  - (ii) spill management/hazardous materials.

**Part D. Noise**

**Condition 11. Sensitive receptors**

The proponent must ensure appropriate noise mitigation measures are implemented along the haulage route to ensure the predicted noise levels do not exceed the relevant noise criteria at sensitive receptors as determined by the relevant authority, including but not limited to the *Gold Coast Planning Scheme 2003, Part 7, Division 3, Chapter 13: Road Traffic Noise Management*.

**Part E. Air quality**

**Condition 12. Haulage trucks**

- (a) All haulage trucks are to exit the site via the wheel wash.
- (b) Loads on all road haulage trucks leaving the quarry must be covered to minimise dust emissions during transport.

## **Part F. Hazard and risk**

### **Condition 13. Actinolite and other fibrous minerals similar to asbestos**

Prior to commencement of the use, an assessment of the health risks to residents at sensitive receptor locations surrounding the quarry residents of exposure to quarry dusts arising from the occurrence of the mineral actinolite or other fibrous minerals similar to asbestos within the rock proposed to be quarried and processed, is to be prepared.

The risk assessment is to address:

- (a) The mode of occurrence and concentration of the mineral within the geology of the site
- (b) Whether the mineral actinolite occurs in an asbestos form ('asbestiform')
- (c) If the mineral actinolite is identified in an asbestos form, then further risk assessment is to include:
  - (i) Specific composition and structure of the mineral
  - (ii) Potential for the mineral to be liberated and transmitted by quarrying activities
  - (iii) Likelihood of the dust being inspired by site employees or the general public
  - (iv) Adoption of a suitable medical model of toxicity to humans
  - (v) Preparation of a risk management plan setting out detailed control measures to ensure the health and safety of residents is not impacted by dusts generated from quarrying activities.

## **Schedule 2. Stated conditions for Material Change of Use of premises for an extractive industry – State agencies**

### **Condition 1. Offset plan**

The Coordinator-General has jurisdiction for this condition.

- (a) The proponent must prepare a site based offset plan to address significant residual impacts that are not covered by Commonwealth requirements.
- (b) The offset plan must be lodged with the Coordinator-General no later than 60 days after a Commonwealth decision on offsets to address MNES.
- (c) The offset plan must be approved by the Coordinator-General.
- (d) The approved offset plan must be implemented within one year of commencement of construction.

### **Schedule 3. Stated conditions for Material Change of Use of premises for an Environmentally Relevant Activity (ERA) 16 – Extractive and screening activities**

The Department of Environment and Heritage Protection has jurisdiction for the following conditions

#### **General**

- G1. Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations:
- (a) Extracting, other than by dredging, up to 2,000,000 tonnes of material per year
  - (b) Extraction is only permitted to be conducted in the areas defined as the disturbance footprint in Figure 3, Gold Coast Quarry EIS - Aerial Photograph, Job no: HRP10003 version 1.0, dated January 2013
  - (c) Crushing and Screening up to 2,000,000 tonnes of material per year.
- G2. The conditions of this environmental authority apply to the establishment, development, construction stage and operational stage of the activity, as defined in Table 2-1: Quarry Development Staging, Gold Coast Quarry Environmental Impact Statement (page 54).
- G3. All reasonable and practicable measures must be taken to minimise the likelihood of environmental harm being caused.
- G4. Any breach of a condition of this environmental authority must be reported to the administering authority as soon as practicable, or at most, within 24 hours of you becoming aware of the breach. Records must be kept including full details of the breach and subsequent actions undertaken.
- G5. Other than permitted within this environmental authority, the release of a contaminant into the environment must not occur.
- G6. The activity must be undertaken in accordance with written procedures that:
- (a) identify potential risks to the environment from the activity during routine operations and emergencies
  - (b) establish and maintain control measures that minimise the potential for environmental harm
  - (c) ensure plant, equipment and measures are maintained in a proper and effective condition
  - (d) ensure plant, equipment and measures are operated in a proper and effective manner
  - (e) ensure that staff are trained and aware of their obligations under the EP Act
  - (f) ensure that reviews of environmental performance are undertaken at least annually.
- G7. All information and records that are required by the conditions of this environmental authority must be kept for a period of at least 5 years.
- G8. An appropriately qualified person must monitor, record and interpret all parameters that are required to be monitored, in the manner provided, as specified in this environmental authority.
- G9. All analyses and tests required under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and

tests. The only exception to this condition is for the in-situ monitoring of turbidity, pH and volume of effluent released per day.

- G10. When you receive advice from the administering authority that a complaint of environmental nuisance has been received which the administering authority does not consider to be frivolous or vexatious, monitoring must be undertaken in the manner prescribed by the administering authority to investigate the complaint. The monitoring results must be provided to the administering authority upon request.
- G11. The activity must not be carried out until you have given the appropriate financial assurance under the *Environmental Protection Act 1994* to the administering authority as security for compliance with this environmental authority and in relation any costs or expenses, or likely costs or expenses, mentioned in section 298 of the EP Act.
- G12. If the administering authority increases the amount of financial assurance you must give the financial assurance to the administering authority within 28 days of receiving written notice.

### **Air quality**

- A1. Odours or airborne contaminants, including dust and particulate matter, which are noxious or offensive or otherwise unreasonably disruptive to public amenity, safety or human health must not cause environmental nuisance at any nuisance sensitive place or commercial place.
- A2. Dust and particulate matter must not exceed any of the following levels when measured at any nuisance sensitive place or commercial place:
- (a) dust deposition of 120 milligrams per square metre per day over a 30 day averaging period, when monitored in accordance with *Australian Standard AS 3580.10.1, 2003* (or more recent editions)
  - (b) a concentration of total suspended particulates (TSP) in the atmosphere of 90 micrograms per cubic metre (annual average)
  - (c) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre ( $\mu\text{m}$ ) (PM10) suspended in the atmosphere, of 50 micrograms per cubic metre (24-hour average).
- A3. You must monitor air quality for the activity, which must include, but not be limited to:
- (a) continuous monitoring of PM10 at one location and dust deposition at three locations (representative of the worst affected receptors of the quarry) during the operation of both the West Burleigh Quarry and the activity
  - (b) high-volume air sampling of TSP, 1-day-in 6 sampling regime, collected over 24 hours (midnight to midnight)
  - (c) meteorological monitoring (including at least temperature, wind speed and direction) at a single location representative of the approved place
  - (d) regular reporting of the measured dust deposition rates and PM10 concentrations to a publicly available web site
  - (e) investigation of all measured exceedances to determine the influence of emissions from the quarry.

