



Planning & Infrastructure

MAJOR PROJECT ASSESSMENT: Calga Sand Quarry Project (MP 06_0278)



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

September 2013

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EXECUTIVE SUMMARY

Rocla Materials Pty Ltd (Rocla) is proposing to expand the existing Calga Sand Quarry located on Peats Ridge Road about 1.6 kilometres from the F3 Freeway in the Gosford local government area.

The quarry has operated periodically since the late 1960's and more formally since the early 1990's, and currently operates under a Ministerial approval granted in 2005. It is recognised as a 'sand extraction area of regional significance' under the *Sydney Regional Environmental Plan No. 9 – Extractive Industry* and is located within a 'preferred location for extractive industries' under *Sydney Regional Environmental Plan No. 8 – Central Coast Plateau Areas*.

The project involves the continued operation of the existing quarry (identified as Stage 3), and the southern expansion in 2 separate sand extraction pits identified as Stage 4 (which is an extension of the Stage 3 pit) and Stage 5 (which is a detached pit to the south of Stage 4). The layout of the expansion area has been designed to:

- avoid identified significant Aboriginal heritage sites;
- avoid identified threatened species habitat and creek lines;
- provide reasonable setbacks to property boundaries; and
- address the topographical and geological constraints of the site and sand resource.

As with the existing quarry operations, extracted sand would be processed (washed) on site before being transported to markets in Sydney and the Central Coast, predominantly via the F3 Freeway. Some of this material would be blended with imported material (eg. soil and aggregates) for specialty products, which also occurs under the existing approval.

The project involves increasing the production rate from the existing approved maximum of 400,000 tonnes of sand products a year to 1 million tonnes a year, as well as increasing the hours of operation in the early morning and evening periods. It has a capital investment value of \$5 million, and would provide continued employment for 16 people during operations.

Although Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) has been repealed, the project remains a 'transitional Part 3A project' under the Act and consequently requires approval from the Minister for Planning and Infrastructure. However, under the Minister's existing delegations, the project application must be determined by the Planning Assessment Commission (PAC) due to the number of objections received.

The Department exhibited the Environmental Assessment (EA) for the project from 27 November 2009 to 19 February 2010, and received some 2,827 submissions: including 7 from government authorities, 7 from special interest groups and 2,813 from the general public, most of which were form letters.

Rocla subsequently took an extended period to provide its response to the issues raised in these submissions, finally lodging its formal Response to Submissions and a Preferred Project Report (PPR) in November 2012. The PPR included changes to the project to further avoid and/or mitigate the project's environmental impacts, most notably:

- additional buffers to key Aboriginal heritage sites and threatened species habitat; and
- inclusion of the Stage 5 pit in the biodiversity offset strategy as an 'interim offset', with an alternative offset to be identified and included in the offset strategy prior to extraction in the Stage 5 area.

The Department exhibited the Response to Submissions and PPR from 16 November 2012 to 25 January 2013, and received 19 submissions: including 5 from government authorities, 6 from special interest groups and 8 from the general public, most of which were from local residents.

In response to continuing concerns regarding groundwater, Rocla subsequently undertook additional groundwater modelling and assessment, which was submitted in July 2013 as a supplement to the Response to Submissions.

The key issues raised in submissions and/or identified in the Department's assessment include potential impacts associated with:

- *water resources* – particularly impacts to the significant groundwater aquifer resource of the Somersby Plateau;

- *noise and dust* – including health-related impacts associated with crystalline silica;
- *biodiversity* – particularly impacts on threatened frog and flora species, and to hanging swamps which are classified as an endangered ecological community;
- *Aboriginal heritage* – particularly potential impacts on a highly significant women's cultural site;
- *visual amenity*;
- *traffic*; and
- *socio-economics* – particularly potential impacts on surrounding regionally significant commercial and tourism-related land users including the bottled water production facility on the Gazzana property to the north, Australia Walkabout Wildlife Park (Walkabout Park) to the east and south, and Glenworth Valley Outdoor Adventures (Glenworth Valley) to the west of the site.

The Department has assessed the project application, EA, Responses to Submissions, PPR and submissions on the project in accordance with the objects of the EP&A Act and the principles of ecologically sustainable development. As part of this assessment, the Department has commissioned an independent expert to review the project's potential groundwater impacts.

Based on this assessment, the Department believes that Stage 5 of the quarry should not be approved, and that this area should be included in the permanent biodiversity offset strategy. This key recommendation would remove the uncertainty and inadequacy associated with the offset strategy as proposed by Rocla, and would increase the buffer distance between the quarry and land users to the south and south-east, including Walkabout Park.

The Department has also recommended conditions requiring Rocla to provide for a natural final landform, particularly in the vicinity of the Aboriginal 'Women's site', and to rehabilitate approximately one third of the Stage 4 pit to native woodland. Upon successful rehabilitation to agreed standards, this area would then be required to be included in the permanent biodiversity offset area. The outcome of these recommendations is that the culturally significant Women's site and its surrounds would be conserved in perpetuity, and could be added to the adjacent Popran National Park in the future (subject to separate agreement and/or approvals).

Following detailed environmental assessment, including the independent groundwater review, the Department is satisfied that the project is unlikely to have any significant impact on water resources in the locality, and can be undertaken in a manner that is consistent with the water sharing principles established under the *Water Management Act 2000*. The Department has recommended conditions requiring Rocla to provide compensatory water supply measures to any land users in the unlikely event that their groundwater supplies are affected by the project.

With regard to noise and dust, the environmental assessment indicates that the project would comply with all applicable health and amenity criteria at all existing surrounding receivers, even with the proposed Stage 5 extraction. The removal of Stage 5 would further reduce these emissions. The assessment indicates that the project would not contribute significantly to existing ambient noise and dust concentrations in the locality, with the noise environment largely dictated by existing traffic noise on the F3 Freeway and Peats Ridge Road.

With regard to biodiversity, the Department is satisfied that subject to the removal of Stage 5, the project is unlikely to have any significant impact on threatened flora, fauna and endangered ecological communities in the locality, and that the biodiversity offset strategy would ultimately provide for a conservation outcome that would improve or maintain the biodiversity values of the locality, and complement the adjacent Popran National Park.

Similarly, the proposed offset strategy, as amended by the Department's recommendations, would provide for a positive outcome for Aboriginal heritage in the locality, through the long term conservation of the culturally significant women's site and other Aboriginal sites and objects located on the project site.

The removal of Stage 5 would also assist in reducing residual visual impacts to acceptable levels, with only relatively distant and obscured views of the Stage 4 pit likely to be visible from elevated parts of the Walkabout Park and Glenworth Valley tourist facilities.

In this regard, the Department is satisfied that with the removal of Stage 5, the project is unlikely to have any significant impact on the existing tourist facilities at Walkabout Park and Glenworth Valley, or the commercial or socio-economic values of other land users in the locality.

The Department acknowledges that the project is likely to be incompatible with a recently approved camping area in an undeveloped part of Walkabout Park to the north of Darkinjung Road, immediately adjacent to the Stage 4 pit. However, following its consideration the Department believes that: the majority of the Walkabout Park property would not be significantly affected; the camping area is not central to the current or future needs of Walkabout Park; and that other opportunities and locations are likely to exist within the Walkabout Park site to expand its tourist facilities, including large areas within the fenced and developed area to the south of Darkinjung Road.

In its current form, the Department believes that the development of the camping area is inconsistent with the requirements of SREP 9 (which includes provisions to restrict development in the vicinity of regionally significant sand resources), and that any socio-economic benefits of the camping area in this location would not outweigh the socio-economic benefits associated with the quarry. This is reflected in Council's approval for the camping area, which includes a condition requiring the camping area to cease operating when noise, dust or other impacts occur from the quarrying operations.

Notwithstanding, the Department also recognises that the removal of Stage 5 from the quarry expansion proposal, and its inclusion in the on-site offset area, would benefit Walkabout Park by providing a considerable buffer of conservation land between the quarry and the Walkabout Park facilities. Further, the offset strategy together with the rehabilitation strategy would ultimately provide a considerable long term benefit for Walkabout Park by facilitating a largely conservation-based final land use that would complement Walkabout Park's eco-tourism land use.

The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the project complies with the relevant criteria and standards, and to ensure that the predicted residual impacts are effectively minimised, mitigated and/or at least compensated for. The Department believes that the conditions reflect current best practice for the regulation of extractive industry projects in NSW.

The Department also recognises that the site has long been identified as a regionally significant sand resource and/or a preferred location for extractive industries, and that there is a demonstrable need to develop new sand resources to meet the needs of the Central Coast and Sydney construction industry and ensure the continued access to affordable sand supplies.

On balance, the Department believes that the project's benefits sufficiently outweigh its residual costs, and that it is in the public interest and should be approved, subject to stringent conditions.

1 BACKGROUND

1.1 Project Background

Rocla Materials Pty Ltd (Rocla) owns and operates the Calga Sand Quarry on Peats Ridge Road, about 1.6 kilometres from the F3 Freeway in the Gosford local government area (see Figure 1).

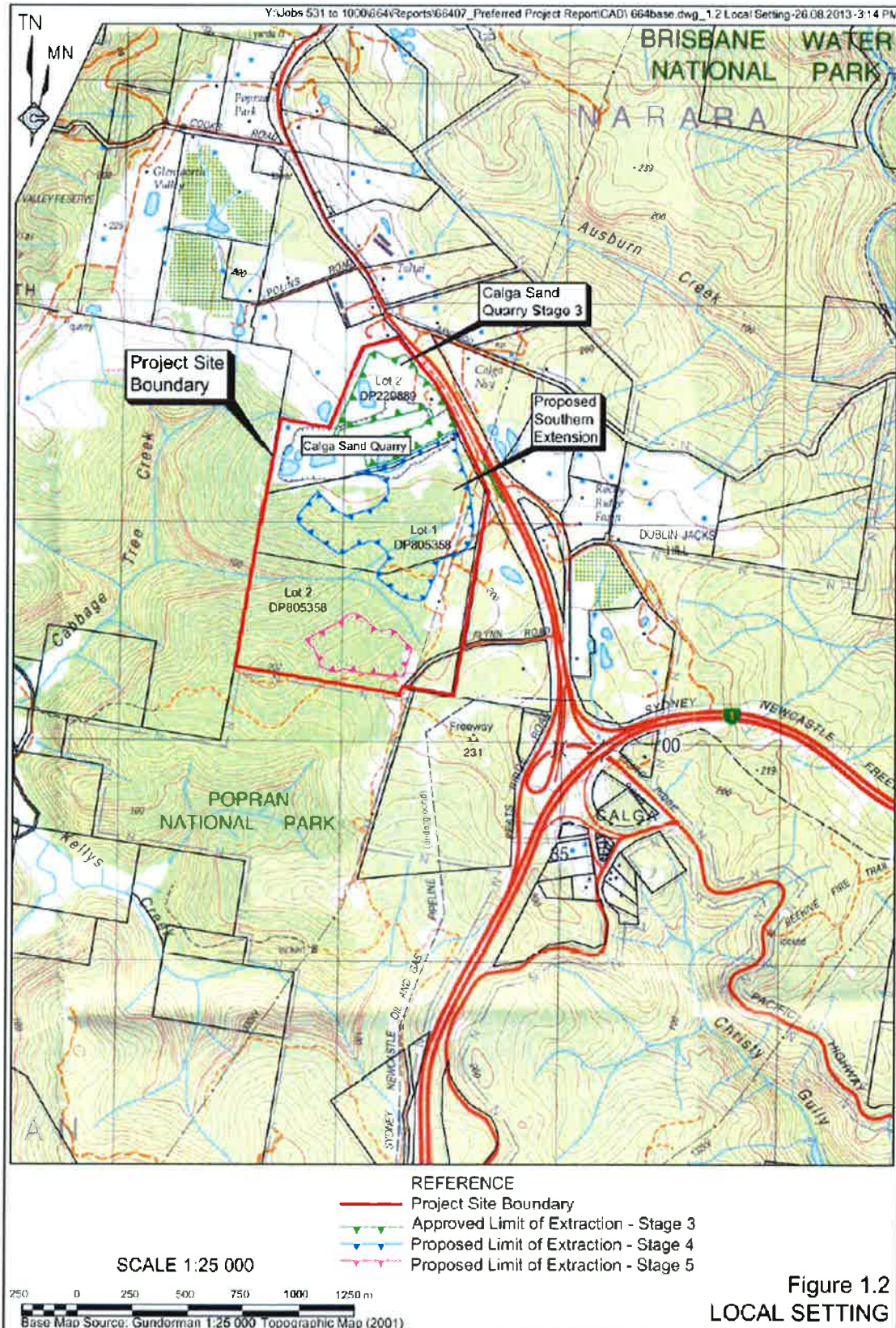


Figure 1: Locality Plan

The quarry has operated periodically since the late 1960's, and more formally since the early 1990's. It currently operates under a Ministerial approval that was granted in 2005 (DA 94-4-2004). Under this approval, Rocla is allowed to extract up to 400,000 tonnes of sand from the quarry a year until 2030. The existing quarrying area covers approximately 11.8 hectares (ha), and is referred to as Stage 3¹ (see green outlined area on Figure 1).

In 2005, the Roads and Maritime Services (RMS)² sold its surplus landholding immediately to the south of the Calga Sand Quarry to Rocla following a tender process. This landholding has been used for some small scale gravel extraction by the RMS in the past but is largely undeveloped. Rocla purchased the land with the view of extending the Calga Sand Quarry southwards onto the land. It is this southern extension which forms the basis for the current application. The current proposal involves quarrying in 2 new areas, referred to as Stage 4 and Stage 5, as well as continued quarrying in the Stage 3 area (see Figure 1).

1.2 Project Setting

The Calga Sand Quarry is located approximately 11 kilometres west of Gosford, and 2 kilometres north-west of Calga, on the Somersby Plateau (see Figure 1).

The Somersby locality is characterised by rolling agricultural land that has historically supported, and continues to support, a range of agricultural land uses, including horticulture and grazing.

The plateau is underlain by large resources of friable fine-medium grained sandstone, which breaks down readily to provide a valuable sand resource for the regional construction industry. The importance of this sand resource is recognised in a number of strategic plans, including *Sydney Regional Environmental Plan No. 8 (Central Coast Plateau Areas)* (SREP 8) and *Sydney Regional Environmental Plan No. 9 – Extractive Industry* (SREP 9). In this regard, the Calga Sand Quarry is specifically identified as a 'sand extraction area of regional significance' under SREP 9, and the existing site and proposed expansion site is mapped as a 'preferred location for extractive industries' under SREP 8.

A number of other existing and planned quarries are located in the locality, as indicated on Figure 2.

The sandstone geology of the Somersby Plateau also supports a large and high quality groundwater resource, which is highly valued both as domestic and agricultural water source, as well as a commercial water source for bottled water suppliers. One such bottled water supplier is located to the north of the existing Calga Sand Quarry on the Gazzana property (see Figure 3). The groundwater resource also forms an integral component of the environment, with the aquifer supplying baseflow to local creeks, and sustaining groundwater dependent ecosystems (including 'hanging swamps') which rely on the maintenance of a natural groundwater regime for survival.

On a local scale, the site and surrounding area is dominated by rural, rural-residential and conservation/tourism land uses (see Figure 3). Key land uses in the immediate area include the Popran National Park adjacent to the southern boundary of the site, Australia Walkabout Wildlife Park (Walkabout Park) adjacent to the eastern and southern boundaries of the site, and Glenworth Valley Outdoor Adventures (Glenworth Valley) adjacent to the western boundary of the site.

¹ Extraction of Stages 1 and 2 was completed under the former 1991 consent.

² Formerly the NSW Roads and Traffic Authority (RTA)

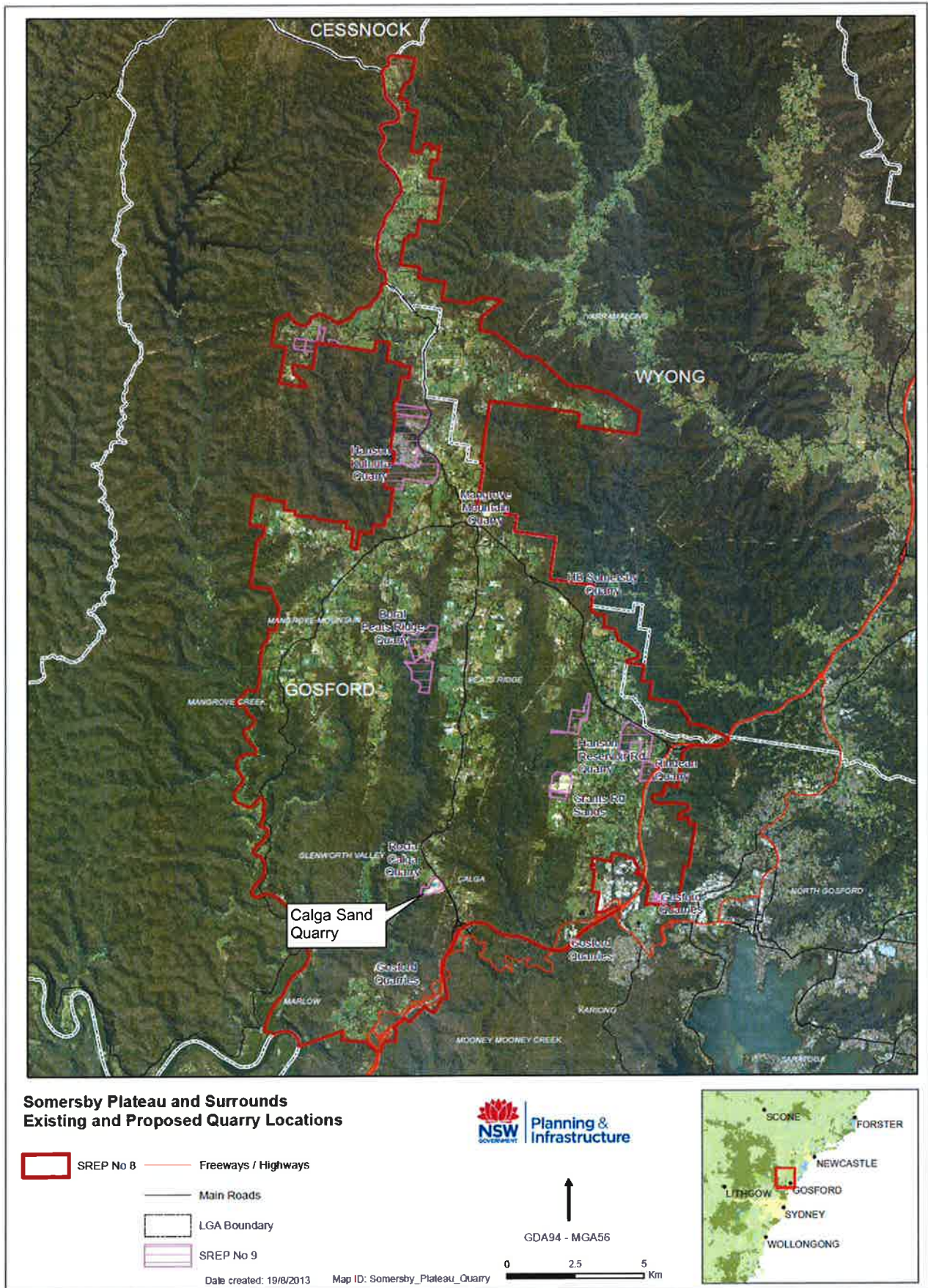


Figure 2: Project Setting

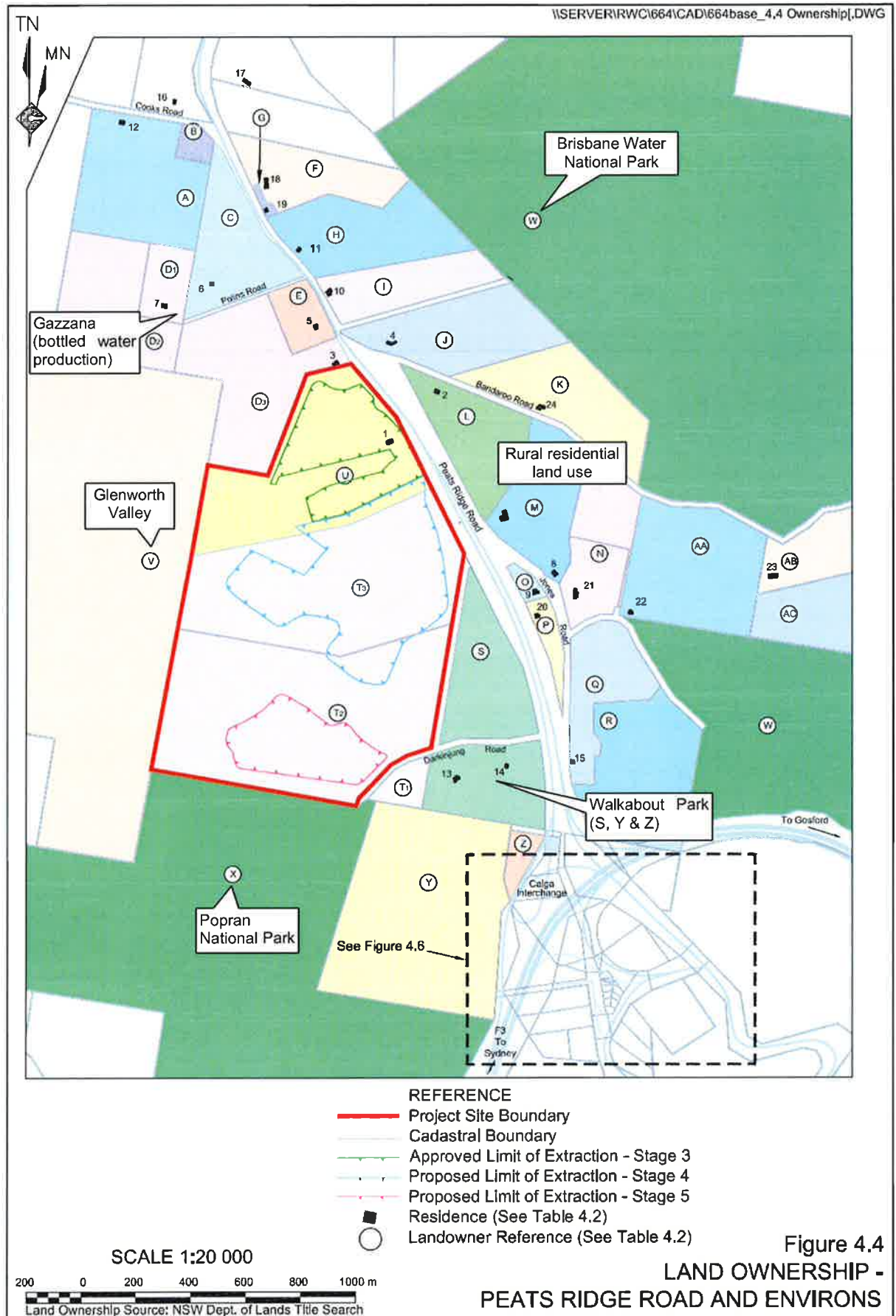


Figure 3: Surrounding Land Uses

There are 34 privately-owned, non project-related residences within 1.5 kilometres of the quarry site, with the closest approximately 90 metres from the existing extraction area (Stage 3) and approximately 320 metres and 270 metres from the proposed Stage 4 Stage 5 pits respectively.

Walkabout Park and Glenworth Valley are two of the Central Coast's most significant tourist facilities.

Walkabout Park is a privately-owned park that operates as a native wildlife sanctuary and zoo, providing visitors with a number of related services and facilities including educational tours, birthday parties, weddings, as well as overnight camping. In addition to native animal conservation, the park has a strong focus on Aboriginal heritage, with a number of Aboriginal sites located within the park and its surrounds. Walkabout Park had more than 75,000 visitors in 2012³.

Walkabout Park houses a range of native Australian animals within a feral-proof fenced 'enclosure' that encompasses approximately 32 hectares of the 72 hectare property. The Park's main facilities are located within this fenced area, which is located to the south of Darkinjung Road, and to the south-east of the quarry expansion site.

In December 2011 (subsequent to the exhibition of the quarry expansion EA), the Park submitted a masterplan and (initial) development application to Council for the staged development of the park. The masterplan is shown on Figure 4 and includes development in and around the existing facilities south of Darkinjung Road, as well as development in the currently undeveloped area to the north of Darkinjung Road, immediately adjacent to Stage 4 of the proposed quarry expansion. The masterplan is proposed to be developed in stages, including:

- Stage 1 – new overnight tourist accommodation cabins near the existing facilities south of Darkinjung Road;
- Stage 2 – the eco-centre adjacent the existing reception south of Darkinjung Road;
- Stage 3 – additional tourist cabins near the existing facilities south of Darkinjung Road;
- Stage 4 – development to the north of Darkinjung Road, involving a campsite around the former shale pit 'wetland' in this area of the site; and
- subsequent stages – additional development to the north of Darkinjung Road (including overnight tourist cabins, a café and visitor centre and parking facilities), as well as development south of Darkinjung Road including a new dwelling near the Calga Interchange.

Walkabout Park advises that it has obtained development approval for the first 3 of these stages (in June 2012), with Stage 1 complete and operational.

In February 2013, Walkabout Park submitted a development application to Gosford Council for Stage 4 of the masterplan, involving a campsite around the former shale quarry, immediately adjacent to the proposed Stage 4 quarry pit. The campsite (as submitted in the DA) involves provision of tents with little other infrastructure or services.

Council approved the DA on 16 August 2012 subject to conditions. In recognition of the precedence of the Calga Sand Quarry (and the proposed expansion), both in terms of the timing of the respective applications and the provisions of SREP 9⁴, the consent includes a condition⁵ requiring that the use of the camping ground shall cease or not operate during times when noise, dust or other impacts occur from the adjoining quarry operations.

Glenworth Valley operates a large horse riding and outdoor adventure facility to the west of the Calga Sand Quarry. Along with guided trail horse riding, Glenworth Valley provides a range of outdoor activities and services including kayaking, quad bike riding, laser skirmish and clay pigeon shooting, abseiling, bushwalking, mountain biking, camping and horse agistment. The facility is also used as a venue for weddings, music festivals and cultural events. Most of the facilities associated with Glenworth Valley are located over 1 kilometre from the existing (and proposed) quarry operations, although Glenworth Valley notes that some of its horse riding trails pass by close to the quarry site.

³ Based on information provided by Walkabout Park.

⁴ Clause 16 of SREP 9 provides that a council must not grant consent to carry out development of land in the vicinity of sand extraction areas of regional significance unless satisfied that the development: will not be adversely affected by noise, dust, vibration or reduced visual amenity from any nearby extractive industry; and that it will not in any way adversely affect any existing nearby extractive industry or prevent any such extractive industry from realising its full economic potential by adversely affecting future expansion of the extractive industry.

⁵ Condition 6.2 of DA 43446/2013

NOTE:
 THIS APPLICATION IS FOR 10 X ECO TOURIST CABINS & A MULTI PURPOSE CENTRE ONLY, ALL OTHER COMPONENTS OF THIS MASTER PLAN ARE SUBJECT TO SEPERATE DEVELOPMENT APPLICATIONS.

