Extractive Industry Model Codes version 1.0 and Guideline for the Extractive Industry Model Codes version 1.0

Prepared in accordance with the Queensland Planning Provisions version 3.0.

CEMENT CONCRETE & AGGREGATES AUSTRALIA

GROUNDWORK plus
Resources, Environment, Land Use Planning

About our industry

About Cement Concrete & Aggregates Australia

Cement Concrete & Aggregates Australia (CCAA) is the peak industry body for the $7 billion-a-year heavy construction materials industry in Australia.

Our members are involved in the extraction and processing of quarry products, the production and supply of cement, pre-mixed concrete and supplementary materials. For example, in 2008 CCAA's Queensland membership accounted for the bulk of the 57.8 million tonnes of extractive materials produced in the State as well as more than 90% of the 8.3 million cubic metres of pre-mixed concrete produced in the State that year. All cement produced in Queensland is by CCAA members. In Queensland, the industry is a key part of the building and construction industry, and provides direct employment for over 6000 people, with thousands more indirectly employed.

In Queensland, our members play a critical role in building the economy and delivery of the State's infrastructure, particularly through the materials supplied for critical pieces of development such as roads, bridges, schools and hospitals. We work cooperatively with the public and other stakeholder groups in creating greater awareness of the cement, concrete and extractive industries, and to support our member companies in being ecologically sustainable and responsible corporate citizens.

We are a key component of the supply chain for the building industry, and the ability of our members to provide product to market is of fundamental importance. We also provide technical advice and support to the building industry on all aspects associated with the usage of concrete products.

About the Extractive Industry

The extractive industry is a critical industry for Queensland and supplies the construction materials needed for the State's built environment. The industry operates in diverse geographic and environmental settings, ranging from built up urban environments to remote outback settings. The scale of operations range from large hard rock quarries producing more than two million tonnes per annum to small sand pits producing a few hundred tonnes per annum. Also the nature of the industry is diverse, and includes large fixed plant quarries using blasting for extraction, small mobile plant pits using bulldozers or excavators for winning material and floating dredges using a variety of dredging methods.

About this document

Cement Concrete & Aggregates Australia (CCAA) have identified that the provisions for assessment of extractive industry operations contained within Local Government Planning Schemes vary greatly despite seeking to achieve the same outcomes. The development of model codes and guidelines for the assessment of extractive industry throughout Queensland would provide significant benefits including greater transparency, certainty and consistency and ensure that the State Planning Policy 2/07 for the Protection of Extraction Resources is appropriately reflected in planning schemes across Queensland.

The model codes are intended to apply to the diverse range of extractive industry operations and environmental settings and are applicable to both existing and proposed operations. However, the nominated performance criteria and control measures may not be applicable to specific sites or operations. Thus the application of the model codes where adopted by Local Governments must be flexible to accommodate particular situations and adaptable to innovation and changing circumstances. The model codes and guidelines reflect the current collective knowledge and experience of those associated with the industry and may be amended from time to time in response to continuous improvement, technological innovation and changing circumstances and community expectation.

Prepared by Groundwork Plus for Cement Concrete & Aggregates Australia

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1.0 Extractive Industry Model Codes

1.1 INTRODUCTION

In Queensland, extractive industries operate in diverse geographic and environmental settings, ranging from built up urban environments to remote outback settings. The scale of operations range from large hard rock quarries producing more than two million tonnes per annum to small sand pits producing a few hundred tonnes per annum. Also the nature of the industry is diverse, and includes large fixed plant quarries using blasting for extraction, small mobile plant pits using bulldozers or excavators for winning material and floating dredges using a variety of dredging methods.

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The principal objectives of the model codes are to:

- **promote the sharing of experience and expertise in environmental planning, impact assessment and environmental management in relation to extractive industry.**
- **provide a benchmark for continuous improvement and development of assessment measures for extractive industry.**
- **promote industry self regulation.**
- **provide guidance for regulatory authorities involved in the planning, assessment, approval, and control of extractive industries.**
- **promote a consistent, stable and transparent regulatory regime.**
- **minimise land use conflict.**
- **improve community awareness about the industry and environmental management of extractive industries.**
- **encourage responsible land care and promote best practice environmental management.**
- **guide ecologically sustainable development.**

The following model codes and associated guidelines have been prepared and are provided for inclusion in Local Government Planning Schemes:

- the 'Extractive Industry Zone Code';
- the 'Extractive Industry Overlay Code'; and
- the 'Extractive Industry Use Code'.

Terms used in the model codes and associated guideline have the same meaning as defined in the Queensland Planning Provisions 3.0, the Sustainable Planning Act 2009, and the Sustainable Planning Regulation 2009. Where a term used in State Planning Policy 2/07 is not defined in those instruments and is used in the planning scheme it is anticipated that it will be defined in Schedule 1 of the relevant planning scheme adopting the same or a very similar definition as currently appears in SPP2/07. Other terms used in the model codes should, where necessary, also be defined in Schedule 1 of the planning scheme.

1.2 STRATEGIC FRAMEWORK PROVISIONS

Planning schemes must deal with extractive resources, as valuable features and key natural resources in the strategic framework elements of the planning scheme. It is essential that these strategic framework elements are consistent with the three codes which are intended to implement them. Suggested draft strategic elements are set out below for implementation by Local Government.

Strategic Intent

Economic Natural Resources

The region's natural resources, whether finite or renewable, are managed to sustainably and efficiently meet the needs of existing and future communities.

Strategic Themes

Natural Resources and Landscape

Natural resources are sustainably managed to allow communities to meet present and future needs, while not compromising the ability of future generations to meet their needs. Natural resources and landscape include biological, energy, extractive, land, air and water resources. Development in and adjacent to resource areas is managed to minimise the impact on the continued and future use of the resource. Landscapes that have important aesthetic and amenity values are conserved or protected from development that diminishes their values.

Strategic Outcomes

The preferred pattern of development shown on the structure plan map XXX limits intrusion of urban development into areas containing natural resources. The extractive resources sites identified on overlay map XXX remain available for utilisation of resources in the long-term. The extractive industry transport routes identified on overlay map XXX are, to the greatest extent possible, taking into account the established pattern of land use, protected from incompatible development in the long-term."

Strategic Elements

Extractive Resources

Key Resource Areas identified under State Planning Policy 2/07 and extractive resources of local and regional significance are identified and protected against intrusion by incompatible development other than where such development is a development commitment or constitutes an overriding benefit to the community. Extractive Industry in Key Resources Areas identified under State Planning Policy 2/07 and in areas identified as containing extractive resources of local and regional significance is assessed in accordance with the Extractive Industry Zone, the Extractive Industry Zone Code, the Extractive Resources Overlay, the Extractive Resources Overlay Code and the Extractive Industry

1.3 ZONE CODE

X.X.X Extractive industry zone code

The purpose of the zone is to provide for:

(a) the extraction of extractive resources;

(b) activities associated with the processing and treatment of extractive resources;

(c) activities that are compatible with extractive industry and which utilise, in whole or in part, extractive resources:

(d) activities associated with the sale and transportation of extractive resources and materials resulting from the activities referred to in (a), (b) and (c);

(e) activities associated with the operation and maintenance of plant, machinery, equipment and vehicles used in connection with the activities referred to in (a), (b),(c) and (d);

(f) activities associated with management and administration of the activities referred to in (a),(b),(c), (d) and (e); and

(g) the zone also provides for the establishment of other activities which are a development commitment or constitute an overriding benefit.

The Local Government Purpose is to ensure that Key Resource Areas identified under State Planning Policy 2/07 and extractive resources of local and regional significance are:

(a) separated and buffered from incompatible development;

(b) protected for future optimal utilisation of the resources; and

(c) developed in an ecologically sustainable way to meet the need of the community.

The overall outcomes sought for the zone are as follows:

(a) the establishment of extractive industry is facilitated, provided the potential environmental impacts are managed;

(b) the viability of existing and future extractive industry is protected from intrusion by incompatible development both within, and in the vicinity of, the Extractive Industry Zone;

(c) development occurring within the Extractive Industry Zone;

  (1) is a development commitment;

  (2) constitute an overriding benefit; or

  (3) is compatible with existing and future Extractive Industry and does not prejudice the future utilisation of the Extractive resource.

Table X.X.X:1 – Extractive Industry Zone – for self assessable and assessable development

Performance outcomes	Acceptable outcomes
Caretaker's accommodation	
PO_1 Development provides for the accommodation of a caretaker and family members of a caretaker which: a is compatible with existing and future extractive industry activities; b is safe for the residents; and c has regard to the residents' needs for recreation and landscape spaces.	$AO_{1.1}$ A caretaker's accommodation is: a separated from the processing and operational areas of the site by at least 150m; b provided with a private landscape and recreation area adjacent to a building façade that is shielded from significant emissions which: i is directly accessible from a habitable room; and ii if at ground level, has a minimum area of $25m^2$ with minimum dimensions of 5m; and iii if a balcony, a veranda or a deck, has a minimum area of $9m^2$ with minimum dimensions of 3m. $AO_{1.2}$ No more than one (1) caretaker's accommodation unit is established.

Table X.X.X:2 – Extractive Industry Zone – for assessable development

Performance outcomes	Acceptable outcomes
Uses	
PO_1 Development in the Extractive Industry Zone must: a not prejudice the future utilisation of the extracitve resource; and b be compatible with existing or future extractive industry activities	No acceptable outcome is nominated.

