Tweed Shire is also projected to experience strong future population growth, increasing from some 85,700 persons in 2008 to almost 112,300 persons by 2026. This represents an average increase of some 1.5% per annum over this period. Accounting for an expected decline in persons per household within this region generates a demand for some 13,700 dwellings to 2026, representing 37% of the current dwelling stock in Tweed Shire.

2.2 The Local Economy

Whilst the population of the South East Queensland region is forecast to expand at one of the most rapid rates in the nation, the distribution of this growth is not even. Brisbane City is forecast to maintain an average annual increase of 1.6% growth in the coming 25 year period, whilst the Gold Coast population growth is forecast at 2.2% over the same period. As a result, the construction industry will on average continue to be a major employer of the local workforce, supporting further residential dwelling formation, associated commercial and retail development and major infrastructure developments within the growing region. Consequently, the building and construction industry will continue to be an important employment and income generator for the region and will continue to be an integral part of the growing Gold Coast's local economy.

It is widely recognised that the Gold Coast region has been one of the fastest-growing regions in Australia, with the strong population growth translating into a booming urban development sector that is generating significant expansion of the region's economic base across a number of the growing industries. Publications detailing the composition of the Gold Coast economy reveal the importance of the building and construction industry that is underpinning the region's solid growth performance and prosperity.

The Economic Development Unit (Gold Coast City Council) has estimated that the total gross regional product (GRP) of the Gold Coast economy in 2004-05 was nearly $16 billion, representing an increase of almost 78% from $9 billion in 2001-02. A breakdown of the contribution of each industry reveals that the construction industry is by far the key industry driver and the largest industry contributor towards the GRP of the Gold Coast economy. The direct value added by the construction industry was $3.44 billion, representing 21.6% of GRP. The property services industry was the second largest industry, contributing almost $2.29 billion to the local economy, or 14.3% of GRP.

The construction industry was the second largest employer of the local workforce, employing a total of 30,250 fulltime equivalent (FTE) persons in 2005-05, representing 14.0% of the total Gold Coast employment base. The largest employer was the retail industry with a total employment base of some 35,170 FTE persons (or 16.2% of total FTE employment). However, the construction industry was the largest generator of total employee wages and salaries, contributing a total of $1.37 billion in wages (or 18.9% of total wages generated within the Gold Coast economy).

Overall, the current economic trough that has been driven by the effects of the current global financial crisis is expected to continue for at least the next 6 to 12 months. With regard to the quarrying industry, it is expected that the downturn will not be as detrimental as it might be for other industries, given the strong fundamentals driving the residential and infrastructure construction industries, especially in strong growth locations such as South East Queensland. Private sector investment in construction is likely to be adversely affected although this will obviously change as economic conditions improve, a situation likely to occur in the later stages of 2009. However, strong public investment in regional infrastructure projects is considered to maintain a strong level of demand for construction materials over the short term.

2.3 Major Projects

Significant population and activity growth within the Gold Coast will challenge the capability of the existing local infrastructure to cater for the increasing transportation, health, community and service needs of the growing population. Consequently, a number of major infrastructure projects have been identified by the Department of Infrastructure and Planning for future planning and development across the Gold Coast region to 2026. These include

TABLE 2.2: Major Infrastructure Projects for Gold Coast Region – Dept of Infrastructure and Planning

Transport Infrastructure	$9,358M	A number of key priorities have been identified across the Gold Coast transport network, including major roads and highways, priority busways, cycle networks and rail infrastructure. Investment projects located within the southern Gold Coast region include: ➢ Pacific Motorway Upgrade – Nerang to Tugun ($3.4Billion) ➢ Southern extension of the Gold Coast Rail Line: Robina to Coolangatta ($1,859M)
Water Infrastructure	$1,600M	Relevant water projects include: ➢ Raising of the Hinze Dam ➢ SEQ (Gold Coast) Desalination Plant
Energy	$480M	Development of bulk supply for Southern Gold Coast Region and future substations
Health Infrastructure	$1,980M	Relevant major health infrastructure developments include: ➢ Gold Coast University Hospital ➢ Expansion of the Robina Hospital ➢ Development of the Robina Health Precinct
Education	$625M	Development of 8 new schools across the Gold Coast region between 2008 and 2026.
Sport and Recreation	$136M	Relevant projects include: ➢ Gold Coast Stadium Redevelopment (Carrara) ➢ Motorcycle Sporting Precinct: Northern Gold Coast ➢ Runaway Bay Sports Precinct Stage 1 (new playing fields)

Source: South East Queensland Infrastructure Plan and Program 2009-2026

Extractive resources underpin all urban and infrastructure development as they are the primary source of materials used for building future roads, bridges, railways, factories, hospitals, schools, homes, etc. Thus, it is also relevant to note that Gold Coast quarries, particularly those located in the far north of the City (Stapylton and Darlington) are servicing the demand for aggregate material within Brisbane, Logan and Ipswich Cities. The aggregate produced in the region's quarries is vital in satisfying society's growing requirements in constructing our built environment. It is clearly evident that, the projected population growth, the resulting demand for housing, and the need for major infrastructure and resource-related projects proposed for the Gold Coast region are set to continue the high level of demand for extractive resources.

Numerous local contractors rely upon Boral's existing West Burleigh quarry for the critical supply of extractive material for a number of major infrastructure projects within the surrounding region. The following TABLE 2.3 provides a list of the past, current and future major infrastructure projects that rely upon extractive material sourced from Boral's West Burleigh quarry.