MASTER SITE PLAN
 SCALE 1:2000 @ A3

AMENDMENT A: JAN 2012 - CORRECTION OF PROPERTY

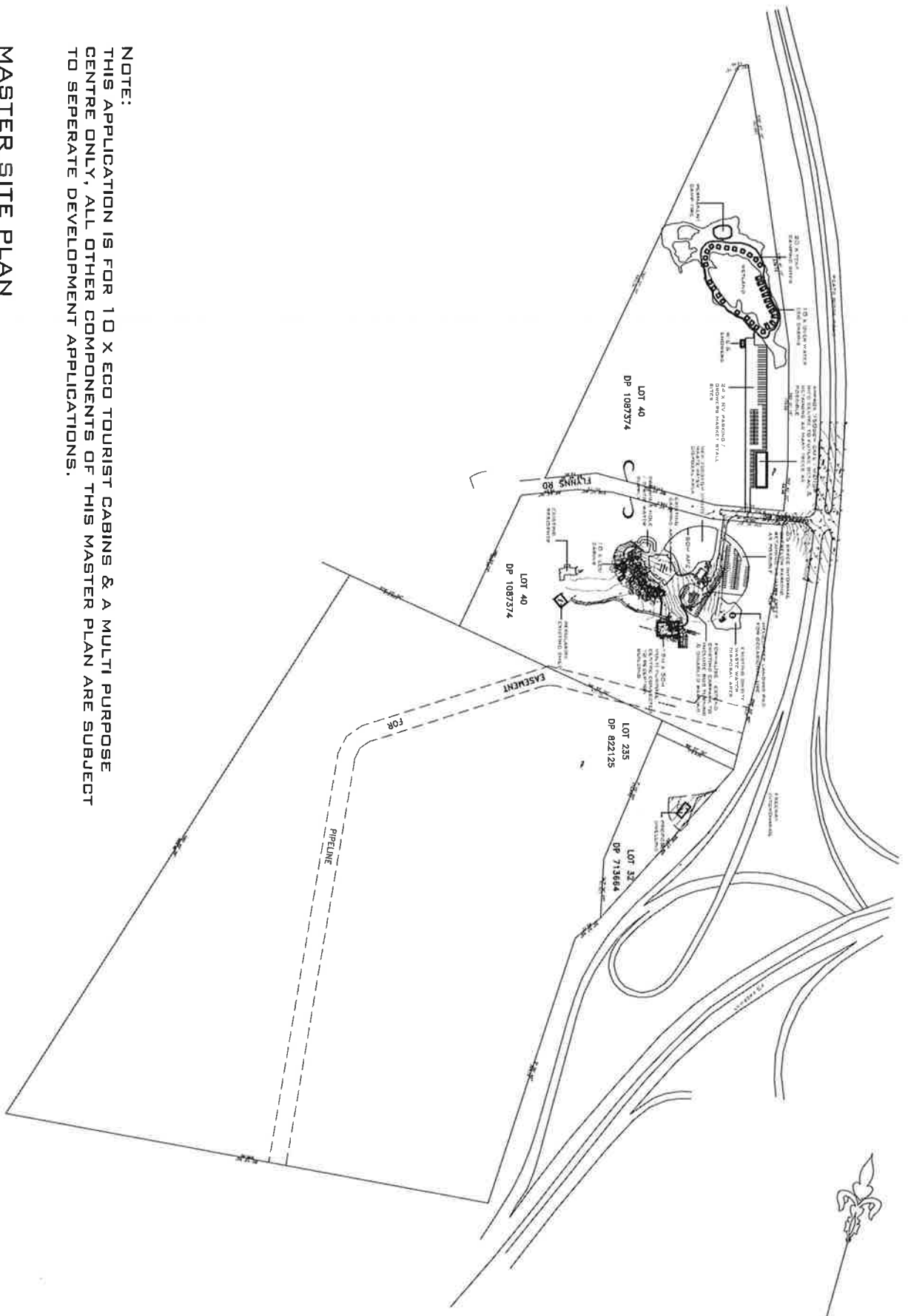


Figure 4: Walkabout Park Masterplan

The Calga Sand Quarry enjoys good access to the arterial road network, with the F3 Freeway's Calga Interchange located approximately 1.6 km to the south-east of the existing site entrance, with access directly from Peats Ridge Road, a former State road which has recently been handed to Council.

1.3 Project Need

The Department recognises that there is an ongoing need to develop new sand deposits to meet the demand of the construction industry both on the Central Coast and the wider Sydney region. At present, this demand equates to about 6 to 7 million tonnes of sand a year, with the Central Coast accounting for about 10% of this total. As an integral raw material to the construction industry, an adequate supply of reasonably priced sand is imperative to keeping building costs affordable across the region.

The need to develop additional sand resources has increased in recent years, as Sydney's traditional sources of construction sand are depleted. In particular, the Penrith Lakes Scheme, which has traditionally supplied around 25% of the region's fine-medium grained sand, is winding down with economic sand resources expected to be depleted by around 2014. It is currently supplying about 10% of the region's demand.

Sydney's other major traditional fine-medium grained sand resource, the Kurnell Peninsula, is also winding down with only one operator still extracting sand from the resource. Kurnell supplies about 25% of the region's sand demand.

Whilst there have been some new sand resources opened up in recent years, including the Mackas Sand Project on the Stockton Bight near Newcastle, the Department is satisfied that there is an ongoing need for the development of new resources close to the Sydney market, to ensure depth in the sand supply market and maintain downward pressure on raw materials prices.

The Somersby Plateau has long been identified⁶ as an important current and future source of fine-medium grained sand for the region's construction industry. Other important existing or potential sources include Maroota, Stockton Bight, the Southern Highlands, the Newnes Plateau and other smaller resources, as well as off-shore marine aggregates and recycled materials.

The large resource on the Somersby Plateau comprises friable (ie. crumbly) fine-medium grained sandstone. As outlined above significance of these resources is recognised in environmental planning instruments including *SREP No.9 – Extractive Industry* and *SREP No.8 – Central Coast Plateau Areas*.

Consequently, the Department is satisfied that there is a demonstrable need for the project in terms of meeting the region's current and future demand for fine-medium grained sand resources.

At the local level, the Department recognises that the Calga Sand Quarry is recognised (in SREP 9) as a regionally significant sand resource, and in an area mapped as a preferred location of extractive industries (in SREP 8). The subject expansion site has also supported quarrying activities in the past, and enjoys very good access to the arterial road network.

However, the Department recognises that a balance must be met in the promotion and co-ordination of the orderly and economic use of land; the proper management and development of the State's resources; and the protection of the environment and ecologically sustainable development. The Department has considered these matters in detail in its assessment of the merits of the project.

⁶ As identified in Sydney Regional Environmental Plan No. 9 – Extractive Industry (No.2 - 1995) and the Department's *Supply and Demand of Construction and Industrial Sand for the Sydney Market*, Dec 2004

2 PROPOSED PROJECT

Rocla is proposing to expand the Calga Sand Quarry to the south of the existing quarry area, and to increase the quarry's existing production rate of 400,000 tonnes a year of sand products to (up to) 1 million tonnes a year of sand products.

The proposal includes the continued operation of the existing quarry (identified as Stage 3), and the southern expansion in 2 separate pits (identified as Stage 4 and Stage 5). The layout of the expansion area is somewhat irregular in shape, as it has been designed to:

- avoid identified significant Aboriginal heritage sites;
- avoid identified threatened species habitat and creek lines (in particular 'Creek B' located between Stage 4 and Stage 5);
- provide reasonable setbacks to property boundaries; and
- address the topographical and geological constraints of the site and sand resource.

Since the exhibition of the EA, Rocla has made some additional changes to the expansion area to further reduce the project's environmental impacts. These include:

- increasing the setback to identified Aboriginal heritage sites in the Stage 4 area;
- increasing the setback to identified Aboriginal heritage sites and threatened species habitat in the Stage 5 area;
- amending an access road corridor to avoid Aboriginal heritage sites;
- amending the biodiversity offset strategy to include the Stage 5 area as an 'interim offset'; and
- amending the Stage 4 and Stage 5 pits to avoid conflicts in Transgrid's electricity easement in the eastern area of the site.

These changes have reduced the total sand resource in the expansion area by about 2 million tonnes, or about 15% of the original identified resource in Stages 4 and 5.⁷

The major components of the project as amended are summarised below in Table 1, and depicted in Figures 5 to 8. The project is described in full in Rocla's EA (see Appendix I), PPR (see Appendix F) and supplement to the PPR (see Appendix D).

Table 1: Major components of the project

Aspect	Description
Project Summary	<ul style="list-style-type: none"> • Continuation and expansion of the Calga Sand Quarry to recover an additional 13.2 million tonnes of sand; • Extraction, processing and transportation by road of up to 1 million tonnes of sand products a year; • Importation of raw materials for blending; and • Progressive rehabilitation of the site.
Total Site Area	130 hectares (ha)
Extraction Area	43.4 ha (36.2 ha in Stages 4 and 5, with 7.2 ha remaining in Stage 3)
Total Sand Resource	<ul style="list-style-type: none"> • Stage 3 – 2.5 million tonnes • Stage 4 – 8.7 million tonnes • Stage 5 – 2.0 million tonnes • Total – 13.2 million tonnes
Extraction Method	Ripping of friable sandstone, excavator and bulldozer for loading in to trucks to be transported to the processing sites (blasting is not proposed)
Extraction staging	Extraction would occur over three stages (Stages 3, 4 and 5) with each stage occurring concurrently at times during the life of the project. Extraction from Stage 3 would continue as currently approved. Stage 4 would commence in Year 1 with Stage 5 commencing in approximately Year 19
Depth of Extraction	Between 8 metres and 30 metres below existing ground level
Processing and Facilities	Site processing facilities would be located in 4 areas during the life of the project, changing locations based on the configuration of extraction stages. An additional processing plant would be installed to increase the project's annual production capacity to 1 million tonnes or a single processing plant with a 1 million tpa capacity would be installed.
Main Products	Concrete sand (washed sand), mortar sand (unwashed sand) and blended products (using imported products including soils, aggregates and excavated sandstone).

⁷ This change, along with other references to areas in Table 1, excludes the additional reduction as a result of the amendments to avoid conflicts in Transgrid's electricity easement, which occurred after submission of the PPR (see Appendix C).

Aspect	Description
<i>Production</i>	Up to 1 million tonnes of sand products a year (average production approximately 550,000 tonnes a year)
<i>Product Transport</i>	All products would be transported by road along Peats Ridge Road with the vast majority headed south to the F3 Freeway. Occasional trucks would head north to local customers via Peats Ridge Road. At full production the maximum predicted truck movements to and from the quarry is 240 a day (in + out) Monday to Friday and 90 on Saturdays
<i>Project Life</i>	30 years
<i>Hours of Operation</i>	Quarry Operations: 6 am – 10 pm Monday to Friday and 6 am – 6 pm Saturday Product Transport: 5 am – 10 pm Monday to Saturday
<i>Employment</i>	Construction workforce of up to 6 (full-time equivalents) and an operational workforce of up to 16 people full-time
<i>Capital Value</i>	\$5 million
<i>Construction</i>	<p>Construction of a new southern site entrance and intersection on Peats Ridge Road, internal site access road, wheel wash facility, various temporary earth noise/visual bunds, and processing plant would be undertaken where required depending on the staging of extraction.</p> <p>Provision has also been made for an access road corridor to provide access from Peats Ridge Road to the Glenworth valley property. However, construction of this road would be subject to a separate approval.</p>
<i>Waste Management</i>	<p>Overburden, oversize materials and fines would be used in the construction of bund walls, water storage dams and other site infrastructure, construction and capping of silt cells, blending to create sand products and in the creation of the final landform.</p> <p>All other non-production wastes would be collected and disposed of by licensed waste disposal contractors.</p>
<i>Rehabilitation</i>	<p>The Stage 3 and 4 pits would be rehabilitated to provide a free draining landform gently sloping to the southwest approximately 10 to 20 metres below the pre-extraction ground level. The landform would be primarily revegetated with native groundcover, with some trees, to support a range of potential final land uses such as agriculture, sporting fields and/or commercial/industrial centre (subject to rezoning).</p> <p>The Stage 5 pit would not be free-draining, with a water storage located in the western area of the pit, with a moderately sloped landform draining to this storage. The final landform would be vegetated with native trees and shrubs, to support an anticipated future land use of nature conservation.</p>
<i>Biodiversity Offsets</i>	<p>The biodiversity offset strategy comprises approximately 97 hectares of native vegetation (or 102 hectares in total), including an:</p> <ul style="list-style-type: none"> • Off-site Offset Area – 41 hectares; and • On-site Offset Area – 56 hectares (including 9 hectares in the Stage 5 pit which is proposed as an 'interim offset'). <p>Rocla proposes to secure an alternative offset for the proposed Stage 5 interim offset, prior to quarrying in Stage 5.</p>

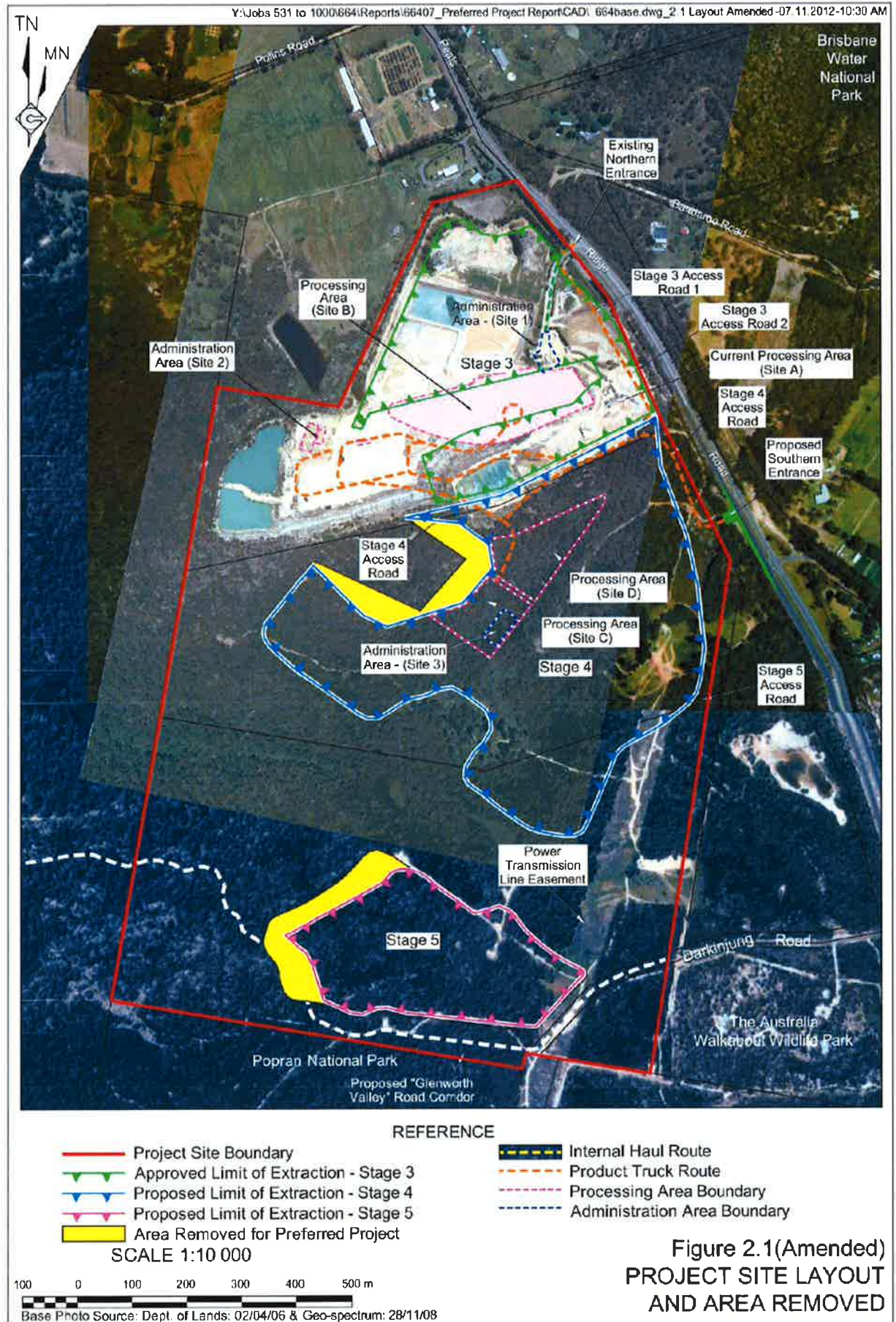


Figure 5: Proposed Site Layout (As Amended)

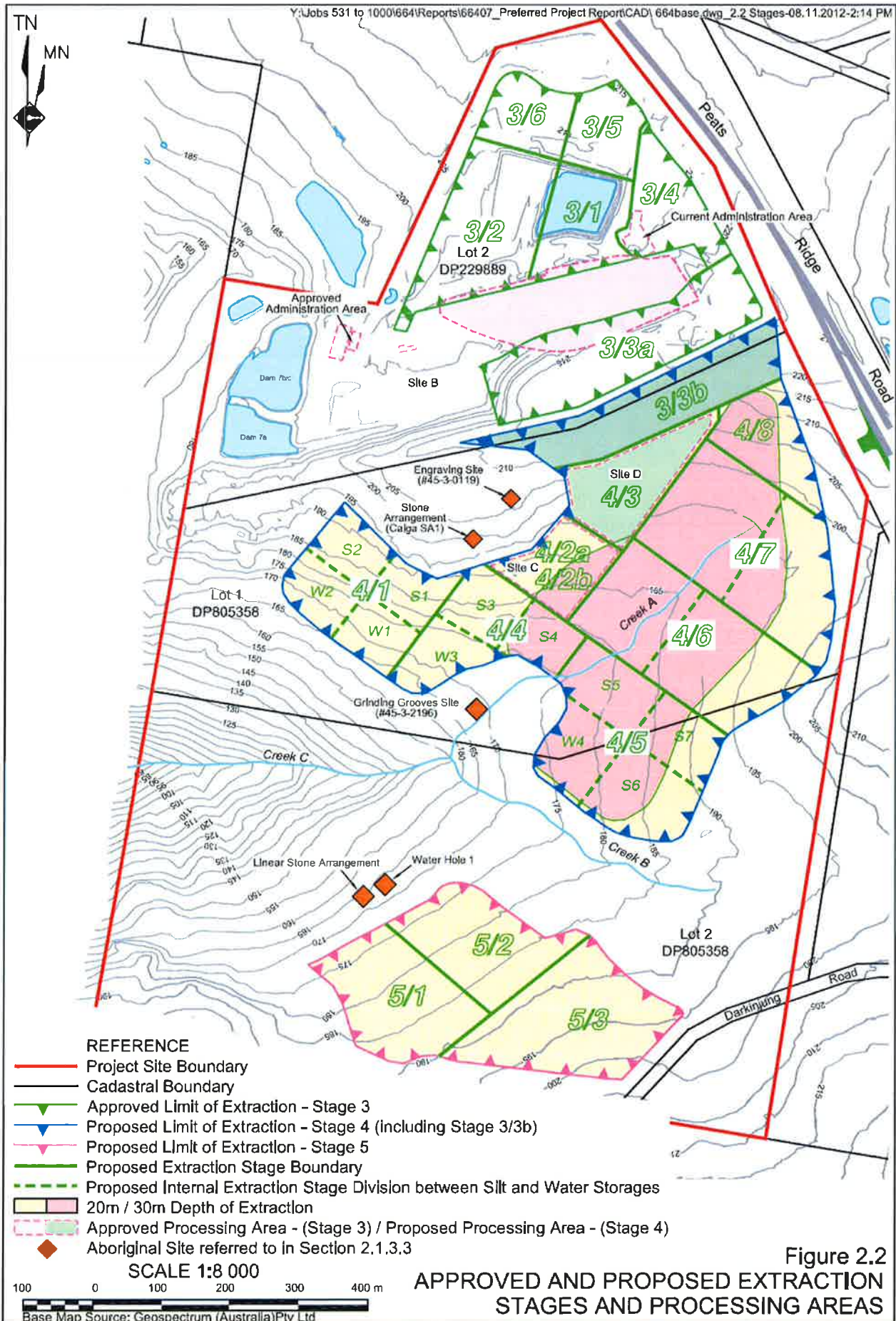


Figure 6: Extraction Staging

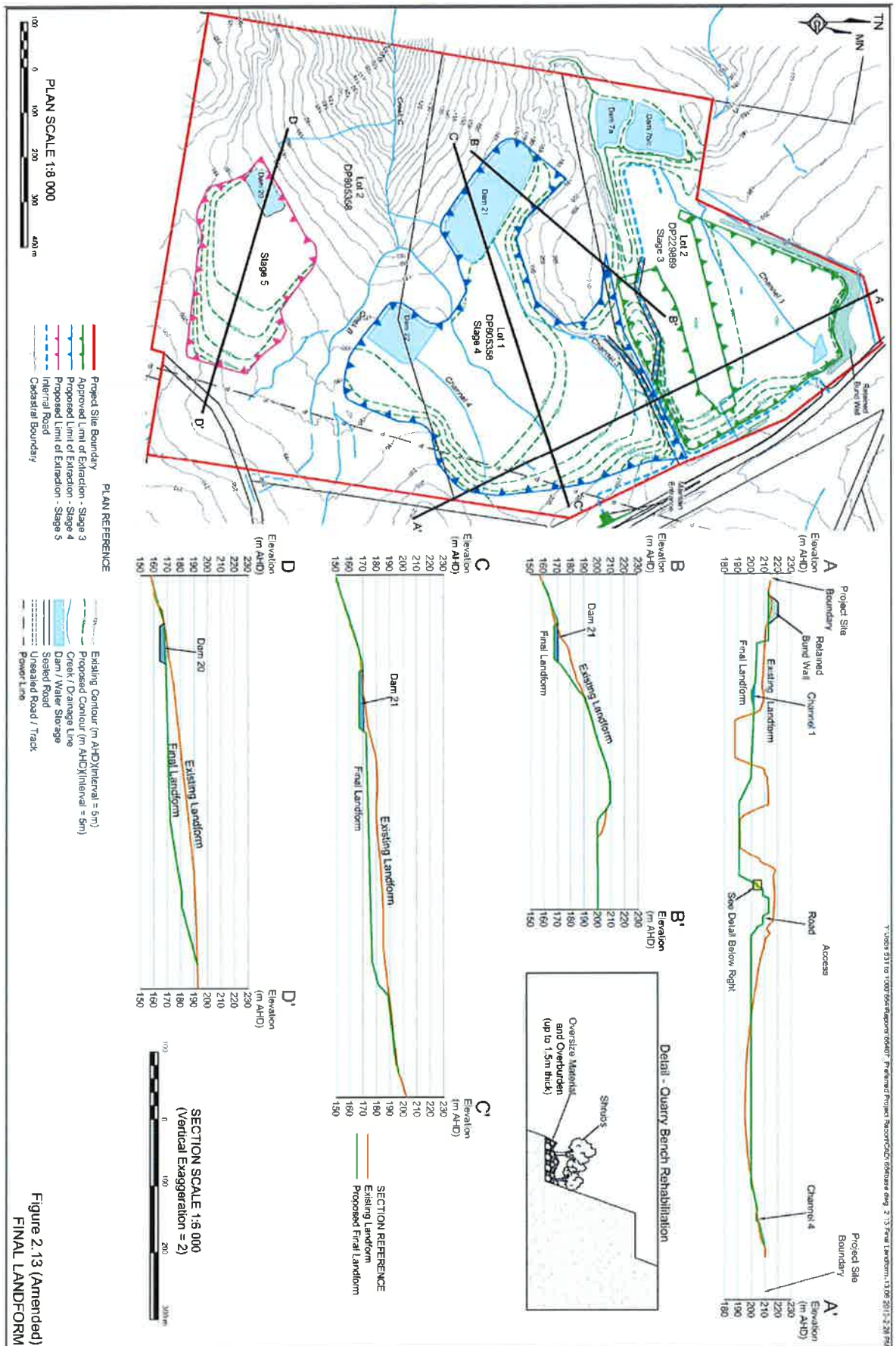


Figure 7: Final Landform

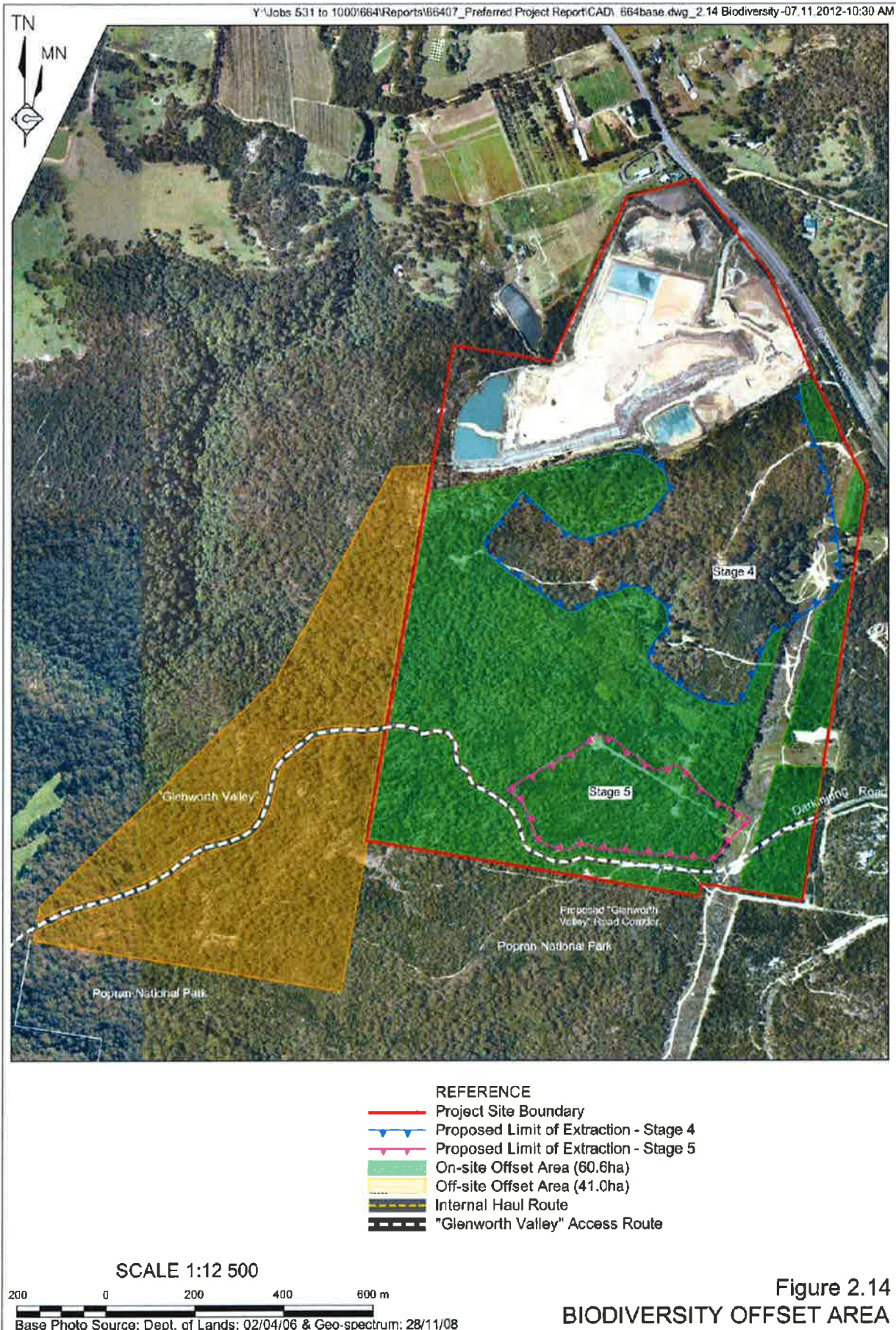


Figure 2.14
BIODIVERSITY OFFSET AREA

Figure 8: Biodiversity Offset Strategy

3 STATUTORY CONTEXT

3.1 Major Project

The project was declared to be a major project under Part 3A of the *Environmental Planning and Assessment Act 1979*, because it is development for the purpose of extractive industry with an extraction rate of more than 200,000 tonnes per year, and therefore met the former criteria in clause 7 of schedule 1 of *State Environmental Planning Policy (Major Development) 2005*.

Although Part 3A of the EP&A Act was repealed on 1 October 2011, the project remains a 'transitional' Part 3A project under schedule 6A of the Act. Consequently, the Minister for Planning and Infrastructure is the approval authority for the project application. However, the project falls within the Minister's delegation to the Planning Assessment Commission (PAC) dated 14 September 2011, because there were more than 25 public submissions in the nature of objections. Consequently, the PAC must determine the application.

3.2 Permissibility

The majority of the existing Calga Sand Quarry site, and the proposed expansion site, is zoned 7(b) Conservation and Scenic Protection (Scenic Protection) under the *Gosford Interim Development Order (IDO) No.122* (see Figure 9). A small portion of the land adjacent to Peats Ridge Road is currently zoned 1(b) Rural (Highway Protection) under the IDO. Further, a triangular portion of the land in the western part of the expansion site is zoned 7(a) Conservation and Scenic Protection (Conservation) under the IDO, however the project does not involve any development in this zone.