### **Water**

- WT1. The only contaminants to be released to surface waters are contaminants contained in settled, treated stormwater runoff from the sediment pond in accordance with Table 1 – Surface water release limits.
- WT2. The monitoring program must include water quality monitoring for metals and metalloids, i.e. a full scan of dissolved metal and metalloids, Limit of Reporting

equal to or better than provided by ICP/MS. Where a review of water quality monitoring program results, comprising of no less than 6 discrete sampling events, demonstrates that a certain contaminant exceeds the relevant default slightly-moderately disturbed freshwater ecosystem ANZECC & ARMCANZ (NWQMS, 2000) trigger value for the level of protection (95 per cent of species), an interim working level trigger values or an adopted locally-derived trigger value, these contaminants must be monitored routinely, e.g. quarterly and upon release. Speciated forms of arsenic (As III, As V) and chromium (Cr III, Cr VI) must be analysed where the results of the total speciated As and Cr analysis exceed the lower of the speciated trigger values (i.e. where the total speciated dissolved concentration for As exceeds 13 µg/L and/or where the total speciated dissolved concentration for Cr exceeds 1 µg/L).

Note: The ultimate frequency of monitoring required will depend on the level of exceedance of the adopted trigger value (i.e. the level of risk).

**Table 1. Surface water release limits**

Quality characteristic	Release Point	Limit	Limit Type	Monitoring frequency
Total Suspended Solids (TSS)	RP <sup>3</sup> (GPS location where release from the approved place enters QLD Waters)	50 mg/L	Maximum	Monthly and upon release
Turbidity		70 NTU <sup>1</sup>	Maximum	
pH		7.0 – 8.5	Range(Maximum and Minimum)	
Dissolved Oxygen (DO) concentration		80-110 per cent saturation	Monitor only <sup>2</sup> (Median)	Monthly

<sup>1</sup> 70 NTU to be used as an interim turbidity maximum limit for the release of sedimentation pond water in situations where there is an operational need to discharge from the sedimentation pond prior to a laboratory confirmed TSS result being available. The interim turbidity limit will remain in place until a correlated value is determined based on a minimum of 24 paired (measure from same sample bottle) data points for turbidity and TSS with a correlation coefficient  $R^2 \geq 0.7$ . The correlation must be developed from data representing TSS ranging from the Limit of Reporting (or  $\leq 10$  mg/L TSS) to  $\geq 50$  mg/L. Once a correlation has been developed in accordance with these requirements, the turbidity limit should be amended accordingly.

<sup>2</sup> Dissolved Oxygen concentration (per cent saturation) to be 'monitored only'. Where the long-term median (of 12 data points collected monthly) does not meet the water quality objective (limit), the EA may have to be amended to include a requirement to 'monitor only' 5-day Biological Oxygen Demand (BOD<sub>5</sub>).

<sup>3</sup> Release points to be agreed in writing with the administering authority, prior to commencement of the activity.

WT3. Monitoring of contaminant releases to waters must be undertaken in accordance with condition WT1 and records of the results must be kept.

WT4. In addition to condition WT1, the release to waters must not:

- (a) have any other properties at a concentration that is capable of causing environmental harm
- (b) produce any slick or other visible evidence of oil or grease, or contain visible floating oil, grease, scum, litter or other visually objectionable matter.

WT5. The stormwater runoff from disturbed areas, generated by (up to and including) a 24-hour storm event with an average recurrence interval of 1 in 5 years must be retained on site or managed to remove contaminants before release.

## Waste

WA1. All waste generated in carrying out the activity must be reused, recycled or removed to a facility that can lawfully accept the waste.

WA2. Waste must not be burnt at the approved place.

### Noise

N1. Noise from the activity must not exceed the levels identified in Table 2 - Noise limits when measured in accordance with the associated monitoring requirements.

**Table 2 – Noise limits**

Noise level measured in dB(A)	Noise measured at the boundary of the approved place			
	Monday to Saturday			Sunday and Public Holidays
	7am-6pm	6pm-10pm	10pm-7am	no audible noise
L10, adj, T	48	45	35	
LAeq, adj, T	43	40	30	

#### Associated monitoring requirements

1. All monitoring devices must be correctly calibrated and maintained.
2. Any monitoring must be in accordance with the most recent version of the administering authority's Noise Measurement Manual.
3. Any monitoring of noise emissions from the activity must be undertaken when the activity is in operation.
4. The compliance noise level must be measured as the component noise level as near as practicable to the location and height where a straight line from the sound source to the affected dwelling intersects the closest boundary of the approved place. If this is not practicably possible, the noise should be measured at the affected dwelling and modelled to determine compliance at the relevant boundary. If a noise reducing device is constructed at the point of measurement, then the effect of this device will be taken into account.

N3. When requested by the administering authority, noise monitoring must be undertaken to assess compliance with Table 2 – Noise limits, and the results notified within 14 days to the administering authority.

Noise monitoring must include:

- (a) LA eq, adj, T
- (b) L10, adj, T
- (c) background noise as LA90, adj, T
- (d) MaxLpAT
- (e) the level and frequency of occurrence of impulsive or tonal noise
- (f) atmospheric conditions including wind speed and direction
- (g) effects due to extraneous factors such as traffic noise
- (h) location, date and time of recording.

N4. Generation of substantial low frequency noise is not permitted.

N5. Blasting activities must not exceed the limits for peak particle velocity and air blast overpressure in Table 3 – Blasting noise limits when measured at a sensitive place or commercial place.

**Table 3 – Blasting noise limits**

Blasting criteria	Blasting limits
Airblast overpressure	115dB (linear) peak for 9 out of 10 consecutive blasts initiated and not greater than 120dB (linear) peak at any time.
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10mm/second peak particle velocity at any time.

#### **Associated monitoring requirements**

1. Monitoring must be in accordance with the most recent editions of the administering authority's 'Noise and Vibration from Blasting' guideline and Noise Measurement Manual and any relevant Australian standard.
2. All monitoring devices must be correctly calibrated and maintained.