TABLE 2.3: Major Infrastructure Projects – Boral's West Burleigh Quarry

Major Project	Total Volume of Quarry Materials (tonnes)	Status
Coolangatta Airport runway extension	130,000	Completed mid 2007
Desalination pipeline 24km	130,000	Completed late 2007
Varsity Lakes to Robina Rail line	70,000	Underway
Varsity Lakes interchange	50,000	Start May 2009
Mudgeeraba Interchange	20,000	Start April 2009
Desalination Plant	100,000	Completion April 2009
Nerang South interchange	70,000	Completion June 2009
Merrimac Treatment Plant	40,000	Completion July 2009
Barney Point upgrade	70,000	Tendering July 2009
Nineteenth Avenue interchange	TBA	Planning 2011
Pacific H/way upgrade stage 1 Nerang to Varsity Lakes	TBA	Planning for 2012
Pacific H/way upgrade stage 2 Varsity lake to Stuart Rd	TBA	Planning and Funding for 2013
Continuation of Rail line to Coolangatta Airport	TBA	Planning and Funding for 2014-2015

Source: Boral Resources (QLD) Pty Limited

The above TABLE 2.3 is demonstrative of the vital presence of Boral's local quarrying operations within the southern Gold Coast corridor as part of the critical delivery of recently completed and, more importantly, upcoming infrastructure projects planned for the future within this region. Indeed, the proposal would continue this critical supply of extractive material for major infrastructure projects within this region.

2.4 Regional Planning Controls

The South East Queensland Regional Plan 2009-2031 has been designed and recently updated to manage growth and change through appropriate policies and the timely provision of infrastructure and employment to achieve a future vision that is sustainable, affordable, prosperous and liveable. This Plan promotes the sustainable management of natural resources by protecting significant resources from incompatible development as they underpin the region's major economic activities and support a diverse range of industries that rely on the quality and accessibility of these resources.

The State Planning Policy 2/07 *Protection of Extraction Resources* is a tool for strategic planning in future land-use decision-making. This Policy is consistent with the Regional Plan. It identifies those *"extractive resources of State or regional significance"* where extractive industry is appropriate in principle, and aims to protect those resources from developments that might prevent or severely constrain their future extraction. Furthermore, the Policy recognises that

- extractive resources *"are essential to the State and regional economies, and the community, as the primary raw materials for the construction industry"; and*

- *"Extractive industry does not have flexible location options because the extractive resources are fixed, finite and are limited in occurrence. Other uses (in particular residential uses) are unlikely to override the long-term availability of an extractive resource because they have more flexible location options."*

The subject site has been identified as a Key Resource Area (KRA 96) within this State Planning Policy 2/07, meaning that this extractive resource is considered to be of State or regional significance.

3.0 The Local Quarry Industry

The purpose of this Chapter is to examine the local quarrying industry, the demand factors for construction materials and the implications for the proposed Gold Coast Quarry development. An overview of the quarrying industry and its strategic issues is also presented.

3.1 Background

Quarries provide a range of extractive materials, such as sand, gravel, crushed rock and clay, which are processed and used as raw inputs for buildings and construction, agriculture and industrial purposes. It is estimated that 90% of the output from quarries in Australia is used within the building and construction industries. These extractive resources (or aggregates) include processed rock, gravel and sand products that are used to build houses, schools, roads, bridges, commercial and industrial buildings, airports, railways and other basic infrastructure our society needs.

Unlike mining for metals or coal, extractive materials (including road base, aggregate, sand and clay) are high volume, low-cost materials that need to be extracted and ideally processed as close as possible to the communities that use them. This is due to the high relative cost of transporting low-cost heavy materials. Utilising extractive materials from outside the region brings with it significant social, environmental and economic costs.

Urban encroachment is becoming more important in South-East Queensland, due to the high rates of population growth that have occurred and are projected to occur over the next two decades. It is both beneficial and in the emergent community's interest for a quarry to be developed close to infrastructure activity due to the high costs involved in transporting the extracted material. However, in the metropolitan Brisbane area, aggregates are increasingly being sourced from outer fringe locations, including quarries in northern Gold Coast City (Stapylton/Darlington). This is due to a number of constraints that are making it increasingly difficult for existing quarries to obtain approvals for extended operations and, in particular, for new greenfield quarries to obtain approvals due to higher environmental and amenity standards being imposed by the Government and expected by the community.

These growing environmental and development constraints upon the quarrying industry are coupled with the fact that these extractive resources are site specific, limited in occurrence by geological conditions and are finite. Furthermore, extractive resource materials have no foreseeable substitutes, with increased efforts for the use of recycled materials only accounting for a small percentage of society's requirements.

Cement Concrete and Aggregates Australia (the peak industry body for the heavy construction materials industry) commissioned an independent assessment as to the impact of a number of new environmental regulations and policies on the accessibility of extractive resources in South East Queensland. This study concluded that:

- Total extractive resources within South East Queensland were estimated to be 1,656 million tonnes, of which 801 million tonnes was identified as having an existing extractive industry development approval.
- About 45% of resources currently approved were categorised as 'developable but with a high level of restriction'.
- The current approved resource without environmental restrictions (341 million tonnes) is expected to be depleted by 2015.