As outlined in Section 4, Gosford Council questioned the characterisation of the project as an extractive industry, because the proposal also involves importation of some material for blending with extracted material. The Department has considered this issue and is satisfied that the proposed importation of material for blending represents a minor component of the project and is ancillary to the dominant extractive industry purpose. As such, the Department is satisfied that the proposal can be correctly characterised as an extractive industry.

Under the Gosford IDO, development for the purpose of extractive industry is permissible with consent in the 7(b) Scenic Protection zone, but prohibited in the 1(b) Highway Protection zone.

However, as outlined above *Sydney Regional Environmental Plan (SREP) No.8 – Central Coast Plateau Areas* applies to the site, and the entirety of the site is identified as a 'preferred location for extractive industries' on the map to the SREP. Clause 7(1) of the SREP provides that extractive industry is permissible with consent on such land.

Further, *SREP No.9 – Extractive Industries* also applies to the site, as the existing quarry (Lot 2 in DP 299889) is identified in schedule 1 to the plan as a sand extraction area of regional significance. Clause 7(2) of the SREP provides that development for the purpose of extractive industries is permissible with consent on land to which the plan applies. It is noted that the expansion site (Lots 1 and 2 in DP 805358) is not formally included in schedule 1 of the SREP, even though it is part of the same sand resource.

In addition to the permissibility under the SREP 8 and/or SREP 9, the proposed extraction within the 1(b) zone is also permissible under clause 7 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP), which makes extractive industries permissible with consent in any zone where agriculture may be carried out. Agriculture is permissible without consent in the 1(b) zone.

Consequently, the Department is satisfied that all aspects of the proposal are permissible under the IDO, Mining SEPP, SREP 8 and/or SREP 9, and that the PAC may determine the application.

The Department also notes that although currently zoned 1(b) for highway protection, the RMS de-proclaimed Peats Ridge Road as a classified road in 2008 and has handed formal control of the road back to Council, as it no longer plans to construct a highway in the corridor. Council's Draft *Gosford Local Environmental Plan 2009* reflects this de-proclamation, with the highway protection zoning removed, and the site zoned RU2 Rural Landscape under the draft LEP. Extractive industries are permissible with consent in the RU2 zone under the draft LEP.

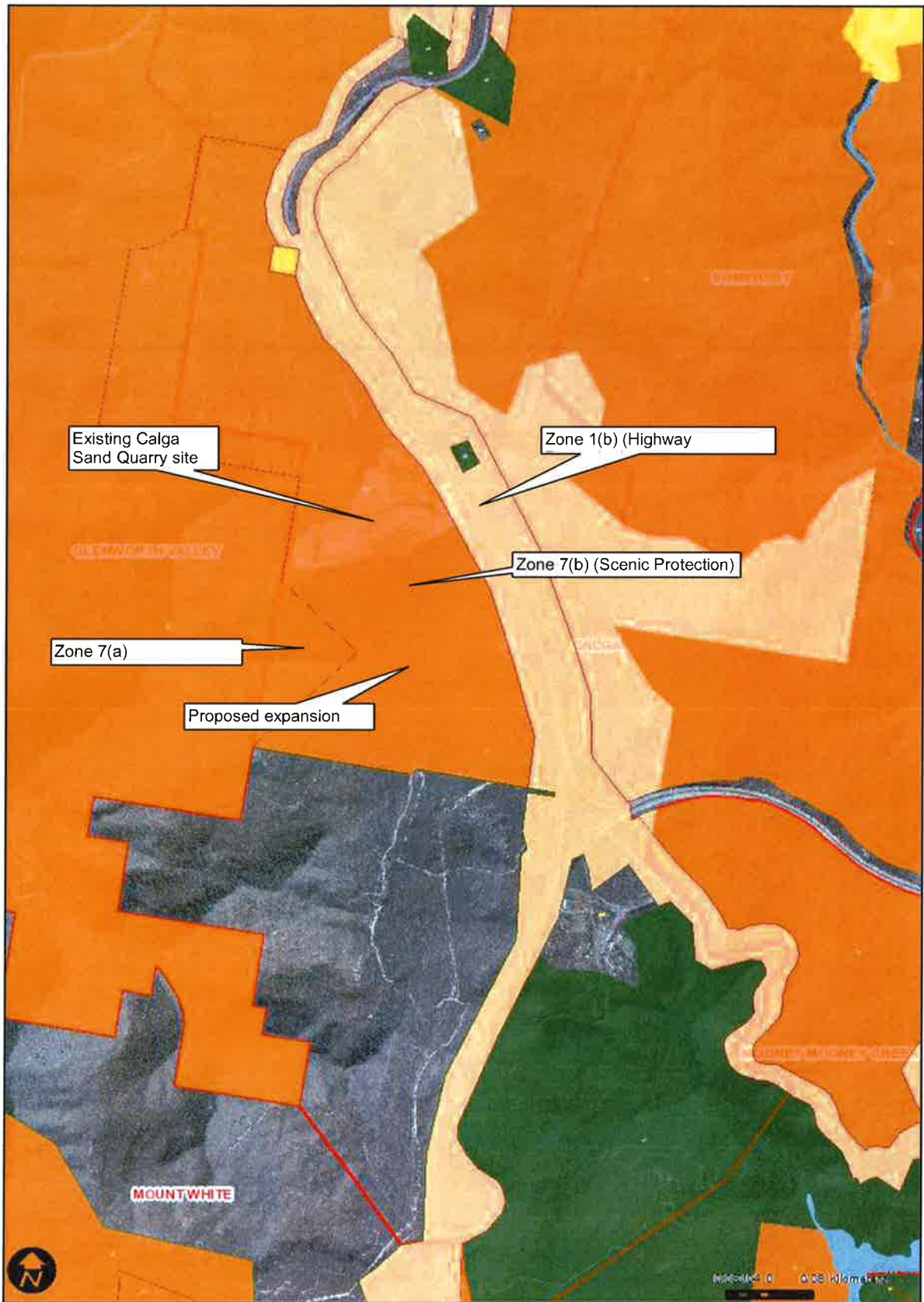


Figure 9: Site Zoning

3.3 Integrated and Other Approvals

Under Section 75U of the EP&A Act, a number of approvals required under other legislation are integrated into the Part 3A approval process, and consequently are not required to be separately obtained for the project. These include:

- heritage-related approvals under the *National Parks and Wildlife Act 1974*; and
- some water-related approvals under the *Water Management Act 2000*.

Under Section 75V of the Act, a number of further approvals are required to be obtained, but must be approved in a manner that is consistent with any Part 3A approval for the project. These include:

- variations to the existing environment protection licence under the *Protection of the Environment Operations Act 1997*; and
- approvals for the site access intersection construction under the *Roads Act 1993*.

Rocla also requires other approvals for the project which are not integrated into the Part 3A approval process, including water licencing under the *Water Management Act 2000*.

The Department has consulted with the relevant government authorities responsible for these integrated and other approvals (see Section 4), and considered the relevant issues relating to these approvals in its assessment of the project (see Section 5). None of the relevant authorities object to the project on grounds related to these other approvals.

3.4 Exhibition

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

After accepting the EA for the project, the Department:

- made it publicly available from Friday 27 November 2009 until Friday 19 February 2010:
 - on the Department's website;
 - at the Department's Information Centre, Gosford City Council, and the Nature Conservation Council;
- notified landowners in the vicinity of the site about the exhibition period by letter;
- notified relevant State government authorities and Gosford City Council by letter; and
- advertised the exhibition in the *Central Coast Express Advocate*.

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

Given the considerable time between the exhibition of the EA and Rocla's submission of its Response to Submissions (see Appendix G) and PPR (see Appendix F), following receipt of these documents the Department:

- made the RTS and PPR publicly available from Friday 16 November 2012 until Friday 25 January 2013⁸ at the same locations as the EA;
- notified people who made submissions on the original project about the exhibition period by letter/email;
- notified relevant State government authorities and Gosford City Council by letter; and
- advertised the exhibition in the *Newcastle Herald* and the *Central Coast Express Advocate*.

The Department also made other documents publicly available on its website during the assessment process, including the:

- project application;
- Director-General's environmental assessment requirements; and
- submissions received during the exhibition of the RTS and PPR⁹.

3.5 Environmental Planning Instruments

Under Section 75I of the EP&A Act, the Director-General's report is required to include a copy of (or reference to) the provisions of environmental planning instruments that substantially govern the carrying out of the project.

⁸ This date was extended by one month (ie. from 21 December 2012) during the exhibition period, in response to requests from some submitters. Further extensions were provided to some community groups, including Walkabout Park and the Calga Peats Ridge Community Group, who provided submissions in February 2013.

⁹ Submissions on the original EA were not made publicly available on the Department's website for privacy reasons, as the exhibition of the EA predated the Department's policy of making such documents publicly available.

The Department has considered the project against the relevant provisions of several environmental planning instruments (see Appendix B), as well as Rocla's consideration of these instruments (see Appendix I). In summary, the key instruments of relevance to the project include:

- *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP);
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP);
- *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP);
- *Sydney Regional Environmental Plan (SREP) No.8 – Central Coast Plateau Areas*;
- *Sydney Regional Environmental Plan (SREP) No.9 – Extractive Industries*; and
- *Gosford Interim Development Order (IDO) No.122*.

Based on its consideration, the Department is satisfied that the project is able to be undertaken in a manner that is generally consistent with the applicable environmental planning instruments.

3.6 Objects of the Environmental Planning and Assessment Act 1979

The Minister should 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, 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), (iii), (vi) and (vii).

The Department is satisfied that the project encourages the proper use of resources (Object 5(a)(i)) and the promotion of orderly and economic use of the land (Object 5(a)(ii)), particularly as the project is a permissible land use and the sand resource is a recognised sand resource of regional significance and located in a preferred location for extractive industries as identified in relevant environmental planning instruments (including SREP 8 and SREP 9).

However, the Department also recognises the potential conflict with other land uses in the area (particularly tourism uses associated with Walkabout Park and Glenworth Valley), and has assessed the potential impacts on these land uses in detail in Section 5 of this report.

With regard to protection of communication and utility services (Object 5(a)(iii)), the Department notes that the proposed quarry expansion encroaches into a 330kV Electricity Transmission Line corridor that runs north-to-south through the site. Rocla has provided confirmation from Transgrid that the proposed development within this corridor is acceptable, subject to certain amendments to the quarry pits (which Rocla has adopted) and the implementation of a range of standard measures to protect and manage Transgrid's assets (see Appendix D).

Consideration of environmental protection (Object 5(a)(vi)) is provided in Section 5 of this report. 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 impact threatened species of the locality. However, this conclusion is subject to the removal of Stage 5 from the project, which the Department has recommended.

The Department has considered the encouragement of ESD (Object 5(a)(vii)) 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. Rocla 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.

3.7 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 environmental assessment requirements with respect to the project.

The Department is satisfied that the environmental assessment requirements have been complied with.

4 CONSULTATION

The Department received a total of 2,827 submissions in response to the exhibition of the EA, including:

- 7 from public authorities (DPI, EPA, OEH, NOW, NSW Health, RMS and Gosford City Council);
- 7 from special interest groups; and
- 2,813 from the general public, including 2,693 form letters/emails.

Following exhibition of Rocla's Response to Submissions and PPR, the Department received a further 19 submissions (either as new submissions or updates to previous submissions), including:

- 5 from public authorities (DPI, EPA, OEH, NSW Health and Gosford City Council);
- 6 from special interest groups; and
- 8 from the general public.

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

Since the exhibition period, the Department has continued to receive a number of representations from special interest groups and the general public in relation to the project. The Department has also consulted further with Rocla, key public authorities, and selected special interest groups in order to get a better understanding of the key issues, and inform the assessment of the merits of the project. This included a site inspection of the Walkabout Park and existing quarry site on 27 March 2013.

4.1 Public Authorities

None of the public authorities object to the project. However, most of the authorities raised concerns and/or made recommendations in relation to a range of issues.

The **Department of Primary Industries**¹⁰ (DPI's) Division of Resources and Energy supports the expansion of the quarry, noting that it is an important source of construction sand in NSW, with demand expected to increase as operations at Kurnell decline. DPI's Fisheries Division has no concerns with the project provided that adequate erosion, water quality and habitat rehabilitation measures are implemented. DPI's Agriculture Division recommended measures be implemented to restrict dust and noise impacts on agricultural land to the east of Peats Ridge Road, to keep the local agricultural community informed about the operations, to ensure rehabilitation seeks to return soils and drainage to pre-mining quality, and to fence the project to prevent animals from entering the extraction areas.

The **Environment Protection Authority (EPA)**¹¹ initially raised some technical concerns in relation to Rocla's noise assessment, however following provision of a supplementary noise assessment it later confirmed that it was satisfied that the noise emissions from the project were licensable (ie. not significant), and that Rocla's request for early morning 'shoulder period' noise criteria was justified

¹⁰ Formerly the Department of Industry and Investment

¹¹ Formerly the Department of Environment, Climate Change and Water (DECCW)

given the elevated background freeway noise in the area in the early morning. The EPA was also satisfied with the air quality assessment, but recommended that Rocla be required to implement real-time fine particulate (PM₁₀) monitoring at two locations.

The **Office of Environment and Heritage (OEH)**¹² noted that the proposed biodiversity offset strategy was on the low side (in terms of size) of what it would normally accept for such a development, but otherwise supports the on-site and off-site offset areas in principle because they: are close to Popran National Park (ie. are not isolated or fragmented); are generally representative of the vegetation to be cleared; provide good quality habitat for fauna; and because they can (mostly) be conserved in perpetuity.

OEH does not support the inclusion of the Stage 5 extraction area in the offset area, as it may be subject to future extraction if Rocla identifies a suitable alternative offset. Nonetheless, OEH recommends that the Stage 5 area is managed for conservation purposes prior to gaining subsequent approval to extract the Stage 5 area.

OEH also made comments regarding the ability to provide for the long term conservation security of the off-site offset area given that it is owned by Glenworth Valley, and also commented on its preferred security mechanism to protect the offsets in perpetuity. It also noted that the Sandstone Hanging Swamp vegetation community has recently (ie. since the EA) been classified as an endangered ecological community.

With regard to Aboriginal heritage, OEH noted that the assessments have identified 15 Aboriginal sites in the project area, and that there is a chance that more may occur. While acknowledging the cultural significance of the area to the Aboriginal community, OEH notes that the project would affect only one of the identified sites, and accepts Rocla's commitments to prepare and implement a detailed Aboriginal Cultural Heritage Management Plan for the project. OEH recommended that this plan be developed and implemented in close consultation with the Aboriginal community, and recommended a number of measures for inclusion in the plan.

NSW Office of Water (NOW) identified that the Calga Sand Quarry does not currently have enough water licences attached to it to account for the existing groundwater take by the Stage 3 operations. However, it also acknowledged that Rocla holds several water access licences in the relevant water source which are not as yet linked to the quarry. Accordingly, NOW recommended that Rocla be required to address this administrative issue and demonstrate that it has adequate water licences linked to the Calga quarry, prior to any expansion.

With regard to the groundwater assessment, NOW noted that the modelling lacked a 'transient' model calibration, but on balance acknowledged that the 'steady state' model calibration provided a close match and was satisfactory.

NOW also noted that there is some uncertainty regarding the potential impacts on groundwater dependent ecosystems (GDEs), and consequently recommended a precautionary approach involving comprehensive monitoring and contingency/compensatory measures, if required. It recommended similar compensatory water supply measures in the event that any surrounding groundwater users' water supplies are affected by the project.

NSW Health recommended that Rocla be required to undertake detailed groundwater quality monitoring, along with provision of compensatory water supply measures if required. It also noted that it would have been preferable that the air quality assessment was based on local baseline data (rather than the ambient data for Richmond as adopted in the assessment, and the assumptions made for background respirable crystalline silica), but nonetheless recommended that Rocla be required to undertake real-time (continuous) air quality monitoring for PM₁₀ and PM_{2.5}.

The **RMS** did not raise any concerns in relation to the project, following provision of additional road safety information from Rocla.

Gosford City Council (Council) raised a wide range of concerns and/or made comments in relation to:

¹² The OEH's original submission was prepared under the letterhead of the former DECCW

- *Traffic* – in particular the capacity of the local road network to cope with the increased production. Council recommended road/intersection upgrades associated with the proposed new site access;
- *Noise and Air Quality* (including crystalline silica) – including a recommendation that hours of operation should be based on predicted noise impacts;
- *Groundwater* – including lack of clarity on compensatory water supplies for affected water users, and the potential for salinity increase;
- *Surface Water* – including a lack of consistency in setbacks to creeks, and concerns about water discharges from the quarry and consequent downstream impacts;
- *Aboriginal Heritage* – including the potential for the site to contain as yet unidentified Aboriginal sites, and the absence of comments from some Aboriginal groups on the project;
- *Project Characterisation* – namely that the project may not classify as an ‘extractive industry’ as the sand resource would be subject to washing and blending;
- *Biodiversity* – including:
 - the EA lacks a management plan for threatened species;
 - the EA lacks consideration of the Somersby Mintbush recovery plan and threatened species significance assessments;
 - potential indirect impacts associated with groundwater, dust and noise impacts;
 - impacts on GDEs;
 - inadequacy of the offsite offset area, which is not owned by Rocla and is already zoned 7(a) Conservation (and therefore not subject to significant development pressure);
 - that no quarry related development should be allowed within the 7(a) Conservation zoned area on the site; and
 - potential impacts of the proposed Glenworth Valley access road on the offset areas;
- *Contamination* – associated (potentially) with the existing site processing area;
- *Waste* – in particular, that Council does not accept the use of a pump-out sewerage system; and
- *Final Landform* – in particular, that the proposed long term highwall near the significant Aboriginal women’s site is unacceptable.

4.2 Community and Interest Groups

Of the 2,820 submissions from special interest groups and the general public, all but 7 objected to the project.

Special Interest Groups Submissions

Special interest groups that made submissions include:

- Calga Peats Ridge Community Group (CPRCG);
- Australia Walkabout Wildlife Park (Walkabout Park);
- Glenworth Valley Outdoor Adventures (Glenworth Valley);
- Central Coast Tourism;
- Community Environment Network’s Gosford Planning Committee;
- Mangrove Mountain Districts Community Group;
- Darkinjung Local Aboriginal Land Council (LALC);
- Guringai Tribal Link Aboriginal Corporation;
- Mingaletta ATSIC Corporation; and
- Parklea Sand and Soil.

An overview of these groups and their principal concerns is presented below.

CPRCG comprises a small group of concerned local residents and business interests (including the owners of Walkabout Park), and was formed specifically to oppose the project. The group has produced very detailed submissions on the project, including specialist water resource advice from Larry Cook & Associates and Environmental Hydraulics, as well as advice from the Environmental Defender’s Office (EDO) regarding the proposed biodiversity offset strategy. CPRCG has also established a website (www.stopsandmine.com.au) which provides information on the project and the group’s concerns. These concerns generally relate to impacts on the local environment and surrounding land users, with key concerns including groundwater, air quality (including crystalline silica), biodiversity, Aboriginal heritage, noise, traffic and socio-economic impacts.

Walkabout Park strongly opposes the project, and has also produced detailed submissions outlining its concerns. In essence, Walkabout Park believes that the proposed quarrying land use is

fundamentally incompatible with its own eco-tourism land use, and that the project would likely affect the ongoing operational viability of the Park. In this regard, Walkabout Park noted that its animal licensing authority (DPI) has advised the Park that it is likely that it will not be able to fulfil its licensing requirements regarding the health and wellbeing of the animals in its care if the project is to proceed. Even if the Park was able to maintain its licences, the owners of Walkabout Park argue that the impacts of the project – primarily via noise, dust, visual, traffic and water resource impacts – would likely result in the closure of the Park due to reductions in visitor numbers. The Park is also concerned that the quarry expansion would affect its own expansion plans (see Section 1.2), and raised additional concerns about the project's impacts on Aboriginal heritage and biodiversity.

Glenworth Valley also strongly opposes the project, notwithstanding its agreement with Rocla for part of the Glenworth Valley property to be used as the project's off-site offset area. Glenworth Valley's objections principally relate to what it considers to be significant impacts on its property and property rights, including the deprivation of groundwater below Glenworth Valley which 'belongs to our property'. Like Walkabout Park, Glenworth Valley believes that the proposed land use is incompatible with its own tourism land use, noting that its horse riding tours regularly pass adjacent to the quarry site. It also believes that the proposal is incompatible with the strategic planning intent and zoning for the site (with inadequate buffers to the 7(a) Conservation zone), and that there is no justifiable need for the project particularly considering the recent approval of the large Mackas Sand Project at Stockton near Newcastle. Glenworth Valley raised a wide range of other concerns, including impacts to water resources, visual amenity, traffic, biodiversity, dust and Aboriginal heritage.

Central Coast Tourism objects to the project due to its potential impacts on tourist visitation and visitor satisfaction at two of the Central Coast's largest attractions, namely Walkabout Park and Glenworth Valley. It also noted that tourism on the Central Coast contributes over \$749 million to the local community annually and directly employs approximately 6,000 people.

The Community Environment Network is an alliance of community and environmental groups from the Central Coast. It objects to the project including the proposed increase in hours of operation and increased traffic levels. It raised concerns regarding the lack of need for the project (with the reduced demand for sand in recent years), the impacts on surrounding residents and Walkabout Park, impacts on biodiversity and the inadequacy of the offset strategy, and impacts on water resources.

The Darkinjung LALC, Guringai Tribal Link and the Mingaletta ATSIC Corporation object to the project, noting that the site contains culturally significant objects and places for Aboriginal people, particularly the women's site (Site 45-3-0119) which has 'immense' cultural significance to Aboriginal women. The groups also noted that the project site may contain many more important Aboriginal sites, and that buffers or setbacks to Aboriginal sites should not be determined until the extent and accuracy of cultural sites is fully known. The LALC also noted that the relationship of individual sites within the broader landscape may be misunderstood or not valued.

Parklea Sand and Soil supports the project, as it would secure much needed sand supplies for the Sydney and Central Coast markets, and would have limited social and environmental impacts, particularly given its close proximity to the F3 Freeway.

General Public Submissions

Individual submissions from the general public were largely from concerned local residents in Calga and surrounding suburbs on the Somersby Plateau. The key issues raised in these submissions related to impacts on the local environment, particularly noise, dust (including respirable crystalline silica), traffic, water resources, biodiversity and Aboriginal heritage, as well as socio-economic impacts on surrounding land uses and property values.

The very large number of form letter/email submissions were received from a wide cross section of the public, including residents of the Central Coast, the Sydney metropolitan area, elsewhere in Australia as well as many from overseas (including the US, UK and Europe). It is likely that many of these submissions were from visitors to Walkabout Park and/or Glenworth Valley. The key issues raised in these form letters/emails were similar to the issues raised in individual submissions.

The small number of submissions in support of the project cited the need for the sand resource, particularly to maintain the affordability of sand for the construction industry. The submissions also noted that the project would not likely lead to significant environmental impacts, and that many of the concerns raised by objectors to the quarry were unfounded.

4.3 Summary of Key Issues Raised in Submissions

Whilst a wide range of issues were raised in the submissions, the key issues were related to the project's direct and cumulative impacts on:

- *Water resources* – particularly impacts to the significant groundwater aquifer resource of the Somersby Plateau;
- *Noise and dust* – including health-related impacts associated with crystalline silica;
- *Biodiversity* – particularly impacts on threatened frog and flora species, and to hanging swamps which are classified as an endangered ecological community;
- *Aboriginal heritage* – particularly potential impacts on a highly significant women's cultural site;
- *Visual amenity*;
- *Traffic*; and
- *Socio-economics* – particularly potential impacts on surrounding regionally significant commercial and tourism-related land users including the bottled water production on the Gazzana property, Walkabout Park and Glenworth Valley.

5 ASSESSMENT

In its assessment of the merits of the project the Department has considered the:

- EA, Response to Submissions, PPR, submissions and additional information provided by Rocla and public authorities;
- the independent groundwater review and independent Aboriginal heritage review;
- current development consent;
- relevant content of previous environmental impact statements (EISs), the quarry's current environmental management plans and monitoring results;
- relevant environmental planning instruments, policies and guidelines, in particular SREP 8 and SREP 9; and
- relevant provisions of the EP&A Act, including the objects of the Act.

The following is a summary of the findings of this assessment.

5.1 Biodiversity

Introduction

The quarry expansion site is largely vegetated with good quality native vegetation, providing a diverse range of vegetative habitats including eucalypt woodland, shrubland and heathland, hanging swamps, creekline habitat and gully rainforest.

To assess the project's impacts on biodiversity, the EA includes a specialist ecological assessment undertaken by Cumberland Ecology. A supplementary assessment providing a revised biodiversity offset strategy was also prepared by Rocla with Cumberland Ecology in response to issues raised about the adequacy of the original offset strategy.

Avoidance and Mitigation

The ecological assessment is based on a number of avoidance and mitigation measures that Rocla would implement to minimise impacts on the biodiversity values of the site as far as practicable. These measures include:

- designing the Stage 4 and Stage 5 pits to avoid key locations of identified threatened:
 - flora species (ie. *Darwinia glaucophylla*, *Hibbertia procumbens*, *Callistemon linearifolius* and *Tetradlea glandulosa*) and their habitat (see Figure 10); and
 - frog habitat, including habitat near (see Figure 12):
 - Creek B (located between Stages 4 and 5), with a minimum 50 metre setback provided to the creek;
 - the south-western corner of Stage 4; and
 - the north-western corner of Stage 5;
- locating the access road between Stages 4 and 5 within the cleared transmission line easement;
- progressively clearing and rehabilitating the site;
- revegetating the Stage 5 pit with native vegetation communities, including threatened flora species (the Stage 4 pit is proposed to be rehabilitated to provide for an agricultural, recreational (sporting fields) or commercial final land use);

- salvaging topsoil and seed and translocating threatened flora species;
- undertaking weed and pest control; and
- providing nest boxes to compensate for the loss of tree hollows.

These measures would be supplemented by a biodiversity offset strategy to compensate for the residual biodiversity impacts of the project. The offset strategy comprises an on-site offset area and an off-site offset area, and is discussed under a separate heading below.

Flora Impacts

The ecological assessment identified 10 native vegetation communities on the site and/or in the offset areas, 7 of which would be disturbed by the project (see Figure 11). In total, approximately 43 hectares of vegetation would be disturbed (cleared) to facilitate the project¹³, including:

- E26 – Exposed Hawkesbury Woodland – 11.3 hectares;
- E29 – Hawkesbury Banksia Scrub-Woodland – 12.8 hectares;
- E29a – Hawkesbury Banksia Scrub-Woodland (Scrub) – 7.8 hectares;
- E29b – Hawkesbury Banksia Wet Scrub – 1.1 hectares;
- E25 – Hawkesbury Peppermint Apple Forest – 0.5 hectares.
- E103 – Gahnia-Banksia Swamp – 0.4 hectares;
- E20 – Dharug Foothills Apple Redgum Forest – 0.1 hectares;
- X – Disturbed native vegetation/regrowth – 3.3 hectares; and
- Exotics – 5.5 hectares.

None of the communities are endangered ecological communities (EECs) listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, there is 0.6 hectares of Sandstone Hanging Swamp (E54) located within the on-site offset area, and 1.4 hectares within the off-site offset area (see Figure 11), which has recently been listed as an EEC under the TSC Act¹⁴. The local occurrences of this EEC represent less than 0.2% of the known distribution of the community in the region.

Some community groups also claimed that the Gahnia-Banksia Swamp (E103), Hawkesbury Banksia Wet Scrub (E29b) and other vegetation communities on site should be considered to constitute the same EEC. OEH has confirmed that whilst part of these communities could be found to constitute the EEC upon further detailed survey, it would mean that large areas of these communities outside the project site would also likely constitute the EEC, reducing the significance of the relatively minor disturbance on the site. Accordingly, OEH is satisfied that the focus for EEC impact assessment can be limited to the Sandstone Hanging Swamp community.

Whilst the project would not directly impact the hanging swamps, the community is a groundwater dependent ecosystem (GDE) and the project's impact on the groundwater regime has the potential to indirectly affect this community. The project's indirect impact on GDEs is considered separately below and in Section 5.2.