1.4 OVERLAY CODE

X.X.X Extractive resources overlay code

The purpose of the Extractive Resources Overlay Code is to protect extractive resources from development that might prevent or constrain current or future utilisation of the resource to meet the needs of the community.

The overall outcomes that will achieve the purpose of the code are as follows:

a existing or future development of extractive resource in areas to which overlay map XXX applies is not prejudiced by the intrusion of incompatible development except for:
   i development that is a development commitment; and
   ii material change of use that constitutes an overriding benefit;

b activities other than extractive industry are buffered from, and mitigate any existing or potential impacts caused by, extractive industry activities.

Table X.X.X:1 – Extractive resources overlay code – for assessable development

Performance outcomes	Acceptable outcomes
For development that is a development commitment or material change of use that consitutes an overriding benefit	
PO_1 The adverse effects of development on the long-term availability of the extractive resource are reduced to the greatest extent practicable. **Explanatory Note:** **As per SPP 2/07 'Development Commitment' means any of the following—** **a development the subject of a current development approval; or** **b a material change of use clearly consistent with the purposes of codes (or equivalent policy intents) of the relevant zone (or equivalent) in the planning scheme and, if applicable, the regulatory provisions of a Regional Plan;** **or** **c reconfiguring a lot consistent with the purposes of codes (or equivalent policy intents) of the relevant zone (or equivalent) in the planning scheme and, if applicable, the regulatory provisions of a Regional Plan.**	$AO_{1.1}$ Development incorporates design, orientation and construction measures that mitigate the potential adverse effects from existing or future extraction, processing and transportation of extractive materials (noise, dust, ground vibration or air blast overpressure) to acceptable levels by: a locating buildings and structures the greatest distance practicable from the resource / processing area and associated transportation route; and b designing buildings so the areas where people live, work and congregate (habitable rooms) are furthermost from the resource / processing area and associated transportation route; and c minimising openings in walls closest to these effects; and d providing mechanical ventilation to habitable rooms; and e use of appropriate construction methods and materials including insulation and glazing materials; and f providing private outdoor recreation space adjacent to a building façade shielded from the extractive industry or resource. AO1.2 Development operates outside the normal hours of operation for existing or future extractive industry of 6am to 6pm (Monday to Saturday).

Performance outcomes	Acceptable outcomes
For all Other Development in the Resource / Processing Area	
PO_2 Development mitigates the potential for impacts from existing and future extractive industry activities including noise, dust, ground vibration and air blast overpressure.	$AO_{2.1}$ Development is for extractive industry, or directly associated with extractive industry. $AO_{2.2}$ Development is for a temporary use that would not constrain existing or future extractive industry.
For all Other Development in the Separation Area	
PO_3 Development maintains the long term availability of the extractive resource to meet the economic needs of the community.	No acceptable outcome is nominated.
PO_4 Development incorporates measures to mitigate the potential adverse effects from existing or future extractive industry on people working or congregating in the separation area.	$AO_{4.1}$ The numbers of people working or congregating in the separation area are not increased. $AO_{4.2}$ Development is compatible with the potential impacts arising from existing or future extractive industry. $AO_{4.3}$ Development incorporates design, orientation and construction measures that mitigate the potential adverse effects from an existing or future extractive industry to acceptable levels by: a locating buildings and structures the greatest distance practicable from the resource / processing area and associated transportation route; and b designing buildings so the areas where people live, work and congregate (habitable rooms) are furthermost from the resource / processing area and associated transportation route; and c minimising openings in walls closest to these effects; and d providing mechanical ventilation to habitable rooms; and e use of appropriate construction methods and materials including insulation and glazing materials; and f providing private outdoor recreation space adjacent to a building façade shielded from the extractive industry or resource. $AO_{4.4}$ Development operates outside the normal hours of operation for existing or future extractive industry of 6am to 6pm (Monday to Saturday).

Performance outcomes	Acceptable outcomes
PO_5 Development does not compromise the function of the separation area in providing a buffer between extractive/processing activities and any incompatible uses outside the separation area.	No acceptable outcome is nominated.
PO_6 Development does not increase the number of people living in the transport route's separation area.	No acceptable outcome is nominated.
PO_7 Development will not adversely affect the safe and efficient operation of vehicles transporting extractive materials.	$AO_{7.1}$ The number of properties with access points to the transport route is not increased. $AO_{7.2}$ Access points are designed to avoid adversely affecting the safe and efficient operation of vehicles transporting extractive materials.

1.5 USE CODE

X.X.X.X Extractive Industry Code

The purpose of the Extractive Industry Code is to facilitate optimal economic utilisation of extractive resources safely and efficiently while appropriately managing amenity and environmental impacts and providing for land rehabilitation.

The purpose of the code will be achieved through the following overall outcomes:

a To the greatest extent practicable the design and layout of extractive industry adequately address the impacts of the development on the environment and minimise impacts on existing sensitive uses;

b An effective buffer is maintained between the extractive industry and existing and future sensitive uses;

c Extractive industry is located, designed and managed so that:

  i It operates safely;

  ii Significant impacts on the natural environment are reduced to the greatest extent reasonably practicable; and

  iii Adverse impacts on the amenity of adjacent sensitive uses are reduced to the greatest extent reasonably practicable.

d Extractive industry is responsive to the environmental values of the land such that those values are appropriately balanced with the economic benefits of the extractive industry;

e Extractive industry has access to development infrastructure, including utility installations and essential services to the extent that is necessary to achieve safe operation of the development;

f Land upon which extractive industry activities have occurred is appropriately rehabilitated including the achievement of a stable land form that is safe and suitable for other appropriate uses.

Table X.X.X:3 – Extractive Industry Code – for assessable development

Performance outcomes	Acceptable outcomes
Buffers, Seperation and Amenity	
PO_1 Extractive industry is adequately separated from sensitive uses to minimise potential for nuisance or complaint.	No acceptable outcome is nominated.
PO_2 The design, operation and staging of the extractive industry promotes the efficient utilisation of the resource.	No acceptable outcome is nominated.
PO_3 The design, operation and staging of the extractive industry mitigates vibration, noise, dust, lighting and other impacts on the surrounding area.	No acceptable outcome is nominated.
PO_4 The design, operation and staging of the extractive industry reduces impacts on natural environmental values to the greatest extent reasonably practicable and where impacts cannot be avoided the loss or decrease in values is minimised or offset.	No acceptable outcome is nominated.
PO_5 The design, operation and staging of extractive industry optimises potential alternative land uses after the cessation of extractive activities.	No acceptable outcome is nominated.
PO_6 The design, operation and staging of the extractive industry has regard to the desired visual character of the locality.	No acceptable outcome is nominated.

Performance outcomes	Acceptable outcomes
Management of Operations	
PO_7 On-site drainage is designed, constructed and maintained to: a minimise erosion; b avoid pollution of groundwater and surface water; c provide opportunities to conserve and reuse water on the site; and d prevent additional flooding or inundation.	$AO_{7.1}$ Banks and / or channels are constructed to divert stormwater runoff away from disturbed areas. $AO_{7.2}$ Sediment basins and other runoff controls are provided as required to detain stormwater runoff from disturbed areas for treatment by sedimentation / settlement or flocculation such that there is no off-site discharge likely to cause environmental harm. $AO_{7.3}$ Bunding, diversion, containment, treatment, clearing, recycling, collection and disposal of wastes is carried out such that no environmental harm is caused. $AO_{7.4}$ Lining or other suitable treatment of erosion prone areas is established and maintained at discharge points. $AO_{7.5}$ Harvested water is re-used on site where possible.
PO_8 Noise from the development is managed to acceptable levels.	$AO_{8.1}$ For a proposed new extractive industry, noise from the site complies with the 'controlling background creep' criteria for 'noise that varies over time' specified in the Queensland Environmental Protection (Noise) Policy 2008. OR $AO_{8.2}$ For a proposed extension to, or intensification of, an existing extractive industry, noise from the proposed extension/intensification does not result in a significant increase in noise levels at sensitive places. AND $AO_{8.3}$ Transport of materials associated with the extractive industry does not generate road traffic noise levels that exceed 63 dB(A) L10 (18 hour) or 80 dB(A) LAmax at residential dwellings on the nominated transportation route. OR $AO_{8.3}$ Where existing road traffic noise levels at residential dwellings on the nominated transportation route exceed 63 dB(A) L10 (18 hour) or 80 dB(A) LAmax, transport of materials associated with the extractive industry does not result in a significant increase in noise levels.
PO_9 Vibration from the development is managed to acceptable levels.	$AO_{9.1}$ Vibration levels do not exceed the relevant provisions contained in the Environmental Protection Act 1994.
PO_{10} Dust emission from the development is managed to acceptable levels.	$AO_{10.1}$ Dust emissions do not result in levels at sensitive receptors which exceed the Air Quality Objectives contained in the Environmental Protection (Air) Policy 2008 and do not cause environmental nuisance by dust deposition.

