NSW GOVERNMENT | Planning

MAJOR PROJECT ASSESSMENT: Nowra Brickworks Quarry (MP 07_0123)

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

November 2009

Cover photograph: Nowra Brickworks Quarry, aerial photo (source: Google Maps)

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EXECUTIVE SUMMARY

South Coast Concrete Crushing and Recycling Pty Ltd (SCCCR) proposes to expand its existing shale quarry operation located west of the Princes Highway, approximately 5 kilometres south of Nowra, within the Shoalhaven local government area. Shale extracted from the site would be combined with recycled materials from other quarries and construction sites, to provide high quality construction materials to the local market. SCCCR proposes to despatch up to 500,000 tonnes per annum of quarry product, for up to 30 years.

The proposal constitutes a 'major project' under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and consequently the Minister is the approval authority. During exhibition of the proposal, the Department received 8 submissions, including 5 from public authorities and 3 from the general public. Submissions from public authorities raised issues in relation to surface and groundwater impacts, noise and blasting, biodiversity offsets, air quality, and traffic. Submissions from the general public raised concerns regarding noise and blasting, traffic and road works, air quality, flora and fauna and the appropriateness of the proposed biodiversity offset strategy.

The Department has assessed the project application, Environmental Assessment (EA), submissions received and SCCCR's Response to Submissions in accordance with the requirements of the EP&A Act. The key issues identified during the assessment were surface and groundwater impacts, the proposed biodiversity offset strategy, traffic and transport related impacts, noise, blasting and air quality.

The surface and groundwater assessments determined that the proposal would have a minor impact on both surface and groundwater resources. Mitigation measures are proposed in order to reduce predicted impacts and monitoring would be undertaken throughout the life of the project to ensure that surface water quality on-site and in Nowra Creek is maintained, and that groundwater levels and quality are not significantly impacted.

The proposal would require clearing of 7.4 hectares (ha) of native vegetation. The EA concluded that the proposal would not significantly impact on identified threatened species, provided that appropriate management plans are implemented and the proposed offsets secured. SCCCR proposes to provide a principal biodiversity offset of 16.19 ha as well as rehabilitating the whole of the project site. However, the principal offset area is subject to long-term proposals by the RTA for the construction of a Western Bypass, from South Nowra to north of Bomaderry. The Department has recommended conditions requiring SCCCR to review its proposed biodiversity strategy, and to seek to identify an alternative offset area in the vicinity which is not identified as potentially requiring resumption for a public purpose. Subject to implementation of an appropriate biodiversity offset, the Department is satisfied that there would be no net loss of flora and fauna values in the area over the medium to long-term.

The noise and air quality impact assessments predicted that all air and noise emissions would be below relevant criteria. However, significant vibration impacts from blasting may occur without proper blasting management. Therefore, SCCCR should be required to prepare Blast Management Plans for the project to substantiate blast design and demonstrate compliance, prior to the commencement of each stage of quarrying and based on actual blast monitoring data from the operating quarry.

The project would result in an increased number of heavy vehicles entering and exiting the site from the adjoining the Princes Highway. The Department is satisfied that the RTA's and Council's concerns regarding the site access intersection are able to be resolved as part of the detailed road design and that highway safety would be maintained with the RTA's proposed Princes Highway upgrade.

The Department is satisfied that all actual and potential impacts can be mitigated, offset and/or managed to ensure an acceptable level of environmental performance. The Department recommends approval of the project, subject to conditions which address extraction operations, on-going environmental monitoring and management, rehabilitation, compliance mechanisms, independent reviews and performance audits.

1. PROPOSED PROJECT

1.1 Project Description

South Coast Concrete Crushing and Recycling Pty Ltd (SCCCR) proposes to continue and expand its operations at its existing shale quarry in South Nowra, approximately 170 kilometres (km) south of Sydney (see Figure 1). The project is known as the Nowra Brickworks Quarry. The major components of the project are summarised in Table 1, and depicted in Figures 2 and 3. The project is described in full in SCCCR's Environmental Assessment (EA), which is attached as Appendix F.

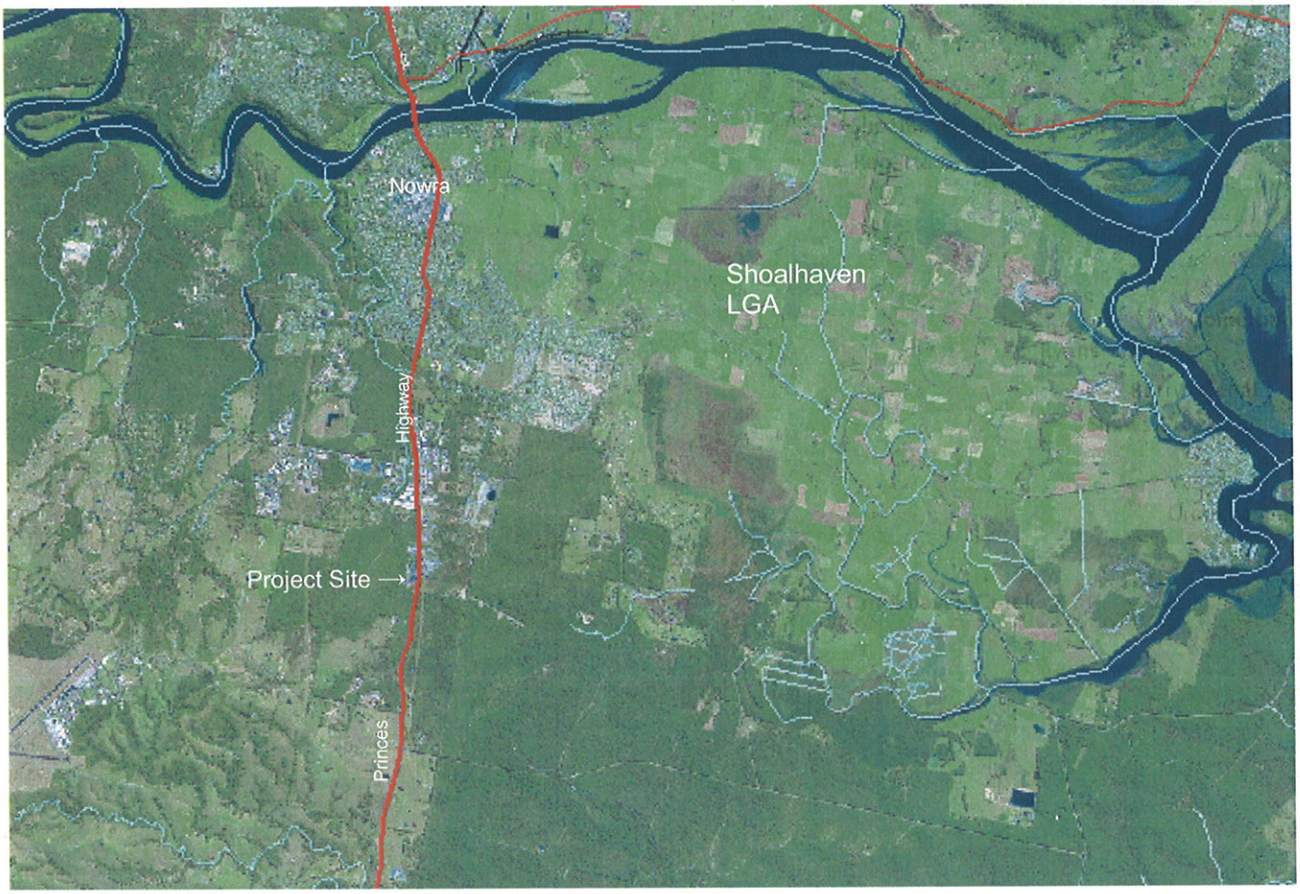

Figure 1: *Project Location*

1.2 Project Setting and History

The project area is located approximately 5 km south of the Nowra CBD within the Shoalhaven Local Government Area. The site is bounded by the Princes Highway to the east, the recently approved South Coast Correctional Facility to the west and State forest to the south. The surrounding locality is characterised by land that is relatively flat with minor relief. The land uses surrounding the site comprise a mixture of residential, industrial and agricultural. The quarry is close to a significant number of commercial premises, the closest of which occupy the commercial lots on the eastern side of the Princes Highway, directly opposite the northern part of the existing quarry (see Figs 4 and 6).

The site comprises two mining leases, ML 5087 and ML 6322, on land owned by the Crown. ML 5087 contains the northern, narrower section of the site (see Figure 2). It was granted in 1948 and has subsequently been renewed until January 2019. ML 6322 contains the southern, broader portion of the site. It was granted in 1972 and has since been renewed until 8 March 2020.

In October 2005, proceedings were bought in the Land and Environment Court. The court held that development consent for extraction operations within ML 6322 had lapsed prior to the commencement of the *Mining Act 1973,* under which the quarry had assumed it had an exemption from the requirement to obtain development consent. As a result, extraction operations within ML 6322 were discontinued.

Table 1: Major components of the project

Aspect	Description
Project Summary	**Continuation and expansion of the shale quarry in South Nowra, including:** • **staged extraction of up to 14,000 tonnes per annum (tpa) of weathered shale material using an excavator;** • **staged extraction of up to 350,000 tpa of unweathered shale material using drill and blast methods;** • **importation and stockpiling of up to 50,000 tpa of recycled materials;** • **importation and stockpiling of up to 125,000 tpa of blending materials;** • **processing and blending of the extracted, recycled and blending materials;** • **loading, sale and dispatch by road of between approximately 300,00 tpa and 500,000 tpa of quarry products;** • **construction of a wheel wash facility, dual weighbridge, office and sealed visitors' carpark;** • **improvements to the site access road from the Princes Highway;** • **importation of up to 200,000 tpa of Virgin Excavated Natural Material (VENM) for rehabilitation purposes; and** • **progressive rehabilitation of the site.**
Total Site Area	21.5 hectares (ha)
Extraction Area	17 ha
Extraction Method	Excavator (for weathered shale), drill and blasting (for unweathered shale)
Extraction Staging	5 main extraction stages, starting from the existing area of extraction and progressing southwards (see Figure 3).
Extraction Area Setbacks	• Approximately 5 m from the base of existing visual and acoustic bunds adjacent to the perimeter of the Project Site; • Approximately 15 m from the boundary of the Project Site; and • Approximately 55 m from the top bank of Nowra Creek.
Resources	• Weathered Shale - approximately 0.47 million m^3 or 0.95 million tonnes (Mt) • Unweathered Shale – approximately 2.9 million m^3 or 7.0 Mt
Depth of Extraction	Variable depth of between 20-30 m below ground surface level, up to a maximum depth of 19 m AHD.
Processing and Facilities	Construction and operation of processing facilities, including two mobile primary jaw crushers, one secondary cone crusher and two mobile screening plants.
Main Products	Road base, sub-grade replacement, aggregates, dust, clay overburden, rip shale, sand, crushed concrete and crushed brick.
Production	Up to a maximum of 500,000 tpa of product.
Product Transport	All products would be transported by road, via the Princes Highway.
Project Life	Up to 30 years of extraction.
Rehabilitation and Offsets	The extraction area would be progressively rehabilitated using imported VENM. The final landform would mimic the pre-extraction landform and provide for the establishment of vegetation communities similar to those in undisturbed areas adjacent to and near the site. The project includes a strategy to offset the clearing of 7.4 ha of Spotted Gum Forest. The offset strategy comprises on and off site measures.
Employment	At between 300,000 tpa to 500,000 tpa of products dispatched, the project would directly employ between 7-12 full-time equivalent employees and is estimated to indirectly lead to a further 20-25 full-time equivalent employees.
Capital Value	$2.8 million.
Construction	Widening of the site entrance to 11 m; construction and sealing of the site access road; construction and installation of a wheel wash and shake down facility; extension of existing tarping area; erection of a transportable office, weighbridge and ablutions facility; construction and sealing of visitors' carpark; and construction of a bio-infiltration facility adjacent to the water storage facility.
Hours of Operation	• Extraction and processing – 7am-6pm Monday to Friday, 7am-4pm Saturday; • Product loading and transportation – up to three unladen trucks would arrive at the site between 6 am-7 am Monday to Saturday and a further three may return to the site between 6 pm-8 pm Monday to Friday and 4 pm-6 pm on Saturdays;

Aspect	Description
	• Maintenance activities – up until 6 pm on Saturday; and • No operations on Sundays or Public Holidays.