The ecological assessment identified 4 threatened flora species on the site, as shown on Figure 10. The project has been designed to avoid some of the key locations of these species, however the project would also impact on some individuals. The 4 species, and the approximate number of individuals identified within the project disturbance area and outside the disturbance area (either within the offset areas or within the transmission line easement), include:

- *Darwinia glaucophylla* – 90 individuals in disturbance area, 334 outside disturbance area;
- *Hibbertia procumbens* – 91 individuals in disturbance area, 107 outside disturbance area;
- *Callistemon linearifolius* – 3 individuals in disturbance area¹⁵, 4 outside disturbance area; and
- *Tetratheca glandulosa* – none in disturbance area, 1 outside disturbance area.

The EA includes tests of ecological significance for these species, which concluded that although the project would have some impact on the local populations, the project is unlikely to result in any significant impact on the abundance, range and distribution of the species.

¹³ Including the Stage 4 and Stage 5 pits, and the access roads including the proposed road access corridor for Glenworth Valley.

¹⁴ The OEH considers that the hanging swamps meet the definition of Coastal Upland Swamps in the Sydney Basin Bioregion, which was determined to be an EEC in March 2012.

¹⁵ All of these individuals are within the Stage 5 pit.

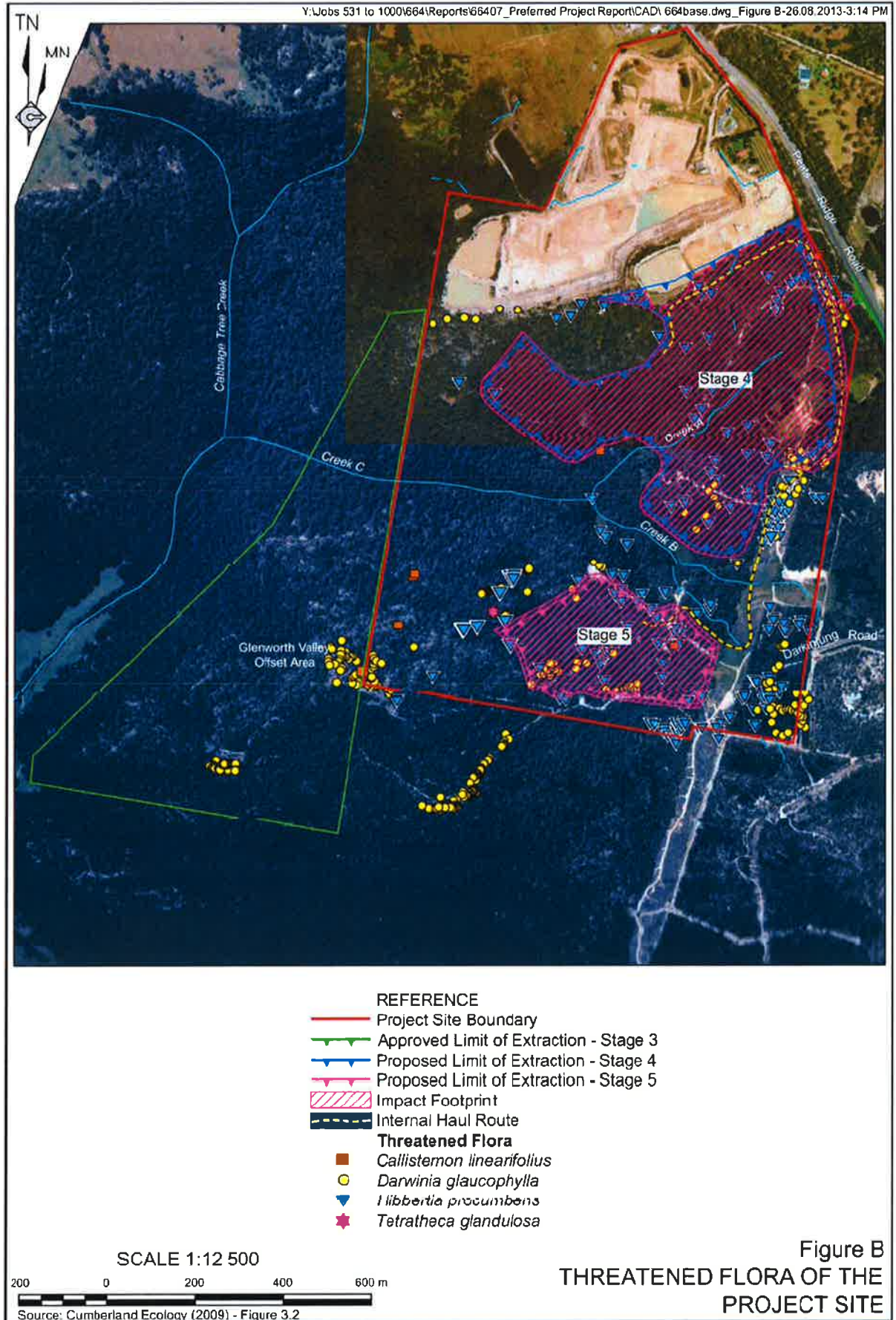


Figure 10: Threatened Flora

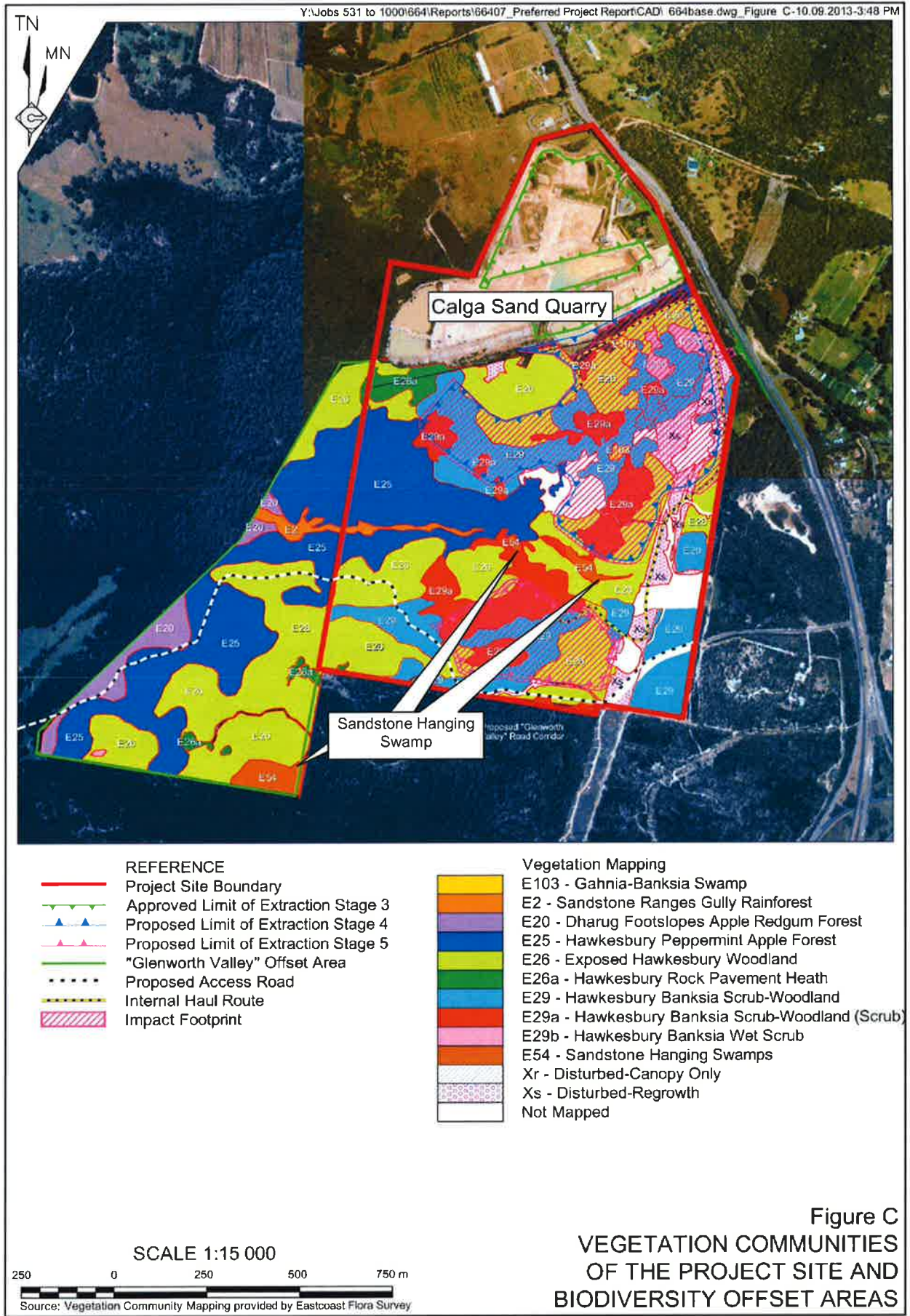


Figure 11: Vegetation Communities

Some submitters (including Council) raised concerns about the potential for the project to impact on other well known threatened flora species on the Central Coast, including Somersby Mintbush (*Prostanthera junonis*) and *Eucalyptus camfieldii*. Although some potential habitat for these species was identified on the site, both in the disturbance area and in the proposed offset areas, the plants were not identified in surveys and the Department and OEH are satisfied that the project is unlikely to have any significant impact on these species.

With regard to the 4 identified threatened species, both OEH and the Department are satisfied with the avoidance and mitigation measures proposed by Rocla to minimise impacts on the species, and that the project is unlikely to result in any significant impact on these species, subject to the implementation of suitable offsetting measures. The Department notes that the removal of Stage 5 from the project – as discussed below – would reduce the potential impacts on threatened flora further, particularly on the identified *C. linearifolius* individuals which are all located within the Stage 5 pit area.

Fauna Impacts

The fauna surveys identified some 84 fauna species on the project site, including 80 native species and 4 exotic species. Nine threatened species were considered to be at high risk of being impacted by the project, and were either identified on site or considered likely to be found on the site due to the presence of preferred habitat. These species include (nb. species marked with an asterisk were identified on site):

- Red-crowned Toadlet*;
- Giant Burrowing Frog*;
- Glossy Black-cockatoo*;
- Powerful Owl*;
- Greater Broad-nosed Bat;
- Large-footed Myotis;
- Grey-headed Flying Fox*;
- Eastern Pygmy-possum*;
- Rosenberg's Goanna*.

All of these species are listed as vulnerable (as opposed to endangered) under the TSC Act.

Rocla has designed the project to avoid affecting some of the key habitat for the less mobile frog species, principally by avoiding impact on Creek B located between the Stage 4 and 5 pits, and by avoiding red-crowned toadlet habitat in the south-western area of the Stage 4 pit associated with Creek A (see Figure 12).

With these measures, Rocla's tests of ecological significance concluded that although the project could have some impact on the local populations, the project is unlikely to result in any significant impact on the abundance, range and distribution of any of the threatened fauna species.

Both OEH and the Department are satisfied with the avoidance and mitigation measures proposed by Rocla to minimise impacts on the species, and that the project is unlikely to result in any significant direct or indirect impact on these threatened species, subject to suitable offsetting measures. The Department notes that the removal of Stage 5 from the project – as discussed below – would reduce the potential impacts on threatened fauna further.

The EA also identified that a large number of tree hollows occur within the project site, with an estimated 5,145 hollows located in the project disturbance area (including Stage 5). Tree hollows are used for shelter and as breeding sites for a wide range of fauna species, including gliders, owls, birds and bats. As outlined above, consistent with best practice for contemporary extractive industry and other projects involving clearing of native vegetation, Rocla proposes to compensate for the loss of tree hollows through the provision of nest boxes within the site. Although the number or density of these nest boxes is not identified, the EA notes that a range of nest box sizes would be provided, focused on providing habitat for threatened owl and bat species.

The Department notes that the biodiversity offsets (including the Stage 5 area) would facilitate the long term protection of a large number of tree hollows, and that the tree hollows would be cleared progressively over the life of the quarry. However, it also recognises that the project would affect a considerable number of hollows. To provide a measure of compensation for the tree hollows that would be affected by the project, the Department has recommended conditions requiring Rocla to

salvage tree hollows from felled trees within the disturbance area, and to reuse these resources for nest boxes and other habitat (such as ground habitat) in the offset areas. These measures would be required to be detailed in a comprehensive Landscape Management Plan, prepared in consultation with applicable agencies including OEH and Council. The Department has also recommended conditions requiring Rocla to undertake pre-clearance surveys to minimise impacts on mobile fauna during vegetation clearing.

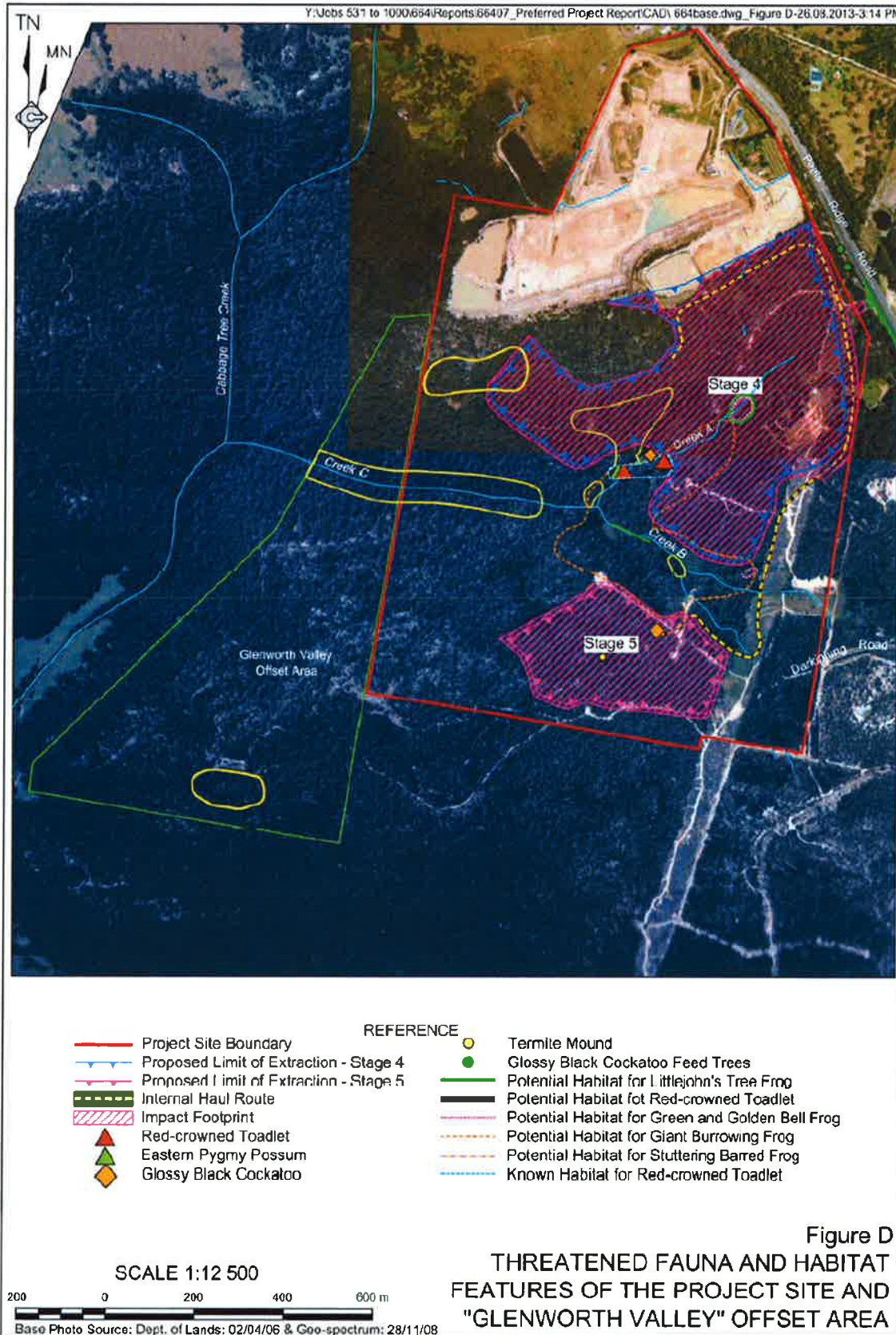


Figure 12: Threatened Fauna and Habitat

Groundwater Dependent Ecosystems

There are a number of groundwater dependent ecosystems (GDEs) located on or near the site, the most significant of which is the Sandstone Hanging Swamp (E54) community located between the Stage 4 and Stage 5 pits.

Consideration of the project's impacts on the local groundwater resource, and the consequent impacts on the hanging swamps and other GDEs, is provided in Section 5.2. In summary, the Department is satisfied that the project is able to be managed in a manner such that it would not have any significant long-term impact on groundwater dependent ecosystems, subject to the implementation of comprehensive monitoring and, if necessary, contingency measures.

The Department also acknowledges that the project would facilitate the permanent conservation of the Sandstone Hanging Swamp EEC within the offset areas, subject to the protection of the community during the period of sand extraction and subsequent groundwater recovery.

Biodiversity Offset Strategy

Rocla has developed a biodiversity offset strategy to offset the 37 hectares of native vegetation to be cleared for the project, and the impact on threatened species. The offset strategy as proposed by Rocla is shown on Figure 8, and comprises an:

- *On-site Offset Area* – comprising 60.6 hectares (including 56 hectares of existing native vegetation) within the quarry extension site surrounding the Stage 4 pit, with the offset area including the Stage 5 pit as an 'interim offset'; and
- *Off-site Offset Area* – comprising a 41 hectare portion of the Glenworth Valley property directly to the west of the quarry extension site, all of which is covered by existing native vegetation.

The on-site offset area is unusual in that it includes the Stage 5 pit as an 'interim offset', with Rocla proposing to identify an alternative offset for this area prior to the commencement of quarrying in Stage 5. This alternative offset has not been identified at this time. If Rocla is unable to find a suitable alternative offset, then the Stage 5 area would remain as a permanent offset.

The Department does not accept this approach to offsetting as it lacks certainty and does not meet, or enable the proper consideration of, the principles for offsetting as set out in OEH's *Principles for the Use of Biodiversity Offsets in NSW*, particularly that offsets must be enduring (Principle 7), agreed prior to the impact occurring (Principle 8) and must be quantifiable (Principle 9). OEH has also stated that it does not support the inclusion of the Stage 5 area within the offset area.

Rocla has argued that this interim approach is necessary as it does not have the time or financial resources to identify an alternative offset area prior to determination of the project. The Department does not accept this argument.

Accordingly, the Department has considered the offset strategy in the absence of the 'interim offset', which leaves 2 main scenarios, namely the:

- 'with Stage 5 quarrying scenario' – ie. Stage 5 excluded from the permanent offset strategy, with no alternative offset; and
- 'without Stage 5 quarrying scenario' – ie. the Stage 5 pit included in the permanent offset area.

Relevant offset ratios based on these scenarios are presented in the following table.

Table 2: Biodiversity Offset Ratios (native vegetation only)

Scenario	Offset Area (hectares)	Cleared Area (hectares)	Offset Ratio
1. With Stage 5 Quarrying	88	37	2.4:1
2. Without Stage 5 Quarrying	97	28	3.4:1

OEH has also considered the adequacy of the offset strategy in the absence of Stage 5 quarrying (ie. Scenario 2). Whilst noting that this offset scenario is on the low side (in terms of size) of what it would normally accept for such a development, it otherwise supports the offset strategy in principle because it: is close to Popran National Park (ie. provides an offset that is not isolated or fragmented); is generally representative of the vegetation to be cleared; provides good quality habitat for fauna; and because it can (in the absence of the interim offset) be conserved in perpetuity.

In its correspondence OEH does leave open the potential for Rocla to lodge a future application to quarry within Stage 5, subject to identifying a suitable alternative offset. Accordingly, OEH recommends that the Stage 5 area is managed for conservation purposes prior to gaining subsequent approval to extract the Stage 5 area (subject to a separate application).

As noted above, the Department does not believe that this approach provides adequate certainty, and accepts that the permanent offset area should either include the Stage 5 pit, or exclude it. If the Stage 5 area is excluded from the offset area, then OEH's correspondence indicates that it would deem the offset strategy to be inadequate.

On balance, the Department believes that the Stage 5 pit should not be quarried, and should be added to the permanent offset strategy, for a number of reasons.

Firstly, the offset strategy without Stage 5 is considered by OEH and the Department to be inadequate, and Rocla has informed the Department that it does not wish to progress identification of an alternative offset at this time. With Stage 5 included in the offset strategy, OEH is satisfied that the offset strategy is adequate.

Secondly, the Stage 5 pit is likely to have residual visual impacts, particularly on Walkabout Park (as discussed in Section 5.5). The Department is not satisfied that these visual impacts could be mitigated to an acceptable standard such that there would be no impact on visitation and visitor satisfaction at Walkabout Park. Not quarrying in Stage 5 would significantly reduce this impact.

Thirdly, not quarrying in Stage 5 would reduce other health and amenity impacts of the project including noise, dust and groundwater, particularly for landowners to the south including Walkabout Park. Whilst the Department is satisfied that these impacts would not be significant even with the quarrying of Stage 5, it recognises that not quarrying in Stage 5 would improve the amenity of the area, and reduce the potential for land use conflict, particularly in relation to Walkabout Park.

Finally, not quarrying in Stage 5 would also reduce other environmental impacts of the project, including impacts on threatened species in and around the Stage 5 pit, as well as reducing the impacts on Aboriginal heritage items in this area.

Accordingly, the Department has recommended conditions restricting the quarry expansion to Stage 4 only, with the Stage 5 area to be included in the offset strategy for the project.

The Department acknowledges that the removal of Stage 5 would sterilise some 1.2 million tonnes of sand, or 13% of the identified sand resource in Stages 3-5. It also acknowledges that the Stage 5 area is identified as a preferred location for extractive industries under SREP 8. However, the Department is satisfied that the biodiversity and amenity (particularly noise, dust and visual) benefits provided by the removal of Stage 5 outweigh the loss of this resource.

With regard to the adequacy of the offset strategy (including Stage 5 as an offset), the Department acknowledges OEH's acceptance of the strategy, but notes that the off-site offset area is already zoned for conservation purposes under the local planning instrument and is therefore not subject to significant development pressure. Accordingly, to bolster the offset strategy further the Department has recommended conditions requiring Rocla to revegetate at least 8 hectares (or approximately one third) of the Stage 4 pit with local vegetation communities and to add this area, along with the highly significant Aboriginal women's site (see Section 5.4) to the permanent offset strategy at the completion of quarrying. The Department believes that this requirement would facilitate a significant long term biodiversity and Aboriginal heritage benefit. The additional offset area is shown on Figure 13 (see red-hatched area), and takes in the western part of the Stage 4 pit in the area surrounding the Aboriginal women's site.

With regard to security mechanisms for the offset strategy, OEH recommended that the offset areas be conserved in perpetuity via a suitable conservation measure as listed in Section 126L of the TSC Act, for example reservation of the land or a conservation agreement under the *National Parks and Wildlife Act 1974*, or a biobanking agreement under the TSC Act. The Department agrees, and has recommended conditions in this regard. The Department notes that, ideally, the offset areas (including the significant Aboriginal women's site) should be added to the National Estate in the future via an extension to Popran National Park.

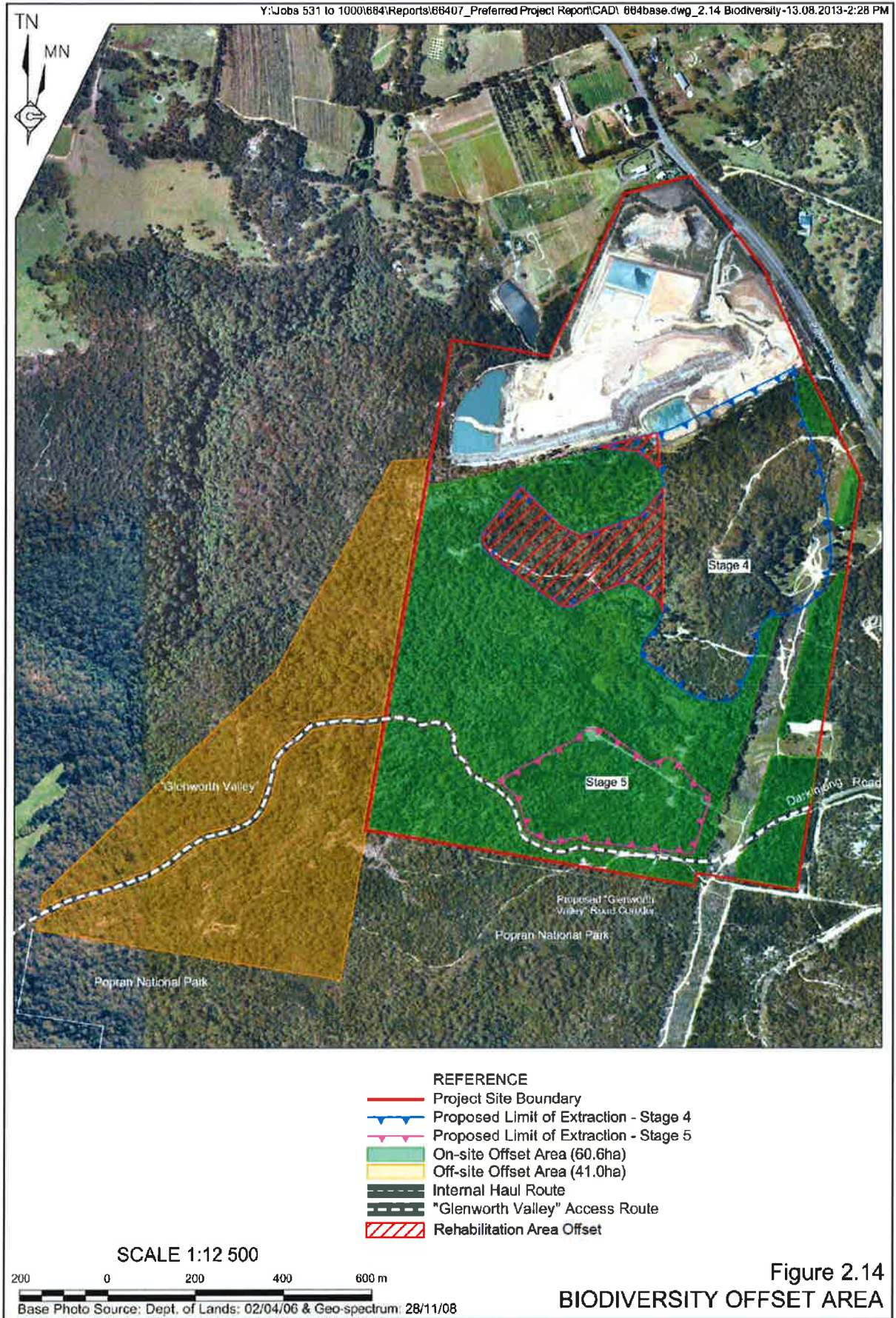


Figure 13: Recommended Biodiversity Offset Strategy

Some submitters also raised concerns about the security of the Off-site Offset Area, given that it is owned by a third party. Glenworth Valley, the owner of the Off-site Offset Area, has since provided written confirmation that it is 'unequivocally committed' to providing Rocla with the proposed offset area, including its long term (in perpetuity) conservation. The Department accepts that this agreement provides sufficient certainty regarding the offset area, but has nevertheless recommended conditions requiring Rocla to provide for the long term conservation of the Off-site and On-site offset areas prior to the commencement of quarrying in Stage 4.

With the implementation of the recommended offset strategy, the Department and OEH are satisfied that the project can be undertaken in a manner that would improve or at least maintain the biodiversity values of the locality over the medium to long term.

Conclusion

The Department is satisfied that Rocla has designed the project in a manner that avoids impacts on key biodiversity values, most notably via the setbacks to the ephemeral Creeks B and C and to key frog habitat and GDEs. The Department recognises that these avoidance measures have sterilised a considerable amount of the identified regionally significant sand resource on the site.

However, as with most extractive industry proposals the project will inevitably result in some residual biodiversity impacts. Following its assessment the Department is satisfied that these residual impacts are able to be adequately mitigated, or at least compensated for, via a range of mitigation and offsetting measures.

With regard to mitigation measures, the Department has recommended conditions requiring Rocla to:

- manage remnant vegetation on the site, and control weeds and pests;
- undertake progressive vegetation clearing and rehabilitation;
- maximise the salvage and reuse of environmental resources (eg. tree hollows) in the disturbance area;
- undertake pre-clearance surveys to minimise impacts on fauna;
- monitor, manage and if necessary compensate, impacts on stream health and GDEs; and
- meet a range of rehabilitation objectives.