Performance outcomes	Acceptable outcomes
PO_{11} Operations minimise lighting impacts on roads and other properties.	$AO_{11.1}$ Fixed site lighting complies with Australian Standard AS4282 Control of the Obtrusive Effects of Outdoor Lighting.
PO_{12} Public access to the site is managed appropriately	$AO_{12.1}$ Safety fencing and signage is provided to prevent unauthorised access to the greatest degree practicable.
PO_{13} Development is designed in a manner which will not compromise the stability, safety or operation of infrastructure.	No acceptable outcome is nominated.
PO_{14} Development is designed and managed to minimise the risk and impact of any accidental spills and / or releases of chemicals and other materials that may contaminate soil, stormwater, groundwater and/or air.	$AO_{14.1}$ Storage of fuels and chemicals on-site is undertaken in acordance with AS.1940 – Storage & Handling of Flammable and Combustible Liquids.
Landscaping	
PO_{15} Landscaping complements biodiversity values of the adjoining area.	$AO_{15.1}$ Landscaping incorporates the following elements where appropriate: a native plants of local origin; and b known food and habitat trees and shrubs; and c replication of adjacent healthy remnant habitats, including understorey vegetation; and d no declared noxious plants, weeds or invasive plants likely to displace native flora species or degrade fauna habitat; and e amenity planting; and f erosion control planting.
Hours of Operation	
PO_{16} Extractive industry activities occurs at times that will not result in disturbance at surrounding uses.	$AO_{16.1}$ Extractive Industry operations are confined to the following periods:- a Blasting operations are limited to 9:00am to 5:00pm Monday to Friday; and b Extraction, crushing, screening, loading, operation of plant equipment, ancillary activities and haulage are limited to 6:00am to 6:00pm Monday to Saturday; and c Maintenance of equipment and vehicles outside of normal operating hours is carried out so as not to cause nuisance at nearby sensitive land uses; and d No operations are conducted on Sundays or Anzac Day, Good Friday, Easter Monday or Christmas Day. $AO_{16.2}$ Extractive Industry operations may occur outside the hours identified in $AO_{16.1}$ if sufficient evidence can be provided that the development will achieve PO_{16}.

Performance outcomes	Acceptable outcomes
Traffic and Transport	
PO_{17} The transportation of materials is undertaken in a way which: a maintains the safety and efficiency of the roads comprising the transport route; and b minimises amenity impacts on premises within the transport routes separation area.	$AO_{17.1}$ The development has road access that: a is of a standard sufficient to carry traffic of the nature that the use would be likely to generate; and b does not compromise traffic safety in the area.
Rehabilitation	
PO_{18} Rehabilitation of the site, over the life of the project and on its completion: a provides for progressive/ staged rehabilitation works; b includes appropriate clean-up works (taking particular account of areas of possible soil or water contamination); c results in a stable final landform; d provide suitable drainage and hydraulic conditions; and e achieves a suitable degree of revegetation consistent with potential post-extraction land uses.	No acceptable outcome is nominated.
PO_{19} Rehabilitation allows for suitable use of any water storage created through the extraction process, having regard to water quality, hydraulic conditions, land form and vegetation.	No acceptable outcome is nominated.

Guideline for the Extractive Industry Model Codes version 1.0

2.0 Guideline – Extractive Industry Model Codes

2.1 PURPOSE

This guideline provides information and advice on implementing the Extractive Industry Model Codes.

This guideline is structured to:

1 outline the policy outcome sought to be achieved by the model codes; and

2 state the objectives of the model code; and

3 provide background information to assist Local Government understand the nature of extractive industry, including its role in the Queensland economy and best practice operational methods employed by the industry; and

4 clarify and confirm the intent of the assessment criteria contained within the codes to assist Local Government in the assessment of development to which the model codes apply.

Where the Extractive Industry Model Codes are implemented by a Local Government, this guideline should be read in conjunction with any implementation guideline or statutory guideline prepared by:

1 this Local Government for that planning scheme; and

2 the State Government for the Queensland Planning Provisions; and

3 the State Government for the Integrated Development Assessment System (IDAS) pursuant to the Sustainable Planning Act (SPA) 2009; and

4 the State Government for the Sustainable Planning Act 2009.

The guideline reflects the current collective knowledge and experience of those associated with the industry and may be amended from time to time in response to continuous improvement, technological innovation and changing circumstances and community expectation.

2.2 POLICY OUTCOME

The Extractive Industry Model Codes have been prepared to:

1 Provide an assessment framework suitable for implementation into Local Government Planning Schemes prepared in accordance with the Queensland Planning Provisions; and

2 Provide a policy outcome consistent with that of the State Planning Policy (SPP) 2/07 – Protection of Extractive Resources.

State Planning Policy (SPP) 2/07 – Protection of Extractive Resources, section 2 **'Policy Outcome'** states the following:

> ***"Need to protect extractive resources***
>
> *2.1 The Policy outcome is to identify those extractive resources of State or regional significance where extractive industry development is appropriate in principle, and protect those resources from developments that might prevent their future extraction.*
>
> *2.2 Extractive resources are deposits of sand, gravel, quarry rock, clay and soil. They are essential to the State and regional economies and the community, as the primary raw materials for the construction industry. Extractive resources are extracted and processed for use in concrete, road bases, asphalt, rail track ballast, breakwater construction, drainage materials, mortar and plaster, and a range of other products.*
>
> *2.3 Extractive resources are high volume, low value products, and the economic viability of an extractive resource depends on its proximity to markets and urban areas. Encroachment by incompatible development can restrict or prevent the extraction, processing and transportation of extractive resources to markets. The amenity of the community surrounding the extractive resource and transport route also needs to be protected from any potential adverse effects of extractive industry.*
>
> *2.4 Under the Integrated Planning Act 1997 a local government, both in plan making and in development assessment, is required to advance the Act's purpose. This includes, amongst other matters, the sustainable use of non-renewable natural resources such as extractive resources. The Act recognises extractive deposits of economic value as 'valuable features', which are a component of the 'core matters' the Act requires planning schemes to address."*

2.3 OBJECTIVES

The principal objectives of the model codes are to:

- promote the sharing of experience and expertise in environmental planning, impact assessment and environmental management in relation to extractive industry.
- provide a benchmark for continuous improvement and development of assessment measures for extractive industry.
- promote industry self regulation.
- provide guidance for regulatory authorities involved in the planning, assessment, approval, and control of extractive industries.
- promote a consistent, stable and transparent regulatory regime.
- minimise land use conflict.
- improve community awareness about the industry and environmental management of extractive industries.
- encourage responsible land care and promote best practice environmental management.
- guide ecologically sustainable development.

2.4 BACKGROUND

Extractive industries are a significant contributor to the material needs of local and regional communities and to economic activity and development. Extractive resources are site specific, limited in occurrence by geological conditions and are finite. Because they are high-volume, low-cost materials, they need to be located close to the communities that use them. Utilising extractive materials from outside the region brings with it significant social, environmental and economic costs. Extractive resources underpin all urban and infrastructure development and make a major contribution to the ongoing economic growth of Queensland. Consequently, the identification, protection and utilisation of extractive resources is an important consideration when land use planning decisions are made.

Quarried products are required in every major infrastructure and urban development project. Cement Concrete and Aggregates Australia (CCAA) published a pamphlet in November 2005 entitled *"Striving for Smart Resource Utilisation"*. The pamphlet gave examples of the use of quarried products in major projects and household construction.

For example:

- One kilometre of highway requires 25 000 tonnes of crushed rock.
- One kilometre of suburban roads requires:
  - 5 000 tonnes of crushed rock
  - 750 tonnes of concrete for footpaths, kerbs and gutters
  - 450 tonnes of asphalt for road surfacing
- One kilometre of railway requires 2000 tonnes of aggregate.
- A high-rise building can use up to 1000 tonnes of aggregate per floor.
- Construction of a typical house, including driveway and landscaping, uses about 100 tonnes of aggregate.

Extractive operations, by their very nature, require changes to land forms and hence have the potential to impact on vegetation, wildlife, soils and water resources. Noise, vibration, dust, sediment and alteration of the visual environment due to extractive industry operations have the potential to effect the amenity of adjacent communities.

However, the potential environmental impacts associated with extractive industry are generally restricted to the location and extents of the resource and buffer area, and hence not as extensive as activities such as agriculture, forestry, and urban development which generally comprise larger land areas. Effective environmental management is an essential component of any extractive industry operation.

Community concern for protecting the environment has focused on the depletion and degradation of natural resources (biodiversity, water, air) and non renewable resources. The concept of sustainable development arose from the concern for depleting environmental values due to economic growth and development.

The National Strategy for Ecologically Sustainable Development defined Ecologically Sustainable Development as *"using, conserving and enhancing the community's resources so that ecological process, on which life depends are maintained and the total quality of life now and in the future, can be increased"*. The Government has responded to community concern with increasing legislation for protecting the environment. Sound environmental management requires planning, commitment, transparency, knowledge, research, communication, training and implementation of effective measures and procedures.

2.4.1 Extractive Industry

In Australia, and specifically Queensland, extractive resources, include sand, gravel, soil, rock, earthern materials and other similar materials which are extracted or won by ripping, blasting, dredging and are processed (crushing, screening, washing, blending or grading) into a wide range of quarried products.

The Queensland Planning Provisions and the State Planning Policy 2/07 – Protection of Extractive Resources, define **Extractive Industry** as:

"Premises used for the extraction and processing of extractive resources and associated activities, including their transportation to market".

Other descriptions for Extractive Industry include the Aggregate Industry, Quarrying Industry, Heavy Construction Materials Industry, and the Sand and Gravel Industry.

2.4.2 Products

Sand, gravel, soil, rock and other similar materials are extracted and processed into a range of products. Aggregates are the major products produced and form the bulk ingredient for manufacturing concrete and concrete products. Road building materials are also a significant proportion of production and include fills, roadbase, road pavement materials, road screenings, asphalt aggregates, drainage media and rock for retaining walls and erosion control devices. Other products include armour rock, rip rap, railway ballast, landscaping materials, filters, and construction sand.