- N6. Blasting must be carried out in accordance with the current edition of the administering authority's *Noise and vibration from blasting guideline* and *Australian Standard 2187*.
- N7. Unless prior approval is obtained from the administering authority:
- (a) blasting is only permitted during the hours of 9am to 5pm Monday to Friday
  - (b) blasting is not permitted at any time on Saturdays, Sundays or public holidays.
- N8. When requested by the administering authority, a blast monitoring program must be developed and implemented to monitor compliance with Table 3 – Blasting noise limits.

#### **Land**

- L1. The quarry pit must be designed to allow for access to disturbed areas for rehabilitation works.
- L2. Land that has been disturbed for activities conducted under this environmental authority must be rehabilitated in a manner such that:
- (a) suitable native species of vegetation are established and sustained for earthen surfaces
  - (b) potential for erosion is minimised
  - (c) the release of stormwater, other than water and seepage released from the approved place, must not cause environmental harm
  - (d) the final landform is stable and protects public safety.
- L3. Rehabilitation of disturbed areas required under condition L2 must take place progressively as works are staged and new areas of extraction are commenced.

#### **Definitions**

**Activity** means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

**Administering authority** means the Department of Environment and Heritage Protection or its successor or predecessors.

**Appropriately qualified person(s)** means a person or persons who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

**Airblast overpressure** is the energy transmitted from the blast site within the atmosphere in the form of pressure waves. As these waves pass a given position, the pressure of the air rises very rapidly then falls more slowly then returns to the ambient value after a number of oscillations. The pressure wave consists of both audible (noise) and inaudible (concussion) energy. The maximum excess pressure in this wave is known as the peak air overpressure, generally measured in decibels using the linear frequency-weighting.

**Background** means noise, measured in the absence of the noise under investigation, as  $L_{A90,T}$  being the A-weighted sound pressure level exceeded for 90 per cent of the time period of not less than 15 minutes, using Fast response.

**Boundary** means within 1m of the cadastral **boundary** of the approved place.

**Commercial place** means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

**Contaminant** (the **EP Act**) means a gas, liquid or solid; or an odour; or an organism (whether alive or dead), including a virus; or energy, including noise, heat, radioactivity and electromagnetic radiation; or a combination of **contaminants**. **Contaminants** include prescribed contaminants listed within Schedule 9 of the Environmental Protection Regulation 2008.

**Design life** means, at a minimum, the duration of land disturbance.

**Drainage lines** means diversion drains, channels, batter chutes and any other feature conveying concentrated storm flows. This excludes **sediment basin** spillways.

**Environmental harm** (the **EP Act**) is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an **environmental value**, and includes **environmental nuisance**. **Environmental harm** may be caused by an activity—

- (a) whether the harm is a direct or indirect result of the activity; or
- (b) whether the harm results from the activity alone or from the combined effects of the **activity** and other activities or factors.

**Environmental nuisance** (the **EP Act**) is unreasonable interference or likely interference with an **environmental value** caused by—

- (a) aerosols, fumes, light, noise, odour, particles or smoke; or
- (b) an unhealthy, **offensive** or unsightly condition because of contamination; or
- (c) another way prescribed by regulation.

**Environmental value** (the **EP Act**) is—

- (a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
- (b) another quality of the environment identified and declared to be an **environmental value** under an environmental protection policy or regulation.

**EP Act** means the *Environmental Protection Act 1994*

$L_{Aeq,adj,T}$  means the adjusted A weighted equivalent continuous sound pressure level **measures** on fast response, adjusted for tonality and impulsiveness, during the time period T, where T is measured for a period no less than 15 minutes when the **activity** is causing a steady state noise, and no shorter than 1 hour when the approved **activity** is causing an intermittent noise.

**Measures** have the broadest interpretation and includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competency.

**Noxious** means harmful or injurious to health or physical well-being.

**Offensive** means causing offence or displeasure; is unreasonably disagreeable to the sense; disgusting, nauseous or repulsive.

**Release of a contaminant into the environment** means:

- a) to deposit, discharge, emit or disturb the contaminant; and
- b) to cause or allow the contaminant to be deposited, discharged, emitted or disturbed; and
- c) to fail to prevent the contaminant from being deposited, discharged emitted or disturbed; and
- d) to allow the contaminant to escape; and
- e) to fail to prevent the contaminant from escaping.

**Sensitive place** includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) a kindergarten, school, university or other educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- f) a public thoroughfare, park or gardens;
- g) for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

**Substantial low frequency noise** means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurement, with a predominant component within the frequency range 10 to 200Hz. It includes any noise emission likely to cause an overall sound pressure level at a sensitive place exceeding 55dB(Z).

**24 hour storm event with an average recurrence interval of 1 in 5 years** means the maximum rainfall depth from a 24 hour duration precipitation event with an average recurrence interval of once in 5 years. For example, an Intensity-Frequency-Duration table for a 24 hour duration event with an average recurrence interval of 1 in 5 years, identifies a rainfall intensity of 7.09mm/hour. The rainfall depth for this event is therefore 24 hour x 7.09mm/hour = 170.16mm.

**Vibration** is the oscillating or periodic motion of a particle, group of particles, or solid object about its equilibrium position.

**You** means the holder of the environmental authority.

#### **Schedule 4. Stated conditions for Material Change of Use of premises for an Environmentally Relevant Activity (ERA) 63 – Sewage treatment**

The Department of Environment and Heritage Protection has jurisdiction for the following conditions