These measures would be required to be addressed via the preparation and implementation of a comprehensive Landscape Management Plan and Water Management Plan (for impacts on GDEs).

With regard to offsetting measures, the Department is satisfied that an acceptable offset strategy can be delivered by the project, subject to:

- the removal of quarrying in Stage 5, and the inclusion of this area in the offset strategy for the project; and
- the revegetation of approximately one third (8 hectares) of the Stage 4 area in rehabilitation for the quarry, and the subsequent inclusion of this area within the long term offset strategy.

The removal of Stage 5 would a considerable amount of sand, however the Department is satisfied that the biodiversity and amenity benefits provided by the removal of Stage 5 outweigh the loss of this resource.

The Department has recommended conditions requiring Rocla to implement the offset strategy, provide for its long term (in perpetuity) conservation prior to the commencement of quarrying in Stage 4 (or following rehabilitation for the area within the Stage 4 pit), and to lodge a substantial bond with the Department to ensure that the offset strategy is implemented in accordance with agreed performance and completion criteria.

With the implementation of these avoidance, mitigation and offsetting measures, the Department is satisfied that the project can be undertaken in a manner that would improve or at least maintain the biodiversity values of the locality over the medium to long term.

5.2 Water Resources

Introduction

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

- directly removing a local unnamed creek (Creek A);

- affecting surface water flows in local and regional catchments, and water availability to downstream water users;
- affecting groundwater flows in subsurface aquifers, and water availability to local groundwater users, baseflow to local creeks, springs and groundwater dependent ecosystems; and
- affecting water quality in downstream surface water and groundwater resources.

A number of specialist water resource assessments and reviews have now been undertaken for the project to assess these issues.

Firstly, the EA includes specialist surface water and groundwater assessments, undertaken by Evans & Peck and GeoTerra, respectively. The groundwater assessment includes groundwater modelling undertaken by Golder Associates.

Secondly, as part of its submission on the EA the Calga Peats Ridge Community Group commissioned its own specialist surface water and groundwater reviews, undertaken by Environmental Hydraulics and Larry Cook & Associates, respectively.

Thirdly, to review these assessments and address residual groundwater issues and concerns the Department engaged Dr Frans Kalf of Kalf & Associates to undertake an independent review of the project's groundwater impacts.

Fourthly and finally, in response to issues raised by Dr Kalf in his review, Rocla engaged Dr Noel Merrick of Heritage Computing to undertake additional groundwater modelling.

One of the key issues raised by the NOW, Mr Cook and Dr Kalf was that the original groundwater assessment was based on 'steady state' modelling only, and did not include any 'transient' modelling calibration to improve the accuracy of the model predictions. Whilst it was generally agreed that the steady state modelling was likely to be conservative, the limitation was particularly evident in the sensitivity analysis (ie. modelling to assess potential worst case impacts) which required unrealistic inputs (for recharge) to calibrate the model. Consequently, the accuracy of the modelling results was difficult to assess with confidence.

To address this issue, Rocla engaged Dr Merrick to undertake revised and more comprehensive modelling which included both steady-state and transient modelling, including a transient calibration model, transient prediction simulation model (to simulate annual progression of the quarry, including backfilling) and a transient recovery simulation model (to simulate groundwater levels for the final landform).

The body of work undertaken to assess the potential surface water and groundwater impacts of the project has been substantial, and has involved reviews by some of the State's most respected water specialists. Based on these assessments, the Department is satisfied that a thorough and robust prediction of the project's potential water resource impacts has now been undertaken.

Catchment Context

The site is located in the Cabbage Tree Creek catchment, an ephemeral creek (ie. flows intermittently in response to rainfall events) located to the west of the project site (see Figure 14). Cabbage Tree Creek flows south to Kellys Creek, which then flows to the tidal section of Popran Creek, which in turn flows to Mangrove Creek, which is a tributary of the Hawkesbury River. Cabbage Tree Creek has a catchment area of some 700 hectares.

There are 3 unnamed tributaries of Cabbage Tree Creek located within the expansion site, identified as Creeks A, B and C (see Figure 15). Creeks A and B converge to form Creek C in the centre of the expansion site, with site drainage flowing in a westward direction through the Glenworth Valley property to Cabbage Tree Creek. Creek C (including Creeks A and B) has a catchment area of approximately 163 hectares, or 23% of the Cabbage Tree Creek catchment, and 2.5% of the Popran Creek catchment. Creek C is predicted¹⁶ to have existing flows of around 395 ML/yr at its junction with Cabbage Tree Creek, although this varies markedly in response to rainfall (ie. flows of around 84 ML/yr in a 10th percentile dry year, and flows of around 864 ML/yr during a 90th percentile wet year). Water quality is generally fresh and good, although pH levels are slightly acidic (ie. around 5.1 to 5.9), which is likely to be due to the contribution of groundwater baseflow to creeks.

¹⁶ Based on hydrological modelling, as no stream flow records exist.

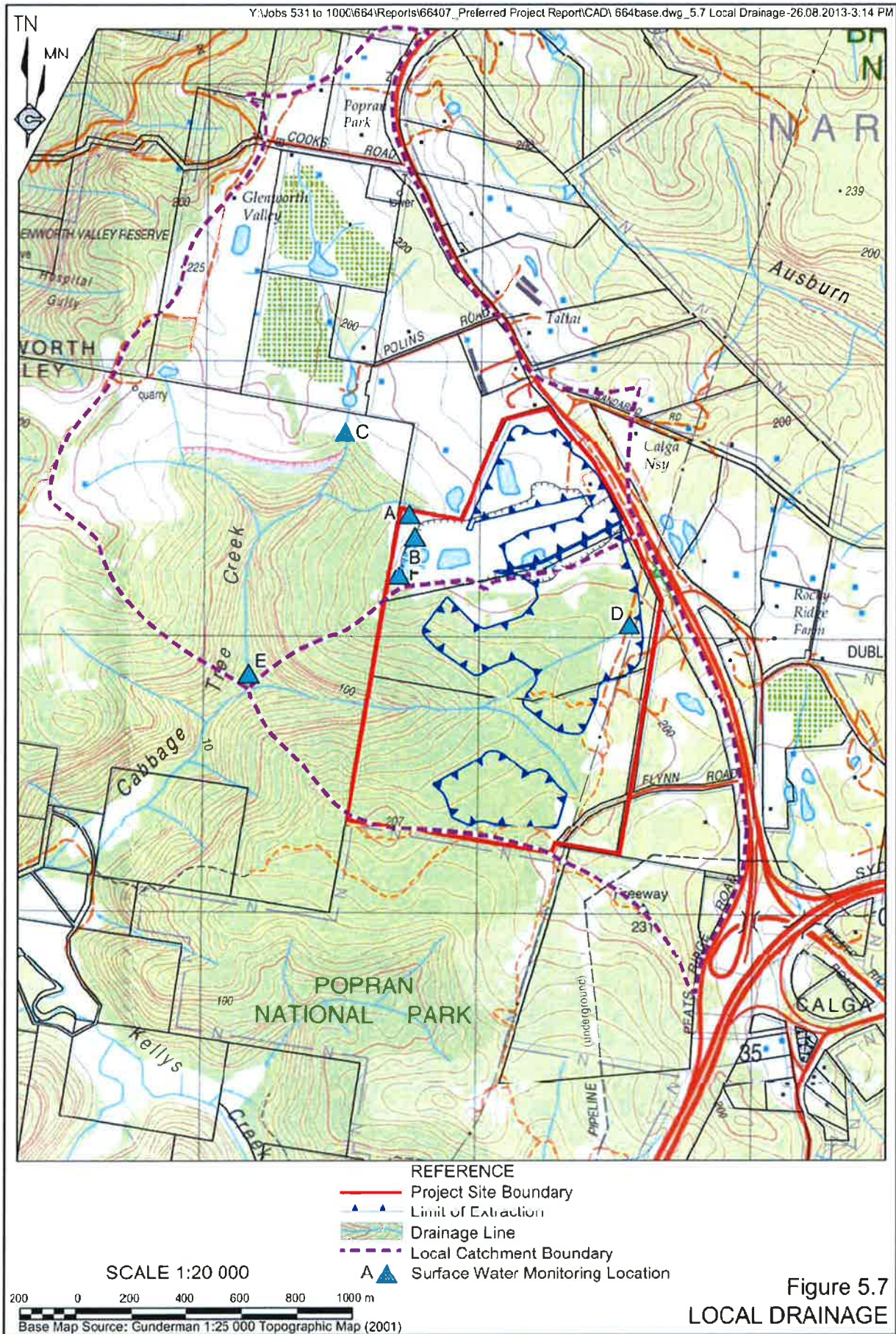


Figure 14: Local Catchments

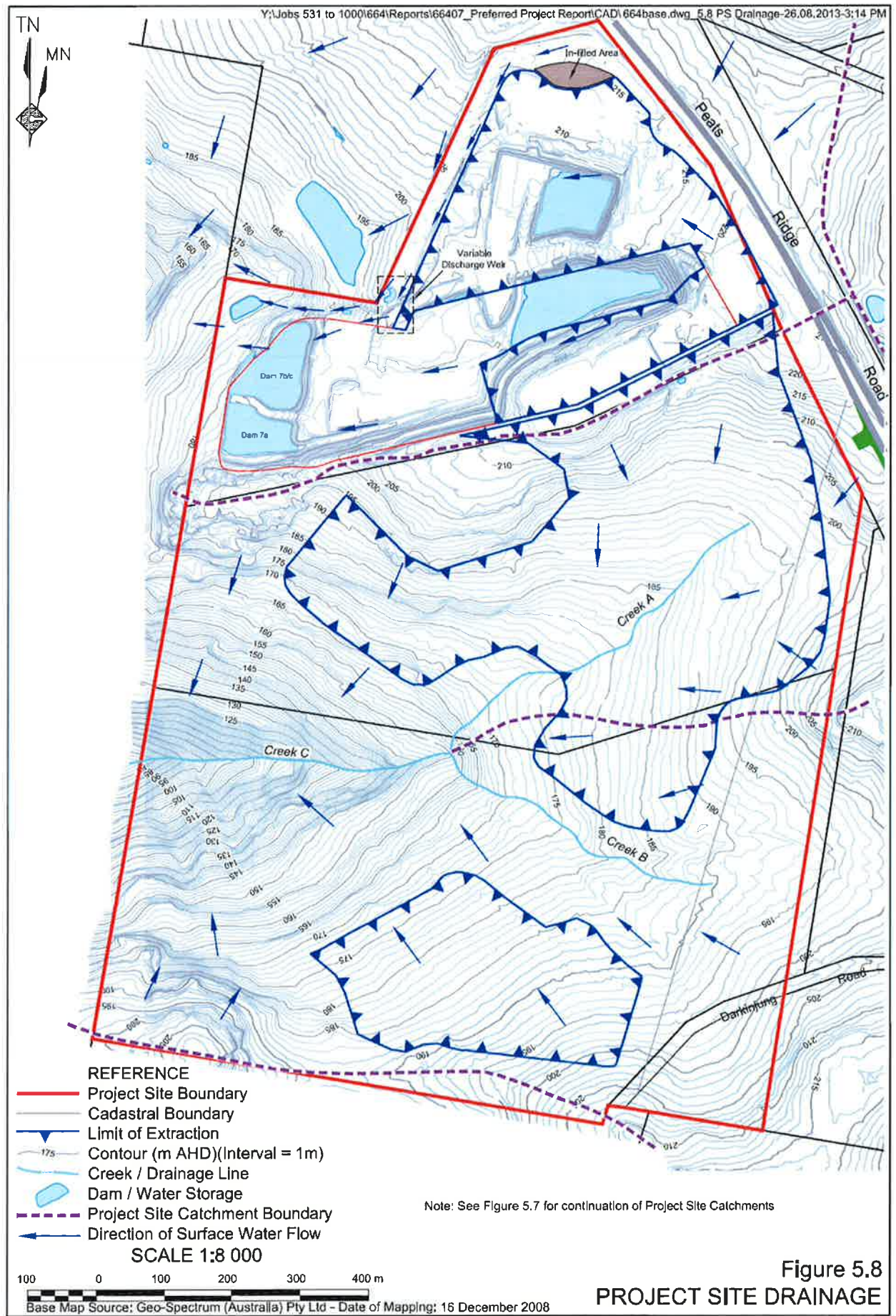


Figure 5.8
PROJECT SITE DRAINAGE

Figure 15: Site Drainage

Groundwater Aquifer Context

There are 2 main groundwater aquifer resources on the Central Coast, namely the:

- Hawkesbury Sandstone; and
- Terrigal Formation, which underlies the Hawkesbury Sandstone.

The Hawkesbury Sandstone is the main source of groundwater in the locality. The groundwater is stored in the massive sheet sandstone and in its fractures, and the aquifer has a close relationship with rainfall recharge (meaning the groundwater table raises and lowers in response to prevailing rainfall). Use of groundwater from this aquifer – for a range of industrial, commercial, agricultural and domestic purposes – is regulated under the *Water Management Act 2000* via the *Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Source 2003* (the Water Sharing Plan).

The site is located in Zone 7 (Lower Mangrove and Popran Creek) of the Kulnura-Mangrove Mountain Groundwater Source. As set out in the Water Sharing Plan, Zone 7 has an average annual recharge of 8,231 ML, of which 6,594¹⁷ ML is reserved for the environment to maintain the fundamental health of the water source and its groundwater dependent ecosystems.

The current annual extraction limit (ie. essentially total recharge minus the volume set aside for the environment) in Zone 7 under the Water Sharing Plan is 1,637 ML, however water access licences have only been issued for approximately 950 ML of this total to date, and there has been an embargo on the issuing of new licences which applies across the entire Water Sharing Plan area.

As with groundwater across the water source area, groundwater levels in the project site fluctuate in response to rainfall events, with levels on the site ranging from between 5 metres and 25 metres below ground level, with groundwater flowing generally westward toward Cabbage Tree Creek. Most bore depths in the locality are between 30 metres and 60 metres deep. Groundwater quality is generally fresh and good, though somewhat acidic (pH of 4.1 to 6.3), and has elevated levels of some metals and nutrients.

Avoidance and Mitigation Measures

Rocla has designed the project to reduce impacts on water resources, including:

- avoiding direct impacts on Creeks B and C, with minimum setbacks of 50 metres to the Stage 4 pit and 100 metres to the Stage 5 pit;
- diverting 'clean' run-on water around the extraction pits;
- maintaining a 'dirty water' management system designed to collect and treat run-off and process water within the quarry, prior to discharge to the Cabbage Tree Creek catchment in accordance with the terms of the quarry's existing Environment Protection Licence (which would be amended to accommodate the project); and
- recycling process water from the wash plant, via the dirty water management system.

Water Use

The key licensable water 'used' by the project would be groundwater that flows into the pit in response to the sand extraction operation (along with the entrained groundwater within the extracted sand resource itself). This groundwater inflow would flow into the quarry's dirty water management system, which involves the collection and treatment of all water run-off from disturbed areas of the site prior to off-site discharge in accordance with the requirements of the quarry's Environment Protection Licence. Some of the collected water is used for operational purposes including sand washing and dust suppression.

Groundwater inflows were predicted in the original EA modelling to amount to up to:

- 28 ML/yr at the end of Stage 3;
- 139 ML/yr at the end of Stage 4; and
- 160 ML/yr at the end of Stage 5.

The original groundwater assessment in the EA included a relatively basic sensitivity analysis to assess possible worst case inflows, which was based on the use of a higher permeability figure in the groundwater model. This analysis indicated that a potential worst case inflow of around 620 ML/yr at the end of Stage 5.

¹⁷ The Water Sharing Plan was amended in May 2013. Prior to the amendment, the environmental water reservation was 5,892 ML, and the annual extraction limit was 2,234 ML.

However, as outlined above the assessment required unrealistic modelling inputs (for recharge) in order to calibrate the model, and accordingly the analysis was dismissed as not being representative of the likely impacts.

The revised modelling undertaken by Dr Merrick found that annual inflow volumes would be much less than those originally predicted, ranging from 9 to 74 ML/year, with an average of 23 ML/yr. The highest inflows would occur in Year 7 of the project and would then steadily decrease, with inflows reducing to about 14 ML/yr by Year 25.

Rocla has noted that it would only actually 'use' a portion of these groundwater inflows (up to a maximum of 24 ML/yr at the end of Stage 5), with much of the remainder flowing back to the environment via surface water discharges or seepage back to the groundwater aquifer. However, the Water Sharing Plan and the *Water Management Act 2000* do not provide any concessions for these surplus flows and seepage back to the environment, and NOW has noted that Rocla would be required to obtain water access licences to account for all water used by the project, including gross groundwater inflows to the pits.

In this regard, Rocla currently has water access licences in the Zone 7 water source that allow it to use up to 92 ML of groundwater a year (with a further 37ML transaction currently underway). However, only a small portion of these (some 6 ML) are currently attached to the Calga Sand Quarry site. Hence, many submissions were very critical that Rocla did not have enough water for its existing quarrying operations, let alone the proposed expansion.

The Department notes that Rocla has been addressing this administrative issue with NOW for some time (ie. to attach its Zone 7 licences to the site), and is satisfied that for all intents Rocla has sufficient water for its current operations.

With regard to the proposed expansion, the Department is satisfied that Rocla has, or will have, sufficient water access licences to account for all gross water use by the project, based on the revised modelling.

To account for water use, Rocla proposes to continue to monitor and model the groundwater inflows to the pits, and adjust licensing on an ongoing basis as needed. NOW does not object to the project water use, but recommended that Rocla be required to demonstrate that it holds adequate water access licences to account for predicted water inflows for each quarrying stage, before the commencement of extraction in each stage.

The Department agrees, and has recommended conditions requiring Rocla to demonstrate that it holds sufficient water access licences, attached to the site, prior to the commencement of quarrying in Stage 4. As detailed in Section 5.1, the Department has recommended that Stage 5 not be approved.

Based on the water modelling and water balance, the Department is satisfied that the water use associated with the project is unlikely to have a significant impact on water availability and water sharing in the Lower Mangrove and Popran Creek water source, noting that average groundwater inflows would represent less than 2% of the annual extraction limit (ie. 1,637 ML) for Zone 7 under the amended Water Sharing Plan. Whilst not recognised in the accounting requirements under the Water Sharing Plan, the Department also acknowledges that a considerable portion of the groundwater inflows would be returned to the environment via surface water discharges and seepage.

It is noted that a large number of public submissions (including many of the form letters) claimed that the project would use some 8 billion litres of water a year (ie. 8,000 ML/yr) and destroy the aquifer. This water demand figure is presumably based on a statement in the EA that says that about 8,000L of process water is required to produce 1 tonne of sand. At the proposed maximum production rate of 1 million tonnes of sand products a year, this would equate to the claimed 8,000 ML/yr of water use. However, this claim does not consider that the vast majority of water used for sand processing would be recycled on-site, with the only real losses being water 'lost' through evaporation and seepage from dust suppression activities and storages, and water retained in product exported from the site. With regard to destruction of the aquifer, the Department notes that the aquifer would continue to recharge, and that the assessment indicates that the project would not have a significant impact on the Lower Mangrove and Popran Creek water source aquifer. In this regard, average groundwater inflows represent only around 0.3% of the annual recharge in Zone 7. Localised impacts on the surrounding aquifer and groundwater users are discussed separately below.

The modelling predicted that the project would affect (ie. a drawdown of more than 1 metre) local groundwater levels within about 1,250 metres of the Stage 4 and Stage 5 pits. Up to 11 privately-owned bores on 8 properties were predicted to experience groundwater level declines of 1 metre or more, as outlined in the following table. The table also includes the available drawdown length remaining in the bores following the project-induced drawdown, to give an indication of the potential impact on the groundwater yield in the bores.

Table 3: Predicted Impacts on Surrounding Groundwater Bores – Original Prediction

Property ID*	Bore Reference	Predicted Drawdown (m)			Remaining Available Drawdown (m)
		Stage 4	Stage 5	Post Closure	
L	66907/CP8	1-5	1-5	1-5	20
AA	37685	1-5	1-5	1-5	unknown
Q	64897	1-5	1-5	1-5	40
	101063	1-5	1-5	1-5	53
	101236	1-5	1-5	1-5	53
R	73145	1-5	1-5	1-5	44
	100894	1-5	1-5	1-5	67
S -Walkabout Park	102729/CP11	1-5	5	5	41
Calga resident	49087	<1	1	1	29
Calga resident	72148	<1	1	1	20
Calga resident	101946	<1	1	1	56

* See Figure 3 for property locations

All of the affected bores are located on properties to the east and south-east of the project site, with the modelling indicating that bores to the north of the site, including the bottled water production bores on the Gazzana property, would not be significantly impacted by the quarry extension.

The assessment indicated that the project would result in a reduction in saturated thickness of less than 10% at all surrounding groundwater bores, with the exception of Bore No. 66907 located on a rural-residential property to the east of Stage 3 and 4 (Property L) which would experience a reduction of around 16%. At this reduction level, the project is not anticipated to significantly affect groundwater yield from the bore.

The revised groundwater modelling undertaken by Dr Merrick found that the groundwater drawdown would be much less than that originally predicted, with the 1 metre drawdown contour extending no more than 250 metres from the boundary of the quarry pits (see Figure 17). The revised modelling concluded that no privately-owned bores surrounding the project site would be measurably impacted during the extraction operations or post-closure.

The project is also unlikely to affect existing groundwater quality in the surrounding area, subject to the implementation of standard best practice dangerous goods handling and management. Localised depressurisation of the aquifer is not expected to adversely affect groundwater quality in the area.

Some neighbouring landowners claimed that the existing quarry is already affecting groundwater yields in their bores, with Walkabout Park noting that its bore has been affected by the existing quarry such that it can only be pumped for 3 hours at a time before running dry. The Department's independent groundwater expert, Dr Frans Kalf, investigated these claims, noting that the severe drought during the period from 1999 to 2007 was more likely to be a factor in any water shortages. Given the distance of about 1 kilometre from the Walkabout Park bore to the existing quarry, Dr Kalf considers that it is very unlikely that drawdown from the quarry is responsible for Walkabout Park's claimed decrease in yield.

Some submitters also argued that the project should be refused on the basis that it is not able to comply with clause 36 of the Water Sharing Plan, which restricts new water supply works (which includes the extraction pits) from certain areas including within 400 metres of an approved bore nominated by another water access licence. Bore No. 66907 is within 400 metres from the proposed Stage 4 pit (although it is even closer to the existing Stage 3 pit). Clause 36 of the Water Sharing Plan includes a number of caveats to this exclusion, including provisions that the distance restrictions may be varied (by the Minister for Water Resources) where a hydrogeological study has been prepared, where consultation with the affected landowner has been undertaken, and where there is a process for remediation in the event that the existing bore is affected. NOW has not raised any concerns

regarding the ability of the project to comply with clause 36 of the Water Sharing Plan (requesting only that the above process be undertaken), and the Department notes that all three abovementioned pre-conditions for exclusion have been, or can be, met. Consequently, the Department is satisfied that the nominal exclusion under clause 36 does not preclude approval of the project.

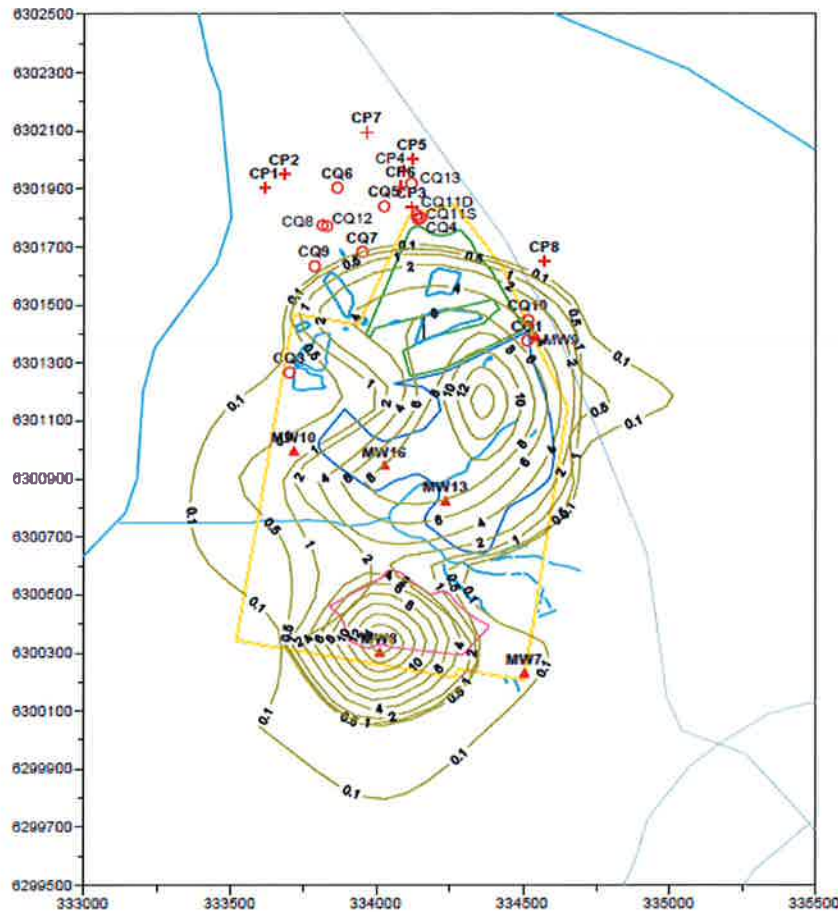


Figure 17: Revised Groundwater Drawdown (at Year 20)

The existing approval for the Calga Sand Quarry provides for a comprehensive groundwater monitoring and contingency strategy, including requirements for Rocla to:

- implement a monitoring program providing for:
 - a groundwater monitoring network to provide advance warning of impact;
 - continuous groundwater monitoring;
 - installation of monitoring equipment in all bores within the groundwater affectation area (subject to landowner consent);
 - annual independent groundwater audits; and
 - impact assessment criteria for triggering the groundwater contingency strategy (based on a reduction in yield of 10% or greater);
- maintain and if necessary implement a groundwater contingency strategy, providing for:
 - prompt investigation of any exceedances of established groundwater drawdown trigger levels; and
 - procedures for water supply compensatory measures including deepening of existing bores, installation of new bores, and/or other compensatory water supply measures.

The Department has recommended similar conditions for the expansion project, with the exception of the annual independent groundwater audits. To date, the annual groundwater audits have not identified any significant groundwater quantity or quality issues attributable to the quarry, with groundwater levels surrounding the quarry observed to be fluctuating in response to rainfall, and with drawdown either in line with, or less than, the modelled impacts. Given these audits, and the predicted impacts, the Department is satisfied that ongoing annual audits are not warranted. Notwithstanding, Rocla would be required to undertake 3 yearly independent environmental audits and annual reviews, as well as ongoing validation of the groundwater model.

Impacts to Surface Water Systems and Users

The Department and NOW are satisfied that Rocla has achieved a reasonable balance in terms of avoiding direct impacts on local creek systems, with the proposed expansion areas designed to avoid direct impacts on (and to provide adequate setbacks to) Creeks B and C. The headwaters of Creek A would be directly impacted by the expansion, however this is a minor (1st order) and ephemeral tributary of Creek C, and the project has been designed to avoid direct impacts on the identified Red-crowned Toadlet habitat on this drainage line near the confluence of Creeks A and C (see Figure 12). Nonetheless, the Department has recommended conditions requiring Rocla to reinstate drainage channel/s through the Stage 4 pit as part of the rehabilitation for the project.

The proposed expansion area (including Stage 4 and Stage 5) represents approximately 20% of the catchment area of Creek C, and 5% of the catchment area of Cabbage Tree Creek. The surface water assessment indicates that the project would reduce surface water flows in the Creek C catchment by about 8% over the life of the project assuming average or wet rainfall years, or about 13% assuming 10th percentile dry rainfall years. Given the relatively small proportion of the wider Cabbage Tree Creek catchment (ie. 5%), impacts on flows in Cabbage Tree Creek (and further downstream) would be very minor.

At the end of the project, the flows in Creek C would recover and actually increase compared to pre-quarrying flows, particularly in low flow events, due to the expected increased run-off (and reduced evapotranspiration) from the rehabilitated surfaces. Post-project flows would increase by about 23% in average rainfall years, 10% in 90th percentile wet rainfall years and by 91% in 10th percentile dry years.