Quarried products are further used in the manufacture of a diverse range of building products and in industrial processes. For example, construction sand is used in the manufacture of pre-mixed concrete, masonry (blocks, bricks, pavers), poles, stumps, manholes, pipes, panels, beams, walling, roof tiles, pots, asphalt, mortar and grout and is used as a filter for treating water and other fluids, as a filler for manufacturing rubber and plastic products and for recreational facilities (artificial beaches, golf bunkers, tennis courts and playgrounds).

2.4.3 Specifications

Quarried products require characteristics that ensure their serviceability for the engineered design life. Product specifications which are generally guided by Australian and International Standards require products to have particular physical and chemical characteristics such as particle size distribution limits, strength, hardness, inertness, water absorption limits, density, mineral type, durability and to be free of deleterious matter. Specialty products may require particular characteristics such as colour, surface texture grading and particle shape.

2.4.4 Industry structure and economics

Extractive industry operators range from sole traders to large multinational corporations with vertically integrated enterprises, including cement and lime manufacturing, pre-mixed concrete batching, concrete product manufacturing (pipe, poles, roof tiles, masonry) and asphalt plants. The larger corporations predominate in the metropolitan and major regional centres. Market areas served by a particular operation are dynamic and depend on a number of factors including integrated investments, product characteristics, competition, access, physical constraints, infrastructure, population distribution, customer preference and construction project requirements. Being high bulk, low cost materials, transport costs are a significant proportion of the total cost to the end user. Ideally, extractive operations should be located in proximity of the end use of the products.

2.5 METHODS OF OPERATIONS

Extractive industry operations essentially comprise the following activities:

- Site planning and development
- Extraction of the raw material
- Haulage of raw material to the processing area
- Processing of the raw material into a saleable products
- Stockpiling of the products
- Distribution of the products
- Rehabilitation.

Methodologies and equipment deployed at a particular operation depend on site characteristics and the nature of the deposit and are selected to achieve effective and cost efficient production.

2.5.1 Hard Rock Quarries

Raw material extraction at rock quarries involves a staged program of vegetation clearing, topsoil stripping, overburden removal and rock extraction.

Vegetation is progressively cleared using a front end loader, excavator or bulldozer to form a windrow on the contour. Generally the vegetation is mulched and material is stockpiled for use in rehabilitation on site. However, depending on the circumstance, the vegetation may be burnt, buried or allowed to rot.

Topsoil stripping is preceded by an assessment of the depth and distribution of 'top soil'. Topsoil is distinguished as being the material below the surface which is generally friable and darker in colour, rich in organic matter and soil organisms. Topsoil may be stripped in one or two passes depending on the nature of the material and the nature of the seed likely to be contained in the topsoil. A bulldozer, front end loader, excavator or scraper may be used for stripping topsoil. In the situation where topsoil is removed by bulldozer or loader and the material is not to remain in windrows, the topsoil may be loaded with an excavator or front end loader and trucked to a storage bank or to rehabilitation works. Alternatively, where topsoil is in excess of rehabilitation requirements, topsoil may be sold unprocessed or screened through a mobile screener.

Overburden is the weathered material, generally overlying the deposit and not suitable for use in down stream product such as concrete or asphalt. Overburden is progressively removed with an excavator or similar earthmoving equipment and stockpiled, sold as fill, used in the construction of bunds or in landforming works. Overburden can be processed to meet engineering and compaction requirements such as reinforced soil structure (RSS) fill. For hard rock quarries, overburden is removed to form a platform (quarry bench) upon which a drilling rig can safely operate. Hard rock is generally removed by blasting to a free face. Face heights are generally between 6 and 20 metres but are typically 10 to 15 metres. (Note: Drop cut development or buffered shots are common but the norm is a free face.)

Blasting involves drilling sub vertical blast holes to a predetermined pattern and angle, charging the blast holes with explosives and detonating the charge. The energy generated by the explosives fractures the rock mass which heaves forward into a shot rock pile (muck pile) in front of the face. The shot rock is loaded and carted to a processing plant. Alternatively, the shot rock may be fed through a grizzley or screen for the production of armour rock, rip rap, gabion rock or similar products. Processing involves crushing, screening, scalping and blending of rock particles to achieve specified particle sizes and grading. Additives such as loam, sand, cement and lime may be added for particular products.

The layout and configuration of processing plants varies to suit the particular products being produced. In essence, the processing plant comprises a series of crushers, bins and screens, interconnected with rubber conveyor belts used to transfer materials.

Processed materials are transferred to ground stockpiles or above ground bins. Typically processing plants have a production capacity of between 100 and 1,000 tonnes per hour. Stockpiling is required to enable quality control testing as part of a quality assurance system and to assist in the supply of materials to the nominated schedules of the particular project or customer. In Queensland, most product is distributed by road, only a very small percentage of material is delivered to customers via railway or ship. Most quarries sell materials by weight over a weighbridge.

Ridge gravel and borrow pits are worked to supply local projects, particularly road and railroads with fill materials, and maintenance materials.

Rehabilitation of quarry workings is dictated by the proposed sequential land uses. The change of landform or the creation of water bodies provides scope for development of a wide range of suitable post extraction uses. In any event, rehabilitation works should be integrated with extractive operations to ensure minimal material handling and progressive implementation of works. However, in planning the layout and sequence of extraction, the benefits of progressive implementation of rehabilitation works must be balanced against other objectives such as protecting visual amenity.

2.5.2 Sand and Gravel Operations

Methods deployed for extraction of sand and gravel depend on the nature of the deposit and its situation. Sand and gravel deposits are typically associated with fluvial and coastal depositional environments and may require material to be extracted from water bodies. Raw materials may be extracted as a one or more pass system where the upper layer of the deposit is initially extracted using land based equipment, and the deposit reworked with floating dredging equipment such as cutter suction or clam shell dredges. Alternatively, the area can be dry worked after being dewatered by pumping from a sump, bore field or drag line.

If overburden requires stripping, methods are similar to that used for hard rock quarrying are used.

Processing of sand and gravel raw material can involve a combination of crushers, screens, clarifiers, cyclones (dewatering and sizing), bins and conveyors dependent on the type of deposit and final product required. The raw material is delivered to the processing plant either by pumping via a pipeline or by load and cart earthmoving equipment (dry extraction or from a turkey's nest which collects raw material pumped from the dredge). Processed materials are transferred to ground stockpiles or above ground bins.

Like hard rock quarrying, stockpiling is required to enable quality control testing as part of a quality assurance

system and to assist in the supply of materials to the nominated schedules of the particular project or customer. In Queensland, most product is distributed by road, only a very small percentage of material is delivered to customers via railway or ship. Most quarries sell materials by weight over a weighbridge.

Rehabilitation of quarry workings is dictated by the proposed sequential land uses. The change of landform or the creation of water bodies provides scope for development of a wide range of suitable post extraction uses. In any event, rehabilitation works should be integrated with extractive operations to ensure minimal material handling and progressive implementation of works. However, in planning the layout and sequence of extraction, the benefits of progressive implementation of rehabilitation works must be balanced against other objectives such as protecting visual amenity.

2.5.3 Ancillary Activities

The conduct of an extractive industry operation (whether hard rock or sand gravel) generally includes a range of ancillary activities including but not limited to, water harvesting and storage, fuel storage, motor vehicle, plant and equipment workshop, concrete batching, abrasive blasting, boiler making, caretaker's residence, site office, site laboratory, workers amenities, weighbridge, and sheds/structures for the storage of machinery, equipment and associated supplies. Explosives may also be stored on site.

2.6 ZONE CODE GUIDELINE

2.6.1 General

The zone code is applied to development applications made within the Extractive Industry Zone. The code should accommodate applications for extractive industry whilst ensuring applications for other uses do not detrimentally impact on the operation and viability of existing or future extractive industry within the zone. It is expected that the Extractive Industry Zone will be placed over land upon which, an extractive industry is already established, or a development approval has been issued for extractive industry, or there is a known resource of state, regional or local significance.

The location of extractive resources is determined by fortuitous geological events and the location of suitable resources is therefore fixed. In some areas resources are abundant whereas in other areas they are rare or non existent. When considering the zoning of land, geological prospectively, economic, social, environmental and cultural aspects should be considered. Extractive industry by its very nature, require changes to landform and consequent impacts on vegetation, wildlife, soils and water resources. However extractive industry can be designed and managed to mitigate those impacts and increase the potential for environmental benefit through rehabilitation and revegetation where applicable. Development other than extractive industry should not restrict full utilisation of the reource now or in the future and demonstrate that the people, goods, livestock, materials and structures associated with the proposed development will not be detrimentally affected by the effects of extractive industry, such as noise, dust, ground vibration, or air blast overpresssure.

The following scenario's are presented as examples that may come before Local Government's for assessment.

SCENARIO 1 – BOARDING KENNEL

An existing hard rock quarry is established on a large land holding on the out skirts of a major regional city. The quarry is leased by the quarry operator from the land holder. The land is located in the Extractive Industry zone reflecting the significant resource. The process to extract the raw material requires regular blasting. The land owner proposes a boarding kennel for a maximum of 80 dogs outside of the lease area for the quarry. The application may not be consistent with the outcomes of the code on the following grounds:

1 The proposed boarding kennel would require permanent structures that would constrain the area available for extraction and processing of the identified resource, and therefore would not maintain the long term availability of the extractive resource for extraction and processing; and

2 The proposed boarding kennel is not compatible with extractive industry as it introduces a use sensitive to potential impacts associated with extractive industry such as noise, dust and vibration.