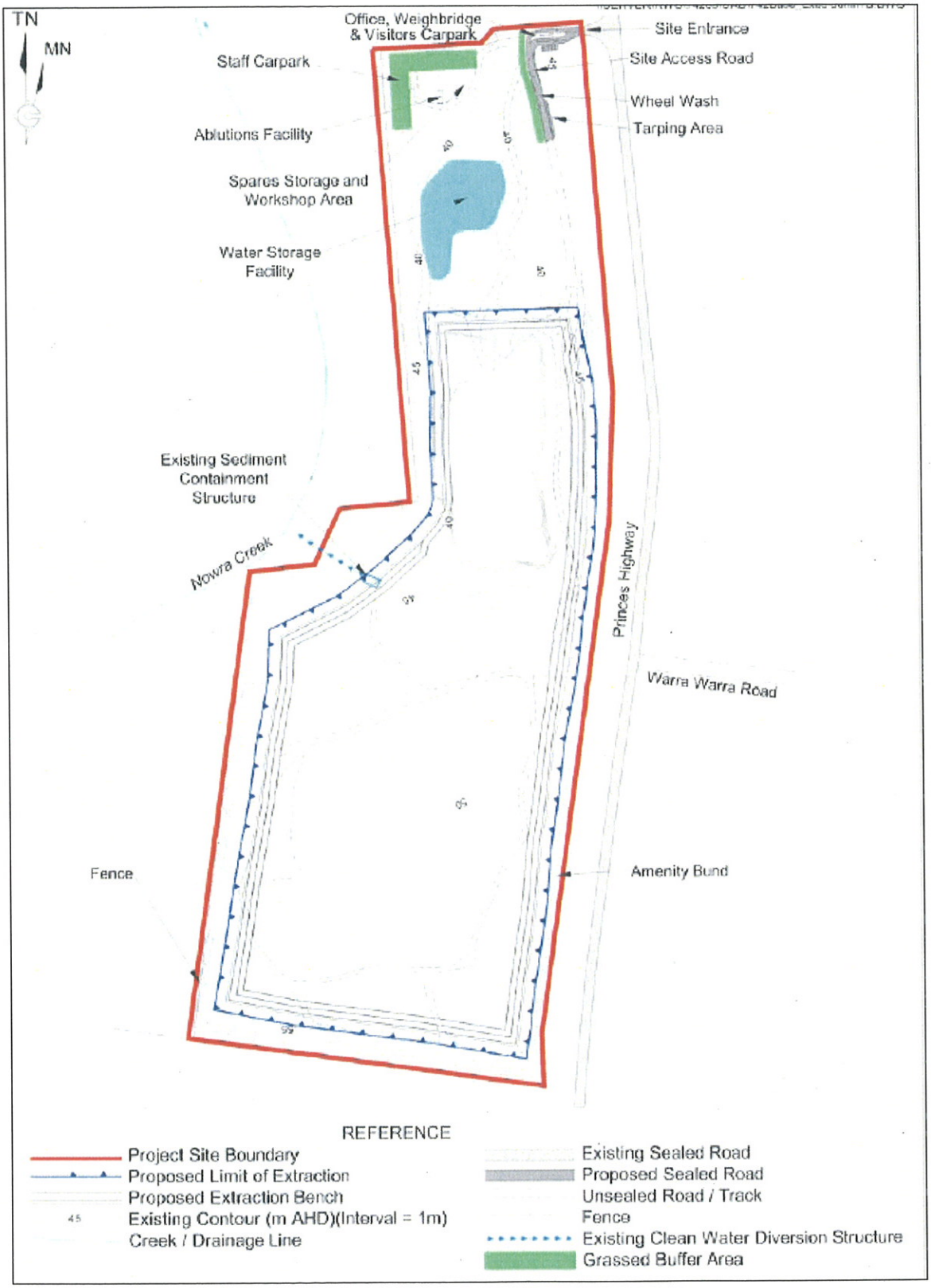

Figure 2: *Project Layout*

Figure 3: *Project Staging*

Existing operations within ML 5087 include:

- extraction of 7,000 tpa of weathered shale material;
- extraction of approximately 80,500 tpa of unweathered shale material;
- importation of approximately 37,500 tpa of products from other quarries or selected construction, concrete and waste material for crushing, recycling and blending with extracted shale;
- stockpile, loading and dispatch of up to 125,000 tpa of quarry products; and
- progressive rehabilitation of areas no longer required for extraction.

These limited operations are currently taking place pursuant to the existing use rights provisions of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As a result of changes to the *Mining Act 1992*, made in August 2005 to extend the application of the EP&A Act and environmental planning instruments to existing mining leases, the lateral extension or intensification of these operations is now required to obtain development consent or project approval. Consent or approval is also required for operations on ML 6355 to recommence.

1.3 Project Need

The proposal aims to produce up to 500,000 tpa of quarry products, incorporating recycled materials from other quarries and construction sites, to provide high quality construction materials to the local market. The extraction of this local resource would reduce the need to transport quarry products from outside the area, thereby limiting the costs of such materials, the amount of heavy vehicle traffic and consequent greenhouse gas emissions. The proposal would allow for the provision of quarry products to local markets for up to 30 years, reducing the need to locate and develop alternative sources over that time.

The Department recognises that there is an ongoing need to produce high quality construction materials to meet ongoing demand for the Illawarra and Shoalhaven regions. A number of project alternatives were presented in the EA, which considered that the proposed project provides the best economic and social outcomes, with limited environmental impacts.

2. STATUTORY CONTEXT

2.1 Major Project

The proposal is classified as a major project under Part 3A of the EP&A Act, because it is development for the purpose of extractive industry with an extraction rate of more than 200,000 tpa, and therefore meets the criteria in Clause 7 of Schedule 1 of *State Environmental Planning Policy (Major Development) 2005.*

Consequently, the Minister for Planning is the approval authority for the project. On 4 March 2009, the Minister delegated to the Director-General her powers and functions as a determining authority under section 75J of the EP&A Act, to approve project applications with less than 25 public submissions and with a capital investment value under $50 million. Consequently, the Director-General may determine the application under delegated authority.

2.2 Permissibility

The land subject to the application is predominately zoned 1(b) - Rural Arterial and Main Road Protection, with a small section zoned 1(f) – Forest, under the *Shoalhaven Local Environmental Plan 1985*. Under the LEP, extractive industries are currently permissible with consent in both zones.

However, recently Shoalhaven City Council submitted a draft LEP, currently under consideration by the Department's regional office. The draft LEP proposes to re-zone ML 5087 as IN2 - Light Industrial. This is to provide an opportunity in the medium and long term to encourage extractive industry to rehabilitate the land for industrial use and so partially offset the loss of industrial land as a result of the recently approved South Coast Correctional Facility. Further, the draft LEP proposes to re-zone ML 6322 as E2 - Environmental Conservation, in which extractive industries would be prohibited.

2.3 Exhibition and Notification

Under Section 75H(3) of the EP&A Act, the Director-General is required to make the EA for a project publicly available for at least 30 days. After accepting the EA for the project, the Department:

- made it publicly available from 27 February until 30 March 2009:
  - on the Department's website;
  - at the Department's Information Centre, Shoalhaven City Council and the Nature Conservation Council;
- notified landowners in the vicinity of the site by letter about the exhibition;
- notified relevant State Government authorities and Shoalhaven City Council by letter; and
- advertised the exhibition in the Nowra Shoalhaven News and the Sydney Morning Herald.

This satisfies the requirements in Section 75H(3) of the EP&A Act.

2.4 Environmental Planning Instruments

Under Sections 75I(2)(d) and 75I(2)(e) of the EP&A Act, the Director-General's report for a project is required to include a copy of, or reference to, the provisions of any State Environmental Planning Policy (SEPP) that substantially governs the carrying out of the project, and the provisions of any environmental planning instrument (EPI) that would (except for the application of Part 3A) substantially govern the carrying out of the project and that have been taken into consideration in the assessment of the project.

The Department has considered the project against the relevant provisions of SEPPs and other EPIs, and is satisfied that none of these instruments substantially govern the carrying out of this project. Nevertheless, the Department has included a consideration of relevant SEPPs and other EPIs (including SEPPs 33, 44, 55 and the Infrastructure SEPP) in Appendix C.

2.5 Objects of the Environmental Planning and Assessment Act 1979

The Minister is required to consider the objects of the EP&A Act when making decisions under the Act. These objects are detailed in Section 5 of the Act, and include:

'The objects of this Act are:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development (ESD), and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.'

The objects of most relevance to the Minister's decision on whether or not to approve this project are those under Section 5(a)(i), (ii), (vi) and (vii).

The Department is satisfied that the project encourages the proper use of resources and the promotion of orderly and economic use of the land. Environmental protection is considered in detail in Section 4 below. Following its consideration, the Department is satisfied that the project is able to be undertaken in a manner that would not result in a net loss of biodiversity values over the medium to long term, and would not significantly impact threatened species in the locality.

The Department has also considered the encouragement of ESD in its assessment of the project. This assessment integrates all significant economic and environmental considerations and seeks to avoid any potential serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences. SCCCR has also considered the project in the light of the ESD principles. Following its consideration, the Department is satisfied that the project is able to be conducted in a manner that is consistent with the principles of ESD.

2.6 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the Director-General's environmental assessment requirements issued with respect to the project. The Department is satisfied that the environmental assessment requirements have been complied with.

3. ISSUES RAISED IN SUBMISSIONS

During the exhibition period, the Department received a total of 8 submissions on the project:

- 5 from public authorities; and
- 3 from the general public.

A summary of the issues raised in submissions is provided below. A full copy of the submissions is attached in Appendix E.

3.1 Public Authorities

The ***Department of Environment, Climate Change and Water*** (DECCW) requested additional information on a range of issues and raised concerns regarding the outcomes of surface and groundwater testing; biodiversity offsets and proposed timeframes; and predicted noise exceedances at the Correctional Facility.

DECCW's ***NSW Office of Water*** (NOW) did not object to the project. NOW raised concerns with the level of groundwater assessment, the impact that groundwater extraction would have on current water and salt balances, the impact of VENM on groundwater hydrology, and the impact of the long term water level in the water storage facility.

The ***Department of Industry and Investment*** (DII) did not object, but requested that SCCCR provide appropriate annual production data to DII. DII – Fisheries also commented on a number of water management and erosion and sediment control measures.

The ***Department of Lands*** did not object, and advised that SCCCR may need to address Native Title.

The ***Roads and Traffic Authority*** (RTA, now part of the Department of Transport and Infrastructure) raised concerns regarding the project and future RTA road works to upgrade the Princes Highway. The RTA did not support the construction of a right turn bay at the quarry access as an interim treatment. Until the Princes Highway upgrade is completed, the RTA recommends a project restriction to limit heavy vehicle movements to outside of peak traffic periods. Further, it recommended that any road works required for the project should be undertaken at the same time as the RTA's Princes Highway upgrade, to minimise traffic disruption. The RTA recommended a number of conditions to be included in any approval in order to reduce the impact of the project on road users and potential costs incurred by the RTA.

The ***Shoalhaven City Council*** (Council) did not "completely support" the application because it does not take into account the *Nowra Bomaderry Structure Plan* (NBSP) or the future planning provisions of the *Shoalhaven Local Environmental Plan 1985* (LEP). Specifically the proposal does not take into consideration the proposed "Regional Services Corridor" southwest of the project site, as outlined in the LEP and NBSP, which would bisect the proposed biodiversity offset area. The NBSP also proposes a western extension of Warra Warra Road directly through the project site. Council also commented on the proposed RTA designs for the Princes Highway upgrade, the proposed site access works, and the timing of the upgrade works proposed by SCCCR.

Council also noted potential impacts on nearby sensitive receivers in regard to operational and blasting noise, dust and transport debris, damage to existing buildings, vegetation and soil management.