Industry sources indicate that it typically takes between 5 and 7 years to gain development approval to develop a greenfield site in South East Queensland, although it is noted that given the complexity of the nature of the quarrying industry and the perceived environmental and social obstacles that may occur, there are no guarantees that future approvals will be forthcoming (or even eventuate).

Should alternative resources have to be found and developed beyond the existing identified resources, it is likely they will be located substantial distances from where the markets are. Consequently, it is expected that average haulage distances in South East Queensland will continue to increase over time. This has a range of flow-on effects, including higher transport costs passed down the chain to the consumer, more congestion and maintenance on State and local roads, increased traffic accidents and increased greenhouse gas emissions. Indeed, the protection and smooth progress of extractive resources within Key Resource Areas will have a beneficial effect on future transport related ecological and social impacts by securing these extractive deposits and minimising such transport distances to urban markets.

Trucks are the most efficient method of transporting low-cost quarry material over short distances to a large number of different sites. Rail is not an appropriate form of transport in this instance, with it only being an effective and economical mode of transporting extractive resources when the distances between the area of extraction and the point of delivery are substantial in length and there is only a single point of delivery.

The industry has become highly competitive, with price, as well as quality and customer service being the key differentiating factor. A geographic location close to markets is also highly advantageous. Unfortunately, should the West Burleigh Key Resource Area aggregate approvals become exhausted, the Gold Coast (part south of Pimpama) market would become too heavily dependent upon the Nerang quarry operating as a monopoly. Whilst prices of most construction inputs have been rising over time, economies of scale have continually been sought from quarry operations and in the transport of aggregates to markets. This includes a high degree of vertically integrated businesses including quarrying operations, concrete products, cement and asphalt manufacturing, with most companies operating substantial truck fleets.

3.2 Demand for Construction Aggregates

Demand for aggregates has closely matched the level of construction industry activity, which can also be affected by a number of macroeconomic factors. However, the overall demand trend is dependent upon population growth and the consequent development of roads, large buildings and associated infrastructure.

As identified in Chapter 2, the South East Queensland Infrastructure Plan and Program includes more than $14 billion will be invested by infrastructure across the Gold Coast region over the next 20 years. It has been developed to ensure that the region continues to meet the infrastructure demands of an increasing population. Indeed, it is recognised that there would be a number of further 'second tier' infrastructure projects to complement these major projects, currently unaccounted for within these estimates.

The following industry benchmarks are relevant in order to gauge the quantum of extractive resources required for the construction of major infrastructure and urban development:

- 1 kilometre of highway requires 25,000 tonnes of crushed rock;
- 1 kilometre of suburban road requires 5,000 tonnes of crushed rock, 750 tonnes of concrete for footpaths, kerbs and gutters, and 450 tonnes of asphalt for road surfacing;
- 1 kilometre of railway requires 2,000 tonnes of aggregate;
- A high-rise building can use up to 1,000 tonnes of aggregate per floor; and
- Construction of a typical house (including driveway and landscaping) uses about 100 tonnes of aggregate.

There have been numerous pieces of literature and research articles in recent years which compare the historic volume of aggregate demanded per person across Australia and South East Queensland, with the results varying from around 8 to 12 tonnes per person (t/pp/annum). However, it is noted that these estimates have been established based on Department of Mines and Energy data prior to 2006, with the industry seeing exceptional demand for construction services over the past 2 years due to an increased level of investment in infrastructure projects.

Furthermore, the increasing population in South East Queensland, mostly from the migration of residents from interstate, has led to an increase in demand for housing, major infrastructure and resource related projects, therefore maintaining a high level of demand for extractive resources in the region. It can be inferred that SEQ has a higher rate of demand for aggregate per person due to this increasing population growth. As a result of the population expansion, the State Government has increased spending in order to catch up on important infrastructure developments and satisfy the existing and future demand for SEQ. In view of the projected population growth and the planned infrastructure programs for the South East Queensland region, it is considered likely that the future demand will be at the higher end of the aggregate demand projections per person.

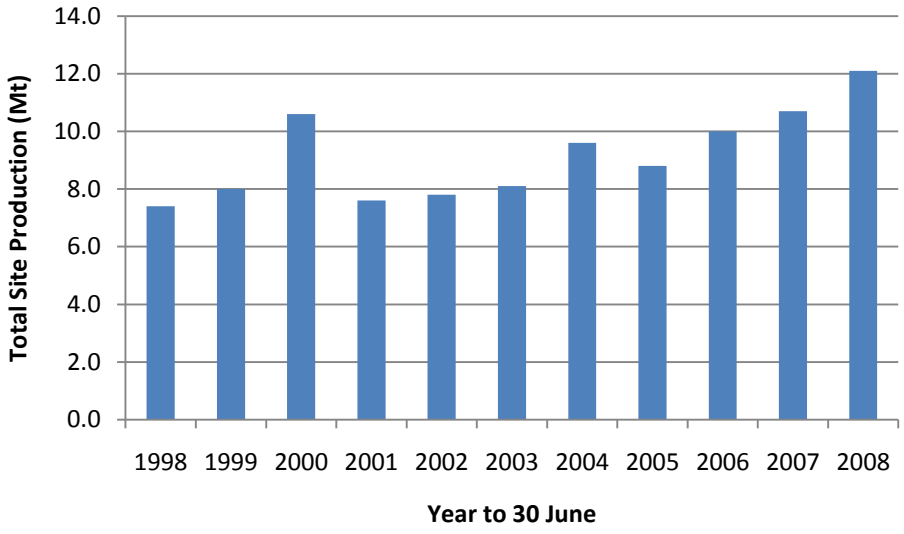
Based upon the research mentioned above, Urban Economics considers it appropriate when forecasting future demand for extractive resources (aggregate) to adopt a base tonnes per person demand for existing residents in addition to a high number of tonnes per person demand for new residents within the region. This allows us to incorporate the drivers of growth into the demand analysis. Trialling several assumptions and comparing them against actual reported South East Queensland volumes compiled by the Department of Mines and Energy has established demand figures of 5 tonnes per existing person and 183 tonnes per new person as providing a good fit against actual.