## General

- G1. Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations:
- (a) Operating sewage treatment works with a total daily peak design capacity of at least 21 equivalent persons if treated effluent is discharged to an infiltration trench or through an irrigation scheme.
- G2. The conditions of this environmental authority apply to the establishment, development, construction and operational stages of the activity, as defined in Table 2-1: Quarry Development Staging, Chapter 2.1, Gold Coast Quarry Environmental Impact Statement, page 54.
- G3. All reasonable and practicable measures must be taken to minimise the likelihood of environmental harm being caused.
- G4. Any breach of a condition of this environmental authority must be reported to the administering authority within 24 hours of you becoming aware of the breach and record full details of the breach and any subsequent actions.
- G5. Other than permitted within this environmental authority, the release of a contaminant into the environment must not occur.
- G6. The activity must be undertaken in accordance with written procedures that :
- (a) Identify potential risks to the environment from the activity during routine operations and emergencies
  - (b) Establish and maintain control measures that minimise the potential for environmental harm
  - (c) Ensure plant, equipment and measures are maintained in a proper and effective condition
  - (d) Ensure plant, equipment and measures are operated in a proper and effective manner
  - (e) Ensure that staff are trained and aware of their obligations under the EP Act
  - (f) Ensure that reviews of environmental performance are undertaken at least annually.
- G7. All information and records that are required by the conditions of this environmental authority must be kept for a period of at least 5 years.
- G8. An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored, in the manner provided, as specified in this environmental authority.
- G9. All analysis and tests required under this environmental authority must be carried out by a laboratory that has NATA certification for such analysis and tests. The only exception to this condition is for the in-situ monitoring of turbidity, pH and volume of effluent released per day.
- G10. When requested by the administering authority, monitoring must be undertaken, in the manner prescribed by the administering authority, to investigate a

complaint of environmental nuisance, arising from the activity. The monitoring results must be provided to the administering authority upon request.

- G11. The activity must not be carried out until you have given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the EP Act.
- G12. If the administering authority increases the amount of financial assurance you must give the financial assurance to the administering authority within 28 days of receiving written notice.

**Part A. Sewage treatment works**

- W9. An appropriately qualified person(s) must monitor, interpret and record all parameters that are required to be monitored for the sewerage treatment works, in the manner provided, under Table 4 – Monitoring requirements for sewerage treatment works.

**Table 4. Monitoring requirements for sewerage treatment works**

Parameter	Measurement (units)	Minimum frequency	Monitoring location (eastings and northings)
<b>Groundwater</b>			
Water level	mBTOC	Yearly	At the monitoring bores listed in Table 2. Summary of Monitoring Bore Construction and Water Levels, from Appendix FF of BORAL Groundwater Impact Assessment or any replacement/additional bore.
pH	scale	Yearly	
Electrical Conductivity	µs/cm	Yearly	
Total Nitrogen	mg/L	Yearly	
Total Phosphorus	mg/L	Yearly	
E. coli	Colony forming units/100mL	Yearly	
5 day Biochemical Oxygen Demand (BOD5)	mg/L	Yearly	
<b>Waste water</b>			
Total Nitrogen	mg/L	Monthly	Post disinfection and immediately prior to irrigation
Total Phosphorus	mg/L	Monthly	
Faecal Coliforms	Colony forming units/100mL	Monthly	
Volume of effluent released per day	(litres per day)	Daily	
pH	scale	Weekly	
Total Suspended Solids	mg/L	Weekly	
BOD5	mg/L	Monthly	
Free Residual Chlorine	mg/L	Monthly	

**Part B. Land**

L1. The only contaminants to be released to land are tertiary treated waste waters in accordance with the Table 5 and the associated requirements.

**Table 5. Land release limits**

Release area (eastings and northings)	Quality characteristics (units)	90th per centile	Minimum	Maximum	
Effluent Irrigation Line as per Appendix A, Sewerage Treatment General Arrangement Plan, of Gold Coast Quarry Environmental Impact Statement	Total Nitrogen (mg/L)	35		30	
	Total Phosphorus (mg/L)	8		20	
	Faecal Coliforms (cfu <sup>4</sup> /100mL)	10		200	
	Volume of effluent released per day (litres per day)			5000	
	pH			6.0	8.5
	TSS (mg/L)	10			45
	BOD5 (mg/L)	10			30
	Free Residual Chlorine (mg/L)				0.5

<sup>4</sup> Means colony forming units

### Part C. Definitions

**Activity** means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

**Administering authority** means the Department of Environment and Heritage Protection or its successor or predecessors.

**Appropriately qualified person(s)** means a person or persons who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

## **Schedule 5. Stated conditions for Material Change of Use of premises for the adequate safe and efficient management of a state-controlled road**

The Department of Transport and Main Roads has jurisdiction for the following conditions.

### **Part A. Additional advice about the conditions**

To ensure the ongoing safety, efficiency and existing condition of the State controlled road network (SCR) and in accordance with the objectives and provisions of the *Transport Infrastructure Act 1994* (TIA), the *Transport Operations (Road-use Management ) Act 1995*, other relevant legislation and the Department of Transport and Main Roads policies and guidelines, eg. *Guidelines for Assessment of Road Impacts of Development* (GARID), the proponent must address the following matters for the Department of Transport and Main Roads to support the project proceeding.

Once further traffic information is available on the final design and construction of the project including traffic generation, the proponent is required to finalise the road impact assessment (RIA), prepare the road-use management plan (RMP) and any traffic management plan/s (TMP) to clearly identify any necessary improvement works, rehabilitation and maintenance, and road-use management strategies to mitigate the impacts of project traffic.

#### **Condition 1. Permits, Approvals, finalising detailed drawings and preparation of Traffic Management Plan/s for any required road works**

The proponent must, no later than three months prior to the commencement of any significant project-related construction traffic, or such other period agreed in writing with TMR, complete the following:

- (a) Prepare detailed drawings for any works required to mitigate the impacts of project-related traffic for review and approval by the Department of Transport and Main Roads
- (b) Obtain road corridor permit approvals for any accesses to or works including ancillary works, signage or other activities in SCR corridors
- (c) Prepare a TMP in accordance with the Department of Transport and Main Roads' *Guide to Preparing a Traffic Management Plan*. The TMP must be approved by the Department of Transport and Main Roads and will be required to be implemented during the construction and commissioning of any site accesses, road intersection or other works undertaken in the SCR corridor
- (d) Obtain the necessary permits for any excess mass or over-dimensional loads associated with the project as required under the *Transport Operations (Road Use Management) Act (Qld) 1995*
- (e) Consult with the Department of Transport and Main Roads' Heavy Vehicle Road Operations Program Office and Gold Coast City Council to ensure any excess mass or over-dimensional transport movements are safely undertaken, without damaging infrastructure.