Changes to baseflows (ie. the contribution of groundwater discharge to creek flow) is also an important consideration for assessing impacts on local hydrology, given the contribution these flows make to local streams and to sustaining aquatic environments in drier periods. The original groundwater assessment included modelling of the changes to baseflow as a result of the project. At the end of Stage 4, baseflow to Creek C was predicted to reduce by about 30%, and by about 6% to Cabbage Tree Creek. Baseflows would gradually recover from this time to the point where, at the end of the project, baseflow to these creeks is predicted to increase on current levels by 13% and 7% respectively.¹⁸

The revised groundwater modelling undertaken by Dr Merrick found that baseflow reductions would be much less than those originally predicted, with the maximum baseflow reduction in Cabbage Tree Creek predicted to be less than 0.2%, although the maximum reduction in the on-site creeks is predicted to be higher at approximately 50%.

The predicted changes to local hydrology are within the range of natural variability, and are not expected to result in any significant impacts to downstream surface water systems, particularly in the Cabbage Tree Creek catchment which would only experience minor changes. While the reductions to baseflows in Creek C are greater, it is expected that this minor creek system is accustomed to variable flow conditions given its high position in the broader catchment. The Department also acknowledges that the reductions in this catchment would be temporary, and that there are no surface water users reliant on these flows (impacts on groundwater dependent ecosystems are discussed separately below).

With regard to surface water quality the Department, EPA and NOW are satisfied that the project is unlikely to have any significant impact on downstream water quality, subject to the implementation of standard best practice mitigation measures to manage water on the site, including diversion of clean run-on water around the disturbance areas and the collection, treatment and discharge of dirty (sediment laden) water in accordance with the Environment Protection Licence for the quarry, which would be amended to accommodate the project.

Impacts on Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are ecosystems which require access to groundwater (beyond soil-based groundwater from rainfall) to meet all or some of their water requirements. The EA identified a number of GDEs on the project site and/or downstream of the project site that could be impacted by the project, including:

¹⁸ These baseflow reduction figures are based on long term averages, with actual baseflows predicted to be higher during wet periods and lower during dry periods.

- Sandstone Hanging Swamp (E54) – located in the on-site and off-site offset areas (see Figure 11);
- Gahnia-Banksia Swamp (E103) – located in the Stage 4 extraction pit (and therefore subject to direct disturbance by the project);
- Sandstone Gully Rainforest (E2) – located in the on-site and off-site offset areas in the lower reaches of Creek C; and
- Coastal Wet Gully Forest, Swamp Mahogany-Paperbark Swamp Forest and Swamp Oak-Rushland Forest – located in the lower reaches of Cabbage Tree Creek, about 600 metres south-west of the project site.

Of these GDEs, the swamp communities are likely to be highly dependent on perched groundwater (ie. 'obligate GDEs'), whereas the other GDEs are likely to be only partially dependent on groundwater (ie. 'facultative GDEs'). As outlined in Section 5.1 above, the Sandstone Hanging Swamp community is classified as an EEC, with the local occurrences of this EEC representing less than 0.2% of the known distribution of the community.

OEH also considered that other communities in the project area could also be considered GDEs – including Hawkesbury Banksia Wet Scrub, Hawkesbury Banksia Scrub Woodland and Exposed Hawkesbury Woodland – however Rocla contends that these ecosystems are not considered to be significantly dependent on groundwater, being sustained by rainfall (ie. soil moisture) as much as by groundwater flows.

Similarly, NOW noted that the Sandstone Hanging Swamps and Banksia Woodland are listed as 'high priority' GDEs in schedule 5 of the *Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources 2003*. Clause 39 of the Water Sharing Plan excludes the extraction of groundwater within 100 metres of high priority GDEs listed in schedule 5 and shown on the map in Appendix 4 of the Plan (although there are certain caveats to this exclusion). Rocla's groundwater assessment notes that there are no mapped high priority GDEs within 100 metres of the proposed disturbance area, and that therefore the clause 39 exclusion does not apply to the project.

The Department believes that the Sandstone Hanging Swamp community on site is the key GDE that has the potential to be impacted by the project. As shown on Figure 11, there are two patches of the hanging swamp community located on or near Creek B, between the Stage 4 and Stage 5 pits, and a further larger patch in the south-eastern corner of the off-site offset area.

The revised groundwater assessment undertaken by Dr Merrick included specific modelling of the potential impacts at the hanging swamps on Creek B. The modelling found that the groundwater table at the swamps could drop by a maximum of about 2 metres at the eastern swamp (E54_1) and about 5 metres at the western swamp (E54_2), on a temporary basis for a period of up to 5 years. It is noted that this maximum modelled reduction occurs toward the end of the project when quarrying in Stage 5 (see Figure 18). As detailed above, the Department has recommended that Stage 5 not be approved. It is also noted that the modelling assumes that the swamps are sustained by the regional groundwater table, and not by a perched water table, in which case the impacts would be less.

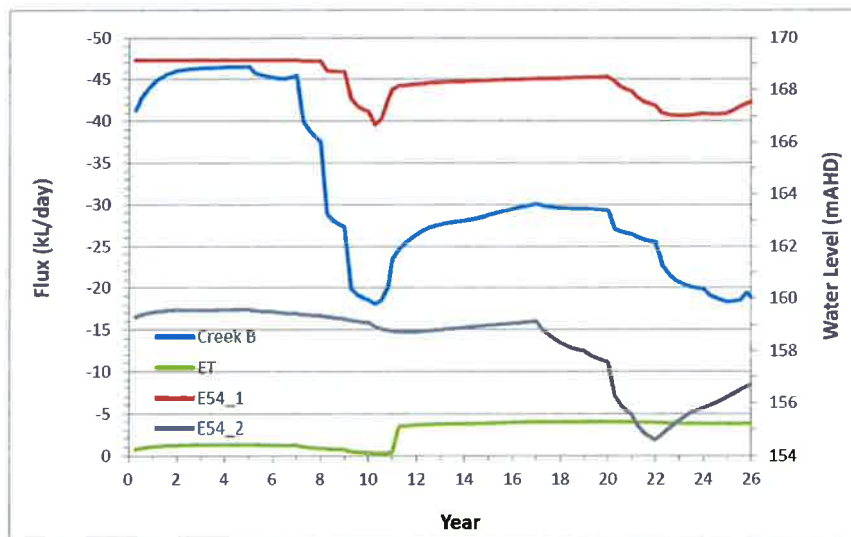


Figure 18: Predicted Groundwater Level Reductions at the Sandstone Hanging Swamps

The EA and revised groundwater assessment considered that whilst these reductions could result in some modification to the Sandstone Hanging Swamp and other GDEs (including the Sandstone Gully Rainforest community) located on Creeks B and C immediately downstream of the quarry extension, the likelihood and significance of any such changes would be mitigated because:

- the natural variation in groundwater levels varies considerably in these higher level local catchments and as such the hanging swamp community is likely to have experienced, and adapted to, fluctuating groundwater levels over time;
- the absolute reductions in baseflow are relatively minor (ie. max. 0.1ML/day), grading to negligible downstream in Cabbage Tree Creek; and
- the reductions in baseflow (and groundwater supply to GDEs) would be temporary, with groundwater levels reducing gradually during the course of the project, and then recovering following quarrying.

OEH and NOW initially raised some concerns about the potential for impact on GDEs, but both agencies are now satisfied that the risks to these communities as a whole are not significant, subject to the protection of the extant GDEs within the biodiversity offset areas, particularly the Sandstone Hanging Swamp EEC. In this regard, both OEH and NOW recommended that comprehensive monitoring of high priority GDEs is undertaken, along with implementation of contingency/compensatory measures, if required.

The Department agrees, and acknowledges that the project would facilitate the permanent conservation of the Sandstone Hanging Swamp EEC within the offset areas, subject to the protection of the community during the period of sand extraction and subsequent groundwater recovery. To ensure that this occurs, the Department has recommended conditions requiring Rocla to monitor the impact of the project on GDEs (both in terms of groundwater supply and ecosystem health) in the offset areas, and to investigate, notify and mitigate any identified impacts. Such mitigation measures could include provision of compensatory water supplies to the vegetation on a temporary basis.

Conclusion

The Department is satisfied that Rocla has designed the project to avoid impacts on key water resources, particularly through avoiding direct impacts on Creeks B and C, and on the lower reaches of Creek A which has been identified as a key frog habitat.

Following very comprehensive groundwater and surface water assessment, including the independent peer review undertaken by Dr Kalf on behalf of the Department, the Department is also satisfied that the project is unlikely to have any significant impacts on the Hawkesbury Sandstone aquifer under the site, or on groundwater users and the environment that rely on this resource. The Department is also satisfied that the project is unlikely to significantly affect downstream surface water resources, or water quality in the area.

To ensure that water resources are effectively managed, the Department has recommended conditions requiring Rocla to:

- ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of quarrying operations on site to match its available water supply;
- ensure that it has adequate water access licences to account for all water used by the project (including gross groundwater inflows), prior to the commencement of quarrying in Stage 4;
- ensure that all surface water discharges from the site comply with the limits set in any environment protection licence;
- provide compensatory water supplies to any private landowner whose supply is found to be adversely affected by the project;
- prepare and implement a comprehensive Water Management Plan for the project, including a:
 - site water balance;
 - surface water management plan and monitoring program, including monitoring of flows, water quality and stream health;
 - groundwater management plan and monitoring program, including monitoring of impacts on groundwater users and GDEs, and including provision for continuous groundwater monitoring; and
 - surface water and groundwater contingency strategy to identify, investigate, mitigate and/or compensate any water related impacts.

5.3 Noise and Air Quality

Introduction

The EA includes specialist noise and air quality assessments, undertaken by Wilkinson Murray and PAE Holmes, respectively. The assessments were undertaken in accordance with applicable guidelines, in particular the *NSW Industrial Noise Policy (INP)* and EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

To address technical issues raised by the EPA and other submitters regarding noise, Wilkinson Murray later prepared a supplementary noise assessment (April 2010) which included additional consideration of background noise levels and noise impacts at Walkabout Park.

Many public submissions were also critical of the air quality assessment's use of baseline dust data from the EPA's monitoring site at Richmond (some 50 kilometres away), rather than actual background dust levels from the local area via Rocla's dust monitoring program for the existing quarry.

In this regard, the EA adopted the Richmond monitoring data as it is the closest continuous particulate monitoring station considered representative of the local environment. Whilst Rocla undertakes continuous dust deposition monitoring around the existing quarry site (consistent with the requirements of the existing development consent for the quarry), it has only undertaken periodic monitoring of fine particulate matter (PM₁₀). This local monitoring data is not adequate for use in impact assessment modelling, as the EPA requires at least 12 months of continuous monitoring.

To address this concern, Rocla provided a comparison of the Richmond background dust levels used in the modelling against the levels determined in the periodic site-based monitoring. This comparison indicates that the particulate matter concentrations measured at Richmond are significantly higher than the concentrations measured during site based monitoring.

Following provision of the supplementary air quality information and the supplementary noise assessment, the EPA and the Department are satisfied that the noise and air quality assessments are adequate and robust enough to determine the noise and air quality impacts of the project on surrounding receivers. These receivers include (see Figure 19):

- residences on Jones Road to the east of the site, the closest of which is about 300 metres from the Stage 4 quarry;
- residences on Peats Ridge Road to the north of the site, the closest of which is about 100 metres from the existing Stage 3;
- the existing residence on Walkabout Park, which is about 300 metres from Stage 5 and 450 metres from Stage 4;
- tourist facilities on Walkabout Park (along with its resident animals), including the existing facilities and the proposed facilities outlined in the Park's masterplan; and
- residences in Calga village (traffic noise only), located about 1 kilometre to the south-east, on the other side of the F3 freeway.

Reasonable and Feasible Mitigation Measures

The assessments were based on a number of avoidance and mitigation measures that Rocla would undertake to reduce noise and dust emissions from the project, including:

- constructing a 5 metre high acoustic bund around the perimeters of the Stage 4 and Stage 5 pits where they face off-site receivers;
- locating the processing area on the base of the pit below ground level, and as far away from receivers as practicable;
- minimising the area of disturbance as far as practicable, and undertaking prompt stabilisation of stockpiles and the acoustic bunds;
- maintaining equipment and internal roads to minimise noise and dust emissions, including maintaining a full time water cart on-site;
- maintaining a wheel wash facility on site, and minimising drop heights;
- complying with proposed hours of operation; and
- commencing operations in Stage 4 as far away from receivers as practicable, to allow for performance to be monitored and evaluated as quarrying progresses closer to receivers.

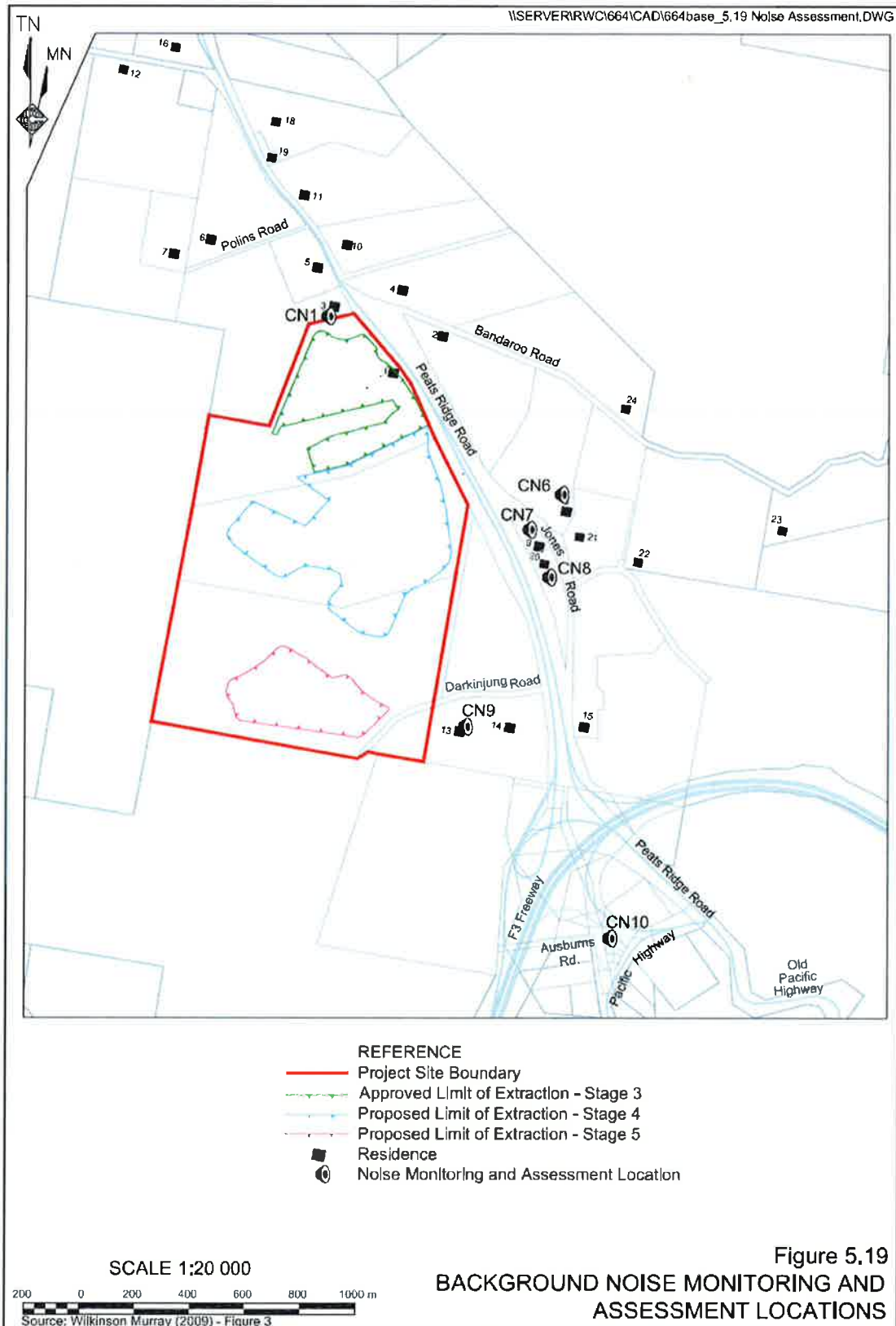


Figure 19: Sensitive Receiver Locations

Detailed consideration of the project's predicted noise and dust impacts based on the implementation of these mitigation measures is provided in the following sections. It is noted that the predicted noise and dust impacts are based on quarrying in both Stages 4 and 5, including simultaneous quarrying from both pits at the same time. However, as outlined in Section 5.1, the Department has recommended that Stage 5 not be approved at this time, due to inadequate biodiversity offsetting. Accordingly, the noise and dust impacts outlined below will overstate the predicted impact on some receivers, particularly residences to the east and south of the Stage 5 pit, including Walkabout Park.

Proposed Hours of Operation

Rocla is proposing to extend the quarry's approved hours of operation by up to 4 hours during the evening and 1 hour during the early morning for extraction, and up to 6 hours on Saturdays for transportation, as outlined in the following table.

Table 4: Proposed Hours of Operation

Activity	Day	Time	
		Approved Project	Proposed Project
Extraction and Processing	Monday – Friday	7am – 6pm	6am – 10pm
	Saturday	7am – 4pm	6am – 6pm
	Sunday and public holidays	Nil	Nil
Product Transportation	Monday – Friday	5am – 10pm	5am – 10pm
	Saturday	5am – 4pm	5am – 10pm
	Sunday and public holidays	Nil	Nil
Maintenance (inaudible at receivers)	Any day	Any time	Any time

The EA notes that extraction would not go on beyond 6pm unless undertaken at least 10 metres below ground and noise levels are compliant at receivers.

To support the proposed additional hours, the noise assessment includes modelling against the applicable evening and early morning criteria in the INP (and the Environmental Criteria for Road Traffic Noise for off-site traffic noise).

With regard to the proposed early morning operations, it is noted that the period between 10pm and 7am is typically defined as the 'night time' and considered under night time criteria, with the intrusive criteria based on the background noise level during the night time period, plus 5dBA.

However, the INP provides for an extraneous 'shoulder' period criterion where it can be demonstrated that background noise levels during this shoulder period are higher than those of the remainder of the night time period, such as in areas near busy roads where early morning traffic noise is a feature of the area.

The noise assessment has applied this shoulder period criteria to the project (from 5am to 7am), given that background traffic noise levels on the F3 Freeway and Peats Ridge Road affect background noise levels in the area in the early morning (typically by up to 4dBA, but up to 7dBA at one receiver location). The EPA and the Department have reviewed this issue in detail, which has involved provision of additional background noise monitoring in the supplementary noise assessment. This assessment demonstrates that the early morning background noise in the area is affected by traffic noise on the F3 Freeway, and to a lesser extent Peats Ridge Road.

Consequently, the EPA and the Department are satisfied that adoption of early morning shoulder criteria is appropriate for the project.

Summary of Predicted Noise and Air Quality Impacts

With the above mitigation measures in place (but including quarrying from Stage 5), the assessments indicate that the project would comply with the applicable noise and air quality criteria at all off-site residences, and would not significantly impact upon Walkabout Park's existing or approved tourist facilities. However, the project does have the potential to conflict with Walkabout Park's proposed facilities as identified in its masterplan.

These impacts are discussed in the following sections.

Operational Noise Impacts

The predicted worst case operational noise levels at surrounding residential receivers, based on the adoption of the noise mitigation measures identified above, are presented in the following table. The predicted noise levels are the maximum noise levels from the 3 scenarios modelled in the assessment, which represent the worst case operating conditions for the project, including concurrent extraction in Stages 3 and 4, and Stages 4 and 5.

Table 5: Predicted Worst Case Operational Noise Levels, dBA L_{Aeq} (15min)

Receiver Location	Predicted Noise Level			Project Specific Noise Level Criteria		
	Morning Shoulder	Day	Evening	Morning Shoulder	Day	Evening
CN1 – residence to north of Stage 3	35	35	35	41	37 ¹	35
CN6 – residence to east of Stage 4	43	41	42	45	43	43
CN7 – residence to east of Stage 4	42	40	42	42	43	44
CN8 – residence to east of Stage 4	42	40	41	46	48	45
CN9 – residence on Walkabout Park	41	39	41	42	45 ²	45

1 Updated since EA following EPA comments

2 Updated since EA in the supplementary noise assessment

The assessment indicates that with the proposed noise mitigation measures in place, in particular the 5 metre high acoustic bunds, the project would comply with all applicable operational noise criteria at all locations at all stages of the project, including the concurrent extraction operations in two operating pits.

The assessment also includes separate consideration of the worst case noise levels during construction of the noise bunds, with concurrent extraction operations occurring. The assessment indicates that construction associated with quarry operations and bund construction would comfortably comply with the applicable daytime operational noise criteria at all receivers, with predicted noise levels between 3 and 16dBA below the applicable criteria.

The supplementary noise assessment undertaken by Wilkinson Murray also included consideration of noise complaints received from Walkabout Park in relation to the existing quarry operations.

In this regard, it is noted that the criteria for the residence on Walkabout Park in the existing consent for the quarry are based on the default criteria for 'all other receivers' (ie. 35dBA at all times). This is because the residence is not one of the closest residences to the existing quarry, and was subsequently not formally assessed in the 2005 application (as closer residences were used to assess and define noise impacts). The 35dBA criterion is based on an assumed background noise level for the Walkabout Park residence of 30dB (ie. the lowest assessable background noise default level in the INP), rather than an actual background noise level.

For the current proposal, actual background noise levels have been measured at Walkabout Park, with the monitoring indicating that background noise levels at the Park (ie. 41dBA during the day, and 40dBA in the evening) are considerably higher than the default background assumed in the 2005 assessment (ie. 30dBA). The higher background noise levels are primarily due to traffic noise from the F3 Freeway.

The investigation of Walkabout Park's noise complaints found that the existing quarry was complying with the relevant (existing) 35dBA criteria at most times, however some exceedances of this nominal criteria (up to 40dBA) were experienced when the wash plant was processing coarser-grade sandstone. Notwithstanding, traffic noise on the F3 was found to dictate ambient noise levels at the Park, with traffic noise levels consistently above 40dBA. It is noted that Rocla is currently in the process of relocating the wash plant from an elevated part of the quarry to the quarry floor in the Stage 3 area (see 'Processing Area Site B' on Figure 5). This relocation is likely to result in an appreciable reduction in the audibility of the processing area at surrounding receivers.

Subsequent to these noise investigations, Walkabout Park requested an additional independent noise investigation in accordance with the provisions of the existing consent for the quarry. This assessment was undertaken by Renzo Tonin & Associates and was completed in June 2013 (see Appendix C). The assessment found that noise levels at the Walkabout Park residence during worst case conditions (with low-moderate wind blowing from the north, from source to receiver) during the day period ranged from 42 – 47 dBA. These measured levels included ambient noise such as local traffic and wildlife (bird) noise, which was said to contribute approximately 1 dBA to the measured levels.

The key source of audible noise from the quarry was found to be plant movement near the wash plant area. As noted above, Rocla is currently in the process of relocating the processing area, which should result in an appreciable reduction in off-site noise from this source.

The Renzo Tonin & Associates report acknowledged that the current noise criteria (ie. 35 dBA) for Walkabout Park under the existing consent are not appropriate, and included a review of the applicable project specific noise level (PSNL) criteria for the Park, recommending that appropriate criteria would be 43 dBA during the day and 38 dBA during the morning shoulder period. As indicated in Table 5 above, these suggested criteria are different (lower) than the criteria established in the Wilkinson Murray assessments and were based on limited background noise monitoring over a period including 5 mornings, including a Sunday.

The Department has reviewed the recommended criteria in both the Wilkinson Murray and Renzo Tonin & Associates reports (see Appendix C), and is satisfied that the PSNL criteria in the Wilkinson Murray report should be adopted (ie. those presented in Table 5 above), as they are based on a satisfactory and representative quantity of data. Based on these criteria, the Department is satisfied that the existing quarry is largely compliant with the adopted noise criteria at Walkabout Park, but recognises that some minor exceedances may occur during worst case conditions. Whilst the current relocation of the quarry's processing area is likely to negate these exceedances, the Department has recommended conditions requiring Rocla to demonstrate compliance prior to the commencement of quarrying in Stage 4 (through demonstrating that all plant and equipment is delivering sound power levels consistent with those used in the EA). The Department has also recommended conditions requiring the ongoing monitoring and adaptive management of extraction operations to ensure compliance with the applicable criteria.

The EPA and the Department are satisfied that Rocla has assessed the potential operational noise impacts of the project appropriately, and that this assessment indicates that the project is able to be undertaken in a manner that would comply with the relevant noise criteria at existing surrounding residences. The Department acknowledges that the existing background noise levels (in the absence of the existing quarry) are already elevated, primarily due to traffic noise on the F3 Freeway and Peats Ridge Road, and that the project is unlikely to significantly contribute to these noise levels.

However, as discussed above the Department has recommended that Stage 5 of the project not be approved. This recommendation would reduce the predicted noise levels at surrounding receivers, particularly for those to the east and south including Walkabout Park.

Sleep Disturbance

The noise assessment indicates that the project would comply with the applicable sleep disturbance noise criteria at all surrounding residences.

Traffic Noise

The EA includes an assessment of traffic noise associated with project-related trucks on Peats Ridge Road at the proposed maximum production limit of 1,000,000 tonnes a year, with reference to the closest residential receivers surrounding the site and in Calga village.

The assessment found that the project would only result in a minor increase in traffic noise levels on Peats Ridge Road (ie. mostly 1dBA or less, but up to 2dBA at one residence), and that traffic noise levels would remain compliant with the applicable traffic noise criteria (ie. 60dBA in the daytime and 55dBA in the night).

Whilst acknowledging that traffic noise-related issues were raised in a large number of submissions (including traffic noise, driver behaviour, access issues), the Department and the EPA are satisfied that the project would comply with the applicable traffic noise criteria. The Department also recognises that the site enjoys good access to the arterial road network, including direct access to Peats Ridge Road, with close and direct access to the Calga Interchange and the F3 Freeway.

Notwithstanding, the Department has recommended conditions requiring Rocla to:

- take all reasonable and feasible measures to comply with traffic noise criteria at all times; and
- establish a comprehensive noise monitoring program that includes traffic noise monitoring and a protocol for mitigating any traffic noise impacts.

Rocla has also committed to establishing and maintaining a truck drivers code of conduct that would include measures to mitigate traffic noise.

Cumulative Noise Impacts

As there are no other proposed extractive industries or other industries immediately surrounding the area that could influence cumulative noise levels, the Department is satisfied that the project is unlikely to result in any cumulative industrial noise impacts in the locality. The Department notes that, in accordance with the provisions of the INP, cumulative noise associated with other, non-industrial noise sources in the area (eg. traffic noise), is considered as part of the operational noise assessment.

Construction Noise

Construction-related noise activities, in particular the construction of the 5 metre high noise bunds, have been considered as part of the operational noise assessment (see above). The Department is satisfied that this approach to assessment is appropriate and conservative (as operational criteria are lower than construction criteria), and that the assessment indicates that the construction of the bunds would comply with applicable operational noise criteria at all off-site receivers.

Operational Dust Impacts

The air quality assessment indicates that the quarry would comply with the applicable health and amenity dust criteria during all stages of the project, including concurrent quarrying in Stages 3 and 4, and Stages 4 and 5. The worst case predicted dust levels at the nearest receivers are presented in the following table.

Table 6: Predicted Worst Case Dust Impacts

Pollutant	Averaging Period / Units	Criterion / Goal	Maximum Predicted Incremental Dust Level		Maximum Predicted Total Dust Level (Increment + Background)	
			Walkabout Park Residence	Other Surrounding Residences	Walkabout Park Residence	Other Surrounding Residences
Total suspended particulates (TSP)	Annual / $\mu\text{g}/\text{m}^3$	90	4	4	<34	<34
PM ₁₀	Annual / $\mu\text{g}/\text{m}^3$	30	2.9	3	17.9	18
	24-hour / $\mu\text{g}/\text{m}^3$	50	22	17	See below	
Deposited dust	Annual / $\text{g}/\text{m}^2/\text{month}$	2	0.7	0.7	-	-
		(increase) 4 (total)	-	-	2.7	2.7

Whilst the air quality assessment includes quantitative cumulative analysis of TSP, dust deposition, and annual average PM₁₀, the analysis of 24-hour PM₁₀ is based on a project-only basis, as the assessment of cumulative 24-hour PM₁₀ is problematic for a number of technical reasons (particularly the inherently large natural variation in background 24-hour PM₁₀ levels).