3.2 Community

There were 3 submissions from the community, including from an owner of commercial premises directly opposite the quarry and from a competitor to the quarry. All submitters objected to the project. The main grounds for objection were related to direct and cumulative impacts on:

- *Blasting and vibrations* – the submitter adjacent to the quarry states that the area currently shakes with each blast; other submitters state that the project would exceed relevant assessment criteria at nearby receivers;
- *Air quality* – particularly operational dust and impacts on nearby receivers;
- *Noise* – residential criteria for noise and blasting are exceeded for the Correctional Facility;
- *Flora and fauna* – the proposed 'services corridor' road would bisect the proposed offset area;

- *Traffic* – the traffic assessment in the EA is inadequate and does not take into account the RTA's proposal to upgrade the Princes Highway along the frontage of the site; the proposal will have also impacts on the proposed Warra Warra Road roundabout;
- *Nowra-Bomaderry Structure Plan* – the proposal is inconsistent with the Plan in that a proposed link road to connect the proposed services corridor to the Princes Highway would cross the southern end of the proposed quarry expansion;
- *Draft Shoalhaven Local Environmental Plan* – extractive industries would not be permissible under the new proposed zoning for part of the site;
- *Socio-economic* – the proposal gives an unfair advantage to the current lessee of the site; and
- *Life of the quarry* – should the quarry be approved it should be limited to a lesser period to ensure the proposal would not obstruct or hinder future development and land use.

3.3 Response to Submissions

SCCCR has provided detailed responses to the issues raised in submissions (see Appendix D), as well as a revised Statement of Commitments for the project.

The Department has considered all issues raised in submissions and SCCCR's responses to these issues in its assessment of the project.

4. ASSESSMENT

4.1 Surface and Ground Water

The project has the potential to affect surface water and groundwater resources in a number of ways, including:

- surface water flows in local catchments;
- groundwater resources and availability to local groundwater users and groundwater dependent ecosystems;
- water quality in downstream surface water and groundwater resources; and
- flood behaviour.

The EA includes detailed surface water and groundwater impact assessments, undertaken by Martens and Associates Pty Ltd (Martens). The assessments include consideration of baseline water flow and quality conditions, water modelling to assess the impacts of the project on water quality, flows and the salinity levels in Nowra Creek. A supplementary surface and groundwater assessment was submitted in response to submissions received from DECCW and NOW regarding groundwater impacts, the water storage facility and salinity levels on site.

Surface Water

Nowra Creek flows northeast past the western boundary of the site, merging with the Shoalhaven River approximately 1.5 km upstream of the Princes Highway bridge (see Figure 4). On the eastern side of the site, Browns Creek Catchment flows towards the north, eventually merging with Nowra Creek approximately 2.5 km north of the project site.

Surface water flows within the site are currently controlled by existing perimeter bunds and the site topography. Five sub-catchments are in place to ensure the separation of fresh and contaminated water on the site, with water from undisturbed areas flowing to Nowra Creek. The project proposes to capture surface waters from all disturbed areas and retain them in the water storage facility. This dam would have sufficient capacity to ensure that there would be no discharge of water to Nowra Creek. Surface waters in undisturbed areas of the site would continue to be diverted towards Nowra Creek, either via sediment containment structures or the grassed buffer areas.

A number of additional mitigation measures and management procedures have been proposed in order to ensure surface water quality is maintained both on and offsite, including:

- construction, maintenance and relocation of water diversion structures to divert and separate surface waters between the disturbed and undisturbed sections of the site;
- maximum catchment area for the water storage facility to be limited to 5.9 ha;
- construction of temporary diversion structures on the up-slope of all soil stockpiles and disturbed areas;

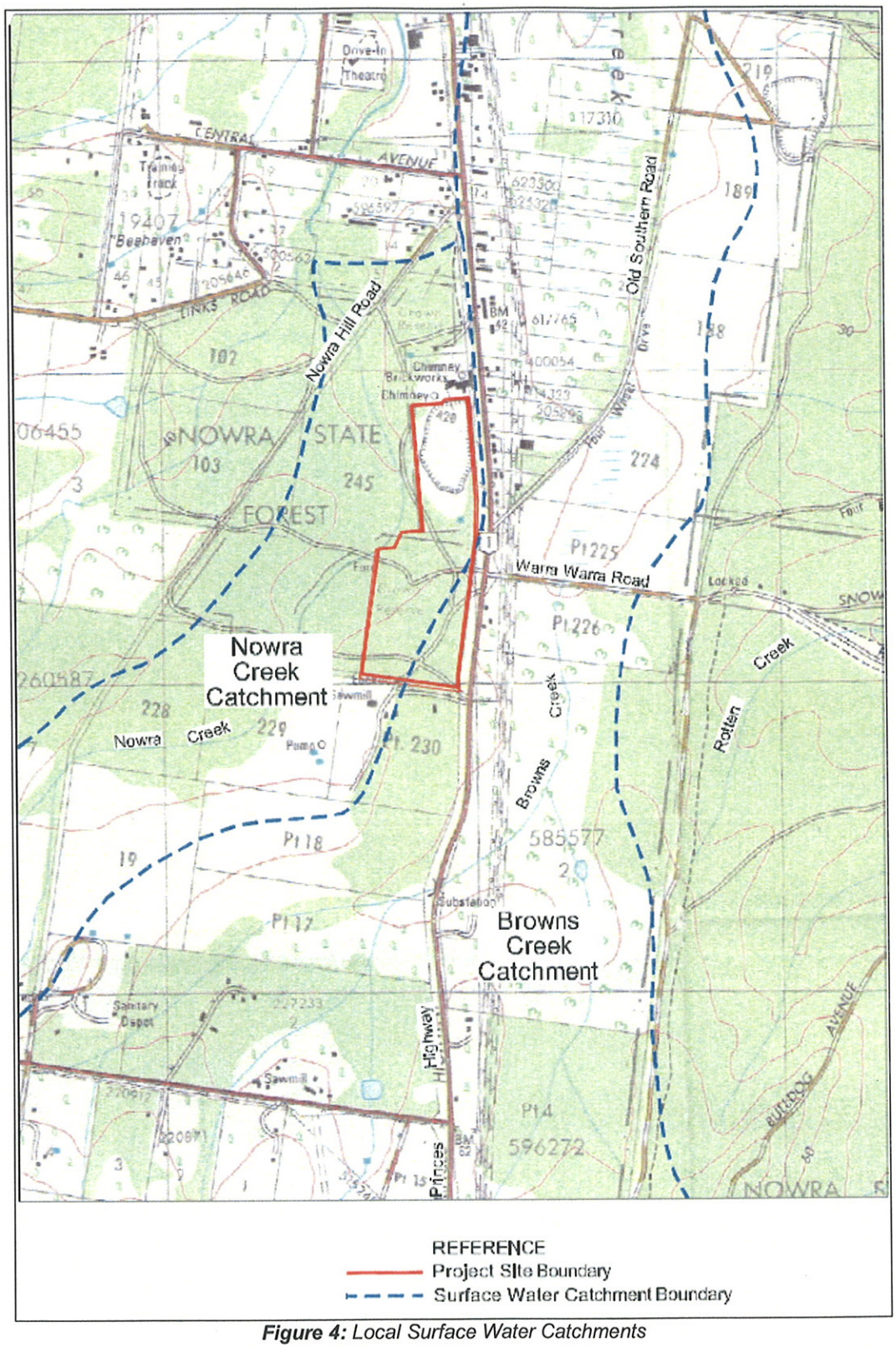

Figure 4: *Local Surface Water Catchments*

- installation of sediment fencing on the down-slope of all soil stockpiles and disturbed areas;
- construction of a sump to capture surface water runoff and groundwater inflows into the extraction area;
- use of sump water for dust suppression related activities;
- use of water from the storage facility for rehabilitation-related activities; and
- construction of grassed buffer areas adjacent to the site.

A flood assessment undertaken for the project found that the site would not encroach on flood liable land and that the development would have minimal impact on flooding events.

Water quality modelling predicts that, with proposed mitigation measures, the mean pollutant concentration would be less than or equal to the assessment criteria determined using the *Model for Urban Stormwater Improvement Conceptualisation.*

The Department and DECCW are satisfied that there would be limited environmental impacts to surface water flows and quality around the site and in Nowra Creek. Conditions are proposed to require SCCCR to develop a Surface Water Management Plan, in consultation with DECCW and NOW, to include appropriate mitigation measures and to monitor surface water flows and quality on-site and in Nowra Creek throughout the life of the project.

Groundwater

There are 20 registered bores within 8 km of the quarry site, the closest being 3.9 km distant. The predicted median pit groundwater ingress rate, as recalculated for the Response to Submissions, is 47.11 m^3 per day. The modelling indicates that the project would result in a localised drawdown of groundwater immediately surrounding the quarry void. Modelling predicted a drawdown of 1 m at a distance of 1.4 km from the site, indicating that the surrounding bores are well outside the radius of influence and would not be affected by drawdown. Regional groundwater flow directions would be unlikely to be significantly affected by the project.

The existing piezometric surface is predicted to be approximately 6.5 m to 8.5 m below the invert of Nowra Creek, indicating that Nowra Creek is a 'losing stream'. The maximum drawdown of the piezometric surface in the vicinity of Nowra Creek is approximately 9 m below the existing level, when modeled at Stage 5 of the project. It is unlikely that this drawdown would have any significant impact to flows in Nowra Creek or the surrounding riparian zone (ie the rate of loss from Nowra Creek to the local groundwater system is not likely to be affected).

No groundwater dependent ecosystems (GDEs) have been identified in the vicinity of the site. Because the piezometric surface within and around the site ranges between 5.5 m to 13 m below ground level, it is unlikely that any GDEs would occur.

SCCCR proposes to backfill the extraction pit with VENM after completing each stage of extraction and has undertaken to backfill the storage facility after completing site rehabilitation. SCCCR has also undertaken that all backfilling would be of low-permeability materials, so as to deliver a final groundwater surface similar to that existing prior to quarrying. SCCCR's undertakings satisfactorily address the concerns raised by NOW.

The Department is satisfied that SCCCR has satisfactorily assessed potential impacts to groundwater resources. Based on this assessment, the Department believes that the project is unlikely to have a significant impact on groundwater resources. However, the Department believes that SCCCR should be required to establish and implement a comprehensive groundwater monitoring program in consultation with NOW and DECCW, which provides for continuous monitoring of groundwater levels and quality on site, throughout the life of the project. With the implementation of comprehensive monitoring, the Department believes that impacts to groundwater resources can be adequately managed, such that water supplies to surrounding land users are not adversely affected and groundwater flows are not affected in the long term.

Water Balance

An initial water balance was undertaken by Martens was included in the EA. This balance indicated a substantial need to irrigate excess site water. Submissions received questioned the capacity of the proposed water storage facility and the impact that irrigation of saline water could have on the site.

Martens therefore undertook further water balance modeling and additional site drilling. The investigations revealed a greater capacity for on-site infiltration than had previously been allowed for. The revised modelling demonstrated that, even with the elimination of the on-site irrigation area originally proposed, the capacity of the proposed water storage facility, coupled with the increased infiltration, was such that there would be no requirement to discharge water from the dam over the project life. The modelling indicates that the maximum storage required on site would be approximately 42 megalitres (ML), with the mean requirement being approximately 4 ML. The capacity of the proposed water storage facility would be 50 ML, resulting in an 8 ML excess capacity.

Following further requests by the Department, Martens provided supplementary information concerning water usage on site and a fully revised site water balance (see Table 2). The water balance indicates that the project would require up to 15.7 megalitres of water per annum (MLpa) to meet on-site water needs, with demand mainly for the processing of quarry products and dust suppression. However, it is understood that this figure does not include an allowance for rehabilitation.

Table 2: *Daily Water Balance*

Category	Item	Description	Annual Total (ML/year)	See note(s)
Inputs	(A)	Runoff from Quarry Pit	31.6	1
	(B)	Runoff from catchment surrounding quarry pit	13.8	1
	(C)	Direct rainfall into reservoir	10.4	1
	(D)	Groundwater Inflow into quarry pit	17.2	2
	(E)	Processing water returns	5.7	3
Losses	(F)	Evaporation from reservoir surface	-11.6	1
	(G)	Groundwater recharge from reservoir	-56.0	1, 4
	(H)	Haul road dust suppression evaporation	-5.2	1, 5
	(I)	Process water (total water usage)	-10.5	3, 6
Total balance (A) to (I)			**-4.6**	

Notes:

1. *Determined / calculated based on 50 year daily (18250 day) climate record and daily water balance modelling.*
2. *Based on modelled continuous inflow scenario of 47.11 KL/d scaled up to an annual basis.*
3. *Calculated based on the following elements:*

Item	Element	Amount	Unit	Notes
a	*Process water usage*	*10.5*	*ML/year*	*See note 5*
b	*Off-site losses*	*2.1*	*ML/year*	*Based on 300,000 tonnes per year with 1% moisture addition as loss.*
c	*Evaporation at crusher*	*2.6*	*ML/year*	*Expected based on area of application*
d	*Return flow to system at crusher*	*5.7*	*ML/year*	*ML/year*

4. *Recharge returns from dam based on dam surface area and extensive field testing of aquifer permeability.*
5. *Dust suppression occurs on days with < 3 mm rainfall during operations (12939 days in 50 year record). Maximum wettable area is 4000 m^2 with an application rate of 5mm/m^2/d. Current peak capacity is 48KL/d based on 6 x 8KL water tankers per day although this is not used every day.*
6. *Process water used on days with < 3mm rainfall during operations (12939 days in 50 year record) at a peak pump flow rate of 1.5 L/s during 7.5 hour working shift.*

The water balance was calculated for Stage 5 of the project (see Figure 5), when disturbance is at a maximum and pit inflows are greatest. The balance indicates that, if average climatic conditions coincide with maximum disturbance, then SCCCR may need to source up to 4.6 MLpa to meet the demands of processing and dust suppression. Rehabilitation needs would be additional to this, and these would increase as the overall area of disturbance increases.