SCENARIO 2 – CONCRETE BATCHING PLANT

Land adjoining an existing industrial area is zoned Extractive Industry reflecting a recent Council decision to approve a material change of use for an extractive industry. An application has been lodged with Council for a material change of use to establish a concrete batching plant adjoining the area previously approved for the site office and amenities area for the extractive industry. The concrete batching plant will utilise the material extracted from the land increasing efficiencies and reducing impacts. The application is likely to be consistent with the outcomes of the code on the following grounds:

1 The development is directly associated with extractive

industry and will maintain the long term availability of the extractive resource for extraction and processing; and

2 The development has similar potential noise, dust and environmental impacts as the existing extractive industry operation, and therefore is compatible with the potential impacts arising from the existing or future extractive industry.

SCENARIO 3 – TOURIST CABINS

Land is zoned Extractive Industry reflecting a recent Council decision to approve a material change of use for an extractive industry (hard rock) in an area identified as a Key Resource Area by State Planning Policy 2/07 – Protection of Extractive Resources. The area approved for the quarry is leased by the quarry operator from the land owner. The quarry operator has indicated that activities on the land will not commence for at least 3 years. The land owner has made application to Council for Tourist Cabins within 400m of the approved quarry. The proposed development will increase the number of people within proximity of the approved quarry in a mapped Key Resource Area. The application may not be consistent with the outcomes of the code on the following grounds:

1 The proposed development is not compatible with the potential impacts arising from extractive industry such as noise, dust and vibration; and

2 The proposed development would not maintain the long term availability of the extractive resource as it would introduce a sensitive use which would cause the extractive industry to no longer comply with conditions of approval set for noise and dust limits and would therefore cause the sterilisation of a number of stages of the quarry.

2.6.2 Self assessable development

Performance outcomes	Acceptable outcomes	Comments
Caretaker's accommodation		
PO_1 Development provides for the accommodation of a caretaker and family members of a caretaker which: a is compatible with existing and future extractive industry activities; b is safe for the residents; and c has regard to the residents' needs for recreation and landscape spaces.	$AO_{1.1}$ A caretaker's accommodation is: a separated from the processing and operational areas of the site by at least 150m; b provided with a private landscape and recreation area adjacent to a building façade that is shielded from significant emissions which: i is directly accessible from a habitable room; and ii if at ground level, has a minimum area of $25m^2$ with minimum dimensions of 5m; and iii if a balcony, a veranda or a deck, has a minimum area of $9m^2$ with minimum dimensions of 3m. $AO_{1.2}$ No more than one (1) caretaker's accommodation unit is established.	Note for $AO_{1.1}$ (b) – A caretakers residence should be afforded an appropriate area of outdoor recreation space. Such a location is likely to be somewhat affected by the effects of the Extractive Industry, but its location and design can minimise those impacts.

2.6.3 Assessable development

Performance outcomes	Acceptable outcomes	Comments
Uses		
PO_1 Development in the Extractive Industry Zone must: a not prejudice the future utilisation of the extracitve resource; and b be compatible with existing or future extractive industry activities	No acceptable outcome is nominated.	Note for PO1 – Development will maintain the availability of the resource where it is compatible with the potential effects arising from existing or future extractive industry (e.g. noise, dust or ground vibration). Development may for example: a comprise a use that is compatible with an extractive industry operation (e.g concrete batching plant, asphalt manufacture); or b be temporary in nature and not be sensitive to the effects associated with extractive industry operation (e.g shipping container storage); or c be located outside of the resource area and sufficiently buffered and appropriately designed to remove any risk of impacts from the effects associated with extractive industry operation (e.g farm foresty).

2.7 OVERLAY CODE GUIDELINE

2.7.1 General

The overlay code is applied to development applications made for development within a mapped area surrounding identified existing or future extractive industry operations. The overlay code is the means to implement the provisions of the SPP 2/07 (Protection of Extractive Resources). The code is to ensure development maintains the long term availability of the extractive resource for extraction or processing. The overlay code should prevent inappropriate/incompatible development from establishing within proximity to extractive resources. Where prevention is not possible, responsibility for ameliorating potential impacts from extractive industry should be placed on the proposed development. The proposed development should be designed to avoid the potential risk for complaints and reverse amenity issues to impact on the extractive industry.

It is noted that the SPP 2/07 Protection of Extractive Resources) identifies resources of State and Regional significance only. Local governments may also wish to protect existing extractive industry operations, and known resource areas of local significance through the Overlay Code.

To assist in determining the extent of the separation area and transport separation area for regionally and locally significant extractive resource operations the following criteria is recommended.

1 1000 metres where the extraction or processing of the extractive resource involves blasting or crushing (namely rock); or

2 200 metres for any other extractive resource not involving blasting or crushing (namely sand, gravel, clay and soil); and

3 100 metres for the transport routes road or rail reserve boundary.

These are indicative distances only and the extent of the separation area should be modified to reflect local circumstances where known, such as topographical features that provide a natural buffer. By way of example, where a hard rock quarry is operating on one side of a ridgeline and will be maintaining the extent of that ridgeline the separation distance in that direction may be reduced as the topographical feature of the ridgeline will minimise the risk of nuisance from noise, dust, and blast overpressure and will also provide a visual buffer to the operational area of the quarry thus reducing potential visual amenity impacts.

The following scenario's are presented as examples that may come before Local Government's for assessment.

SCENARIO 1 – CONCRETE BATCHING PLANT

Land adjoining an existing industrial area is zoned Extractive Industry reflecting a recent Council decision to approve a material change of use for an extractive industry. An application has been lodged with Council for a material change of use to establish a concrete batching plant adjoining the area previously approved for the site office and amenities area for the extractive industry. The concrete batching plant will utilise the material extracted from the land increasing efficiencies and reducing impacts. The concrete batching plant is proposed to be located in the Resource/Processing Area mapped by the Extractive Industry Overlay Code. The application is likely to be consistent with the outcomes of the code on the following grounds:

1 The development is directly associated with extractive industry and will maintain the long term availability of the extractive resource for extraction and processing; and

2 The development has similar potential noise, dust and environmental impacts as the existing extractive industry operation, and therefore is compatible with the potential impacts arising from the existing or future extractive industry; and

3 The development is located within the Resource/Processing area, but on an area previously disturbed, and adjoining the site office and amenities area of the existing extractive industry. Therefore the development is located in manner which will not compromise the function of the separation area established for the existing extractive industry.

SCENARIO 2 – TOURIST CABINS

Land is zoned Extractive Industry reflecting a recent Council decision to approve a material change of use for an extractive industry (hard rock) in an area identified as a Key Resource Area by State Planning Policy 2/07 – Protection of Extractive Resources. The area approved for the quarry is leased by the quarry operator from the land owner. The quarry operator has indicated that activities on the land will not commence for at least 3 years. The land owner has made application to Council for Tourist Cabins within 400m of the approved quarry. The proposed development will increase the number of people within proximity of the approved quarry in a mapped Key Resource Area. The area proposed for the location of the Tourist Cabins is mapped within the Separation Area on the Overlay Code Map. The application may not be consistent with the outcomes of the code on the following grounds:

1 The proposed development would increase the number of people living in the separation area; and

2 The proposed development is not compatible with the potential impacts arising from future extractive industry; and

3 The proposed development would compromise the function of the separation area by establishing an incompatible use within the separation area.

SCENARIO 3 – BUILDING WORKS TO AN EXISTING DWELLING HOUSE

An existing dwelling house is located on land adjoining a parcel of land which is zoned Extractive Industry and which an existing hard rock quarry is contained within an area identified as a Key Resource Area by State Planning Policy 2/07 – Protection of Extractive Resources. The existing dwelling house was established prior to the commencement of extractive industry on the adjoining land. The existing dwelling house meets the definition of a 'Development Commitment' under SPP2/07. The existing dwelling house is located within the Separation Area mapped on the Overlay Code Map, and SPP2/07. The house owner proposes to extend the existing dwelling house by adding a number of additional bedrooms, an outdoor entertainment area, and six (6) car garage. The plans of the extensions show that the six (6) car garage is located between the extractive industry and the existing dwelling house and proposed extensions. The six (6) car garage is a double brick construction with no openings towards the extractive industry and have a building height of 7.5m, which is higher than the existing single storey dwelling house. The extensions are located on the opposite side of the existing dwelling orientated away from the existing extractive industry. The development is only assessable against PO1 of the Overlay Code as it meets the definition of 'Development Commitment' provided by the SPP 2/07. The application may be consistent with the outcomes of the code on the following grounds:

1 The proposed development will locate habitable buildings and structures more distant from the extraction industry mitigating the potential adverse impacts from the extractive industry; and

2 The proposed development minimises openings in the walls closest to the extractive industry, mitigating the potential adverse impacts from the extractive industry; and

3 The proposed development locates private outdoor recreation where it is shielded from the potential adverse impacts from the extractive industry.