## **Condition 2. Maintenance contributions for haulage activities**

- (a) The proponent must pay a monetary contribution to the Department of Transport and Main Roads South Coast Region for the maintenance and accelerated reduction in pavement life of the State controlled road network to the amount of \$947,533 which equates to \$23,688 a year. In particular, the contribution is required for maintenance works from the use of haulage vehicles on the SCR network and rehabilitation on Kingsmore Boulevard round-a-bout, northbound and southbound M1 On-ramp and Burleigh Connection Road.
- (b) Payments must be made within 30 days of the end of each annual interval until the transportation of material extracted from the site by road under this approval ceases. If the transportation of material extracted from the site ceases before the end of an annual interval, within 30 days of ceasing to transport the material, the proponent must advise the Department of Transport and Main Roads South Coast Region in writing and calculate a pro-rata contribution.
- (c) The amount of the contribution must be paid at yearly intervals commencing on the first day that material extracted under this approval is transported from the site by road.
- (d) Records which document the quantity of material extracted from the site and transported by road must be kept by the proponent for no less than five years.
- (e) The annual contribution amount in condition 2(a) must be indexed annually on the CPI Review Date in accordance with the following formula:

$$A = B \times C \div D$$

Where:

- A = the indexed value or rate
- B = the Index Number for the quarter ending immediately before the CPI Review Date
- C = the Charge Rate, Value of Land Dedication, Value of Works and/or the total value of Infrastructure Contributions (as applicable) and
- D = the Index Number for the quarter ending immediately before:
  - (I) for the first review date, the 1st January 2013; and
  - (II) for the second and every other review date, the anniversary of the review date.
- (f) If the reference base of the Index Number is updated by the Australian Statistician, then the Index Number must be adjusted as determined by the Australian Statistician.

## **Condition 3. State-controlled roadworks**

Prior to the commencement of significant project-related construction traffic, the proponent must:

- (a) Upgrade any necessary intersection/accesses, undertake any other required works or make contributions towards works as required, in accordance with the current Department of Transport and Main Roads road planning and design policies, principles and manuals, unless otherwise agreed in writing with the Department of Transport and Main Roads South Coast Region Office

- (b) Prior to undertaking any of these works and as required above, obtain the relevant licenses and permits under the TIA for works and project facilities/infrastructure within the State controlled road corridor. Any required plans, permits and TMPs must be approved by the Department of Transport and Main Roads three months prior to commencement of significant project construction traffic
- (c) Specifically, the proponent must upgrade the existing Old Coach Road/Bridgman Drive/Pacific Motorway on-ramp signalised intersection to include an extended right turn lane, generally in accordance with drawing titled 'Old Coach Road/ Bridgman Drive/ Pacific Motorway On-Ramp Concept Layout for Potential Mitigation Solution' prepared by Cardno (Drawing reference: CEB06354 – SK01, Revision A).
  - (i) The design of the intersection is to be completed in accordance with the current Department of Transport and Main Roads Road Planning and Design Manual, and must detail all modifications required to:
    - (A) Earthworks
    - (B) Pavement
    - (C) Drainage
    - (D) Line marking
    - (E) Road Furniture (signs, guard rail)
    - (F) Overhead Street lighting
    - (G) Traffic Signals.
- (d) Implement the approved TMP for the works during construction and commissioning of the above mentioned intersection upgrade.

**Condition 4. Prohibited Use of State Controlled Road Tallebudgera Creek Road**

- (a) Heavy vehicle movement between the site access and Tallebudgera Creek Road via the southern end of Old Coach Road is strictly prohibited at all times, to ensure the ongoing road safety, condition and transport efficiency of the SCR network.
- (b) The proponent must clearly identify and include in the RMP for the quarry operations, how heavy vehicle movements between the site and Tallebudgera Creek Road will be restricted. The RMP must be approved by the Department of Transport and Main Roads before any haulage operations commence

**Condition 5. Submit Road-Use Management Plan for Approval**

The proponent must complete the following at least six months prior to the commencement of any significant project construction traffic:

- (a) A RMP for all use of SCRs for each phase of the project, in consultation with the Manager (Project Planning and Corridor Management) of the Department of Transport and Main Roads South Coast Region Office and in accordance with the Department of Transport and Main Roads' *Guide to Preparing a Road Use Management Plan*. The RMP must summarise:
  - (i) Latest traffic generation (vehicle/ESA numbers, routes etc.)

- (ii) Finalised assessment of impacts on road safety, efficiency and condition at intersections, level crossings, on road links and pavements etc.
  - (iii) Updated impact mitigation strategies both “hard” strategies (infrastructure-based, such as ensuring adequate project access to SCRs) and “soft” strategies (such as road safety strategies - dealing with worker/driver fatigue), and any other necessary improvements or contributions towards road maintenance and so on
  - (iv) How the proponent will demonstrate implementation and efficacy of proposed road-use management strategies
  - (v) The inclusion of condition 4.
- (b) Submit the RMP to the Manager (Project Planning and Corridor Management) of the Department of Transport and Main Roads South Coast Region Office and Planning Management Branch, Brisbane for review and approval.

**Condition 6. Safety-related mitigation**

In accordance with the safety audit titled “Road Safety Review, Old Coach Road Reedy Creek”, Cardno Pty Ltd, August 2013, the proponent must prior to the commencement of significant project-related construction traffic, complete the following work:

- (a) relocate the 60/70 km/hr speed zone change on Old Coach Road at the northbound approach to the Old Coach Road/Kingsmore Boulevard/Pacific Motorway off-ramp roundabout. Signs and pavement markings must be installed in accordance with the Manual of Uniform Traffic Control Devices.
- (b) install guardrail protection to the culvert headwall structure on the left-hand side of Old Coach Road approximately 20 metres south of the Old Coach Road/Kingsmore Boulevard/Pacific Motorway off-ramp roundabout. Guardrail must be installed in accordance with the Department of Transport and Main Roads’ Road Planning and Design Manual, Standard Drawings Roads, and Main Roads Technical Standards
- (c) install guardrail protection to the right hand side of the Pacific Motorway northbound off-ramp Old Coach Road at the hairpin curve on the approach to the Old Coach Road/Kingsmore Boulevard/Pacific Motorway off-ramp roundabout. Guardrail must be installed in accordance with the Department of Transport and Main Roads’ Road Planning and Design Manual, Standard Drawings Roads, and Main Roads Technical Standards.

Note – In accordance with section 33 of TIA, the proponent must obtain construction approval from the Department of Transport and Main Roads prior to commencing any of the required works within the road corridor.