SCCCR may have other options to obtain this water (such as reducing evaporation or infiltration from the storage facility). However, based on the water balance modelling, it may need to purchase a groundwater entitlement via a groundwater extraction licence under the *Water Act 1912*. The groundwater resource in the area is low quality with few groundwater users in close proximity. The Department considers that this potential small licensed extraction is unlikely to have a significant impact on groundwater flows or quality in the area.

The Department and DECCW are satisfied that water use associated with the project is unlikely to have a significant impact on water availability and that there would be no requirement to discharge water from the site to Nowra Creek and no need to develop an on-site irrigation area. However, there may be small annual average water deficits from time to time, which can be met either by improved water management on site (ie reduced infiltration and/or evaporation) or the purchase of a small annual groundwater entitlement under the *Water Act 1912*.

Salinity

Testing undertaken for the EA indicated high salinity readings along Nowra Creek adjacent to the site. Further soil and water sampling was conducted following submissions from DECCW and NOW. The testing gave results that were generally in accordance with the previous testing, but with slightly higher salt concentrations. The higher results were attributed to lower creek flow rates from reduced rainfall or possibly the recently constructed bund for the Correctional Facility, which would have resulted in a reduction in the creek's catchment area. However, monitoring of the site's shallow piezometer found

that it did not intercept groundwater flowing towards Nowra Creek. This suggests that shallow groundwater is unlikely to be the cause of the high salinity levels in the creek. Because there is also no discharge of surface water from the site, it is considered unlikely that the project has contributed significantly to salinity in the creek. However, DECCW has requested further monitoring of salinity levels in the creek throughout the life of the project.

SCCCR proposes to use water from the water storage facility for rehabilitation purposes on site after each stage of extraction, provided salinity levels remain below 1500 mg/L. Should salinity levels increase due to reservoir levels being low for a period of time, rehabilitation would be stopped until water levels increase and salinity reduces.

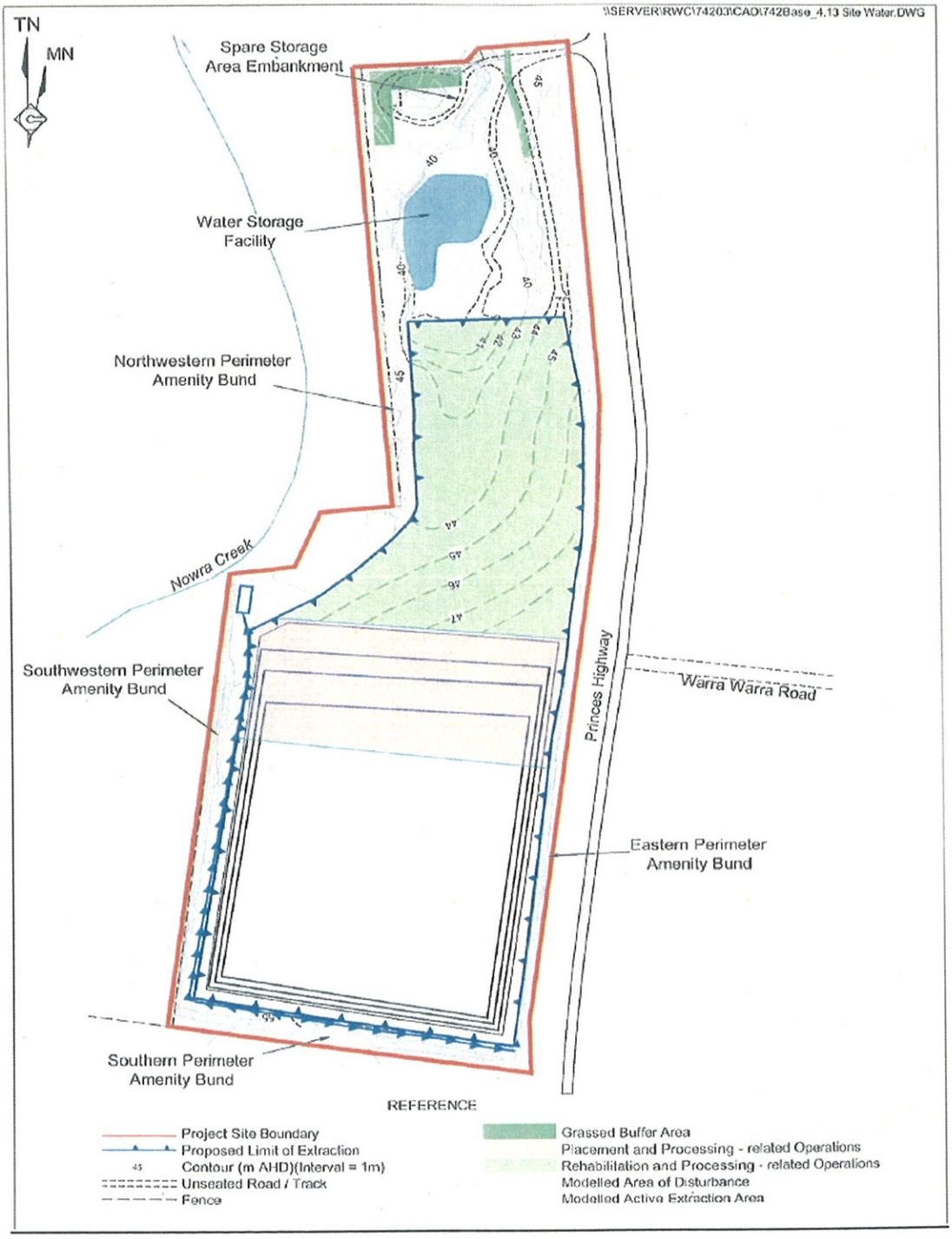

Figure 5: *Site water balance catchments – Stage 5*

Conclusion
The Department is satisfied that SCCCR has satisfactorily assessed potential impacts to surface water and groundwater resources in the area. Based on this assessment and the undertakings included in its Response to Submissions, the Department believes that the project is unlikely to have significant impacts. Any water resource impacts can be minimised, managed and/or compensated effectively through SCCCR's commitments and the Department's recommended conditions, which include requirements to:

- develop a comprehensive Water Management Plan, including:
  - a water balance;
  - an erosion and sediment control plan;
  - a surface water monitoring plan;
  - a groundwater monitoring plan; and
  - a surface and ground water response plan, to identify, investigate, mitigate and/or compensate any water related impacts; and
- undertake regular independent environmental audits, with results and associated recommendations to be submitted to the Department for review and endorsement.

4.2 Flora and Fauna

The EA includes specialist flora and fauna assessments undertaken by Gaia Research Pty Ltd. The project would require the removal of approximately 7.4 ha of native vegetation. The project has the potential to impact 3 threatened plant species and a number of threatened fauna species.

Flora
Currently around 50% of the project site has been disturbed by existing quarrying operations. The undisturbed, vegetated sections of the site comprise Spotted Gum forest at various age classifications and a number of other isolated individuals or small stands of trees. Eighty one species of plants were identified on the site, including thirty one species of exotic weeds.

There are no endangered or critically endangered ecological communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) occurring within the site. Targeted searches for endangered orchid species (such as the Illawarra Greenwood Orchid, Midge Orchid and Leafless Tongue Orchid) failed to identify any individuals within the site. The site is considered to be unsuitable for these species.

SCCCR has proposed a number of mitigation measures and operational safeguards to minimise project-related impacts to flora. This includes the proposed area of extraction being designed to avoid a stand of mature vegetation in the northwestern section of the site near Nowra Creek, as well as the progressive rehabilitation of all areas of disturbance when no longer required for extraction.

The Department and DECCW are satisfied that the project is unlikely to have a significant impact on any endangered flora communities or species, subject to adequate biodiversity offsetting (see below).

Fauna
The fauna assessment included surveys which identified a total of 63 fauna species within or surrounding the site. Eight threatened fauna species were identified as having the potential to be impacted by the development:

- Grey-headed Flying Fox;
- Gang-gang Cockatoo;
- Square-tailed Kite;
- Large Bentwing Bat;
- Eastern Free-tail Bat;
- Greater Broad-nosed Bat;
- Fishing Bat; and
- Yellow-bellied Sheathtail Bat.

All these species are listed as vulnerable under the TSC Act. The Grey-headed Flying Fox was observed foraging within the project site, while the Square-tailed Kite was observed in close proximity to the site. Both species prefer forest vegetation on the coastal plain and are seasonal migrants to the area. There were no critical habitat areas identified in the vicinity of the site and, although the removal of 7.4 ha of Spotted Gum forest would further fragment the habitat for these species, it is unlikely that the development would have any significant impacts.

The assessment included tests of ecological significance for potential impacts on the other six threatened fauna species noted above. The assessment concluded that the project would not result in a significant impact on any threatened fauna species and that the removal of 7.4 ha of forest is unlikely to impact on any viable local population of the Gang-gang Cockatoo or microbat species.

DECCW and the Council raised concerns regarding the felling of hollow-bearing trees and the appropriate method of removal. SCCCR has agreed to restrict the removal of hollow-bearing trees to mid-late autumn and early spring and for any hollow-bearing trees to be tapped by machinery prior to removal, in an attempt to make resistant fauna vacate the hollows so that impacts are minimised.

Biodiversity Offset Strategy

SCCCR has developed a biodiversity offset strategy to compensate for the 7.4 ha of native vegetation which it proposes to clear, as well as the possible impacts of the project on threatened species. SCCCR amended the offset strategy in response to submissions received. The offset strategy now proposed is shown in Figure 6, and comprises:

- revegetation, enhancement and long term conservation of 16.19 ha of the site outside the proposed disturbance area (Southern Biodiversity Offset Area); and
- rehabilitation (to native woodland) and long term conservation of the total 21.5 ha quarry site (Northern Biodiversity Offset Area).

The proposed Southern Biodiversity Offset Area comprises the whole of Lot 228 (see Figs 6 & 8). It supports similar species to those found at the site, however includes a greater variation in species diversity. Its vegetation is classified as Spotted Gum Forest, but with a higher density of Ironbark and Woollybutt. Also, Lot 228 incorporates portions of Nowra Creek, includes riparian vegetation and a larger number of hollow-bearing trees (31).

SCCCW has entered into a deed of option to lease Lot 228 for a period of 80 years from the date of any project approval. However, this does not in itself satisfy DECCW's biodiversity principles of securing the offset area in perpetuity. In addition, there is a proposed "Regional Services Corridor" southwest of the project site, which bisects Lot 228. The principal purpose of this corridor is for the RTA to construct a major traffic bypass for both Bomaderry and Nowra (the "Western Bypass"). The corridor is identified (but not zoned) in the current LEP and the NBSP. In the draft LEP it is zoned 'SP2 – Infrastructure'.

Clearly, any construction of the Western Bypass would have major implications for the proposed Southern Biodiversity Offset Area. Although the bypass corridor has been identified for many years, it is noted that the RTA has no firm plans for its construction. The bypass would need a major new road bridge over the Shoalhaven River and probably cost in the hundreds of millions of dollars. The RTA has not yet moved to secure the land, nor did it object to the offset area first proposed by SCCCR (which was also bisected by the identified corridor). As SCCCR points out in its Response to Submissions, it is possible that the bypass will not be built for decades to come, particularly seeing as the RTA has more immediate plans to upgrade the Princes Highway in South Nowra.