Urban Economics projects that the demand for aggregate within the Gold Coast region is projected at 100 million tonnes between 2008 and 2026. This equates to an average of 5.5 million tonnes per annum demanded. This demand excludes the significant demand from outside Gold Coast City (such as from Brisbane, Logan and Ipswich Cities) expected to also be placed upon Gold Coast quarries.

3.3 Local Network of Quarry Operations

The Department of Mines and Energy collects extraction data from quarries across South East Queensland, with the following Figure 3.1 providing a summary of the quantum of material extracted from quarries across the Gold Coast local government area. Extractive materials included within this data includes broken rock, crushed coarse aggregates (>5mm), crushed fine aggregates (<5mm), and road sub-base.

FIGURE 3.1: Extractive Materials: Gold Coast



Source: Department of Mines & Energy

Although it is evident that there have been fluctuations in the total site production volumes over this period, it is clear that there is a general growth pattern that is consistent with the strong population growth and the rise of major infrastructure projects that have been undertaken in recent years within the region. Indeed, total site production peaked during 2008 at 12.2 million tonnes after continued growth in production since 2001. It should be noted that this volume of production is approximately double the estimated demand per annum from Gold Coast City, explained by a combination of significant volumes of aggregate supplied by Gold Coast quarries to, mainly, Brisbane, Logan and Ipswich Cities and recent higher levels of infrastructure demand. Northern Gold Coast quarries supply the majority of this exported product, being well placed to service these demands due to the aforementioned impact of transport costs upon the price of aggregate.

The following TABLE 3.1 provides a summary of the competitive supply of existing hard rock quarries operating across the Gold coast region, noting their location, operator, product type, service area, capacity and estimated reserves. This information has been sourced from State Planning Policy 2/07 Guidelines for Key Resource Areas, as well as internal investigations and information obtained from Boral's internal research.

TABLE 3.1: Local Quarry Network: Gold Coast Central and Southern Corridor

Name/Operator	Location	Reserves	Notes
West Burleigh (Boral)	Bermuda Street/ Pacific Motorway West Burleigh (less than 1km NE from Subject Site)	13Mt	➢ Located proximate to subject site. ➢ Major Greywacke deposit. ➢ Record strong sales in previous 2 years, producing around 1.2Mt to 1.5Mt per annum (up to 2Mt). ➢ This quarry services the internal needs of Boral's concrete batching and asphalt plants on the Gold Coast, including the concrete plant at Coomera. ➢ Concrete and asphalt plants located on-site. ➢ Busiest of all of Boral's Quarries in Queensland. ➢ Service area extends as far north as the Inter-Urban Break between Brisbane and the Gold Coast. ➢ Significant operational reasons why West Burleigh has a large service area reach. ➢ Boral is advantaged by its low cost position through it being strategically located to service the central and southern end of the Gold Coast. ➢ Up to 80 persons employed across all of the operations situated at West Burleigh Quarry. ➢ Threats to this reserve include the development of the proposed Queensland Transport Rail Corridor and Energex Power Lines Project.
Nerang (Hymix-Hanson)	Hymix Road Nerang (some 16km North of the Subject Site)	70Mt	➢ Similar rock deposit as West Burleigh and Subject Site. ➢ Producing large volumes of material – estimated at 2Mt per annum. ➢ Sufficient resource remaining for more than 30 years at current rates of extraction. ➢ Strategically located to service major markets of the Gold Coast and southern Brisbane metropolitan area.
Oxenford (Nucon)	Maudsland Road/ Tamborine Oxenford Road Oxenford (some 20km North of the Subject Site)	12Mt	➢ Greywacke deposit. ➢ Producing sale volumes in the order of 0.4Mt per annum. ➢ Diminishing resources indicate this is not a long term quarry. ➢ Conveniently situated to service the northern part of Gold Coast and Tamborine Mountain areas.
West Burleigh (GCCC)	Bermuda Street/ Pacific Motorway West Burleigh (less than 1km NE from Subject Site)	1.5Mt	➢ Two small quarry operations are still operating. ➢ Very limited resources remain. ➢ Lower grade product quality in comparison to Boral's West Burleigh operation and Subject Site.

Source: State Planning Policy 2/07, Boral's internal research, Urban Economics' research

The above TABLE 3.1 highlights that there are a number of competitive hard rock quarry reserves in relation to the proposed Gold Coast Quarry development at the subject site. The two major significant reserves include Nerang (Hymix-Hanson) and West Burleigh (Boral). The Nerang (Hymix-Hanson) quarry is the most significant reserve in the competitive network and are low cost to the central to northern end of the Gold Coast markets. The coast of transport to southern Gold Coast markets is more prohibitive and hence these markets are more likely to rely upon Reedy Creek/West Burleigh quarries for their aggregate needs.