2.7.2 Assessable development

Performance outcomes	Acceptable outcomes	Comments
For Development that is a Development Commitment or Material Change of use that consitutes an overriding benefit		
PO_1 The adverse effects of development on the long-term availability of the extractive resource are reduced to the greatest extent practicable. ***Explanatory Note:*** ***As per SPP 2/07 'Development Commitment' means any of the following—*** ***a development the subject of a current development approval;*** ***or*** ***b a material change of use clearly consistent with the purposes of codes (or equivalent policy intents) of the relevant zone (or equivalent) in the planning scheme and, if applicable, the regulatory provisions of a Regional Plan;*** ***or*** ***c reconfiguring a lot consistent with the purposes of codes (or equivalent policy intents) of the relevant zone (or equivalent) in the planning scheme and, if applicable, the regulatory provisions of a Regional Plan.***	$AO_{1.1}$ Development incorporates design, orientation and construction measures that mitigate the potential adverse effects from existing or future extraction, processing and transportation of extractive materials (noise, dust, ground vibration or air blast overpressure) to acceptable levels by: a locating buildings and structures the greatest distance practicable from the resource / processing area and associated transportation route; and b designing buildings so the areas where people live, work and congregate (habitable rooms) are furthermost from the resource / processing area and associated transportation route; and c minimising openings in walls closest to these effects; and d providing mechanical ventilation to habitable rooms; and e use of appropriate construction methods and materials including insulation and glazing materials; and f providing private outdoor recreation space adjacent to a building façade shielded from the extractive industry or resource. $AO_{1.2}$ Development operates outside the normal hours of operation for existing or future extractive industry of 6am to 6pm (Monday to Saturday).	Note for $AO_{1.1}$ – The applicant should demonstrate to the satisfaction of the assessment manager that development incorporates physical and/or other design solutions that will neutralise the potential adverse effects associated with Extractive Industry operations. Note for $AO_{1.2}$ – The hours listed are those generally associated with the operation of extractive industries but it should be noted that an existing extractive industry could have extended hours of operations.

Performance outcomes	Acceptable outcomes	Comments
For all other Development in the Resource / Processing Area		
PO_2 Development mitigates the potential for impacts from existing and future extractive industry activities including noise, dust, ground vibration and air balst overpressure.	$AO_{2.1}$ Development is for extractive industry, or directly associated with extractive industry. $AO_{2.2}$ Development is for a temporary use that would not constrain existing or future extractive industry.	Note for PO_2 – Development will maintain the availability of the resource where it is compatible with the potential effects arising from existing or future extractive industry (e.g. noise, dust or ground vibration). Development may for example: a create one or more of the effects associated with an extractive industry operation (e.g concrete batching plant); or b be temporary in nature and not be sensitive to the effects associated with extractive industry operation (e.g shipping container storage); or c be located outside of the resource area and sufficiently buffered and appropriately designed to remove any risk of impacts from the effects associated with extractive industry operation (e.g farm foresty).
For all other Development in the Separation Area		
PO_3 Development maintains the long term availability of the extractive resource to meet the economic needs of the community.	No acceptable outcome is nominated.	Note for PO_3 – Extractive resources directly contribute to the economic development of communities. Development which encroaches and detrimentally effects the operation of extractive industry will increase cost of production of quarry products resulting in increased construction costs over the long term.

Performance outcomes	Acceptable outcomes	Comments
PO_4 Development incorporates measures to mitigate the potential adverse effects from existing or future extractive industry on people working or congregating in the separation area.	$AO_{4.1}$ The numbers of people working or congregating in the separation area are not increased. $AO_{4.2}$ Development is compatible with the potential impacts arising from existing or future extractive industry. $AO_{4.3}$ Development incorporates design, orientation and construction measures that mitigate the potential adverse effects from an existing or future extractive industry to acceptable levels by: a locating buildings and structures the greatest distance practicable from the resource / processing area and associated transportation route; and b designing buildings so the areas where people live, work and congregate (habitable rooms) are furthermost from the resource / processing area and associated transportation route; and c minimising openings in walls closest to these effects; and d providing mechanical ventilation to habitable rooms; and e use of appropriate construction methods and materials including insulation and glazing materials; and f providing private outdoor recreation space adjacent to a building façade shielded from the extractive industry or resource. $AO_{4.4}$ Development operates outside the normal hours of operation for existing or future extractive industry of 6am to 6pm (Monday to Saturday).	Note for $AO_{4.1}$ - Development which increases the number of people living in the separation area will increase the number of people at risk of exposure to the effects of extractive industry operations. Increased numbers of people directly relate to increased risk of complaints and directly impact on Local Government resources to investigate and respond to those complaints and may directly impact on the ability of the extractive industry to operate effectively. Note for $AO_{4.2}$– Development may be compatible with the potential effects arising from existing or future extractive industry (e.g. noise, dust or vibration). Development may for example: a create one or more of the effects associated with an extractive industry operation (e.g concrete batching plant); or b be temporary in nature and not be sensitive to the effects associated with extractive industry operation (e.g shipping container storage); or c be located outside of the resource area and sufficiently buffered and appropriately designed to remove any risk of impacts from the effects associated with extractive industry operation (e.g farm foresty). Note for $AO_{4.3}$ – The applicant should demonstrate to the satisfaction of the assessment manager development incorporates physical and other design solutions that will neutralise the potential adverse effects associated with Extractive Industry operations. Note for $AO_{4.4}$ the hours listed are those generally associated with the operation of extractive industries but it should be noted that an existing extractive industry could have extended hours of operations that should be considered.

Performance outcomes	Acceptable outcomes	Comments
PO_5 Development does not compromise the function of the seperation area in providing a buffer between extractive/processing activities and any incompatible uses outside the separation area.	No acceptable outcome is nominated	Note for PO_5 the applicant will be expected to demonstrate to the satisfaction of the assessment manager that where development is proposed in the separation area people would not be adversely affected by the effects of noise, dust, ground vibration, or air blast overpressure from extractive industry.
PO_6 Development does not increase the number of people living in the transport route's separation area.	No acceptable outcome is nominated.	Note for PO_6 – Extractive Industry operations rely of haulage of materials via transport routes. Haulage will generally occur in line with the hours of operation of the quarry (e.g 6am to 6pm Monday to Saturday). Effects associated with the haulage of materials for extractive industry operations may include noise, dust and general traffic congestion associated with heavy vehicle movements. Development that increases residential densities or the number of lots within the transport route's separation area should not be supported, as it increases the number of people at risk of exposure to the effects associated with the haulage of material. Where lots have land both within and outside the separation area, a residential use of the lot could be approved provided the dwellings are located outside the part of the lot affected by the separation area and associated effects of the haulage of material. Building envelopes that limit the location of dwelling should be included as conditions of any approval.

Performance outcomes	Acceptable outcomes	Comments
PO_7 Development will not adversely affect the safe and efficient operation of vehicles transporting extractive materials.	$AO_{7.1}$ The number of properties with access points to the transport route is not increased. $AO_{7.2}$ Access points are designed to avoid adversely affecting the safe and efficient operation of vehicles transporting extractive materials.	Note for PO7 – Extractive Industry operations rely of haulage of materials via transport routes. Effects associated with the haulage of materials for extractive industry operations may include noise, dust and general traffic congestion associated with heavy vehicle movements. Additional access points onto a haulage route may increase the risk of vehicular accidents occurring. Where access points are approved all due care should be taken to minimise the risk of vehicular accidents by requiring necessary works to achieve appropriate sight distances and lines.

2.8 USE CODE GUIDELINE

2.8.1 General

The extractive industry use code will be applied to development applications for Material Change of Use - Extractive Industry. The provisions and intent of the code should be appropriate for applications to establish a new extractive industry operation. The code must also be appropriate for applications seeking an increase in the scale and intensity of existing extractive industry operations. The code should establish baseline expectations for the management of the impacts that are associated with extractive industry. As a result the code should be outcome focused. The code should also provide flexibility in the method of achieving the outcome. The definition of Extractive Industry under the QPP captures a wide variety of operations including sand, gravel, earthern materials and hard rock, as well as variation in the scale and intensity of operation.

At the time of writing, all development applications for Material Change of Use for Extractive Industry require referral to the Department of Environment and Heritage Protection (DEHP) under the Sustainable Planning Act 2009 (SPA). In addition to the necessary land use approvals under a local government planning scheme, Extractive Industry operations can not be carried out without obtaining a range of other approvals and authorities currently administered by DEHP including but not limited to, Environmentally Relevant Activities (ERAs). An activity is defined as an ERA under the Environmental Protection Act 1994 and associated regulations because it has the potential to cause environmental harm. DEHP as the assessment manager for ERAs will assess the potential for the development to generate the following:

a air emissions;
b blasting & vibration;
c noise emissions;
d discharges to water;
e discharges to land;
f discharges of other contaminants (e.g. gas, liquid, solid, odour, organism (alive or dead), virus, or energy – including noise, heat, radioactivity and electromagnetic radiation); and
g rehabilitation

A Local government may choose to rely upon the DEHPs determination of the appropriateness of the activities and control measures rather than undertaking its own assessment of air, noise, water and potential for discharge of contaminants. The following scenario's are presented as examples that may come before Local Government's for assessment.

Scenario 1 – Managing Potential Impacts on a Sensitive Use

An existing hard rock quarry is established on a large land holding on the out skirts of a major regional city. The quarry is leased by the quarry operator from the land holder. The land is located in the Extractive Industry zone reflecting the identification of the resource. The process to

extract the raw material requires regular blasting. It is proposed to increase the scale and intensity of the existing operations to increase the quantity of material extracted annually, and also to extend the footprint of the approved workings further to the west. An existing dwelling house is located to the west of the site in the direction of the proposed quarrying. Initial quarry designs include extending the quarry footprint past a ridge line that separates the quarry from the adjoining dwelling house. During the public notification period a submission is received from the land owner of the adjoining dwelling house. In response to the matters raised, the applicant changes the application prior to a decision being made by the assessment manager, and restricts the quarry footprint to the eastern side of the ridgeline ensuring that the topographic feature of the ridgeline is retained to minimise the potential impacts on the adjoining dwelling house. The application is likely to be consistent with PO_1 of the code.