To address cumulative 24-hour PM₁₀ impacts in some manner, the air quality assessment includes an assessment of the probability of cumulative 24-hour PM₁₀ levels exceeding the applicable $50\mu\text{g}/\text{m}^3$ goal, based on available baseline data.

This assessment indicates that the probability of an exceedance of the cumulative PM₁₀ goal is between 0.27% and 0.31%, depending on the modelling scenario. This is equivalent to 1 additional day per year exceeding the goal at the nearest receiver location. However, the project's contribution to this exceedance was found to be very low, with the project contributing at most 20% of the total cumulative PM₁₀ level. This indicates that regional dust sources (eg. bushfires, dust storms, sea salt) are the dominant contributor to periodic 24-hour PM₁₀ exceedances in the area.

The Department notes that the modelling has not taken into consideration active (or adaptive) management measures to reduce air emissions during dusty conditions (especially during dry and windy conditions). Active management uses a combination of real-time dust monitoring and weather forecasting to guide the day-to-day planning of quarrying operations, to prevent air quality impacts during these adverse weather conditions.

Such active management systems are starting to become more and more common for mining projects in places like the Hunter Valley, with results indicating that predicted impacts (particularly in relation to 24-hour PM₁₀) are able to be significantly reduced or eliminated. The EPA has recommended that Rocla be required to enhance its existing monitoring program through the addition of two real-time (continuous) fine particulate monitors, with one at Walkabout Park and the other near the residences

to the east of the site. NSW Health has also noted that the quarry's existing monitoring program is inadequate and has recommended that, as a minimum, ongoing continuous PM₁₀ and PM_{2.5} monitoring is undertaken for the project, as well as periodic determination of ambient crystalline silica levels in the air (see discussion on crystalline silica below).

The Department agrees, and has recommended conditions requiring Rocla to undertake continuous real-time fine particulate matter monitoring for the proposed expansion.

With this real-time monitoring, together with the implementation of active management measures, the Department is satisfied that Rocla should be able to avoid, or at least minimise the potential for, any significant contribution to PM₁₀ exceedances in the locality.

The Department has also recommended a range of best practice air quality management measures for the project.

Respirable Crystalline Silica

Many public submissions raised serious concerns regarding the potential for silicosis-related health impacts associated with breathing in dust containing respirable (very fine) crystalline silica.

The EA includes detailed modelling of crystalline silica levels in dust emissions from the project, with a health risk assessment against applicable health-related criteria. The assessment indicates that the project would comfortably comply with the applicable criteria at all sensitive receiver locations surrounding the quarry, as summarised in the following table.

Table 7: Predicted Worst Case Crystalline Silica Impacts (all receivers)

Health Risk Indicator	Unit	Criterion	Predicted Project Level (Increment + Background)
Chronic Reference Exposure Level (REL)	µg/m ³	3	0.21
Silicosis Potency	µg/m ³ .years	1,000	55.3

Whilst not refuting the findings of the crystalline silica modelling, NSW Health noted that the background silica content of local particulate matter in ambient air should be determined to base the health risk assessment upon.

This issue was comprehensively addressed by the Independent Hearing and Assessment Panel (the Panel) established for the Somersby Fields Project¹⁹, which included recognised air quality expert Dr Nigel Holmes. At the Panel's request, the proponent of the Somersby Fields Project undertook a number of attempts to determine the background respirable crystalline silica levels in the area. However these attempts proved unsuccessful due to the very low background silica levels and constraints in the available monitoring methodologies (including that most monitoring mediums contain silicon themselves).

Nonetheless, the Panel was able to rely on data collected by the Australian Nuclear Science and Technology Organisation (ANSTO) to overcome this problem. This information found that a conservative estimate of background respirable crystalline silica in the area is 0.34 µg/m³ (PM₁₀).

The background level used in the Somersby Fields Project was 0.7 µg/m³, indicating that the EA-assumed background level for that project was conservative by a factor of some 100%. Dr Holmes was satisfied that the background respirable silica concentration was reasonable.

The air quality assessment for the Calga Sand Quarry extension project has adopted a similar background respirable silica level (0.7 µg/m³). Given the Panel's findings in the Somersby Fields Project, the Department is satisfied that the assumed background is reasonable and conservative.

¹⁹ The Somersby Fields Project (05_0137) was a similar sand quarry proposal located near the Somersby Interchange on the F3 Freeway, approximately 10km north-east of the Calga Sand Quarry. In December 2007, the then Minister commissioned an Independent Hearing and Assessment Panel to assess key aspects of the project, including dust. The Panel concluded that the air quality impacts (and other impacts) of the project could be effectively managed via appropriate controls of approval supported by monitoring and testing. The Panel and the Department subsequently recommended that the project could be approved, subject to conditions, however the Minister refused the project in August 2009 largely because of its proximity to Somersby Public School (about 180 metres away) and to residences (about 150 metres away at the closest point), and the potential impacts on these receivers.

Based on the findings of the air quality assessment, the Department is satisfied that the concentrations of airborne crystalline silica in the air would remain well below internationally accepted health-based criteria in the areas surrounding the quarry. Notwithstanding the unlikely potential for impact, the Department has recommended conditions requiring Rocla to:

- comply with applicable crystalline silica criteria; and
- establish a detailed air quality monitoring program, including crystalline silica monitoring.

Combustion-related Air Emissions

The air quality assessment does not include quantitative assessment of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) associated with combustion-related emissions from vehicles and plant. However, given the relatively low amount of vehicle and plant use and the distance to receivers, the Department is satisfied that the project would not result in any significant increase in levels of SO₂ and NO_x in the local airshed.

Walkabout Park Animal Welfare

Walkabout Park houses a range of native Australian animals within a feral-proof fenced 'enclosure' that encompasses approximately 32 hectares of the 72 hectare property. The Park's main facilities are located within this fenced area, which is located to the south of Darkinjung Road, and immediately to the south-east of the quarry expansion site. Most animals are free to roam in this predator-free open enclosure, although some animals are kept in enclosures near the Park's main facilities area due to safety, legal or specialised animal care reasons.

The DPI licenses the keeping and exhibition of animals at Walkabout Park under the *Exhibited Animals Protection Act 1986*. Under this licensing regime, Walkabout Park is required to manage the keeping and exhibition of its animals in accordance with a range of standards aimed at ensuring the welfare of the animals. As outlined in Section 4.2, Walkabout Park has noted that DPI has advised that it is likely that it will not be able to fulfil its licencing requirements regarding the health and wellbeing of the animals in its care if the project is to proceed.

The Department has consulted further with the DPI's Animal Welfare Branch to investigate these claims. The DPI denied that the park owners had been told that the quarry expansion would likely mean that the Park would be unable to fulfil its licencing requirements, clarifying that the Park had been advised that its licencing may be affected "if the expansion of the mine impacts on the welfare of the animals and the park operators cannot mitigate those effects". It also noted that "obviously we cannot licence a park where the operators are unable to keep their animals in accordance with welfare standards" and that it is "certainly possible that unavoidable adverse impacts from an adjoining property use may prevent an operator from achieving those welfare standards". However, the DPI has not made any judgment about the potential or likelihood of the quarry expansion to affect the Park's licences.

The animal welfare standards do not contain any specific criteria in relation to acceptable noise and/or air quality standards to ensure the welfare of animals is maintained, however the standards do make reference to avoiding and/or minimising sources of stress and behavioural problems.

With regard to noise-related stress, the noise assessment indicates that noise from the quarry expansion would be similar or less than the existing traffic noise from the F3 Freeway. Visitor noise at the Park would also be expected to be noisier than the quarry at times. As such, project-related noise experienced by the resident animals is expected to be similar or less than the noise already experienced by the animals.

With regard to air quality, the predicted compliance with relevant human health and amenity criteria at the existing Park residence would suggest that the animals located within the Park would be unlikely to be adversely affected by dust emissions from the quarry.

Accordingly, the Department is satisfied that there is no evidence to suggest that the welfare of animals at Walkabout Park would be adversely affected by the proposed quarry expansion, or that Walkabout Park would be unable to continue to maintain its animal keeping and exhibition licences. The recommendation to not allow quarrying in Stage 5 would assist in reducing noise and dust levels within the Park's fenced area near the south-eastern corner of the quarry expansion site.

Walkabout Park Masterplan

With regard to Walkabout Park's proposed expansion and masterplan (as outlined in Section 1.2), the Department is satisfied that the noise and dust levels at the approved tourist cabins and eco-centre (ie. Stages 1-3 of the masterplan) near the Park's existing facilities would be similar to the predicted noise levels at the existing Walkabout Park residence, given their similar location and distance to the quarry.

Stage 4 of Walkabout Park's masterplan involves development (including additional tourist cabins and/or camping tents) in the northern, currently undeveloped, portion of the Walkabout Park property to the north of Darkinjung Road. This area is almost immediately adjacent to the proposed Stage 4 extraction area (see Figure 4). The proposed camping tents that are the subject of the recent development application would be located approximately 150 metres from the Stage 4 pit.

The EA does not include any modelling or assessment of noise and dust impacts on the Park's Stage 4 proposal, given that the Walkabout Park masterplan was prepared well after the exhibition of the EA for the proposed quarry extension. Indeed, Walkabout Park's original submission on the EA did not make any mention of the masterplan or development in this area of the Park's site.

It is noted that the proposed 5 metre high noise bund does extend around the Stage 4 pit in this location, which would reduce the noise emissions at this location to some extent. This location is also close to Peats Ridge Road, and is therefore likely to be subject to existing traffic noise. However, given the close proximity of the Stage 4 pit to the proposed camping tent area, it is likely that the camping area would be subject to some noise and/or dust impacts.

It is clear that the two proposed land uses (ie. Rocla's Stage 4 quarrying on one side of the fence and Walkabout Park's Stage 4 camping/tourism development on the other side of the fence) are likely to be incompatible, and that this raises a land use conflict. The potential for impact on this area of the Walkabout Park property also raises the broader question about impacts on the development rights and development potential of neighbouring land users. This concern was also raised by the neighbouring Glenworth Valley property, which believes that the impacts of the quarry should be confined within the quarry site.

Whilst land use conflicts are multi-faceted and addressed on a case-by-case basis, one of the Department's longstanding 'tools' for considering this issue in relation to noise and dust impacts from mining and extractive industry projects on surrounding broad-acre land uses is what is known as the '25% rule'. That is, where more than 25% of a surrounding privately-owned landholding is predicted to be significantly affected by noise or dust, then it is considered that the development potential of that landholding could also be significantly impacted, notwithstanding whether a residence or other sensitive receptor on the landholding is significantly affected or not.

Whilst Rocla has not undertaken any specific 25% rule analysis for the project, it is clear through review of the nature of the Walkabout Park landholding that if compliance with noise and air quality criteria is predicted at the residence on Walkabout Park, then less than 25% of the Park landholding is likely to be significantly noise or dust affected. Similarly, the size of the Glenworth Valley property indicates that well less than 25% of the property would be affected by the project. Accordingly, the Department is satisfied that the broad development rights of the Walkabout Park or Glenworth Valley properties are unlikely to be significantly impacted by the project.

A more detailed consideration and weighing up of the broader land use conflict with Walkabout Park's Stage 4 camping area is provided in Section 5.7.

Conclusion

The Department is satisfied that Rocla has designed the project with a number of reasonable and feasible measures so as to avoid or mitigate the noise and/or dust emissions from the project, and that the modelling indicates that the project would comply with applicable noise and air quality criteria at all off-site residences. Further, the assessment indicates that the project would not significantly impact the existing and approved tourist facilities at Walkabout Park or the welfare of the animals at the Park.

The project is likely to impact Walkabout Park's recently proposed camping area in a currently undeveloped part of the Park immediately adjacent to the Stage 4 pit, however the Department is satisfied that the project would not significantly impact the main areas of the Park or its development potential. This issue is addressed in more detail in Section 5.7.

The Department has recommended a broad range of conditions to ensure that the quarry operates in accordance with best practice with regard to noise and air quality, including requirements on Rocla to:

- comply with applicable noise and air quality criteria, and hours of operation, at all times;
- develop a comprehensive Noise Management Plan and Air Quality Management Plan, including real-time air quality monitoring and an adaptive management system to identify and manage potential exceedances;
- independently investigate noise and air quality complaints and undertake applicable management measures; and
- publicly report on its environmental performance.

5.4 Aboriginal Heritage

Background

The EA includes an Aboriginal Cultural Heritage Assessment prepared by John Appleton of Archaeological Surveys and Reports Pty Ltd. The assessment identified that the local area, including the project area, is extremely rich in archaeological sites with a number of rock engravings, grinding grooves, ceremonial sites and artefact scatters representing both occupation sites and ceremony.

The archaeological survey undertaken as part of the assessment recorded 5 sites within the project area, as indicated in the following table and shown on Figure 20. The assessment recommended that each of these sites be protected from harm.

Table 8: Originally identified archaeological sites

Site Name	Description	Located outside of direct impact area
45-3-0119 (also recorded as 45-3-2195)	Engraving site (Women's site)	Yes
Calga SA1	Stone arrangement	Yes
Popran Art1	Rock shelter with art	Yes
45-3-2196	Grinding groove site	Yes
45-3-0132	Grinding groove site	Yes

Rocla has consequently designed the project to avoid any direct impact on these sites.

In response to concerns raised by stakeholders during exhibition of the EA, Rocla engaged Forward Planning Heritage Solutions to undertake a Supplementary Heritage Assessment which included further survey work. A Cultural Heritage Assessment was also undertaken by Uniquist (Dr Anne Ross), which provided further assessment of the cultural heritage significance of the Women's site (Site #45-3-0119).

The Supplementary Heritage Assessment identified a further 10 previously unrecorded sites in the project area, as indicated in the following table and shown on Figure 20.

Table 9: Previously unrecorded sites

Site Name	Description	Located outside of direct impact area
Site 1: Artefact scatter #1	Low density artefact scatter	Yes
Site 2: Water Holes #1	2 small water holes on rock platform	Yes
Site 3: Linear stone arrangement	Linear stone arrangement	Yes
Site 4: Water hole #2	5 water holes on low rock platform	Yes
Site 5: Emu engraving (re-recording)	Re-identified engraving site.	Yes
Site 6: Fish/trident engraving	Pecked engraving site	Yes
Site 7: Artefact scatter #2	Low density artefact scatter	No
Site 8: Water holes #3	3 water holes	Yes
Site 9: Rock shelter	Rock shelter with archaeological deposit	Yes
Site 10: Rock shelter	Rock shelter with potential archaeological deposit	Yes

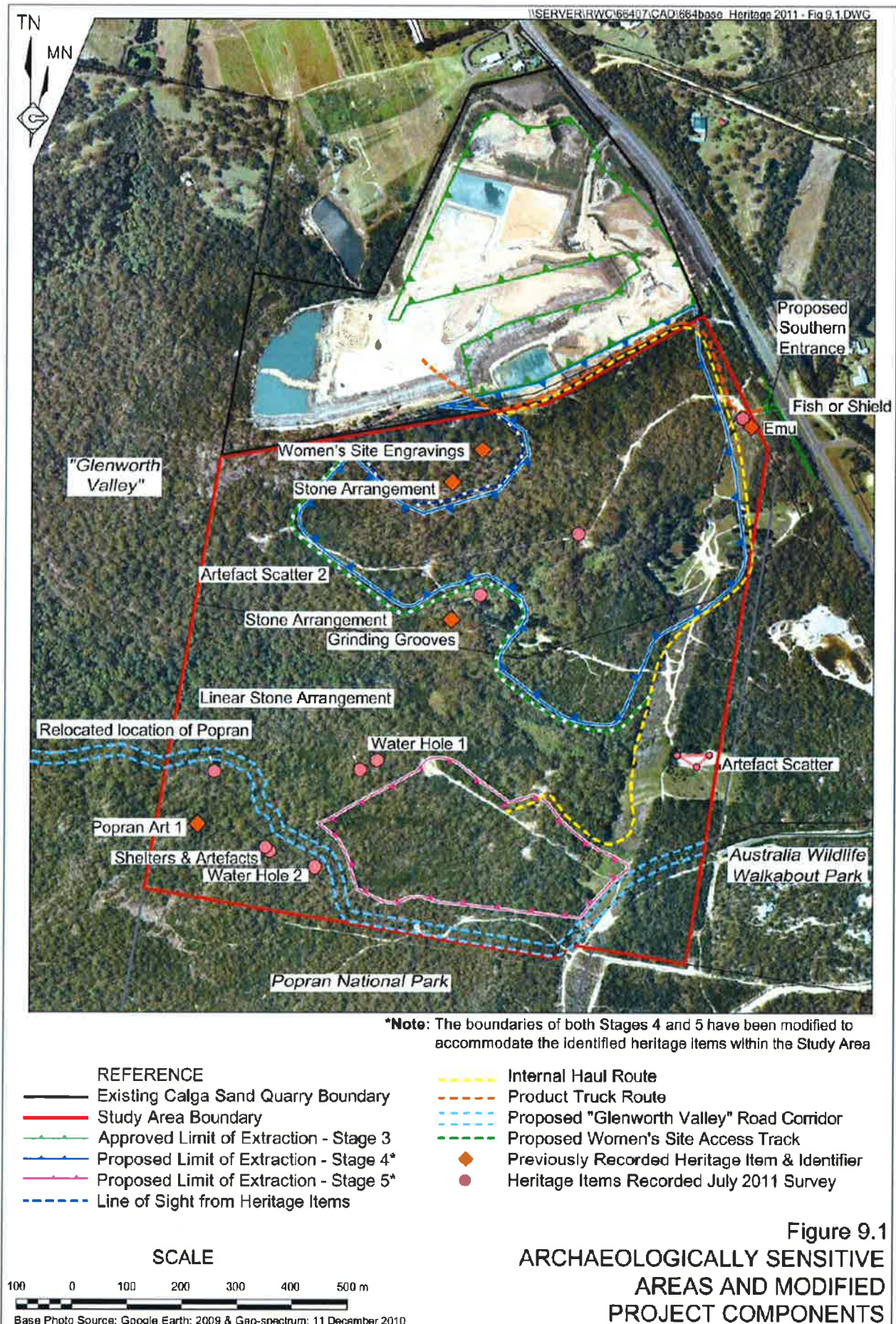


Figure 20: Recorded Heritage sites

Adequacy of Consultation

A number of public submissions and submissions from Aboriginal stakeholders raised concerns that the consultation for the project was inadequate.

Consultation for the project included a number of site inspections, face-to-face meetings and the provision of reports to the Aboriginal stakeholders for comment. The original EA publicly advertised an invitation to Aboriginal stakeholders in accordance with OEH's (formerly DECC) *Interim Community Consultation Recommendations* (ICCR) for involvement in the survey and assessment of cultural heritage items for the project.

The three key Aboriginal stakeholder groups that were involved throughout the consultation process were the:

- Darkinjung Local Aboriginal Land Council (LALC);
- Guringai Tribal Link Aboriginal Corporation; and
- MINGALETTA Aboriginal & Torres Strait Islander Corporation.

The Supplementary Heritage Assessment was provided to these stakeholders for comment, with comments incorporated into the assessment.

Rocla has continued to consult with the relevant Aboriginal stakeholders in relation to the project and has advised the Department of the outcomes of continued consultation with these stakeholders.

Overall, the Department is satisfied with the consultation undertaken with the local Aboriginal stakeholders and has been provided with records of the consultation undertaken. The Department has also been involved in the consultation process with Aboriginal stakeholders, which has included meetings and a site visit on 20 January 2011.

OEH has also indicated that it has no residual concerns with the Aboriginal Cultural Heritage Assessment and has recommended a number of conditions to be incorporated into the project approval.

The consultation process undertaken for the project has highlighted that the project site and the wider area is of high cultural heritage value to Aboriginal stakeholders, with particular significance attributed to the Women's site.

Avoidance and Mitigation

As outlined in Tables 8 and 9 above, Rocla has designed the project to avoid any direct impacts on 14 of the 15 sites identified within the project area. The one site that would be affected – ie. Site 7, an artefact scatter of low archaeological significance – is located in the middle of the Stage 4 area, and Rocla proposes to salvage this site prior to extraction commencing.

The Department and OEH acknowledge the commitment that Rocla has made to avoid direct impacts on Aboriginal heritage sites. In this regard, the Department is satisfied that the project has been designed to avoid direct impacts to heritage sites as far as practicable.

The EA includes a number of measures to further mitigate impacts on the Aboriginal heritage values of the site, including:

- establishing a fenced buffer area (minimum 40 metres) around the Women's site and stone arrangement (#45-3-0119 and SA 1);
- establishing a fenced buffer area (minimum 20 metres) around the grinding grooves site (#45-3-2196);
- maintaining buffers of at least 20 metres around all other Aboriginal sites outside the disturbance area;
- installing signage on the fencing around sites #45-3-0119, SA 1 and #45-3-2196 identifying them as culturally significant and prohibiting unauthorised access;
- implementing erosion and sediment controls to protect Aboriginal sites;
- allowing Aboriginal groups to monitor on-site soil stripping activities;
- implementing procedures to address any additional Aboriginal sites identified during vegetation clearing and soil stripping; and
- implementing a cultural heritage awareness induction course for all staff and contractors.

The Supplementary Heritage Assessment also recommended that access to Aboriginal sites be retained during the project (see access track on Figure 20).

These measures would be managed in accordance with a Cultural Heritage Management Plan for the project, prepared in consultation with Aboriginal stakeholders.

In recognition that there exists the possibility of further unidentified Aboriginal sites within the project site, the EA also noted that Rocla intended to adopt a recommendation of the Darkinjung LALC to burn off the vegetation in and immediately adjacent to the extraction areas prior to the commencement of quarrying operations. The burned area would be re-surveyed with Aboriginal stakeholders, with management of any identified sites in accordance with the Cultural Heritage Management Plan. However, this mitigation measure was later dropped as it did not receive the continued support from the key Aboriginal groups.

The size of the buffer to the Women's site and associated stone arrangement was perhaps the key mitigation measure that was criticised by the Aboriginal stakeholders. In response to these concerns, Rocla subsequently increased the setback (to between 40 and 80 metres), as shown on Figure 5 (see yellow shaded area). Nonetheless, the Aboriginal stakeholders maintain that the buffer is inadequate and remain opposed to the project. This issue is discussed in more detail below.

Women's Site and Stone Arrangement

The Women's site (#45-3-0119) is identified as being the most significant heritage site within the project area and is of high archaeological significance and has particularly high cultural value to contemporary Aboriginal women. All Aboriginal stakeholder groups requested that only females visit and view photos of the Women's site as this is a sensitive site to local Aboriginal women.

In response to this request, Rocla developed a specific protocol which was followed in the preparation of the Cultural Heritage Assessment. The Department also established an internal protocol where only female staff members were involved in reviewing and assessing specific matters relating to the Women's site.

The Women's site is located on the northern ridgeline approximately 100 metres from the existing quarry (Stage 3 pit). The site contains an engraving of a woman and a large emu with the detail on the engraving of the woman including an elaborate headdress. Engravings of female figures are rare on the Sydney Hawkesbury Sandstone and this site is located within 80 metres of a stone arrangement (Calga SA1). The circular stone arrangement is thought to be associated with ceremonial activities and is also assessed as being of high significance. Both of these sites are identified as being places with special associations for local Aboriginal women.

As outlined above, the PPR for the project made further modifications to the Stage 4 (and Stage 5) extraction boundaries to reflect the recommendations of the Supplementary Heritage Assessment and the Cultural Heritage Report prepared by Dr Anne Ross, including increasing the proposed buffer area to these two heritage sites.

In this regard, the Cultural Heritage Report said the buffer around the Women's site should take into account the 'cultural landscape setting', which should be determined not only on scientific grounds but also on social and anthropological grounds, in consultation with the Aboriginal groups.

In response, the revised buffer in the Supplementary Heritage Assessment and PPR (prepared in consultation with the Aboriginal groups) is based on protecting the 'line of sight', that is, the minimum distance to ensure that the quarry operations would not be visible from the heritage sites. This method is aimed at ensuring that the Women's site and associated stone arrangement is retained in its natural setting and context.

Notwithstanding, members of the local Aboriginal community have continued to raise concerns regarding the appropriateness of the buffer. The submissions indicated that they do not believe that the use of buffers or setbacks is adequate until the extent and accuracy of the cultural sites is fully known. The Mingaletta group believes that a buffer of natural bush should be preserved with at least a 2 kilometre radius of the site in all directions. Such a buffer would effectively preclude the project.

The Department has reviewed the heritage assessments and is satisfied that the revised buffer area is reasonable and suitable and will ensure the protection and in-situ conservation of these two sites. It is

also generally consistent with the buffer to the existing quarry operations. The OEH agrees, and does not have any residual issues related to the buffer.

However, the Department acknowledges the issues raised by the Aboriginal groups, including the concern that the women's site would remain as an 'island' within the quarry, with resultant impacts on the cultural heritage values of the site and surrounds.

In this regard, the originally proposed final landform for the project (including the final landform in the PPR) included the retention of quarry benches and steep slopes in the vicinity of the Women's site, particularly to the north-east of the site (see Figure 21). The Department is not satisfied that this landform addresses the Aboriginal group's concerns about the buffer and islanding effect. Consequently, the Department required Rocla to re-address the final landform to provide more natural slopes in the vicinity of the Women's site, consistent with the existing landform to the greatest extent practicable. Rocla subsequently revised the final landform to address this issue, with the revised final landform shown on Figure 7.

As discussed in Section 5.1, the Department has also recommended conditions requiring Rocla to revegetate at least 8 hectares (or approximately one third) of the Stage 4 pit with local vegetation in the vicinity of the Women's site (see Figure 13). This area takes in the area surrounding the Women's site, and extends down to the area surrounding the grinding grooves site. Upon successful rehabilitation to agreed standards, this area would then be required to be included in the permanent biodiversity offset area for the project. The outcome of these recommendations is that the Women's site and its surrounds would be conserved in perpetuity, with the potential that this site (which is currently located on privately-owned land) is added to the adjacent Popran National Park in the future with ownership transferred to the public (subject to separate agreement and/or approvals).

The Department believes that these requirements would facilitate a considerable long-term benefit to the Aboriginal heritage (and biodiversity) values of the locality.