Nonetheless, the Department considers that the land proposed for the Southern Biodiversity Offset Area should be able to be conserved in perpetuity. The potential for the land to be resumed for a public purpose (ie construction of the Western Bypass) is very real, although the date of any such resumption is uncertain. While the Department and DECCW are satisfied with the biodiversity values of Lot 228, the Department considers that SCCCR should re-examine its proposed offset strategy to try to identify a portion of land in the vicinity which is not affected by potential resumption for a highway or the like.

The quarry site (ie the Northern Biodiversity Offset Area) is Crown land held under mining leases. The quarry site is proposed to be rehabilitated progressively at the completion of each extraction stage. It is SCCCR's intention to surrender the leases once rehabilitation is complete.

SCCCR has indicated that it has reached in-principle agreement with the Department of Corrective Services for the South Coast Correctional Facility's labour force to manage both biodiversity offset areas. The intention is that this management would continue after the surrender of the mining leases. SCCCR intends to establish the terms of this agreement in a management plan to be prepared under the project approval.

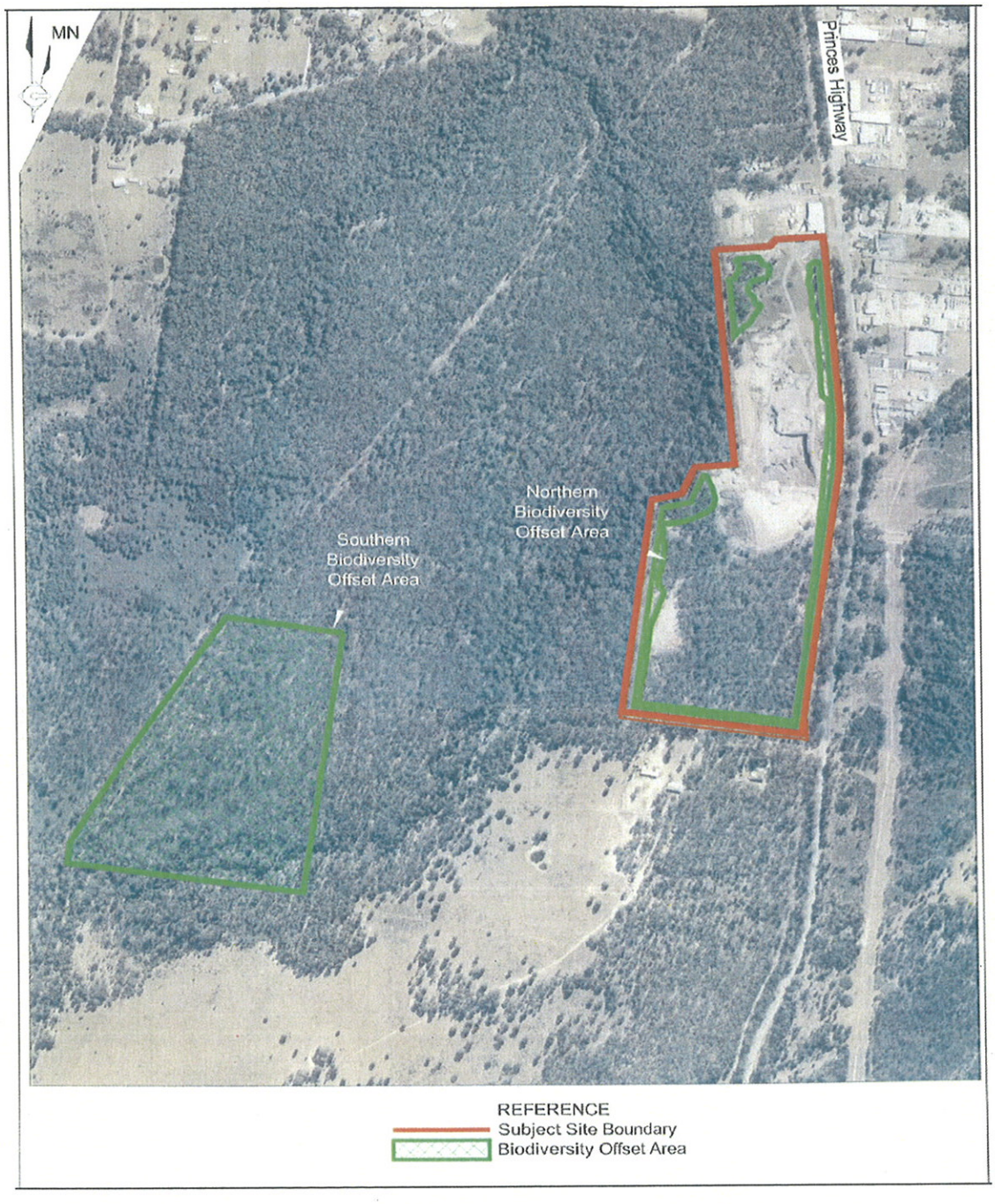

Figure 6: *Biodiversity Offset Strategy*

Conclusion

The Department and DECCW are satisfied that SCCCR has assessed the potential flora and fauna impacts of the project. The assessment indicates that the project, without any offsetting measures, would result in significant flora and fauna impacts, most notably:

- the removal of 7.4 ha of native vegetation;
- disturbance of potential habitat for threatened fauna species, particularly the Grey-headed Flying Fox and the Square-tailed Kite.

The Department and DECCW are satisfied that the project is unlikely to have a significant impact on threatened fauna. The overall offset ratio is now just over 5:1 and Lot 228 contains appropriate biodiversity values to offset those which will be lost. However, the Department considers that SCCCR should re-examine the offset strategy to try to identify a portion of land in the vicinity which is not affected by potential resumption for a highway or the like.

DECCW and the Department are satisfied that, subject to the implementation of a biodiversity offset strategy, containing land equivalent to Lot 228 and the conservation of which can be assured over the long-term, the project can be undertaken in a manner that would improve or maintain local biodiversity values. The Department has recommended conditions requiring SCCCR to:

- implement a revised offset strategy to the satisfaction of the Director-General ;
- provide for the long term conservation security of both offset areas; and
- develop a comprehensive Landscape and Biodiversity Management Plan, including a Rehabilitation and Biodiversity Offset Strategy Management Plan and Long Term Management Strategy.

4.3 Traffic

The EA includes a specialist traffic assessment undertaken by John Coady Consulting Pty Ltd. The site is located adjacent to the Princes Highway, which is classified by the RTA as a State Road. The Highway is two lanes and has a local speed limit of 80 km/hour. Access to the site is via a sealed entrance, which is approximately 10 m wide, with 1 m wide unsealed shoulders, at the site boundary; and approximately 52 m wide where it merges with the Princes Highway. The project is based on all trucks entering and exiting the site via the Princes Highway.

Current 85th percentile (one way) traffic movements for the project have been assessed as 139 per day, based on a traffic survey conducted in October 2007. This includes 31 car movements, 36 light rigid truck movements, 42 heavy rigid truck movements and 30 articulated truck movements. The quarry peak hour is between 1.00-2.00 pm, with 85th percentile traffic movement of 23 vehicles. It should be noted that traffic surveys and modelling suggest that historical traffic movements may have been as high as 190 per day (eg in August 2007). Predicted 85th percentile traffic movements for the project (based on a quadrupling of product dispatch to 500,000 tpa) are shown in Table 3.

Table 3: *Predicted 85th Percentile Project-Related Traffic Movements*

	Daily	Quarry Peak (1.00-2.00pm)	AM Peak (8.15-9.15am)	PM Peak (4.30-5.30pm)
Cars	45	2	9	6
Light Rigid Trucks (2 axle)	144	20	0	0
Heavy Rigid Trucks (3+ axles)	134	34	12	0
Heavy Articulated Trucks	96	22	0	0
TOTALS	**419**	**78**	**21**	**6**

Source: John Coady (2007) – Table 8

It should be noted that, while 78 vehicles are modelled as entering or leaving the site during the early-afternoon quarry peak, only 21 are shown entering or leaving during the morning highway traffic peak, including 12 trucks (compared with a current level of 4 such truck movements).

Table 4 shows current and projected project-related and total traffic levels for the Princes Highway. When compared with existing traffic movements, Table 4 indicates that, at full production, the project would increase vehicle movements by 280 per day, and that project-related truck movements would increase by more than 300%. However, the project would increase predicted 2017 traffic levels by only 0.06%, with the overall number of project-related vehicles amounting to approximately 0.9% of total traffic on the Princes Highway. This amount is considered to be minor and unlikely to result in any significant traffic-related impacts on the Highway.

Table 4: *Projected Traffic Increases on the Princes Highway*

Year	Estimated traffic Level (vehicles per day)	Total 85th Percentile Traffic Movements			Increase
		Existing	Proposed	Additional	
2007	30,247	139	419	280	0.1%
2017	42,667	139	419	280	0.06%

Source: John Coady (2007) – Modified after section 6

Site Access

The RTA has confirmed that proposed upgrades to the Princes Highway would restrict access to the project site. The road works proposed by the RTA include construction of an additional two lanes of roadway, installation of a two-lane roundabout at the intersection of Warra Warra Road and the Princes Highway, and a central median strip with wire rope safety barrier. This central median would limit access to the site to left-in, left-out only. This would then require all trucks entering the site from

the north and leaving the site to the south to use roundabouts (to the north at Central Avenue and to the south at Warra Warra Road), rather than direct turning across the highway lanes.

The Council has raised concerns regarding the site access and states that it is currently of inadequate width and formation. SCCCR has assessed the operational efficiency of the site access for the project's increased traffic levels. It found that the site access would function significantly better at all peak traffic periods after completion of the RTA's proposed road works and that the site access should be upgraded to meet RTA design specifications. It also proposed, as an interim measure, to construct a right turn bay on the Highway for access to the site from the north. The RTA has raised concerns regarding right turn truck movements from the Princes Highway into the site and originally recommended that, until the highway upgrades are completed, right turn movements from the north should be restricted to outside of highway peak periods.

The RTA also proposes that road works required for the proposal should include a left deceleration lane for access to the site from the south. The RTA has included in its preliminary highway upgrade roadworks design a quarry access to ensure the safety of road users and the efficient use of the highway. It recommends that these works are undertaken at the same time as the highway upgrade to limit traffic disruption.

The RTA has recommended a number of conditions to be included in the project approval including:

- all southbound heavy vehicle movements turning right into the site should be restricted to off-peak traffic periods for the Princes Highway;
- once the proposed Princes Highway upgrade has been completed, all right turn movements entering the site would cease;
- prior to any increase in product dispatch, the site access to the development should be relocated and the land dedicated generally in accordance with the RTA's preliminary design (see Figure 7); and
- prior to any increase in product dispatch, SCCCR should submit a monetary contribution to the RTA to cover costs of the central median for a length of 60 m and the cost of construction of a left turn deceleration lane.

Further traffic assessment and modelling were undertaken by John Coady Consulting in response to the RTA submission. SCCCR opposed the RTA's proposed right turn restriction during peak hours and argued that the increase in vehicles turning right into the site during peak times is not significant in number. The assessment indicated that the width of the roadway at this point and the presence of a passing lane would be sufficient to accommodate trucks turning right into the site. The alternative, that all trucks enter the quarry from the south during peak hours, would require all such southbound vehicles to either continue past the quarry entrance and turn left into Forest Road, conduct a U-turn and then re-enter the Princes Highway by turning right across both lanes of traffic; or else use a circuitous route via Flinders Road, north of the quarry, which would require an extra 14 km of travel.

The Department is sympathetic to SCCCR's position. SCCCR's traffic survey indicates that only up to 4 trucks currently either enter or leave the site during the morning traffic peak, generally from or to the north. The traffic modelling indicates that this would increase only to 12 (85^{th} percentile, at maximum production, either entering or leaving). It is unlikely that even this level would be reached prior to completion of the RTA's road upgrades. The Department considers that the number of heavy vehicles turning right into the site at peak hours is very low, and it is unreasonable that the proposed restriction should cause a significant impact on quarry operations, even over these limited hours. The Department therefore does not accept the RTA's first recommendation, while supporting the others. The RTA has accepted the Department's position. The Department is satisfied that the other concerns of the RTA and Council regarding the site access intersection are able to be resolved as part of the detailed road design. In this regard, the Department has recommended a condition requiring the site access intersection to be designed and constructed to the satisfaction of the RTA and Council.

Some submissions raised concerns about the timing of the site access intersection works, which are proposed to be undertaken with certain works on site. To ensure traffic safety, the Department has also recommended a condition that all works to the quarry access be completed either before or coincide with the RTA's construction of the left deceleration lane and other Princes Highway upgrade works. With the adoption of these measures, the Department is satisfied that the project can be managed such that it would not result in any significant traffic impacts.