**Glossary:** Significant project traffic means an increase in project traffic equal to or greater than 5% in either traffic numbers (AADT) or axle loadings (ESAs), as outlined in the GARID.

## Appendix 2. Proponent commitments

Number	Commitment
<b>Public Consultation Process</b>	
C1.	A community liaison group will be established
<b>Description of the Project</b>	
C2.	Minimise the disturbance footprint to 30 per cent of the site area..
C3.	Discharge of treated wastewater into watercourses will be avoided.
<b>Climate, Natural Hazards, and Climate Change</b>	
<b>Flooding</b>	
C4.	There will be no pumping of water from the quarry to the reservoir during storm events.
<b>Land Issues</b>	
<b>Visual Assessment</b>	
C5.	Progressive rehabilitation will be undertaken to soften and partly screen the upper 5 or 6 benches of the quarry pit. The rehabilitation of the benches will be a combination of vegetation and non-vegetative measures.
<b>Geology and Soils</b>	
C6.	An erosion and sediment control program will be implemented in order to minimise potential sediment loads.
C7.	A topsoil stripping survey will be conducted to assess the suitability and volume of material available for on-site and off-site use.
C8.	Soil conservation measures to repair erosion in the buffer zones will be included in the Landscape Rehabilitation Plan.
<b>Nature Conservation</b>	
<b>Flora and Fauna</b>	
C9.	The extent of development will avoid threatened species of national environmental significance.
C10.	Vegetation on the site with respect to potential impact associated with groundwater and hydrological flows will be monitored.
C11.	Food source trees for glossy black cockatoos will be propagated as part of the rehabilitation for the buffer area.
C12.	A net benefit for koalas will be achieved through the implementation of an appropriate offset regime.
C13.	A vegetation offset which is of ecological equivalency for an area of 4.88ha will be achieved within the buffer area.
C14.	On-going weed management in the buffer area will be undertaken.
C15.	Identified areas of degradation within the buffer area will be restored and rehabilitated.
C16.	Vegetation will be cleared in a staged manner in accordance with the Koala Management Plan.
C17.	Groundwater Dependent Ecosystems (GDE) will be identified and mitigation measures for impacts on those GDE's outlined.
<b>Aquatic Ecology</b>	

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C18. Water quality will be monitored to ensure no harm to aquatic flora and fauna.

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**Water Resources**

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C19. A recycle, reuse, recover philosophy for water supply which ensures all operational water demands are met will be adopted.

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C20. Stormwater runoff will be treated via a best practice erosion and sediment control management strategy including quarry pit storage, quarry dam and sediment basin – in addition to a water quality monitoring program.

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C21. Only that proportion of water and associated pollutants which exceed the capacity of the sediment basin and quarry dam will be disposed of..

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C22. A Groundwater Monitoring Plan will be prepared to be incorporated into the Environmental Management Plan.

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C23. Ongoing groundwater monitoring of bores will be conducted quarterly.

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C24. More detail will be provided on the volume of groundwater to be encountered at depth (below 107.5m).

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C25. Flooding risk will be minimised by limiting the removal of vegetation and stripping of overburden to outside of the wet season where practicable, up to and including Stage E3 of the quarry development.

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**Water Quality**

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C26. Guidelines for Managing Risks in Recreational Water, National Health and Medical Research Council (2008) will be adopted for managing water quality objectives.

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**Air Quality**

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C27. 

- Appropriate dust control measures for all phases of the development will be adopted. This will include:
  - Dust suppression systems installed and utilised on all plant and equipment
  - Plant enclosures and hi-pressure dust suppression systems installed on all crushers, screens and feeders
  - Use of water trucks to wet down working roads and pads
  - Dust collector to be installed on the drill rig
  - Storage to be contained in bunkers fitted with retractable covers.

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C28. The proponent will conduct routine monitoring of the exposure of its workforce to respirable crystalline silica dust throughout the lifetime of the Gold Coast Quarry.

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**Greenhouse Gas Emissions**

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C29. The proponent will endeavour to minimise greenhouse gas emissions.

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**Noise and Vibration**

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**Blasting**

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C30. Offer to undertake a limited number of building surveys for existing dwellings in the surrounding area, at locations nominated by the Proponents Blasting consultants.

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C31. On-going monitoring of blasting practices, and if vibration and overpressure measurements approach the regulatory limits, then Boral will review the blast design regime and adjust practices to ensure compliance. The following are examples of potential mitigation actions:

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**Vibration and Overpressure Mitigation**

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C32.	Two separate charges, separated by an inert stemming deck with each charge independently delayed, so that the maximum weight of explosive is reduced from around 75 kg to around 35 kg
C33.	The bench height can be reduced from 12 metres to 6 metres
C34.	The blasthole diameter can be reduced from 89 mm to 76 mm
<b>Vibration Mitigation</b>	
C35.	Delay timing can be adjusted to produce destructive interference of vibration waves from different charges.
<b>Overpressure Mitigation</b>	
C36.	Stemming height and front row burdens can be increased to provide greater charge confinement.
<b>Noise</b>	
<b>Establishment, Development and Construction Stages</b>	
C37.	Items of major noise generating plant to be strategically placed to maximise the beneficial shielding provided by the retained high ground.
C38.	A 3m high noise barrier to be constructed along the outer rim of the sedimentation pond at Phase E3.
C39.	5m high moveable modular barriers to be constructed and deployed close to one or more of the mobile primary crushers from the commencement of Establishment Phase E2/E3.
C40.	Aa 5m high moveable modular barrier located in close proximity to the single mobile primary crusher to be deployed throughout Phases C1 and C2.
C41.	A 8m high 176m long barrier/earth mound combination to be constructed along the high ground immediately to the west of western extent of Phase C2 together with a 6m high 111m long barrier/earth mound combination to be constructed along the northern edge of Phase C2.
C42.	Action to mitigate road traffic noise from the quarry impacting on properties that back onto Old Coach Road will be undertaken.
C43.	Compliance with the requirements of the Construction Noise Management Plan, especially with regard to the selection, operation and maintenance of "low noise" plant and equipment.
<b>Operational Stages</b>	
C44.	All fixed crushing and screening plant to be fully enclosed, with openings let into the enclosures for the entry and passage of product and conveyors only.
C45.	At, or prior to, the commencement of Phase Q5, the construction of a 6m high 150m long barrier fixed acoustic barrier along a line parallel to and set back 6m from the common boundary with The Observatory Stage 20.
C46.	Rock drilling to be carried out using a "low noise" rock drill only which is to be operated for the minimum time feasible and, where necessary, screened using moveable modular barriers located at appropriate elevated positions between the operating drill rig and the nearest residences.
C47.	Compliance with the requirements of the Environmental Noise Management Plan, especially with regard to the selection, operation and maintenance of "low noise" plant and equipment.
<b>Waste</b>	
C48.	A tracking system will be implemented for all regulated waste
C49.	The standards and procedures of the waste management plan will be implemented.