Accessibility to the Tweed Shire market has increased due to the completion of the Tugun Bypass. There are also a number of competitive quarries located to this region, including:

i. Tumbulgum (Cowell) is a lower grade quality quartzite reserve with approximately less than 10Mt of reserves remaining.

ii. Terranora (Readymix) is a basalt reserve with approximately 5Mt of reserve. This quarry is not operational, although actively pursuing approval to re-open to service the local market.

iii. The next major hard rock quarry reserves are located some distance away at Ballina.

Furthermore, a number of hard rock deposits are situated north of the Gold Coast/Brisbane Inter-Urban break at Pimpama. Three Key Resource Areas have been identified at Blue Rock (Cedar Creek), Darlington Range and Stapylton. Significant crushed rock material used for various aggregate and road base applications are located in these areas. These resources primarily service the metropolitan markets of southern Brisbane, Logan and the western corridor (Ipswich), due to the lack of hard rock quarries situated within these markets. Should the proposed Gold Coast Quarry not be approved, the Gold Coast market would have to compete against the Brisbane, Logan and Ipswich markets for these already stretched northern deposits.

3.4 Implications for the Subject Site

The above investigations indicate that the local quarry industry fundamentally underpins the future growth of the urban development within the Gold Coast region, with strong population growth and a number of major infrastructure projects set to fuel future demand for construction material. Information from the Department of Mines and Energy indicate that this demand for extractive material has increased significantly in recent years within the Gold Coast region, with total site production volumes peaking in 2008.

With diminishing resources remaining at West Burleigh, the lack of alternative extractive resources in the southern Gold Coast region (Gold Coast Quarry is the only KRA situated within this corridor) and given the extensive lead time required to transfer to any replacement extractive operation, Boral has strategically identified the proposed Gold Coast Quarry development at the subject site to take over production of its West Burleigh operations and to cater for future demand within the central and southern Gold Coast corridor, continuing its economical position to customers within this region. Should this transition be delayed or hindered in any way (due to reasons such as environmental and development

approval constraints) a number of significant negative transportation and customer cost impacts will be incurred by the community as a result, including increased strain on the production capacity of the northern Gold Coast Quarry sites, not to mention the creation of an effective monopoly due to the Nerang Quarry becoming the primary supplier for the Gold Coast (part south of Pimpama) region's aggregate market.

4.0 Strategic Significance of the Gold Coast Quarry

The purpose of this Chapter is to examine the strategic significance and economic impact of the proposed Gold Coast Quarry development within the surrounding Gold Coast region, its role in supporting the region's construction industry and future urban growth and its contribution to the local regional economy as a whole. Urban Economics has undertaken an initial desktop assessment of the economic benefits of the proposal, with this assessment based upon published benchmarks and Urban Economics' analysis of the quarrying industry and operations.

Many practitioners apply output multipliers, which significantly overstate the real effect on an economy by double-counting. Value added multipliers are considered to be a more appropriate measure of economic activity, representing the contribution to Gross Regional/State/Domestic Product. The value added and employment (full-time equivalent) multipliers are applied in this study. They are derived from the Gold Coast City Council's Economic Development Unit who commissioned the Centre for Economic Policy Modelling (CEPM) at the University of Queensland to produce a set of input-output accounts for the Gold Coast City region.

It is estimated that the set up costs by Boral in undertaking the transitioning of its West Burleigh quarrying operations to the proposed Gold Coast Quarry development at the subject site would be in the order of $111million. Multipliers were utilised to determine the additional value generated from every dollar spent or invested during the set up and construction phase. Thus, the indirect flow on multiplier effects to the Gold Coast regional economy is projected to be in the order of $85million.

It is estimated that upon completion, the proposed Gold Coast Quarry is to maintain certainty of up to 100 full time employment positions, across its quarrying, asphalt, concrete and transport operations on the Gold Coast. The proposed development will provide a net increase in employment opportunities and help continue quarrying industry jobs within the area once the West Burleigh quarry resources are diminished. The flow-on benefits of this employment would maintain further employment opportunities, resulting in an estimated 290 full-time equivalent jobs maintained in other industry (supporting and consumptive) sectors, resulting in a total 390 jobs being maintained in the Gold Coast region as a result of the proposed Gold Coast Quarry.

The proposal would allow Boral to capitalise upon the identified opportunities in the construction materials market, achieving increased levels of revenues, production and employment. Existing extractive resources located at West Burleigh are insufficient to adequately cater for future population and associated infrastructure growth within the region. Indeed, it is recognised that the subject site is the last remaining significant greenfield resource located within the southern Gold Coast corridor and is identified by State Planning Policy 2/07 as a Key Resource Area.

There are no other Key Resource Areas south of Nerang. Consequently, the proposed Gold Coast Quarry is the last and only opportunity to secure a cost effective and long term supply of extractive material for the central and southern Gold Coast region. The failure to capitalise on this opportunity would not only result in inefficient servicing of the Gold Coast market, but inefficiencies in other surrounding Local Government Areas which rely upon aggregate produced by the Gold Coast quarries.