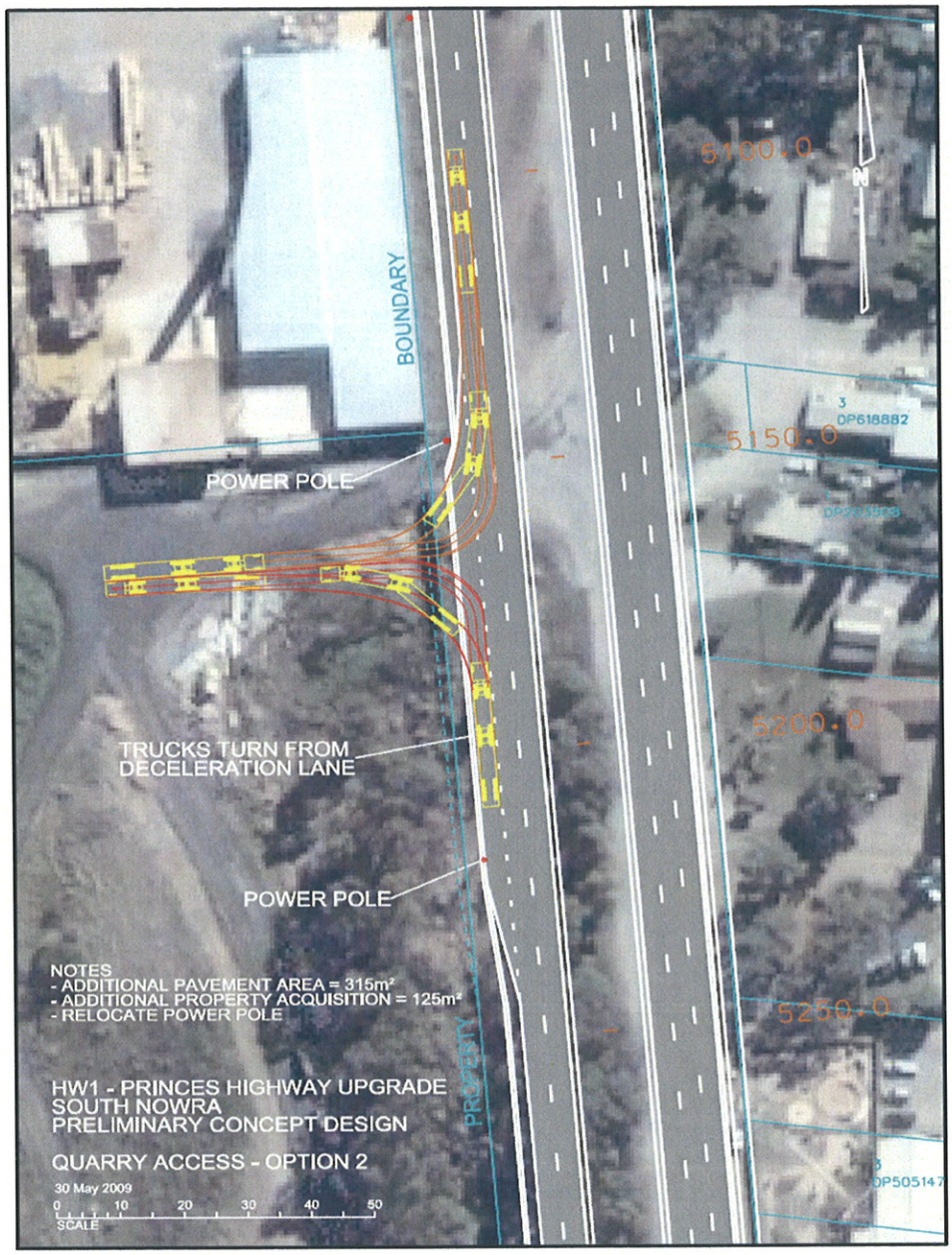

Figure 7: *Quarry Access – Option 2 (RTA Design)*

4.4 Strategic Planning

Council and one of the public submitters raised concerns over the project's consistency with the existing and draft LEPs and the *Nowra Bomaderry Structure Plan* (NBSP), which is Council's high level strategic planning document. The issues of consistency are twofold. First is the proposed "Regional Services Corridor" southwest of the project site, which bisects SCCCR's proposed Southern Biodiversity Offset Area (ie Lot 228). This issue is addressed under section 4.2 above.

The second issue concerns a proposed local road network for the Flinders Industrial Estate in South Nowra, as identified in the NBSP but not in either the current or draft LEPs. This proposed network includes a western extension of Warra Warra Road which would bisect the project site. The purpose of this proposed road is to service the industrial estate from the south. However, as pointed out in the EA, the proposed alignment of this road also bisects the site of the Correctional Facility, the development of which was not announced until after the development of the NBSP. Consequently, this link road will have to be re-routed, whether or not the project is approved. Again, there are no clear plans to build the link road, and there is no clear reason why it should be assumed that its construction would be prevented by the quarry's operations, providing that extraction has moved further south at the time of construction, and that the proposed backfilling of the quarry void uses materials which are

amenable to future road construction. It must also be noted that the existence of ML 6322, granted for the purposes of extracting clay/shale, substantially predates the proposed alignment of the link road through the quarry site. The Department can see no reason why the property rights inherent in the grant and renewal of this lease should be lessened by the possible future development of the link road. However, it recommends that the alignment of the proposed link road is backfilled with material which would be suitable for the support of a future road sub-base and pavement.

4.5 Noise

The EA includes a noise impact assessment undertaken by specialist acoustics consultants Heggies Pty Ltd in accordance with applicable contemporary guidelines including the *NSW Industrial Noise Policy* (INP). The assessment was undertaken with reference to sensitive receivers in the vicinity of the project site (see Figure 8).

Construction Noise

All site establishment and construction activities are expected to take place during the ongoing operations of the project, since the project site is already operational. Therefore, no separate construction assessment was undertaken by SCCCR.

Operational Noise

The INP advises that project specific noise levels (PSNLs) for projects such as Nowra Brickworks Quarry should generally be derived by adding 5 dB(A) to the background noise measurement. The Department and DECCW considered that, due to the high background noise measurements, unacceptable noise limits would result if 5 dB(A) was added to these levels. It is also the Department's general practice in approvals for quarrying projects to restrict PSNLs to the highest-predicted project-related noise levels, not exceeding the PSNLs as calculated under the INP. The Department and DECCW therefore agreed to the approach of applying the highest-predicted project-related noise levels as the PSNLs for most locations and most noise measurement periods. The project specific operational intrusive and amenity noise criteria are shown in Table 5.

SCCCR's operational noise modelling considered three scenarios, representative of existing operations and Stages 3 and 5 of the proposal. Further noise modelling was undertaken by Heggies to respond to submissions by DECCW and the public. While the quarry only proposes to operate between 7.00 am and 6.00 pm (Monday to Friday), the noise assessment also included the arrival of three unladen trucks between 6.00 pm and 8.00 pm and a further three unladen trucks between the hours of 6.00 am and 7.00 am. The modelling shows that operational noise for this predicted worst case scenario would not exceed the PSNLs throughout the life of the project and under a range of meteorological conditions (see Table 5).

The INP does not contain guidelines for intrusiveness criteria for facilities such as the South Coast Correctional Facility. DECCW initially proposed that noise limits for the Correctional Facility should be based on the same criteria as for residential receivers. SCCCR then consulted with the Department of Corrective Services in order to negotiate appropriate criteria for the Facility. SCCCR's additional noise assessment then recommended adoption of an internal acoustic design goal for the Facility (ie that noise intrusiveness should be measured inside the walls of the Facility's buildings). However the Department considers that noise intrusiveness should also take account of external use of the Facility's grounds. Consequently, external amenity criteria, based on the "passive recreation" category, have been included for SCCF in Table 5 below.

Table 5: *Predicted Worst Case Operational Noise Levels and Proposed Noise Impact Assessment Criteria*

Receiver Area	***Worst Case Predicted Noise Levels (all years)***			***Intrusiveness Criteria in Heggies' Additional Noise Assessment***			***DECCW and DoP Criteria***		
	Day	***Evening***	***Night/Early morning***	***Day***	***Evening***	***Night/Early Morning***	***Day***	***Evening***	***Night/Early Morning***
Location 1	39	26	26	46	40	35	39	35	35
Location 2	45	30	30	45	43	36	45	35	35
Location 4	49	38	38	53	49	44	49	38	38
Correctional Facility	51	37	37	50	50	50	51	37	37

Note: All units expressed as dB(A) $LA_{eq(15min)}$

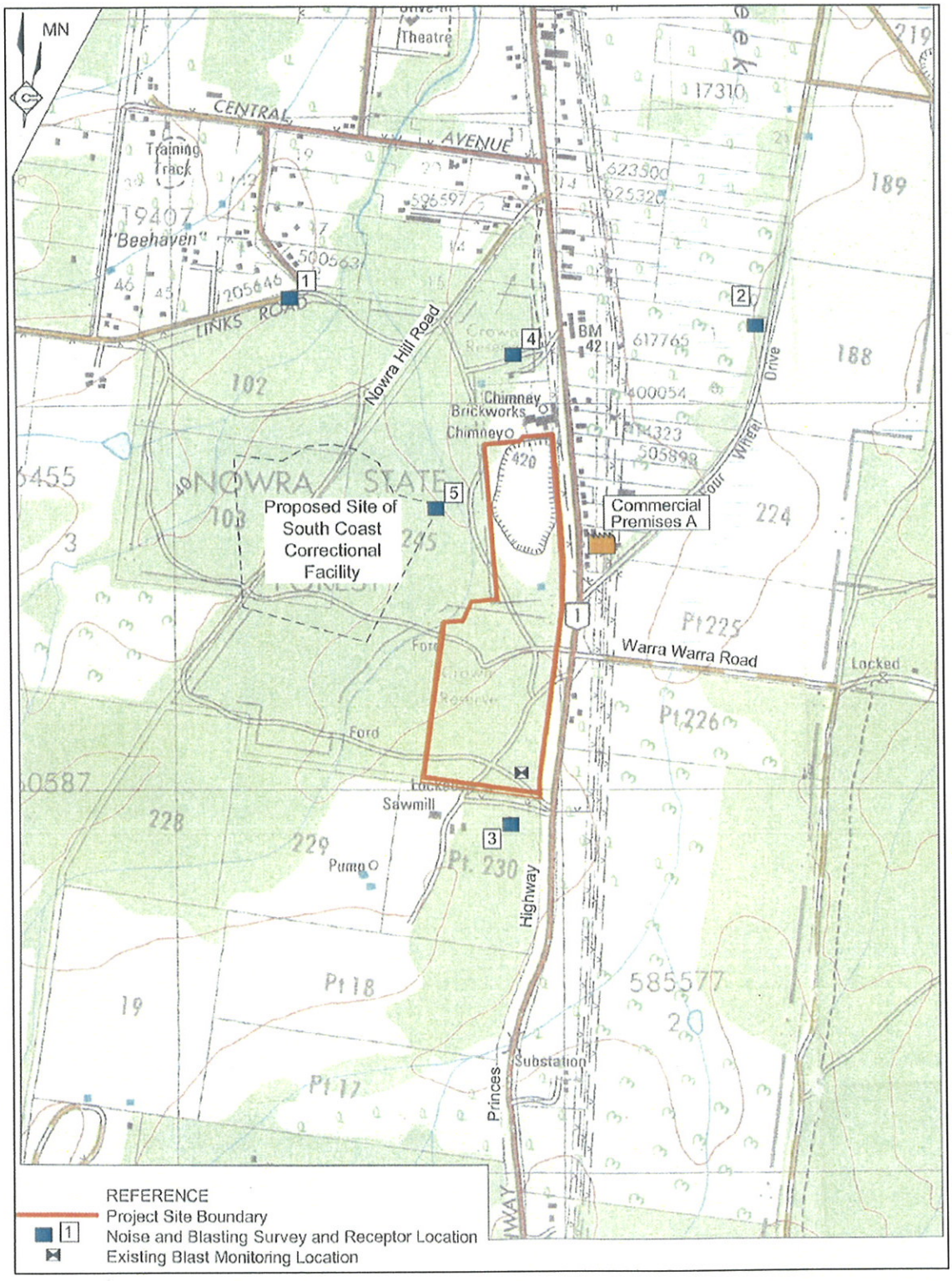

Figure 8: *Noise and Blasting Survey and Receptor Locations (Sensitive Receivers)*

The assessment indicates that the project would comply with all appropriate noise criteria at all sensitive receivers. However, the Department has also recommended conditions requiring SCCCR to:

- comply with the noise predictions in Heggies *Additional Information – Noise and Blasting,* submitted on 2 September 2009 in the Response to Submissions, and strive to continually improve the noise performance of the project;
- establish a detailed noise monitoring program; and
- regularly and effectively communicate with surrounding landowners concerning quarry operations, including publicly reporting all monitoring results and effectively responding to enquiries and complaints.