Scenario 2 – Managing Potential Impacts on the Environment

A new extractive industry is proposed and seeks to extract sand and gravel from land adjoining a watercourse. The land is identified as a Key Resource Area, has previously been disturbed by agricultural activities and is largely clear of protected vegetation. An isolated patch of vegetation consisting of protected marine plants is located within one of the areas identified for sand extraction. Retaining the isolated patch of protected marine plants would result in the sterilisation of one third of the sand available from the land. The applicant has provided a Flora and Fauna Assessment Report by a suitably qualified person identifying that there are significant patches of the same protected marine plants located on along the banks of the watercourse forming the lands southern boundary. The applicant proposes to offset the loss of the protected marine plants by completing extensive rehabilitation works along the banks of the watercourse which would meet the offset requirements of the State Governments environmental department. The application is likely to be consistent with PO4 of the code.

2.8.2 Assessable development

Performance outcomes	Acceptable outcomes	Comments
Buffers, Seperation and Amenity		
PO_1 Extractive industry is adequately separated from sensitive uses to minimise potential for nuisance or complaint.	No acceptable outcome is nominated.	Note for PO_1 - The potential effects arising from existing or future extractive industry (e.g. noise, dust or vibration) may detrimentally impact sensitive uses. Whilst it is preferable to avoid those impacts on sensitive uses, this may not always be possible. Accordingly the applicant will be expected to demonstrate that sufficient separation is available by establishing adequate buffer distances to mitigate the potential for nuisance or complaint. The extent of the separation requirements should be considered on an individual basis. Where-ever possible the separation area should be contained within the application area, or land upon which the extractive industry is proposed. However this may not always be possible.

Performance outcomes	Acceptable outcomes	Comments
Buffers, Seperation and Amenity		
		The extent of the separation will be influenced by technical studies related to the potential to generate noise, dust and ground and air vibration (if blasting is proposed). Consideration should be given to the nature of the proposed operations, the quarry design, proposed mitigation measures, topographic and natural features, and the importance of the resource at a local and/or regional scale. The nature of intervening topography can significantly affect the separation distance required between non-compatible land uses. The separation distance required in areas of flat relief will generally need to be much greater than where ridgelines intervene between quarrying operations and other uses. Vegetation screens not only protect visual amenity but can also reduce dust and noise effects. It should also be noted that buffer distances for infrequent or low production volume sites could be less than that required for operations of high utilisation and production.
PO_2 The design, operation and staging of the extractive industry promotes the efficient utilisation of the resource.	No acceptable outcome is nominated.	Note for PO_2 – Optimising the functional relationships of extraction, processing, storage, and product distribution within the site and associated environmental constraints is generally expressed in the form of a Conceptual Site Layout Plan, including Sequence of Extraction Plans, supported by an Environmental Management Plan and a Rehabilitation Strategy Plan.

Performance outcomes	Acceptable outcomes	Comments
PO_3 The design, operation and staging of the extractive industry mitigates vibration, noise, dust, lighting and other impacts on the surrounding area.	No acceptable outcome is nominated.	Note for PO_3 – In designing the layout of the extractive industry operations the amenity of surrounding land holders should be protected to the greatest extent practicable. Applicants shall be expected to incorporate measures to control and mitigate impacts through an Environmental Management Plan (EMP). The EMP will be assessed by DEHP as part of the consideration of the necessary ERAs. Where appropriate DEHP will set conditions of approval relating to matters including air, blasting & vibration, noise, water, lighting, erosion and sediment control, revegetation and rehabilitation.
PO_4 The design, operation and staging of the extractive industry reduces impacts on natural environmental values to the greatest extent reasonably practicable and where impacts cannot be avoided the loss or decrease in values is minimised or offset.	No acceptable outcome is nominated.	Note for PO_4 – Extractive industry operations by their very nature require land disturbance and consequent impacts on vegetation, wildlife, soils and water courses. However, the potential environmental impacts associated with extractive industry are generally restricted to the location and extents of the resource and buffer area, and hence not as extensive as activities such as agriculture, forestry, and urban development which generally comprise larger land areas. In designing the layout of the extractive industry operations unnecessary disturbance to existing vegetation, landform or drainage lines should be avoided. The location, layout and staging of operations should to a large extent be predicated by consideration of environmental issues. A wide range of controls should be integrated into the design of the operations and set out in an Environmental Management Plan. The separation areas for the extractive industry operations present opportunity for rehabilitation and biodiversity offsets that may in some circumstances result in no net loss or a net increase in biodiversity values of the land.

Performance outcomes	Acceptable outcomes	Comments
PO_5 The design, operation and staging of extractive industry optimises potential alternative land uses after the cessation of extractive activities.	No acceptable outcome is nominated.	Note for PO_5 – Extractive industry is a temporary land use. The life of a project borrow pit may only be a matter of months. Alternatively a significant hard rock resource may take many years or decades to be fully utilised. Planning for post extraction land use should form part of the design and staging of extraction, and inform the necessary rehabilitation works. Post extraction land use will primarily be determined by the surrounding land uses and stategic planning intent for an area as outlined in a local government planning scheme. In most situations it is not feasible to replace the original landform or completely back fill a void. A pragmatic balance has to be struck between the practicalities and economics of extraction, land stability, the hydrological regime and the post extraction land use. At a minimum the land should be returned to a stable, non-polluting, self-sustaining state and generally free draining unless water storages or features are incorporated into the design.

Performance outcomes	Acceptable outcomes	Comments
PO_6 The design, operation and staging of the extractive industry has regard to the desired visual character of the locality.	No acceptable outcome is nominated.	Note for PO_6 – Landscape character and visual amenity are recognised by the community as important environmental and social values. Activities and impacts associated with extractive industry include, surface workings, processing plant, stockpiles, waste storage, site buildings, haulage routes, and other ancillary facilities. Extractive industry is often located in areas of high visual amenity such as river valleys, forested ridgelines and bushland. Visual amenity can not be measured as can the concentration of a chemical element or the speed of a vehicle, however systematic methods for assessing landscape values provide consistent, if not objective results. Where there is significant concern assessment may be warranted via a Visual Amenity Assessment. Methods for reducing visual impacts may include but are not limited to: ■ locating exposed features behind natural barriers; ■ constructing amenity banks and vegetation screens; ■ carrying out timely rehabilitation works; ■ minimising signage; ■ constructing and painting buildings and facilities using materials and colours existing in the landscape; ■ limiting and containing security and night lighting within the site; ■ aligning access and haulage roads to prevent direct views into the site.

Performance outcomes	Acceptable outcomes	Comments
Management of Operations		
PO_7 On-site drainage is designed, constructed and maintained to: a minimise erosion; b avoid pollution of groundwater and surface water; c provide opportunities to conserve and reuse water on the site; and d prevent additional flooding or inundation.	$AO_{7.1}$ Banks and / or channels are constructed to divert stormwater runoff away from disturbed areas. $AO_{7.2}$ Sediment basins and other runoff controls are provided as required to detain stormwater runoff from disturbed areas for treatment by sedimentation / settlement or flocculation such that there is no off-site discharge likely to cause environmental harm. $AO_{7.3}$ Bunding, diversion, containment, treatment, clearing, recycling, collection and disposal of wastes is carried out such that no environmental harm is caused. $AO_{7.4}$ Lining or other suitable treatment of erosion prone areas is established and maintained at discharge points. $AO_{7.5}$ Harvested water is re-used on site where possible.	Notes for PO_7 – Extractive industry operations inevitably result in land disturbance. Applicants shall be expected to incorporate measures to control and minimise risk of erosion and water pollution which will be communicated through an Environmental Management Plan (EMP). The EMP will be assessed by DEHP as part of the consideration of the necessary ERAs. Where appropriate DEHP will set conditions of approval relating to matters including air, blasting & vibration, noise, water, erosion, sediment control and rehbilitation.

Performance outcomes	Acceptable outcomes	Comments
Management of Operations		
PO_8 Noise from the development is managed to acceptable levels.	$AO_{8.1}$ For a proposed new extractive industry, noise from the site complies with the 'controlling background creep' criteria for 'noise that varies over time' specified in the Queensland Environmental Protection (Noise) Policy 2008. OR $AO_{8.2}$ For a proposed extension to, or intensification of, an existing extractive industry, noise from the proposed extension/intensification does not result in a significant increase in noise levels at sensitive places. AND $AO_{8.3}$ Transport of materials associated with the extractive industry does not generate road traffic noise levels that exceed 63 dB(A) L10 (18 hour) or 80 dB(A) LAmax at residential dwellings on the nominated transportation route. OR $AO_{8.3}$ Where existing road traffic noise levels at residential dwellings on the nominated transportation route exceed 63 dB(A) L10 (18 hour) or 80 dB(A) LAmax, transport of materials associated with the extractive industry does not result in a significant increase in noise levels.	Note for PO_8 – Where extractive industry is proposed in proximity to sensitive uses applicants shall be expected assess the potential impacts by undertaking a Noise Impact Assessment, and where necessary incorporate measures to control and minimise risk and impacts through an Environmental Management Plan (EMP). The Noise Impact Assessment and EMP will be assessed by DEHP as part of the consideration of the necessary ERAs. Where appropriate DEHP will set conditions of approval relating to matters including air, noise, water, lighting, erosion and sediment control, revegetation and rehabilitation.
PO_9 Vibration from the development is managed to acceptable levels.	$AO_{9.1}$ Vibration levels do not exceed the relevant provisions contained in the Environmental Protection Act 1994.	Note for PO_9 – Where blasting is proposed in proximity to sensitive uses applicants shall be expected to assess the potential impacts and where necessary to incorporate measures to control and minimise risk and impacts. The degree of risk and control measures will be assessed by DEHP as part of the consideration of the necessary ERAs. Where appropriate DEHP will set conditions of approval relating to blast management.