Major infrastructure projects are planned within the region as a result of the increasing demand from a growing population within the southern and wider Gold Coast region. Furthermore, significant infill development is planned across Gold Coast City (including the central and southern urban areas), with Council's Draft Local Growth Management Strategy indicating that *"about 60% of the city's growth to 2026 will be achieved through infill and redevelopment of existing developed areas"* (page 9). This infill and redevelopment is projected to capture a strong proportion of construction material demand to 2026, with such demand to be targeted towards the consolidation of growth within Regional Activity Centres and Transit Orientated Development across the developed areas of Gold Coast City.

Applying market shares to the future demand for extractive resources within the Gold Coast region provides an estimate of the projected demand for material to be sourced from the proposed Gold Coast Quarry development. Furthermore, accounting for the comparative advantages of the proposed development, as well as the opportunity to service the southern Tweed Shire market, Urban Economics estimates that the proposed Quarry development could achieve production sales in the order of 1.4Mt to 1.5Mt per annum. This on-going supply to the market would continue to allow Boral to provide its low cost position to the central and southern urban markets within the Gold Coast, once the resources at West Burleigh become exhausted. Moreover, the operation of the proposed Gold Coast quarry (as a replacement for the West Burleigh quarry) would prevent reliance upon the northern Gold Coast aggregate deposits and ensure a greater level of self sufficiency for the Gold Coast aggregate market.

Should the proposed Gold Coast Quarry development not be realised by the time the resources at West Burleigh become exhausted alternative extractive material has to be sourced from elsewhere, which is likely to be located some substantial distances to the southern Gold Coast region in comparison to the subject site and West Burleigh operation. This outcome would result in the increased costs and impacts associated with transporting equivalent material from outside this region, including higher transport costs passed down the chain to the consumer, more congestion and maintenance on State and local roads, increased potential for traffic accidents and increase greenhouse gas emissions. Indeed, the proposed Gold Coast Quarry development would continue sustaining the affordability of future growth and urban development for the central and southern Gold Coast region.

Reducing greenhouse gas emissions is an important objective as part of the sustainability and climate change desired regional outcomes that are outlined within the Draft South East Queensland Regional Plan 2009-2031. Indeed, an important mechanism in achieving this outcome is minimising the movement of goods and shortening the supply chain. Based on industry benchmarks obtained from the Australian Government Fuel Consumption Guide (2003), it is estimated that at least an additional 4,000 tonnes of greenhouse gas emissions would be produced per annum should the proposed Gold Coast Quarry not proceed. Given that the indicated resource is considered sufficient for in excess of 40 years of supply to the market, this equates to at least an additional 160,000 tonnes of greenhouse gas emissions being produced should extractive material be sourced and transported from elsewhere.

It is Urban Economics' opinion that, notwithstanding that the proposal would directly replace an existing extractive operation within the immediate area, the localised and manageable impacts of quarrying should be considered as offsetting the larger and widespread transportation impacts and not appropriately managing the sustainability of future

affordable growth for the entire South East Queensland region. State Planning Policy 2/07 documents a number of considerations as to the social, economic and ecological implications of using alternative sources should the development of extractive industry within the identified Key Resource Area network be restricted or prevented, including:

- increased costs of extractive materials for building construction and infrastructure;
- increased pollution levels from increased exhaust emissions;
- increased road maintenance costs;
- increased transport costs for extractive industry; and
- reduced transport safety and efficiency.

Furthermore, the proposed Gold Coast Quarry meets the criteria of State or regional significance, as determined by the State Planning Policy 2/07 (Appendix 1). An extractive resource is State or regionally significant if it meets any of the following criteria:

TABLE 4.1: Criteria for State or Regional Significance

Criteria	Description	Criteria Met
1. Size	The size of the extractive resource is equal to or greater than the annual demand for the commodity type in its region or sub-region; or	Yes. Initial estimates suggest an indicated resource of up to 80Mt, which is far in excess of current and projected yearly demand (5.5Mt)
2. Production	The resource is capable of producing 5 percent of annual demand for the commodity type in its region or sub-region; or	Yes. Projected market shares for the proposal development are in the order of 22% across the Gold Coast. This market share is even higher for the central and southern subregion.
3. Market	The resource can supply more than one significant part of the region or sub-region; or	Yes. The service area of Boral's West Burleigh Quarry is extensive and ranges as far north as the Inter-Urban Break. The proposal will continue this trend.
4. Scarcity	The resource has particular physical properties that are scarce in the region or sub-region; or	Yes. Boral's existing reserves at West Burleigh are limited and diminishing with only a limited capacity for further extraction. Indeed, there are no other KRA south of Nerang.
5. Specialised	Specialised resources needed for strategic infrastructure.	Yes. Significant infrastructure is planned for the region, with Main Roads and Gold Coast City Council being major customers of material sourced from the West Burleigh Quarry.

As such, it is Urban Economics' opinion that the proposed Gold Coast Quarry is a strategically significant project and meets Section 27(h) of the *State Development and Public Works Organisation Act 1971*. It has been demonstrated that the local quarry industry fundamentally underpins the future growth of the urban development within the Gold Coast region, with strong population growth fuelling growth in residential dwellings and a number of major infrastructure, which in turn is set to fuel demand for construction material. The proposed Gold Coast Quarry is the last and only opportunity to secure a cost effective and long term supply of extractive material within the central and southern Gold Coast region, prevent monopolisation of the local aggregate market and mitigate the inflationary price effect stemming from the increasing scarcity of aggregate materials relative to rising demand.