### **Transport**

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- C50. Payment of Road Pavement Rehabilitation Contribution (indexed from 2013 base year) as follows:
- with Bermuda Street: upfront cash contribution of \$29,622.00 plus annual payment of \$0.0064 per tonne over operational life of the project; or
  - without Bermuda Street: upfront cash contribution of \$4,963.00 plus annual payment of \$0.0057 per tonne over operational life of the project.
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- C51. Turning lanes associated with the Old Coach Road/Bridgeman Drive/Pacific Motorway intersection to be lengthened.
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### **Indigenous Cultural Heritage**

- C52. The recommendations of the Indigenous cultural heritage assessment to be implemented if there is an unexpected find during the development and operation of the project.
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### **Non-Indigenous Cultural Heritage**

- C53. The recommendations of the Non-Indigenous cultural heritage assessment to be implemented if there is an unexpected find during the development and operation of the project.
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### **Hazard and Risk**

- C54. The bushfire management plan to be implemented.
- C55. The emergency response plan to be implemented.
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### **Environmental Management Plan**

- C56. All aspects of the Environmental Management Plan to be implemented
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### **EIS Chapter 11: Matters of National Environmental Significance**

- C57. Areas of clearing to be monitored to ensure that boundaries are demarcated and that clearing activities are confined to the demarcated boundaries.
- C58. Areas of excavation to be monitored for entrapped fauna.
- C59. The effectiveness of weed management activities to be monitored.
- C60. The effectiveness of erosion and sediment control devices to be monitored.
- C61. The success of rehabilitation works to be monitored.
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### **White-Bellied Sea Eagle**

- C62. Where necessary enhance the screening in the shrub and subcanopy layers through planting uphill of the nest tree.
- C63. The likelihood of nest abandonment during a breeding season to be reduced by adopting an active management strategy involving the covering the nest during the nesting season to discourage use for the period while construction activities are underway. Specifically, this would apply only to the period while the cut face immediately to the north of the nest site is being constructed during Phases D1-D4 (i.e. approximately potentially for 2 breeding cycles)
- C64. Health of nesting tree to be monitored.
- C65. Use of the nesting tree by white-bellied sea-eagles to be monitored.
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# Acronyms and abbreviations

<b>Acronym</b>	<b>Definition</b>
μS/cm	microsiemens per centimetre
ABARE	Australian Bureau of Agricultural and Resource Economics
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i> (Qld)
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
AS/NZS	Australian Standard/New Zealand Standard
AEP	Annual exceedance probability
ASX	Australian Stock Exchange
BoM	Bureau of Metrology
BOM	Board of Management
CAMBA	China–Australia Migratory Bird Agreement
CASA	Civil Aviation Safety Authority
CDMP	coal dust management plan
CEMP	construction environment management plan
CHMP	cultural heritage management plan
CIS	community investment strategy
CLMP	the coal loss management program for coal transport and coal dust emissions
CLR	Contaminated Land Register
CO <sub>2</sub> -e	carbon dioxide equivalent
CSG	coal seam gas
dB(A)	decibels measured at the 'A' frequency weighting network
DCS	Department of Community Safety
DEEDI	The former Department of Employment, Economic Development and Innovation
DEHP	Department of Environment and Heritage Protection
DEO	desired environmental outcomes
DERM	The former Department of Environment and Resource Management
DOC	Department of Communities (Qld)
DOTE	Department of the Environment
DSDIP	Department of State Development, Infrastructure and Planning
DTMR	Department of Transport and Main Roads (Qld)
DSQ	Disability Services Queensland
EA	environmental authority
EF	Emission factors
EIS	environmental impact statement
EMP	environmental management plan
EMR	Environmental Management Register
EP	equivalent persons

<b>Acronym</b>	<b>Definition</b>
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPC	exploration permit for coal
EPP	Environmental Protection Policy (water, air, waste, noise)
EPP (Air)	Environmental Protection (Air) Policy 2008
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity
ESA	environmentally sensitive area
FID	financial investment decision
FIFO	fly-in fly-out
FSL	full supply level
FTE	full-time equivalent
GHG	greenhouse gas
IAS	initial advice statement
ICLR	independent community liaison representative
JAG	Queensland Department of Justice and Attorney-General
JAMBA	Japan–Australia Migratory Bird Agreement
kPa	kilopascal
KRA	key resource area
L <sub>A1</sub>	those noise levels that are exceeded for one per cent of each one-hour sample period
L <sub>Aeq</sub>	the average A-weighted sound pressure level of a continuous steady sound that has the same mean square sound pressure as a sound level that varies with time
L <sub>Amax</sub>	the maximum average A-weighted sound pressure measured over a specified period of time
LAN,T	statistical descriptor for the variation of noise
max L <sub>PZ,15 min</sub>	the maximum value of the Z-weighted sound pressure level measured over 15 minutes
MCU	material change of use
mg/L	milligrams per litre of liquid/gaseous liquid
ML	megalitres
MM	millimetres
MNES	matters of national environmental significance
MOU	memorandum of understanding
MRA	<i>Mineral Resources Act 1989</i> (Qld)
mtpa	million tons per annum
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NEPC	National Environmental Protection Council
NEPM	national environment protection measure
NGA	National Greenhouse Accounts