Sleep Disturbance

The EA includes an assessment of the potential for sleep disturbance from the proposal. Based on DECCW's criteria of RBL+15 dBA, the sleep disturbance criterion is 54 dBA at the most affected receiver (Location 4). The worst case predicted evening/night-time noise assessment for this location is 38 dBA, produced by the three trucks modelled to be entering the site in the evening and early morning. The assessment indicates that the project would comply with the applicable sleep disturbance criteria at all surrounding receivers.

Traffic Noise

Additional truck movements on public roads to and from the site are likely to increase traffic noise, especially on roads immediately adjacent to the site. Table 6 below shows existing and anticipated hourly traffic volumes on the Princes Highway in the vicinity of the site.

Table 6: *Average Hourly Traffic Movements – Princes Highway*

Vehicle Classification	Existing Traffic Levels		Anticipated Traffic Levels
	Excluding Quarry-related Traffic	Including Quarry-related Traffic	
Light	1280	1283	1284
Heavy	131	143	169
Source: Heggies (2008) – Table 11			

The background noise assessment found that the existing noise levels on the Princes Highway are between 58.1 and 58.3 dB(A), this is below the ECRTN noise criterion of 60 dB. The EA indicates that traffic noise from the proposal would not result in an increase of more than 0.5 dB over existing levels for the most sensitive receiver (Location 4). This is below the ECRTN criteria and is considered to have a negligible impact. The Department does not consider this slight increase in noise to be discernible and does not require any noise mitigation measures to be implemented in this regard.

Conclusion

The Department and DECCW are generally satisfied that SCCCR has assessed the potential noise impacts of the project in accordance with relevant DECCW guidelines, and considered reasonable and feasible noise mitigation measures. Based on this assessment, the Department is satisfied that the project can be managed such that it would not have a significant noise impact on nearby residences or the Correctional Facility.

However, the Department has recommended a range of conditions to minimise, monitor, manage and/or compensate for the noise impacts of the project, including requirements to:

- comply with stringent noise criteria, and strive to continually improve noise performance;
- comply with strict hours of operation and truck movements;
- establish and implement a comprehensive noise monitoring program, which includes real-time monitoring of noise impacts; and
- regularly and effectively communicate with surrounding landowners concerning quarry operations, and effectively respond to enquiries and complaints.

4.6 *Airblast and Vibration*

Blast Impact Assessment

A blast impact assessment undertaken by Heggies Pty Ltd was included in the EA. The assessment was undertaken with reference to blast criteria relating to human comfort (ie amenity), as listed in ANZECC's *Technical Guideline to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (see Table 7) and to criteria relating to structural damage to buildings, as listed in Australian Standard *AS 2187.2.2006 Use of Explosives* and a related British Standard. The original Heggies assessment applied the amenity criteria in Table 7 only to residential receivers, and structural damage criteria to both the Correctional Facility and all commercial premises (as represented in the assessment by Commercial Premises A). That is, it did not apply amenity criteria to either the Correctional Facility or commercial receivers.

Table 7: *ANZECC Blasting Guideline Limits*

	Acceptable*	Maximum
Airblast (dBLinear)	115	120
Ground Vibration (mm/s)	5	10
**Acceptable blasting limits must be achieved at least 95% of the time.*		

The EA indicated that between 5 and 10 blasts are currently carried out on site each year. It predicts that between 9 and 13 blasts would be required at the maximum proposed production rate, and the maximum size of blast proposed (maximum instantaneous charge (MIC) of 112 kg). During the period April 2006 to October 2007, the nine blasts carried out on site were monitored, with airblast overpressure generally in the range 100-102 dBL. Two blasts resulted in overpressure of 107 dBL and 119 dBL. The highest result was said to be the result of low, heavy overcast conditions. However, all these results are of limited value in predicting airblast overpressure at receivers such as Location 4, the Correctional Facility and Commercial Premises A, because the existing monitoring site is in the far southeast corner of the site, some 600-800 m from the source of the blasts.

Four submissions concerning potential blast impacts of the proposal: 2 from the general public, 1 from DECCW and 1 from the Council. Issues raised included:

- blasting impacts at nearby commercial premises;
- structural damage to buildings;
- flyrock associated with blasting; and
- the blasting criteria for the SCCF was considered to be unacceptable and should be the same as residential blasting criteria.

DECCW indicated that proposed blasting should be modified to ensure that the ANZECC amenity criteria are not exceeded at any residence, or the Correctional Facility. Council indicated that it had received complaints about the noise, vibration and lack of warning to neighbouring properties.

Heggies subsequently revised its blast assessment, which was included in the Response to Submissions. Details are shown in Table 8.

Table 8: *Predicted Blasting Impacts, MIC of 112 kg*

Residence/Receiver	Distance from Blasting	PVS Ground Vibration	Peak Airblast
Location 1: 80 Links Road	980 m	1.4 mm/s	111 dBLinear
Location 2: 371 Old Southern Road	650 m	2.8 mm/s	114 dBLinear
Location 4: 243 Princes Highway	360 m	7.5 mm/s	118 dBLinear
Location 5: Correctional Facility	200 m	20.0 mm/s	116 dBLinear*
Commercial Premises A	90 m	76.5 mm/s	127 dBLinear

**Within the Correctional Facility, a predicted attenuation of 6 dBLinear (provided by the perimeter wall) has been included.*

Table 8 indicates that the ANZECC blasting amenity criteria would be exceeded at Location 4, the Correctional Facility and Commercial Premises A, when using a MIC of 112 kg. Heggies therefore calculated the MIC required to achieve the appropriate criteria at most locations (see Table 9). Heggies calculated that the ANZECC airblast and vibration criteria could be met by reducing the MIC to 22 kg, when blasting at the quarry's nearest point to the Correctional Facility (approximately 200 m). SCCCR proposes that lowered MIC levels would be achieved through modifications of blasting and extraction procedures, including the use of smaller bench heights.

Table 9: *Controlling Criteria and Allowable MIC*

Residence/Receiver	Distance from Blasting	Acceptable Criterion	Allowable MIC	Maximum Criterion	Allowable MIC
Location 1: 80 Link Road	980 m	5mm/s	516kg	10mm/s	1200kg
Location 2: Old Southern Road	650 m	115dBLinear	169kg	10mm/s	520kg
Location 4: 243 Princes Highway	360 m	115dBLinear	28kg	10mm/s	160kg
Location 5: Correctional Facility	200 m	5mm/s	22kg	10mm/s	50kg

(Source: SCCCR Response to Submissions)

Heggies did not re-assess the ability of the Project to meet the ANZECC amenity criteria at Commercial Premises A, which is located only 90 m from the site of closest proposed blasting, or other commercial premises. Heggies states (correctly) that these criteria were developed to apply to noise sensitive receivers such as residences, hospitals and schools. In response to the Department's requests, Heggies later submitted that amenity standards of 25 mm/sec and 125 dBL should apply at

commercial premises, based on the standards to protect human amenity in occupied factories or commercial premises found in *AS 2187.2.2006 Use of Explosives*. The Department considers that these standards are appropriate.

Conclusion

The Department is satisfied that the proposal could be conducted in a manner which does not cause damage or inappropriate amenity impacts to nearby residences, the Correctional Facility and commercial premises. In order to achieve these outcomes, the Department considers that SCCCR should be required to:

- prepare and implement a detailed Blast Management Plan for the project;
- comply with appropriate amenity airblast and vibration criteria at all affected nearby receivers, including residences, the Correctional Facility and commercial premises;
- implement all proposed mitigation measures detailed in the EA;
- monitor all blasting activities at appropriate locations close to affected receivers;
- regularly and effectively communicate with all surrounding landowners concerning blasting activities, and effectively respond to enquiries and complaints; and
- mitigate, remediate or compensate for any project-related blasting impacts on property, or the use of property.

4.7 Air Quality

The EA includes a specialist air quality impact assessment undertaken by Heggies Pty Ltd. The assessment included consideration of dust deposition and fine particulate matter (PM_{10} and $PM_{2.5}$), with reference to relevant 24-hour, monthly and annual air quality goals. The assessment was based on a number of mitigation measures being implemented, including:

- water sprays on processing equipment and unpaved sections of the site access road and project site;
- the installation of a wheel wash at the site access;
- minimising the area of disturbance to only that necessary for quarrying operations;
- commencing rehabilitation as soon as possible once an area is no longer required for extraction;
- adequately stemming all blast holes with aggregate;
- installation of a number of earthen bunds and barrier fences;
- use of a suitable chemical dust suppression system;
- timely removal of material deposited on the site access road; and
- prompt stabilisation and seeding of exposed soil stockpiles and bunds.

Submissions received from the Council and the public noted existing dust levels on site and raised concerns regarding an increase in production levels, potentially resulting in an increase in air quality impacts. The assessment indicates that the quarry would comply with applicable dust criteria during all stages of the project, so long as the further mitigation measures listed above are implemented, in addition to current dust management measures. Table 10 presents the worst case predicted dust levels at the nearest sensitive receivers with additional dust management measures in place. However, the Council remains concerned that dirt tracked onto the Princes Highway by haulage vehicles could impact on dust levels in the area. Therefore, the Department has included a condition requiring SCCCR to install its proposed wheel wash facility prior to 30 June 2010, rather at a production trigger as proposed by SCCCR.

Conclusion

DECCW and the Department are generally satisfied that SCCCR has assessed the potential air quality impacts of the quarry in accordance with relevant DECCW guidelines, and appropriately considered reasonable and feasible mitigation measures, so as to ensure that the project is unlikely to result in any significant dust related impacts. The assessment indicates that the cumulative dust emissions of the quarry together with background dust emissions would comply with established air quality criteria during all stages of the quarry's operations. The Department has recommended conditions requiring SCCCR to:

- comply with applicable incremental and cumulative dust criteria, and strive to continually improve the air quality performance of the project;
- establish a detailed air quality monitoring program, including real-time air quality monitoring at nearby residences and surrounding sites; and
- regularly and effectively communicate with surrounding landowners concerning quarry operations, and effectively respond to enquiries and complaints.

Table 10: *Predicted Worst Case Dust Impacts for all Scenarios (Additional Dust Controls)*

Pollutant	Averaging Period / Units	Criterion / Goal	Project and other sources
Warra Warra Rd Roundabout (8)			
Particulate matter < 10 µm (PM_{10})	Annual / µg/m^3	30	14.5
	24 hour / µg/m^3	50	36
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual / µg/m^3	8	6.04
	24 hour / µg/m^3	25	14.33
Deposited Dust	Annual / g/m^2/month	4	2.7
South Coast Correctional Facility (9)			
Particulate matter < 10 µm (PM_{10})	Annual / µg/m^3	30	10.8
	24 hour / µg/m^3	50	25
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual / µg/m^3	8	5.39
	24 hour / µg/m^3	25	14.28
Deposited Dust	Annual / g/m^2/month	4	0.3
Sawmill (3)			
Particulate matter < 10 µm (PM_{10})	Annual / µg/m^3	30	12
	24 hour / µg/m^3	50	42
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual / µg/m^3	8	5.9
	24 hour / µg/m^3	25	19.23
Deposited Dust	Annual / g/m^2/month	4	0.8
Light Industry (6)			
Particulate matter < 10 µm (PM_{10})	Annual / µg/m^3	30	12.70
	24 hour / µg/m^3	50	27
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual / µg/m^3	8	5.56
	24 hour / µg/m^3	25	13.50
Deposited Dust	Annual / g/m^2/month	4	2.0
Brickworks (4)			
Particulate matter < 10 µm (PM_{10})	Annual / µg/m^3	30	14.20
	24 hour / µg/m^3	50	39
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual / µg/m^3	8	5.81
	24 hour / µg/m^3	25	14
Deposited Dust	Annual / g/m^2/month	4	2.2

4.8 Rehabilitation and Final Landform

SCCCR is proposing to progressively rehabilitate the site, including backfilling the pit with imported VENM up to the natural ground level contours on completion of each stage of extraction. The water storage facility would be backfilled on completion of rehabilitation works. The quarry would be rehabilitated to provide a stable landform that gently slopes to the north, which would support areas of native vegetation. The conceptual final landform is shown on Figure 9.