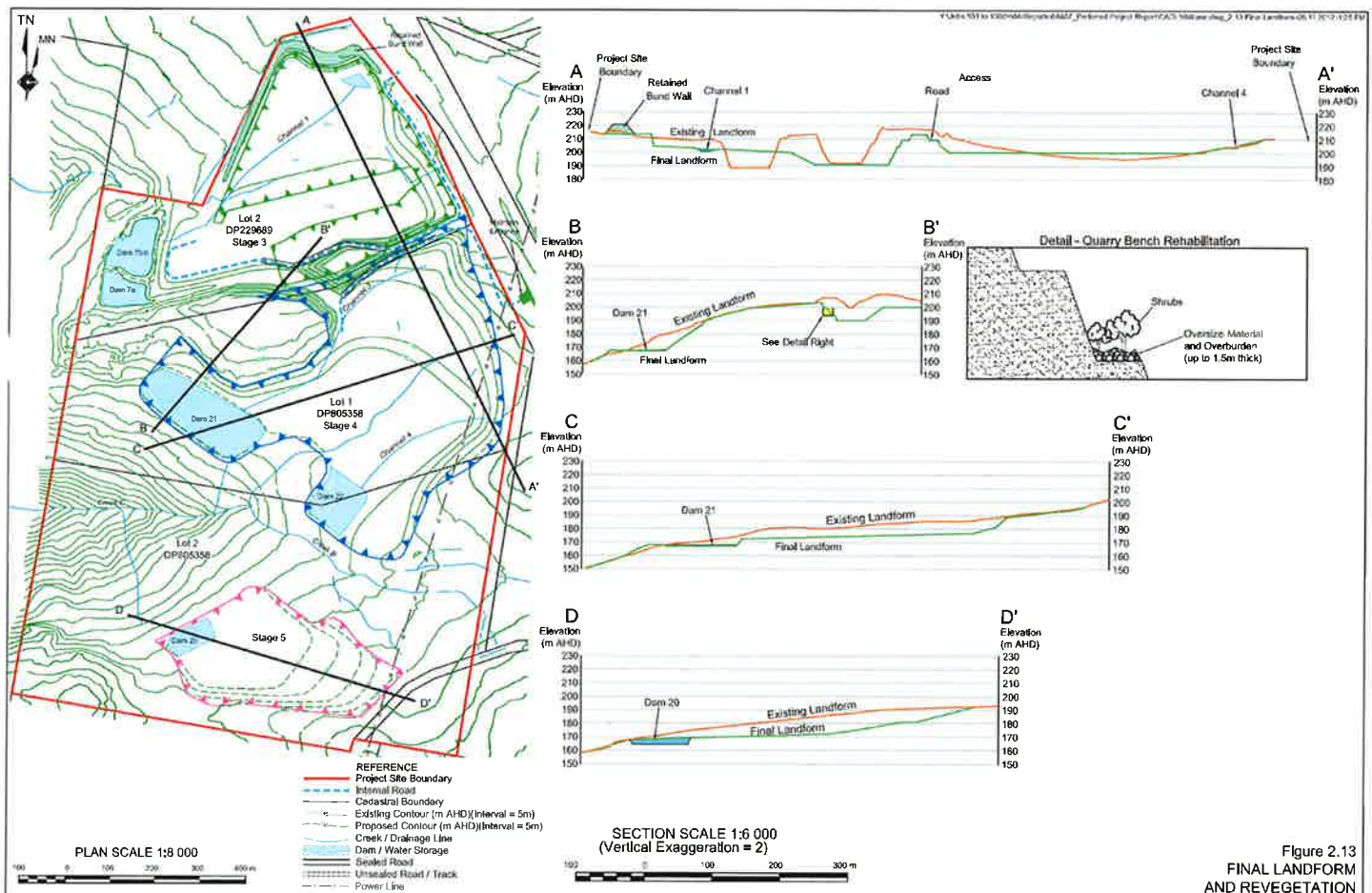


Figure 21: Final Landform as Originally Proposed

Figure 2.13
FINAL LANDFORM
AND REVEGETATION

Vibration Impacts

Concerns were also raised regarding the potential damage to the Women's site and stone arrangement as a result of vibration impacts from the ripping of the quarry. To investigate and address this issue, Rocla undertook site specific vibration monitoring to assess the likely risk of vibration on the rock engravings/sites.

Vibration monitoring was undertaken at two locations at a range of distances from the existing quarry operations (approximately 15m to 120m). During all measurements, vibration levels did not exceed 1mm/s peak particle velocity (ppv). During most ripping operations, the highest vibration levels experienced were between the range of 0.4mm/s – 0.6mm/s.

There are no existing criteria relating to the potential vibration damage to rock carvings or engravings in the natural environment as such. However, there are a number of standards that deal with potential vibration damage to structures such as houses, buildings and heritage properties that can be related to such sites. Wilkinson Murray, who undertook the monitoring and assessment, recommended that a vibration impact assessment criterion of 5-10mm/s would be conservative and appropriate for the site. The Department accepts that such a standard is appropriate and conservative, noting that higher limits have been determined as appropriate for mining projects in the Hunter Valley.

By applying the lower vibration impact assessment criterion of 5mm/s and the minimum buffer distance of 40m, it is expected that the ripping of the quarry would not exceed these limits given the monitoring undertaken for the project. Vibration levels would be typically less than 0.1mm/s, with potential worst case levels up to 0.5mm/s.

Based on this assessment, the Department is satisfied that the risk of damage to any of the Aboriginal sites due to vibration from the project is very unlikely. Notwithstanding, the Department has recommended conditions requiring Rocla to ensure that the project does not cause any direct or indirect impact to the identified Aboriginal sites located outside the disturbance area for the project, and to undertake ground vibration monitoring when undertaking extraction operations within 100 metres of the Women's site and stone arrangement.

Conclusion

The Department recognises the high significance of the identified heritage items within the project area, in particular the Women's site and nearby stone arrangement. However, the Department and OEH are satisfied that Rocla has designed the project in a manner that avoids impacts on Aboriginal heritage items as far as practicable, with only 1 of 15 identified sites proposed to be directly impacted by the project.

The Department and OEH are further satisfied that the project can be undertaken in a manner that would not result in any significant impacts on the Aboriginal cultural heritage values of the site and wider area, subject to the protection of the 14 sites outside the disturbance area during quarrying operations. Indeed, the Department believes that the project should be able to facilitate a beneficial long-term Aboriginal heritage outcome, by providing for the permanent protection of the significant Aboriginal sites within the biodiversity offset areas.

To ensure this occurs, the Department has recommended conditions requiring Rocla to:

- provide for a final landform that includes naturalistic slopes in the vicinity of the Women's site;
- revegetate at least 8 hectares of the Stage 4 pit with local vegetation in the vicinity of the Women's site (see Figure 13), and include this area in the biodiversity offset area for the project;
- provide for the long-term security of the proposed offset areas (preferably transferred to the national park estate);
- protect identified Aboriginal sites outside the project disturbance area;
- undertake vibration monitoring when excavation occurs within 100m of the Aboriginal Women's site and stone arrangement;
- maintain and manage reasonable access to the Aboriginal sites for local Aboriginal stakeholders;
- manage the discovery of any previously unidentified Aboriginal heritage items during surface disturbance;
- prepare and implement a detailed archaeological salvage program, including provisions for pre-disturbance monitoring with Aboriginal stakeholders;

- provide for the ongoing consultation and involvement of Aboriginal stakeholders in the conservation and management of the sites Aboriginal heritage values; and
- ensure all workers receive suitable heritage inductions.

These measures would be required to be addressed in accordance with a comprehensive Cultural Heritage Management Plan, prepared in consultation with OEH and local Aboriginal stakeholders.

5.5 Visual Amenity

Visual Context

As outlined in Section 3 and shown on Figure 9, the proposed quarry extension site, as well as the existing quarry site, is predominately zoned 7(b) Conservation and Scenic Protection (Scenic Protection) under the *Gosford Interim Development Order 122*. Whilst this zoning allows extractive industries (with consent), the zoning also includes an objective that development should not 'detract from the scenic quality of the area as viewed from within the zone or from other areas of the City'. The Department would seek that extractive industry development complies as far as is practicable with this strategic planning intent.

In this regard, the views of the proposed expansion area are generally limited to localised areas within Walkabout Park and Glenworth Valley, with distant views also available from landholdings further to the west of Glenworth Valley. Views from Peats Ridge Road and properties to the east are generally limited by the intervening vegetation on Peats Ridge Road, and the sloping topography of the site (ie. to the west).

Avoidance and Mitigation Measures

Rocla is proposing to implement a number of measures to avoid or mitigate the visual impacts (including those from night lighting) of the project, including:

- construction of the 5 metre high vegetated acoustic bunds around the extraction areas, which would also serve to limit visual impacts;
- retention of existing vegetation along the eastern boundary of the site which, together with vegetation in the Peats Ridge Road reservation, would provide a vegetative barrier of at least 30 metres, restricting views onto the site from Peats Ridge Road;
- planting of additional trees along the eastern boundary to further screen the site from Peats Ridge Road and properties to the east;
- retention of at least 80 metres of vegetation along the southern boundary of the site to assist in screening views from Walkabout Park;
- relocating processing areas to the base of the pits; and
- cladding new buildings with dark, non-reflective material (such as dark green colorbond).

Residual Visual Impacts

With these measures, the Department is satisfied that any residual visual and/or night lighting impacts from Peats Ridge Road and residences to the east would be minor. Any impacts on views from Glenworth Valley and landholdings further to the west would also be relatively minor, given the distance to these receivers and intervening vegetation, which would include the off-site offset area on the Glenworth Valley property.

However, residual visual impacts on parts of the Walkabout Park property are harder to mitigate, given the local topography and the relatively close distance to this receiver (ie. approximately 300 metres to the existing residence and park facilities from the Stage 5 pit, and 450 metres from the Stage 4 pit).

The anticipated views from the existing residence to the extension project are shown on Figure 22. It is noted that this depiction (from the EA) is somewhat crude, and might actually overstate the impacts of Stage 5, particularly in consideration of the topography of the land (see Figure 15), which indicates that the Stage 5 topography continues to dip down from the existing residence on Walkabout Park.

Based on the Department's site visit to Walkabout Park, it is evident that the project would be visible from some of the elevated parts of Walkabout Park (south of Darkinjung Road), in particular some topographical high points that are located just off some of the Park's walking tracks. The Stage 5 pit would be most visible from these locations, with the Stage 4 pit visible but with impacts mitigated by distance and/or intervening vegetation. Views from the existing residence and main facilities on Walkabout Park would be largely obscured by vegetation and the nature of the topography, although some limited views of the Stage 5 pit may be visible.



Figure 22: View towards quarry extension from existing residence on Walkabout Park

Based on the information provided in the EA and its site visit, the Department believes that the project would result in some residual visual impacts to Walkabout Park, particularly associated with the Stage 5 pit. The Department is not satisfied that these impacts could be adequately mitigated, and believes that there is some likelihood that the impacts from Stage 5 could adversely affect visitor satisfaction, and hence potentially visitor numbers over time.

Accordingly, the Department has recommended conditions restricting the quarry expansion to Stage 4 only. Whilst the Stage 4 area would also be visible from Walkabout Park, the Department is satisfied that the visual (and night lighting) impact on the existing residence and park facilities from this stage would be relatively minor and acceptable, due to the distance and intervening vegetation, and would be unlikely to affect the quality of the tourist experience at Walkabout Park.

With regard to the Walkabout Park masterplan (as discussed in Section 1.2) and the areas north of Darkinjung Road, the Department notes that the Stage 4 pit would be at least partly visible from the proposed tourist cabins / camping area in the northern part of the Walkabout Park property, although views to the pit would be limited once the acoustic bund is established and vegetated. Views would also be obstructed by existing vegetation along the eastern boundary of the quarry extension site, which would be retained.

To minimise residual visual impacts as far as practicable, the Department has recommended conditions requiring Rocla to:

- construct and re-vegetate the acoustic bunds to mitigate visual impacts;
- prepare and implement a Landscape Management Plan to minimise visual impacts and improve amenity; and
- ensure no lights shine above the horizontal, and install lighting to minimise obstruction in accordance with relevant standards.

5.6 Traffic and Transport

The road network in the vicinity of the site is shown on Figure 23. As shown, the site enjoys direct access to Peats Ridge Road, which provides direct access to the F3 Freeway via the Calga Interchange approximately 1.6km south of the site. Between the site and the freeway, Peats Ridge Road is a good quality 4-laned rural arterial road.

At the proposed maximum production rate of 1 million tonnes of sand products a year, the project would generate up to 240 truck movements a day (ie. 120 in: 120 out) and around 40 light vehicle movements a day. At the predicted average production rate of 550,000 tonnes a year, project-related traffic would be around 50-60% of these traffic levels. Maximum hourly traffic movements would be up to 30 truck movements per hour in a busy period, with this peak occurring in the mornings on weekdays (ie. between 7am to 1pm, Monday to Friday).

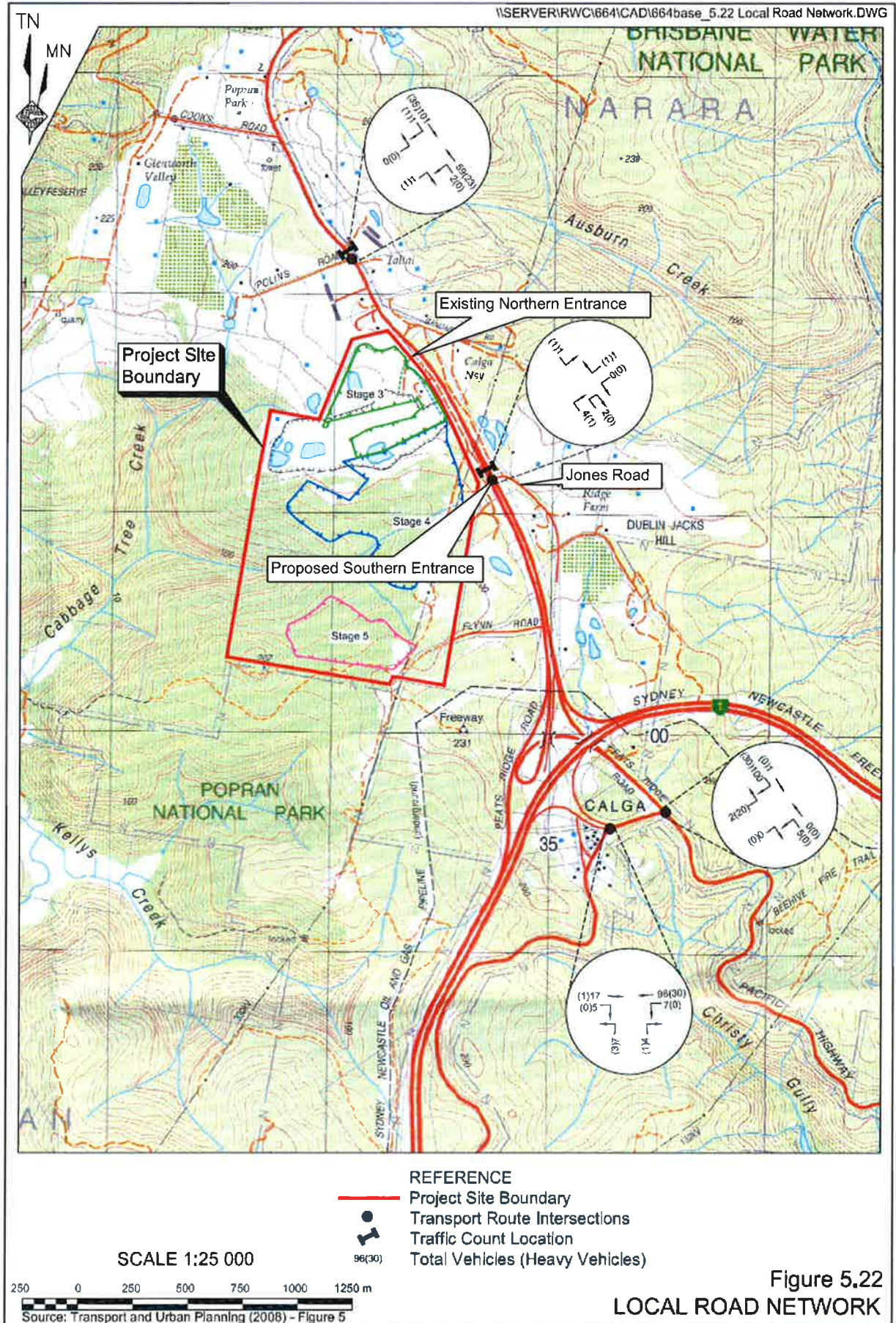


Figure 23: Local Road Network

The vast majority of this traffic would travel to and from the F3 Freeway via Peats Ridge Road, to service the Sydney and Central Coast markets. Occasional trucks would travel to and from local customers to the north of the site, which would also occur via Peats Ridge Road.

At the maximum predicted traffic levels, the traffic assessment undertaken for the project indicates that the project would not result in any significant traffic capacity or traffic safety impacts on the local road network, with Peats Ridge Road continuing to operate with a Level of Service of A, indicating good operation and minimal delays.

Rocla is proposing a phased approach to providing access to the site from Peats Ridge Road, which can be summarised as:

- Phase 1 – Access via the existing 'northern' site access intersection;
- Phase 2 – Entry via a new 'southern' site access intersection located to the east of the Stage 4 pit, and exit via the existing northern access intersection; and
- Phase 3 – Entry and exit via an upgraded southern site access intersection, and closure of the northern access to project-related traffic.

This phased approach to site access is driven by internal quarry planning, rather than any off-site traffic or safety issues. Essentially, the eventual closure of the northern site access intersection to quarry-related traffic would allow the northern portion of the quarry to be used for other land uses (subject to separate approval), once it is rehabilitated.

Prior to public exhibition of the EA, the RMS raised concerns about the southern access intersection, particularly the potential for conflict between the proposed intersection with the existing intersection with Jones Road (see Figure 23). However, following provision of a road safety audit (along with minor changes to the proposed intersection design), the RMS confirmed that it was satisfied that Rocla had adequately demonstrated that the proposed site access intersection could be implemented in a manner that is consistent with applicable road design standards, and that it had no other concerns in relation to the project.

Public submissions raised a number of traffic-related concerns, with key concerns including:

- the sheer volume of trucks associated with the project, and traffic congestion;
- traffic safety concerns, including in fog conditions;
- conflicts with cyclists on Peats Ridge Road;
- truck driver behaviour; and
- traffic noise.

Traffic noise is addressed in Section 5.3.

With regard to traffic volumes and congestion, the Department notes that the site enjoys very good access to the arterial road network, and that the modelling undertaken in the traffic assessment indicates that the local road network would continue to operate at a very good level of service with the project.

Similarly, the assessment indicates the project would comply with applicable road design and safety standards, subject to the appropriate design and construction of the southern access intersection. In this regard, the Department has recommended conditions requiring Rocla to undertake the site intersection upgrades to the satisfaction of the applicable roads authority.

The maintenance of sight distances in accordance with applicable Australian Standards would mitigate safety concerns during fog conditions, which are a feature common to many parts of the NSW road network and not unique to this locality. Rocla notes that the existing quarry has operated without incident in all weather conditions including fog for the past 20 years, and that none of the accidents on Peats Ridge Road that occurred in the assessed 5 year period (ie. 2001 – 2005) occurred during fog.

With regard to potential conflicts with cyclists on Peats Ridge Road, the Department is satisfied that the potential for conflict is unlikely to be any more significant than in other areas of the NSW road network, and that the road design is consistent with applicable road design standards. It is also noted that the project site is located only a short distance from the F3 Freeway, and that Peats Ridge Road between the site and the freeway provides a 4-lane roadway in good condition.

With regard to driver behaviour, Rocla has an existing driver code of conduct which stipulates safe driver practices at all times, and has committed to maintaining this code of conduct for the expansion project. The Department is satisfied with this commitment, and that significant driver conduct issues are unlikely given the site's direct access to the arterial road network.

In addition to requiring the intersection upgrades to be undertaken appropriately, the Department has also recommended conditions requiring Rocla to:

- seal the internal road (from the southern access intersection to the wheel wash);
- provide adequate on-site parking; and
- ensure that all loaded vehicles entering or exiting the site are appropriately covered.

5.7 Socio-economics

The project would have a number of socio-economic benefits, but also has the potential to have a number of potential socio-economic costs, particularly to neighbouring commercial/tourism land users, as well as to other rural and residential land users in the Calga area.

The key socio-economic benefits of the project include:

- the shoring up of regional sand supplies;
- the generation or continuation of 16 direct jobs associated with the Calga Sand Quarry; and
- the benefits associated with the additional capital investment (\$5 million) in the quarry.

The key potential socio-economic costs of the project include the potential impacts on:

- the bottled water production on the Gazzana property;
- the tourism numbers and satisfaction levels at Walkabout Park and Glenworth Valley; and
- other land users in the Calga community.

Like any other development, the project would also give rise to a number of indirect socio-economic benefits and costs, or 'externalities'. Such costs include noise and air pollution, biodiversity impacts and Aboriginal heritage impacts associated with the project. These issues have been addressed in separate sections of this report.

With regard to the benefits, the primary socio-economic benefit associated with the project is the shoring up of affordable regional sand supplies for the Sydney and Central Coast construction industries. As noted in Section 1.3, Sydney and the Central Coast's demand for sand resources is approximately 6 to 7 million tonnes a year, and this demand is expected to grow into the future as these population centres continue to grow. With two of Sydney's biggest traditional sand supply areas now winding down (ie. Penrith Lakes and Kurnell, which together have historically supplied about 50% of Sydney's demand), there is a demonstrable need to develop alternative sands supplies to fill the gap in supply. Whilst a number of sand quarry developments have been approved in recent years (eg. the large Mackas Sand project in Stockton, Newcastle), there is an ongoing need to develop additional resources in areas close to Sydney to replace resources as they are exhausted and to meet the organic growth in demand.

The Somersby Plateau has long been identified as an important sand resource for the Sydney and Central Coast regions. In this regard, the existing Calga Sand Quarry is identified as a 'sand extraction area of regional significance' in *Sydney Regional Environmental Plan No. 9 – Extractive Industry (SREP 9)*, and the existing and proposed quarry site is within an area identified as a 'preferred location for extractive industries' in *Sydney Regional Environmental Plan No. 8 – Central Coast Plateau Areas (SREP 8)*.

In recognition of the importance of the sand resource to the region and the State, clause 16 of SREP 9 requires that Councils shall not consent to development in the vicinity of sand extraction areas of regional significance unless satisfied that the development:

- (a) will not be adversely affected by quarry-related impacts (eg. noise, dust, visual); and
- (b) will not affect or prevent the nearby extractive industry from realising its full economic potential by adversely affecting future expansion of the extractive industry.

This clause is particularly relevant when considering the conflict of the project with the recent proposal by Walkabout park for a camping area in the currently undeveloped northern portion of the Park's site (see discussion below).

Given the strategic context, the Department is satisfied that the sand resource on the site is of regional significance, and that the project would have significant socio-economic benefits for the Sydney and Central Coast region by shoring up regional sand supplies and helping to keep construction sand, and building costs in general, at affordable levels.

As with many large resource extraction, industrial or infrastructure projects, these socio-economic benefits would accrue largely to the wider society. On the other hand, the socio-economic costs would be borne more at the local level. To some extent, this is an inevitable outcome for resource extraction projects, where the location of the resource is fixed and there is limited scope to adjust the location of extraction in a way that would mitigate all residual impacts.

However, the residual impacts should be avoided or mitigated as far as is practicable and/or at least compensated for. The Department is satisfied that the project, together with the recommended conditions, effectively mitigates these residual impacts as far as practicable.

With regard to the potential impacts on the Gazzana water bottling land use to the north of the existing quarry, the Department is satisfied that the groundwater modelling indicates that the proposed expansion would not have any significant impact on the supply in the production bores. Notwithstanding, the Department has recommended conditions requiring Rocla to provide compensatory water supplies to any landowner whose water supplies are affected by the project.

With regard to impacts on Glenworth Valley, the Department recognises that the quarry expansion would be buffered from Glenworth Valley's tourist facilities by the off-site offset area and the quarry setbacks to the western boundary, and that any residual impacts on Glenworth Valley's tourist facilities would be minor and would not adversely affect tourist numbers or satisfaction levels. Indeed, the project's Glenworth Valley access road corridor would facilitate improved access to Glenworth Valley.

With regard to impacts on Walkabout Park, the Department is satisfied that Rocla's environmental assessment indicates that the project – excluding Stage 5 – would not result in any significant amenity impacts that would significantly affect tourist numbers or visitor satisfaction levels at the Park. In this regard, and in relation to the existing park facilities (and the proposed facilities) south of Darkinjung Road, the environmental assessment indicates that:

- noise levels would meet the applicable criteria, and that ambient noise levels at the Park are and will continue to be largely dictated by traffic noise from the F3 Freeway and Peats Ridge Road (see Section 5.3);
- air quality levels would meet the applicable health and amenity criteria (see Section 5.3);
- water quantity and quality would not be significantly affected, and would be subject to compensatory measures if affected (see Section 5.2);
- traffic safety and congestion in the local area would not be adversely affected (see Section 5.6); and
- residual visual amenity impacts associated with the Stage 4 pit would not be significant (see Section 5.5).

With regard to Walkabout Park's masterplan development in the undeveloped northern part of the Park site north of Darkinjung Road, including the Park's current application to develop camping sites adjacent to the former shale quarry, it is evident that the proposed quarry extension is likely to be incompatible with this proposed land use given its close proximity.

It is noted that the masterplan development was not mentioned in Walkabout Park's original submission on the EA. It is also noted that this proposed camping area is well removed from Walkabout Park's existing facilities, and is located outside the Park's feral-proof fenced area (which is located south of Darkinjung Road). It is also well removed from the Park's existing extensive network of walking tracks that are open to visitors, which extend through the bushland to the south of the Park's main facilities, within the fenced area. The proposed camping area is also close to Peats Ridge Road, and is therefore subject to some existing traffic noise.

In summary, the Department does not believe that the proposed camping area in the northern part of the Walkabout Park site is central to the current or future needs of Walkabout Park, and that other opportunities and locations are likely to exist within the Walkabout Park site to expand its tourist facilities, including large areas within the fenced and developed area to the south of Darkinjung Road.

In its current form, the Department believes that the proposed development of the camping area is inconsistent with the requirements of clause 16 of SREP 9, and that any socio-economic benefits of the camping area in this location would be negligible compared to the socio-economic benefits associated with the quarry.

This precedence is reflected in Council's recent approval of the camping area, which includes a condition (Condition 6.2) requiring Walkabout Park to cease use of the camping ground when noise, dust or other impacts occur from the adjoining quarry operations.

The Department also recognises that the removal of Stage 5 from the quarry expansion proposal, and its inclusion in the on-site offset area, would benefit Walkabout Park by providing a considerable buffer of conservation land between the quarry and the Walkabout Park facilities. Further, although many years off yet, the offset strategy together with the rehabilitation strategy would ultimately provide a considerable long term benefit for Walkabout Park by facilitating a largely conservation-based final land use that would complement Walkabout Park's eco-tourism land use.

With regard to socio-economic impacts on the wider Calga area, the Department is satisfied that the environmental assessment indicates that the quarry expansion would not result in any significant impacts on the wider community. In this regard, the Department notes that the quarry has been operating on the site for many years, and that it enjoys very good access to the arterial road network including Peats Ridge Road, the Calga Interchange and the F3 Freeway. The Department has recommended a range of conditions requiring Rocla to operate the quarry in accordance with best practice environmental standards.

5.8 Other Issues

Other issues raised in during the assessment of the project are considered to be minor issues, components of key issues or of minor environmental impact, and/or can be effectively managed via appropriate conditions of approval.

6 RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of approval for the project (see 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.

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

7 CONCLUSION

The Department has assessed the project application, EA, Response to Submissions, PPR and submissions on the project in accordance with the relevant statutory requirements. The Department has also commissioned an independent expert to review the project's potential groundwater impacts.

Based on this assessment, the Department is satisfied that Rocla has designed the project in a manner that achieves a reasonable balance between maximising the recovery of the recognised regionally significant sand resource and minimising the potential impacts on surrounding land users and the environment, particularly through:

- avoiding significant Aboriginal heritage sites;
- avoiding threatened species habitat and creek lines;
- providing reasonable setbacks to property boundaries; and
- addressing the topographical and geological constraints of the site and sand resource.

However, to further mitigate the potential environmental impacts, the Department has recommended that Stage 5 of the quarry not be approved, and that this area be included in the permanent biodiversity offset strategy.

The Department has also recommended that the area around the culturally significant Aboriginal women's site be rehabilitated to provide a naturalistic landform, and that this area along with approximately one third of the Stage 4 pit be ultimately included within the permanent biodiversity offset area.

With these and other measures, the Department is satisfied that the project is able to be conducted in a manner that would comply with all relevant health and amenity criteria, and would not result in any significant impacts on surrounding land users or the environment.

The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the project complies with the relevant criteria and standards, and to ensure that the predicted residual impacts are effectively minimised, mitigated and/or at least compensated for. The Department believes that these conditions reflect current best practice for the regulation of extractive industry projects in NSW.

The Department also acknowledges that the Calga Sand Quarry has long been recognised as a 'sand extraction area of regional significance' under SREP 9, and located within a 'preferred location for extractive industries' under SREP 8. The Department believes that the project represents a reasonable extension of the existing quarry and would make use of existing quarry-related infrastructure and services. Further, the Department recognises that there is a demonstrable need to develop new sand resources to meet the needs of the Central Coast and Sydney construction industries, and that the project would assist in maintaining supplies of affordable sand across the region.

On balance, the Department believes that the project's benefits sufficiently outweigh its residual costs, and that it is in the public interest and should be approved, subject to stringent conditions.

8 RECOMMENDATION

It is RECOMMENDED that the Planning Assessment Commission:

- considers the findings and recommendations of this report;
- approves the project application, subject to conditions; and
- signs the attached project approval (see Appendix A).

DKitto 27/9/13

David Kitto
Director
Mining Projects



20.9.13

Chris Wilson
Executive Director
Development Assessment, Systems & Approvals

SH Haddad

Sam Haddad
Director-General

1/10/2013