Consequently, this Report has also addressed Sections 27(c), (d) and (g) of the *State Development and Public Works Organisation Act 1971*.

5.0 Conclusion

Quarrying in South East Queensland has increasingly faced significant constraints in recent years. Increasingly difficult operating and approval conditions have had a direct impact on the construction and infrastructure provision sectors by restricting supply at a time of increasing demand. Constraints have included:

- Encroachment upon existing quarrying sites by residential uses, causing previously non-existent amenity issues to arise;
- Heightened amenity standards for quarry uses, i.e. increased noise suppression, dust reduction requirements, etc;
- Increasing concern over the decline of Koala habitat in the South East Queensland region;
- Increasing awareness of environmental sustainability issues amongst both government and the broader community, reflected in increasingly stringent environmental regulations within planning instruments; and
- A trend towards a more detailed development application process with approvals for new or expanded quarries having to meet more stringent criteria than in the past.

These constraints on supply have adversely affected operations within, growth of and the prices charged by the aggregate sector. In particular, GHD's Report for Availability of Extractive Resources in South East Queensland (released in 2007), commissioned by Cement, Concrete and Aggregate Australia, estimated that by 2015, all approved aggregate resources in South East Queensland will be exhausted. Prices will not remain flat as 2015 approaches if significant new approvals are not granted. Rather, this sector will increasingly experience substantial price inflation as rising demand attempts to secure aggregate from a diminishing supply. It is evident from the results of the Report that the approval of additional aggregate resources is urgently required in order to reduce the impact of these price rises upon the construction industry and, by association, the wider economy.

It is also relevant to note that South East Queensland's quarries are located in outer ring metropolitan areas outside Brisbane City. In particular, northern Gold Coast quarries supply significant quantities of aggregate to Brisbane City, in addition to other LGAs such as Logan and Ipswich Cities. Thus, demand for aggregate in the Gold Coast faces significant competition from demand from other adjacent LGAs. Only the West Burleigh Quarry and Gold Coast Quarry sites are located specifically toward servicing the central and southern parts of the Gold Coast. Hence, the refusal of this proposal would significantly constrain the range and choice of suppliers for the Gold Coast market. Were the existing West Burleigh sites to become exhausted, as they certainly will within a decade, the Gold Coast (part south of Pimpama) would only have one significant resource for aggregate materials in operation, at Nerang. This would create a monopoly situation, as well as this quarry being unable to efficiently service the central and southern Gold Coast markets.

Given that a significant proportion of South East Queensland's construction industry is based in the Gold Coast region and that the localised economy is heavily dependent upon the property sector, the location of the proposed Gold Coast Quarry is well suited to replacing the West Burleigh quarry and efficiently catering to central and southern Gold Coast businesses.

Overall, the refusal of this proposal would result in the following disbenefits to not only the Gold Coast region but the wider South East Queensland region (due to the increased demand Gold Coast development would place upon aggregate resources in the northern Gold Coast region, resources typically relied upon by Brisbane, Ipswich and Logan markets):

- Increased product prices due to increasing resource scarcity;
- Increased transport costs;
- Creation of an effective monopoly of aggregate supply on the Gold Coast (part south of Pimpama), resulting in artificially inflated prices;
- Increased competition with demand from other LGA's, especially Brisbane City, would compound the above price impacts on the Gold Coast market;
- Increased air pollution and contribution to global warming due to increased transport distances; and
- Reduced pedestrian and driver amenity due to increased presence of trucks on Gold Coast roads.

Appendix C

Preliminary Ecology Report, prepared by Chenoweth EPLA

Gold Coast Quarry

Issues Paper
ECOLOGY

for

Boral Resources (Qld)
Pty Limited

CHENOWETH
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088054 June 2009

EXECUTIVE SUMMARY

Chenoweth Environmental Planning and Landscape Architecture (CEPLA) were engaged to undertake a preliminary review of ecological issues associated with Lot 105 on SP144215 for Boral Resources (Qld) Pty Limited. The purpose of this investigation was to document known and likely ecological issues affecting the site, including matters considered of significance at the National, State and Local levels.

Preliminary site work by CEPLA (2008) and ddwfauna (2005) confirmed the Regional Ecosystem Mapping by the State as broadly correct. Areas of non-remnant vegetation are 'locked in' as Category X on a Property Map of Assessable Vegetation. The proposed quarry footprint has minimal impact on areas mapped as Remnant Regional Ecosystems.

Some threatened species have previously been located on site, however are found outside of the proposed quarry footprint.

The site is mapped on Gold Coast City Council overlay maps as containing riparian communities, remnant vegetation (and other natural systems) and major linkages (land and water based).

Based on preliminary investigations the proposed disturbance footprint avoids known high value ecological features including endangered regional ecosystems[1] and threatened species with these features retained in a broad buffer area.

[1] A minor area of mapped Category 1 (Endangered Regional Ecosystems) will be crossed as part of site access.

1.0 INTRODUCTION

Chenoweth Environmental Planning and Landscape Architecture (CEPLA) were engaged to undertake a preliminary review of ecological issues associated with Lot 105 on SP144215 for Boral Resources (Qld) Pty Limited. The purpose of this investigation was to document known and likely ecological issues affecting the site, including matters considered of significance at the National, State and Local levels. This preliminary assessment involved review of existing studies undertaken by Mark Rigby and Associates (2005), Gold Coast Botany (2005) and ddwfauna (2005) for the site, current Environmental Protection Agency mapping, review of the Wildnet database and a brief site assessment conducted on 5 August 2008.