SCCCR has proposed a number of monitoring and maintenance measures to ensure the long term rehabilitation of the site. DECCW and other government agencies were generally supportive of the proposed final landform. NOW recommended that any consent restrict backfilling of the quarried void to low permeability materials which are defined as "Virgin Excavated Natural Materials" (VENM) as defined in the *Protection of the Environment Operations Act 1997*. NOW initially questioned the appropriate size of the water storage facility and requested further information regarding the final water level and volume. However, SCCCR has since confirmed that the water storage facility would be completely backfilled.

The Department has recommended a condition requiring SCCCR to prepare a Long term Management Strategy, in consultation with NOW, DII and Council, which defines the objectives and criteria for quarry closure and post-extraction management and investigates options for future use of the site.

Conclusion

The Department is satisfied that the project provides for the progressive and ultimate rehabilitation of the site. The proposed final landform would be compatible with the landscape and environmental values of the surrounding locality and surrounding landuses. To ensure that rehabilitation and post-extraction planning is effectively managed, the Department has recommended conditions requiring SCCCR to:

- ensure only materials classified as VENM are used for backfilling operations;
- progressively rehabilitate the site to the satisfaction of the Director-General; and
- establish, implement and periodically update a comprehensive Landscape and Biodiversity Management Plan, including a Rehabilitation and Biodiversity Offset Strategy Management Plan and Long Term Management Strategy.

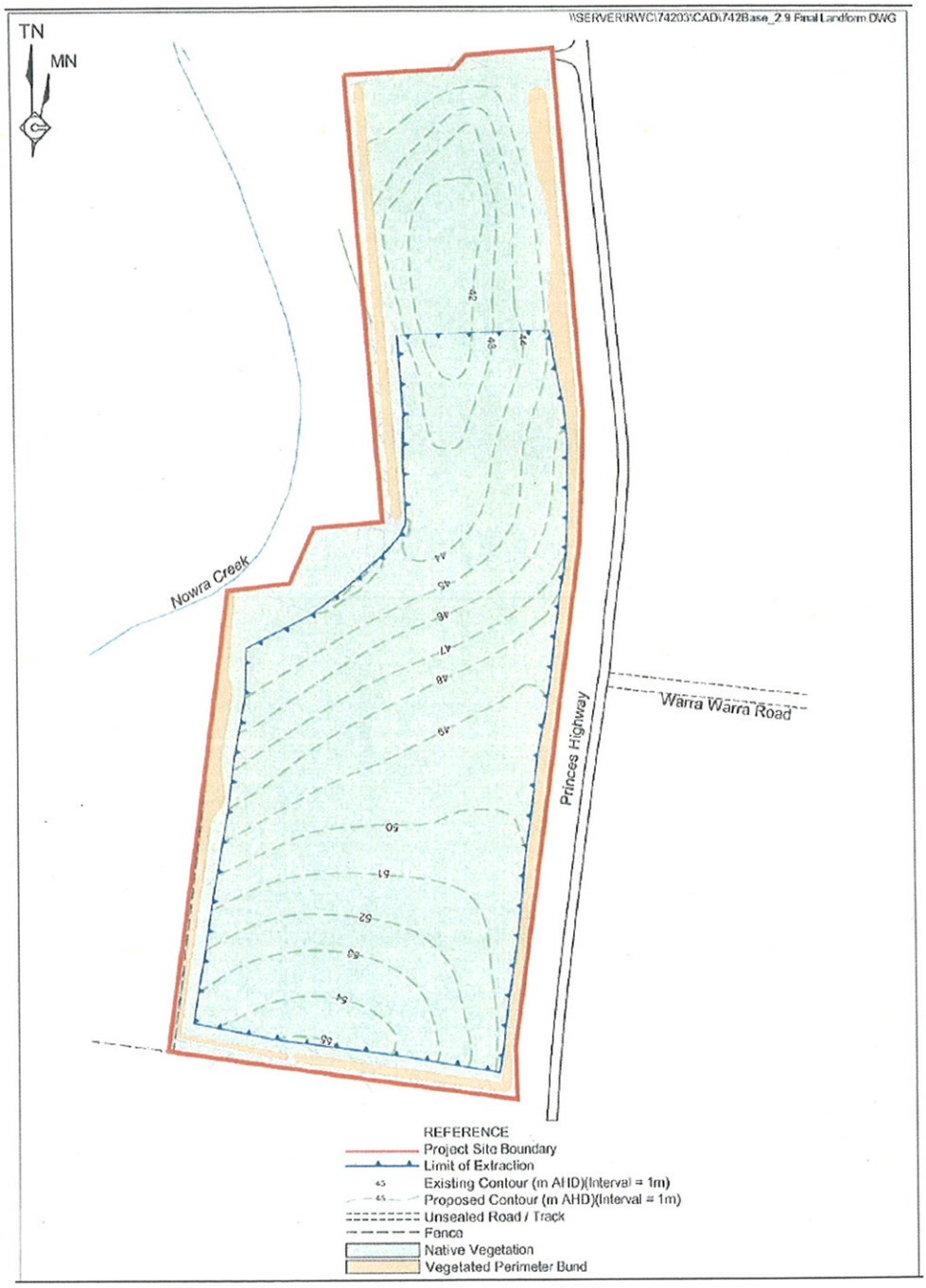

Figure 9: *Rehabilitation and Conceptual Final Landform*

4.9 Heritage

Aboriginal Heritage

The EA includes a specialist Aboriginal cultural heritage assessment, undertaken by Cultural Heritage Management Australia (CHMA) in consultation with the Nowra Local Aboriginal Land Council (LALC) and Dungarn Consultancy. The assessment draws on previous archaeological assessments for the area, including a search of the National Parks and Wildlife Service's Aboriginal Heritage Information Management System and a review of other published information.

The assessment concluded that the majority of the site contains little archaeological potential. There are 15 archeologically significant sites within a 10 km radius of the site, the closest of which is an open campsite, located 2 km to the southwest. The Nowra LALC and Dungarn Consultancy are satisfied that it is unlikely that the site contains significant archaeological potential, and agree with the recommendations of the Aboriginal heritage assessment.

DECCW and the Department are satisfied that the project is unlikely to have any significant impact on Aboriginal heritage values. The Department has recommended a condition that would require SCCCR to prepare an Aboriginal Cultural Heritage Management Plan, which includes provisions for:

- management of any Aboriginal sites/objects identified during the project; and
- ongoing consultation with applicable Aboriginal groups.

Non-Aboriginal Heritage

The EA includes a specialist European heritage assessment, undertaken by RW Corkery & Co. Pty Ltd. A search of a number of databases was conducted. The closest registered heritage site is approximately 4 km from the proposed quarry expansion. The Department is satisfied that the project would not have any direct or indirect impact on non-Aboriginal heritage values.

4.10 Bushfire Impacts

A bushfire assessment was undertaken by RW Corkery & Co. Pty Ltd. The site is identified as bushfire prone land on the *Bushfire Prone Lands Map* published by the NSW Rural Fire Service, with a Fire Danger Index of 100 for the Shoalhaven LGA.

The assessment found that all fixed project-related equipment would be constructed more than 70 m from the boundary of vegetation classified as Dry Sclerophyll Forest. This would maintain suitable asset protection zones. All other equipment would be mobile and able to be moved to a location more than 70 m from any Dry Sclerophyll Forest should a fire occur. The project site access road is approximately 120 m from any Dry Sclerophyll Forest. It allows for easy access and egress from the site in the case of an emergency. The site is adjacent to the Princes Highway, which would satisfactorily accommodate the increased level of traffic should a bushfire occur. SCCCR intends to maintain the site water storage facility throughout the life of the project. This is considered to be an adequate water supply if required in the case of a bushfire.

The Department is satisfied that the project has satisfactorily assessed and provided for the management of bushfire risks.

4.11 Visual Amenity

The project would not be readily visible from any public areas or sensitive receivers, given that the:

- existing perimeter bund along the eastern, southern and western boundaries of the site will be maintained and enhanced;
- existing vegetated buffer in the Nowra Creek riparian zone would be retained and enhanced to limit views from the Correctional Facility;
- existing line of mature trees adjacent to the site's eastern boundary would be retained and enhanced where appropriate; and
- site would be kept clean and tidy at all times, and materials and landscaping would be used to reduce visual impacts.

The Department is satisfied that, with the implementation of these measures, the project is unlikely to result in any significant visual impact to surrounding receivers.

5. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of approval for the project (see Appendix B), and summarised these conditions in Appendix A. These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

The Department has included standard conditions requiring SCCCR to:

- establish and maintain a Community Consultative Committee for the project which would include representatives from the community, with an independent chair;
- ensure that all monitoring results are made publicly available at the site and on company's website;
- report all incidents; and
- prepare and implement a comprehensive Environmental Management Strategy, which includes procedures to:
  - keep the community informed about the project;
  - manage complaints;
  - resolve disputes; and
  - respond to an non-compliances.

SCCCR has reviewed and accepts the recommended conditions. The Department believes the conditions reflect current best practice for the regulation of quarries in NSW.

6. CONCLUSION

The Department has assessed the project application, EA, submissions on the project and SCCCR's response to these submissions, in accordance with the relevant statutory requirements. The Department recognises that the site has been identified as having a good resource of shale materials, and the Department acknowledges that there is a need to continue extraction of this resource to meet the needs of construction industries in the Shoalhaven district. The Department is satisfied that the impacts of the project are able to be minimised, managed, offset and/or compensated to ensure an acceptable level of environmental performance.

The Department considers that, on balance, the project's benefits sufficiently outweigh its residual costs, and that it is therefore in the public interest. Consequently, the Department recommends that the Nowra Brickworks Quarry be approved, subject to strict conditions of approval.

7. RECOMMENDATION

It is RECOMMENDED that the Director-General, as delegate for the Minister:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (see Appendix B).

for David Kitto
Director
Major Development Assessment
27.11.09

Chris Wilson
Executive Director
Major Project Assessment
30.11.09

Richard Pearson
Deputy Director-General
30/11/09

Sam Haddad
Director-General
1/12/2009

CR 30.11.09

APPENDIX A – SUMMARY OF CONDITIONS OF APPROVAL

Aspect	Condition	Requirement
Schedule 2: Administrative Conditions		
Obligation to Minimise Harm	1	The Proponent shall work to prevent harm occurring to the environment.
Terms of Approval	2-6	The Proponent shall carry out the development in accordance with the EA and the conditions of approval; and surrender all existing approvals concerning operations at the site.
Limits on Approval	7	Limit extraction of shale material to 350,000 tpa and limit the despatch of quarry product to 500,000 tpa, until December 2039.
Schedule 3: Specific Environmental Conditions		
Noise	1-4	Noise impact assessment criteria, hours of operation and monitoring
Blasting	5-13	Blasting criteria, frequency, property inspections and monitoring.
Air Quality	14-16	Air quality impact assessment criteria and monitoring.
Surface and Groundwater	17	Restriction on discharging dirty water from the site.
	18-24	Water management plans and monitoring.
Rehabilitation and Landscape Management	25-28	Landscape and Biodiversity Management Plan and Rehabilitation and Biodiversity Offset Strategy Management Plan.
	29	Backfilling the quarry void and storage facility.
Aboriginal Heritage	30	Aboriginal Cultural Heritage Management Plan.
Visual	31	Reduce visibility of the project from surrounding receivers.
Waste Management	32	Minimise waste.
Traffic and Transport	33-36	Monetary Contribution to RTA, requirements to construct site access intersection to the satisfaction of the RTA and Council, and ensure all haulage vehicles are covered.
Emergency and Hazards Management	37-39	Ensure public safety and bushfire management.
Production Data	40	Provide annual production data to DII.
Schedule 4: Additional Procedures	1	Notification of landowners.
	2-5	Independent review.
Schedule 5: Environmental Management and Monitoring	1	Environmental Management Strategy/ Environmental Management Program.
	2-4	Requirement to report incidents, annual reporting.
	5	Requirement to undertake regular independent environmental audits.
	8	Requirement for Community Consultative Committee.
	9-10	Requirement to publicly report environmental management plans/programs/strategies, and monitoring results.

APPENDIX B – CONDITIONS OF APPROVAL