Performance outcomes	Acceptable outcomes	Comments
Management of Operations		
PO_{10} Dust emission from the development is managed to acceptable levels.	$AO_{10.1}$ Dust emissions do not result in levels at sensitive receptors which exceed the Air Quality Objectives contained in the Environmental Protection (Air) Policy 2008 and do not cause environmental nuisance by dust deposition.	Note for PO_{10} – Where extractive industry is proposed in proximity to sensitive uses applicants shall be expected assess the potential impacts by undertaking an assessment, and where necessary incorporate measures to control and minimise risk and impacts through an Environmental Management Plan (EMP). The assessment and EMP will be considered by DEHP as part of the necessary ERAs. Where appropriate DEHP will set conditions of approval relating to matters including air, noise, water, lighting, erosion and sediment control, revegetation and rehabilitation.
PO_{11} Operations minimise lighting impacts on roads and other properties.	$AO_{11.1}$ Fixed site lighting complies with *Australian Standard AS4282 Control of the Obtrusive Effects of Outdoor Lighting.*	Note for PO_{11} - Extractive industry is often located in areas of high visual amenity such as river valleys, forested ridgelines and bushland. Those same areas are often characterised by low or no articifical lighting levels. Lighting should be limited and designed to contain illumination and impacts within the site. Generally the Local Government will impose a condition of approval requiring lighting to comply with the relevant Australia Standard.

Performance outcomes	Acceptable outcomes	Comments
Management of Operations		
PO_{12} Public access to the site is managed appropriately .	$AO_{12.1}$ Safety fencing and signage is provided to prevent unauthorised access to the greatest degree practicable.	Note for PO_{12} – Extractive industry operations involve the operation of heavy machinery, may require storage of flammable liquids, and result in landforms which may be a safety risk to those unfamiliar with the site. Extractive industry operations are required to comply with strict workplace health and safety requirements. However it should be noted that fencing requirements should reflect the locality, topographic nature of the site and operational safety risks. In rural and remote areas fencing may need to be no more than that necessary to exclude livestock. Whereas urban and outer urban areas may need more significant fencing and security measures. Sand dredges only need fencing around the processing area and machinery compound.
PO_{13} Development is designed in a manner which will not compromise the stability, safety or operation of infrastructure.	No acceptable outcome is nominated.	Notes for PO_{13} – Extractive industry operations alter landforms. The applicant shall be required to demonstrate that the proposed operations will not place infrastructure and public assets (e.g. water, sewer, gas and power infrastructure) at risk. A conceptual site layout plan and EMP would identify if any such infrastructure was at risk and what measures would be utilised to manage the risk.
PO_{14} Development is designed and managed to minimise the risk and impact of any accidental spills and / or releases of chemicals and other materials that may contaminate soil, stormwater, groundwater and/or air.	$AO_{14.1}$ Storage of fuels and chemicals on-site is undertaken in acordance with AS.1940 – Storage & Handling of Flammable and Combustible Liquids.	Note for PO_{14} – Extractive industry operations involve the operation of heavy machinery, and may require storage of flammable liquids, oils, solvents and other chemicals. The applicant shall demonstrate how the extractive industry will be conducted via an EMP which will be assessed by DEHP as part of the necessary ERAs. Where appropriate the DEHP will set conditions of approval relating to the storage of fuels and chemicals on the site.

Performance outcomes	Acceptable outcomes	Comments
Landscaping		
PO_{15} Landscaping complements biodiversity values of the adjoining area.	$AO_{15.1}$ Landscaping incorporates the following elements where appropriate: a native plants of local origin; and b known food and habitat trees and shrubs; and c replication of adjacent healthy remnant habitats, including understorey vegetation; and d no declared noxious plants, weeds or invasive plants likely to displace native flora species or degrade fauna habitat. e amenity planting; f erosion control planting.	Note for PO_{15} – For sites of visual prominance, or in urban and outer-urban areas it may be appropriate to establish landscaping at the entrance of a site, as part of vegetation buffers, and adjoining site office and amenities buildings. Rehabilitiation of the land will also be conducted in accordance with the relevant conditions of approval imposed by DEHP as part of the ERAs. For sites in rural and remote areas landscaping may provide no significant benefit and empahsis should instead be placed on weed management and general landcare measures.
Hours of Operation		
PO_{16} Extractive industry occurs at times that will not result in disturbance at surrounding uses.	$AO_{16.1}$ Extractive Industry operations are confined to the following periods:- a Blasting operations are limited to 9:00am to 5:00pm Monday to Friday; and b Extraction, crushing, screening, loading, operation of plant equipment, ancillary activities and haulage are limited to 6:00am to 6:00pm Monday to Saturday; and c Maintenance of equipment and vehicles carried outside of normal operating hours is carried out so as not to cause nuisance at nearby sensitive land uses; and d No operations are conducted on Sundays or Anzac Day, Good Friday, Easter Monday or Christmas Day. $AO_{16.2}$ Extractive Industry operations may occur outside the hours identified in $AO_{16.1}$ if sufficient evidence can be provided that the development will achieve PO_{16}.	Note for PO_{16} – Extractive industries are a significant contributor to the material needs of local and regional communities and to economic activity and development. Control of operating hours is often used as prescriptive tool for protecting amenity. Hours of operation should be based on performance standards for noise, lighting and other relevant issues and therefore be determined on an individual site basis. Note for $AO_{16.1}$ and $AO_{16.2}$ – Extractive industry operations proposed outside the standard periods identified in $AO_{16.1}$ may be appropriate in certain circumstances (e.g. locations without nearby sensitive receivers or sites within existing disturbed environments such as industrial areas). In such cases the applicant will be expected to provide relevant Impact Assessments (e.g noise) prepared by an appropriately qualified person to determine the potential impacts and recommend the necessary mitigation measures to manage potential disturbance to surrounding uses to appropriate levels.

Performance outcomes	Acceptable outcomes	Comments
Traffic and Transport		
PO_{17} The transportation of materials is undertaken in a way which: a maintains the safety and efficiency of the roads comprising the transport route; and b minimises amenity impacts on premises within the transport routes separation area.	$AO_{17.1}$ The development has road access that: a is of a standard sufficient to carry traffic of the nature that the use would be likely to generate; and b does not compromise traffic safety in the area.	Note for PO_{17} – The applicant shall demonstrate the suitability of the local road network for the anticipated traffic associated with the proposed extractive industry. Traffic Impact Assessment may include but not be limited to assessing alternative routes, traffic volume type and distribution, road design, school bus routes, intersection performance, future road proposals and maintenance requirements.
Rehabilitation		
PO_{18} Rehabilitation of the site, over the life of the project and on its completion: a provides for progressive/ staged rehabilitation works; b includes appropriate clean-up works (taking particular account of areas of possible soil or water contamination); c results in a stable final landform; d provide suitable drainage and hydraulic conditions; and e achieves a suitable degree of revegetation consistent with potential post-extraction land uses.	No acceptable outcome is nominated.	Notes for $PO_{18\ \&\ 19}$ – Extractive industry is a temporary land use. Design and implementation of rehabilitation works is an imporant element of extractive industry. DEHP will impose conditions relating to rehabilitation as part of the assessment of the necessary ERAs for extractive industry. The rehabilitation measures and actions will be described within the Environmental Management Plan or Rehabilitation Plan or Rehabilitation Strategy prepared for the site. Where practicable, the sequence of working should be planned so that extraction limits are reached early during the project life. However, for some operations progressive rehabilitation may not be possible because the method of extraction selected was more appropriate for noise control or protecting visual amenity. The receding tree line/rim and glory hole methods of quarrying are examples of quarrying methods that limit visual exposure and contain other environmental impacts but limit the opportunity for implementing progressive rehabilitation. ***Next page***

Performance outcomes	Acceptable outcomes	Comments
Rehabilitation		
PO_{19} Rehabilitation allows for suitable use of any water storage created through the extraction process, having regard to water quality, hydraulic conditions, land form and vegetation.	No acceptable outcome is nominated	***From last page*** For some sites, particularly those of limited life, the post extraction land use may be obvious, for other sites there may be a range of options. In any event the landform, drainage pattern and revegetation treatments envisaged by the rehabilitation plans should seek to be compatible with planning scheme intentions. However consideration must be given to the anticipated life of the development in formulating final rehabilitation and post-extraction land uses. Where the development may have an extended operating life beyond the life of a planning scheme an accurate understanding of the likely post -extraction land use may not be available. Accordingly any rehabilitation and post-extraction land use plans should be flexible. Therefore the principal objective of rehabilitation is to return the land to a stable, non-polluting, self sustaining state and generally free drainaing unless water storages or features are incorporated in the design.

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