2.0 ECOLOGY

2.1 FLORA

2.1.1 Vegetation Communities

Mapping prepared by the Queensland Herbarium and subsequently certified by the Department of Environment and Resource Management identifies the presence of remnant regional ecosystems over part of the site thereby triggering the provisions of the *Vegetation Management Act 1999* (VMA) for the purposes of development applications. The 220ha site has been mapped as supporting 2.8ha of the 'Endangered' regional ecosystem 12.11.23, <1ha of the 'Of Concern' regional ecosystem 12.3.11, 23.6ha of the 'Not of Concern' regional ecosystems 12.11.3 and 12.11.5 and additionally 170.7ha of non-remnant 'disturbed' vegetation. Areas of remnant regional ecosystems are also mapped as Essential Habitat for the Koala (*Phascolarctos cinereus*) (See Figure 1).

Preliminary site assessment by both CEPLA (2008) and Gold Coast Botany (2005) confirmed the presence of remnant regional ecosystems and various stages of regrowth vegetation having established since large portions of the site was cleared in the 1970s. The site is covered by a Property Map of Assessable Vegetation (PMAV). The proposed disturbance footprint will largely impact on areas of Category X (i.e. Non-remnant) vegetation. Where the footprint results in impacts on remnant vegetation, offsets, as a requirement of the *Vegetation Management Act* 1999, will be provided.

2.1.2 Threatened Species

Many 'natural' areas in the southern Gold Coast support threatened species of plant. Targeted site investigations by Gold Coast Botany (2005) identified significant species including Durobby (*Syzygium moorei*), which is listed as Vulnerable under both the *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBCA) and the *Nature Conservation Act 1992* (NCA), and Rare species scheduled under the NCA including Silver Leaf (*Argophyllum nullumense*), Smooth Scrub Turpentine (*Rhodamnia maideniana*) and Long Leaved Tuckeroo (*Cupaniopsis newmanii*). Preliminary site investigations by CEPLA confirmed the presence of the latter species.

Figure 1 shows the approximate location of *Syzygium moorei* (Mark Rigby and Associates, 2005) and the approximate location of *Cupaniopsis newmanii* as located by Chenoweth in the preliminary site investigation. These identified threatened species are located outside of the disturbance footprint, with one specimen recorded directly adjacent to the footprint.

Database searches have identified a number of other significant species are likely to occur in the area. In order to adequately understand EPBCA and NCA issues and mitigate potential impacts on threatened plant species additional survey work will be necessary to identify the species, localities and numbers of threatened plant species on site.

2.2 FAUNA

The site is located in the State Significant "Burleigh Heads/Springbrook NP Terrestrial Corridor" identified as part of the South East Queensland Biodiversity Planning Assessment (EPA, 2006). The disturbed vegetation and remnant regional ecosystems are therefore well connected with a much broader habitat network and are therefore likely to support habitat for a diversity of species including threatened taxa.

Although the certified regional ecosystem mapping identifies Essential Habitat for the NCA 'Vulnerable' Koala (*Phascolarctos cinereus*) over portions of the site, ddwfauna (2005) found only relatively low Koala usage based on faecal pellets observations. The NCA 'Vulnerable' Glossy Black Cockatoo (*Calyptorhynchus lathami*) has been recorded from the broader Reedy Creek Area (WBM, 2005) and was recorded from site by ddwfauna (2005) from feeding signs. Also recorded nesting on site (ddwfauna, 2005) was the EPBC Migratory Species the White-bellied Sea Eagle (*Haliaeetus leucogaster*).

In order to adequately understand EPBCA and NCA issues and mitigate potential impacts on threatened fauna species additional survey work will be necessary to identify the species, important habitats and likely extent of population of threatened fauna species on site, including specialist investigations with regard the importance of the area to koalas.

2.3 EPBC ACT

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister. To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether a proposed action will need formal assessment and approval under the EPBC Act (DEWHA, 2008).

A referral is the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that should be taken. These decisions are made within 20 business days, provided that sufficient information is provided in the referral.
A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance;
- Listed threatened species and communities;
- Listed migratory species;
- Protection of the environment from nuclear actions;
- Marine environment;
- The environment, if the action involves Commonwealth land including:
  - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
  - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth; and
- Commonwealth Heritage places outside the Australian jurisdiction.

Of relevance to this site is the presence of listed threatened and migratory species, namely Durobby (*Syzygium moorei*) and the White Bellied Sea Eagle (*Haliaeetus leucogaste*) respectively.

3.0 PLANNING

The site is situated in the centre of a 5km wide Bioregional Corridor connecting Springbrook to the Coast identified as part of the Biodiversity Planning Assessment (EPA, 2006). Although this mapping does not currently have any legislative force, it is still utilised by the EPA when considering development applications.

Gold Coast City Council has identified ecological values associated with the site in various Planning Scheme maps (Version 1.2) including parts of the site mapped as riparian communities in Overlay Map 11 "Natural Wetlands and Waterway Areas" and remnant vegetation and major linkages in Overlay Map 20 "Conservation Strategy Plan".