<b>Acronym</b>	<b>Definition</b>
NGAF	National Greenhouse Accounts Factors
NGOs	non-government organisations
NPI	National Pollutant Inventory
NT agreement	native title agreement
P&G Act	<i>Petroleum and Gas Act 2004</i> (Qld)
PM <sub>10</sub>	particulate matter with equivalent aerodynamic diameter less than 10µm
PM <sub>2.5</sub>	particulate matter with equivalent aerodynamic diameter less than 2.5µm
PAH	Polycyclic aromatic hydrocarbons
PPV	peak particle velocity, which is a measure of ground vibration magnitude and is the maximum instantaneous particle velocity at a point during a given time interval in mms <sup>-1</sup>
PLM	Polarized light microscopy
QASSIT	Queensland Acid Sulfate Soils Investigation Team
QASSMAC	Queensland Acid Sulfate Soils Management Advisory Committee
QGEOP	Queensland Government Environmental Offsets Policy
QH	Queensland Health
QWC	Queensland Water Commission
QWQG	<i>Queensland Water Quality Guidelines</i>
RE	regional ecosystem
REDD	Regional Ecosystem Description Database
RIA	road impact assessment
ROM	Run of mine
RMP	road-use management plan
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i> (Qld)
SDWPO Regulation	State Development and Public Works Organisation Regulation (Qld)
SEIS	supplementary environmental impact statement
SEM	Scanning electron microscopy
SEWPaC	Former Australian Government Department of Sustainability, Environment, Water, Population and Communities
SEQKPA	South East Queensland Koala protection Area
SEQRP	South East Queensland Regional Plan
SIA	social impact assessment
SIAU	Social Impact Assessment Unit
SLA	statistical local area
SPA	<i>Sustainable Planning Act 2009</i> (Qld)
SPRP	State planning regulatory provisions
SPP	state planning policy
TDS	total dissolved solids
TAPM	The Air Pollution Model

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<b>Acronym</b>	<b>Definition</b>
TEM	Transmission electron microscopy
TMP	traffic management plan
TOR	terms of reference
TPH	Total petroleum hydrocarbons
TSP	total suspended particles
USEPA	United States Environmental protection Agency
VM Act	<i>Vegetation Management Act 1999</i> (Qld)
WMP	waste management plan
WRP	water resource plan
XRD	X-Ray Diffraction

# Glossary

Term	Definition
assessment manager	For an application for a development approval, means the assessment manager under the <i>Sustainable Planning Act 2009</i> (Qld).
bilateral agreement	The agreement between the Australian and Queensland governments that accredits the State of Queensland's EIS process. It allows the Commonwealth Environment Minister to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
catchment	The area of land, which collects and transfers rainwater into a waterway.
construction areas	The construction worksites, construction car parks, and any areas licensed for construction or on which construction works are carried out.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
controlling provision	The matters of national environmental significance, under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth), that the proposed action may have a significant impact on.
coordinated project	A project declared as a 'coordinated project' under section 26 of the SDPWO Act. Formerly referred to as 'significant projects'.
Coordinator-General	The corporation sole constituted under section 8A of the <i>State Development and Public Works Organisation Act 1938</i> and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
environment	As defined in Schedule 2 of the SDPWO Act, includes: <ol style="list-style-type: none"> <li>a) ecosystems and their constituent parts, including people and communities</li> <li>b) all natural and physical resources</li> <li>c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community</li> <li>d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).</li> </ol>
environmental effects	Defined in Schedule 2 of the SDPWO Act as the effects of development on the environment, whether beneficial or detrimental.

environmentally relevant activity (ERA)	An activity that has the potential to release contaminants into the environment. Environmentally relevant activities are defined in Part 3, section 18 of the <i>Environmental Protection Act 1994</i> (Qld).
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for the condition.
initial advice statement (IAS)	<p>A scoping document, prepared by a proponent, that the Coordinator-General considers in declaring a coordinated project under Part 4 of the SDPWO Act. An IAS provides information about:</p> <ul style="list-style-type: none"> <li>• the proposed development</li> <li>• the current environment in the vicinity of the proposed project location</li> <li>• the anticipated effects of the proposed development on the existing environment</li> <li>• possible measures to mitigate adverse effects.</li> </ul>
matters of national environmental significance	<p>The matters of national environmental significance protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>. The eight matters are:</p> <ol style="list-style-type: none"> <li>a) world heritage properties</li> <li>b) national heritage places</li> <li>c) wetlands of international importance (listed under the Ramsar Convention)</li> <li>d) listed threatened species and ecological communities</li> <li>e) migratory species protected under international agreements</li> <li>f) Commonwealth marine areas</li> <li>g) the Great Barrier Reef Marine Park</li> <li>h) nuclear actions (including uranium mines).</li> </ol>
nominated entity (for an imposed condition for undertaking a project)	An entity nominated for the condition, under section 54B(3) of the SDPWO Act.
properly made submission (for an EIS or a proposed change to a project)	<p>Defined under section 24 of the SDPWO Act as a submission that:</p> <ol style="list-style-type: none"> <li>a) is made to the Coordinator-General in writing</li> <li>b) is received on or before the last day of the submission period</li> <li>c) is signed by each person who made the submission</li> <li>d) states the name and address of each person who made the submission</li> <li>e) states the grounds of the submission and the facts and circumstances relied on in support of the grounds.</li> </ol>
proponent	The entity or person who proposes a coordinated project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.

Significant project	A project declared (prior to 21 December 2012) as a 'significant project' under section 26 of the SDPWO Act. Projects declared after 21 December 2012 are referred to as 'coordinated projects'.
stated condition	<p>Conditions stated (but not enforced by) the Coordinator-General under sections 39, 45, 47C, 49, 49B and 49E of the SDPWO Act. The Coordinator-General may state conditions that must be attached to a:</p> <ul style="list-style-type: none"> <li>• development approval under the <i>Sustainable Planning Act 2009</i></li> <li>• proposed mining lease under the <i>Mineral Resources Act 1989</i></li> <li>• draft environmental authority (mining lease) under Chapter 5 of the <i>Environmental Protection Act 1994</i> (EPA)</li> <li>• proposed petroleum lease, pipeline licence or petroleum facility licence under the <i>Petroleum and Gas (Production and Safety) Act 2004</i></li> <li>• non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EPA.</li> </ul>
works	<p>Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that:</p> <ol style="list-style-type: none"> <li>a) the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body is or may be authorised under any Act to undertake, or</li> <li>b) is or has been (before or after the date of commencement of this Act) undertaken by the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body under any Act, or</li> <li>c) is included or is proposed to be included by the Coordinator-General as works in a program of works, or that is classified by the holder of the office of Coordinator-General as works.</li> </ol>

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