

VOLUME 1
ENVIRONMENTAL ASSESSMENT
SECTION 75W MODIFICATION
DA 250-09-01
DIXON SAND (PENRITH) PTY LTD
OLD NORTHERN ROAD
MAROOKA

8 December 2011

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TABLE OF CONTENTS

STATEMENT OF VALIDITY

EXECUTIVE SUMMARY

GLOSSARY OF TERMS AND ABBREVIATIONS

PART 1 INTRODUCTION

1.1	Introduction	1-1
1.2	The Site	1-1
1.3	Statement of the Proposal	1-3
1.4	Background to the Proposed Modification	1-4
1.4.1	Development Consent No.796/00/HE	1-4
1.4.2	Development Consent No.250-09-01	1-5
1.4.3	Environment Protection Licence	1-6
1.4.4	Existing Environmental Management and Monitoring	1-6
1.5	The Proposed Modification	1-6
1.6	Additional Resources to be Extracted	1-12
1.7	Need for an Environmental Assessment	1-13
1.8	Director-General's Requirements	1-18
1.9	Local Government, Government and Statutory Authority Consultation ..	1-19
1.10	Structure of the Environmental Assessment	1-22
1.11	Project Team	1-22
1.12	Future Modifications	1-22

PART 2 DETAILS OF PROPOSED MODIFICATION

2.1	Introduction	2-1
2.2	Proposed Modification to Development Consent No.250-09-01	2-1
2.2.1	General Modifications	2-2
2.2.2	Specific Modifications	2-2
2.3	Limits on Production	2-6
2.4	Traffic and Transport	2-6
2.5	Hours of Operation	2-6
2.6	Rehabilitation	2-7
2.7	Right of Carriageway	2-9
2-8	Existing Acoustic Wall	2-10

PART 3 IMPACT OF THE PROPOSED MODIFICATION

3.1	Local Planning	3-1
3.1.1	Baulkham Hills Local Environmental Plan 2005	3-1
3.1.2	Baulkham Hills Development Control Plan 2005	3-6
3.2	Regional Planning	3-9
3.2.1	Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2 - 1995)	3-9
3.2.2	Sydney Regional Environmental Plan No.20 - Hawkesbury- Nepean River (No.2 - 1997)	3-16
3.3	State Environmental Planning Legislation	3-19
3.3.1	State Environmental Planning Policy No.55 - Remediation of Land	3-19

3.3.2	State Environmental Planning Policy No.44 - Koala Habitat Protection	3-21
3.3.3	State Environmental Planning Policy (Infrastructure) 2007	3-22
3.3.4	Protection of the Environment Operations Act 1997	3-24
3.4	Commonwealth Legislation	3-25
3.5	Groundwater	3-25
3.6	Acoustic Impact	3-34
3.7	Traffic Impact	3-35
3.8	Air Quality	3-37
3.9	Biodiversity	3-38
3.10	Heritage	3-39
3.11	Waste	3-39
3.12	Rehabilitation	3-41
3.13	Social and Economic Impact	3-44

PART 4 DRAFT STATEMENT OF COMMITMENTS

4.1	Introduction	4-1
4.2	General	4-1
4.3	Groundwater	4-1
4.4	Rehabilitation	4.2
4.5	Retention of Acoustic Wall	4-2

PART 5 CONCLUSION

REFERENCES

FIGURES

Figure 1-1	Site Location Map	1-2
Figure 1-2	Aerial photograph indicating the location of the Site	1-3
Figure 2-1	Extract from the approved final landform for Lots 196 and 29 contained in the Site Environmental Management Plan	2-7
Figure 2-2	An extract from the proposed modified final landform after the completion of extraction of Lots 196 & 29	2-8
Figure 2-3	Extract from the amended final landform plan showing the location of cross sections AA and BB	2-9
Figure 3-1	Extract from the Baulkham Hills Local Environmental Plan 2005 Map ...	3-1
Figure 3-2	Extract from the approved final landform for Lots 196 and 29 contained in the Site Environmental Management Plan	3-43
Figure 3-3	An extract from the proposed modified final landform after the completion of extraction of Lots 196 & 29	3-44

TABLES

Table 1-1:	Summary of Director-General's Requirements	1-13
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ATTACHMENTS

Attachment 1:	Development Consent No.796/00/HE
Attachment 2:	Development Consent No.250-09-1
Attachment 3:	Crown Landowner's Consent
Attachment 4:	Director-General's Requirements
Attachment 5:	Responses from Consultation
Attachment 6:	E3 Consulting Australia Groundwater Report
Attachment 7:	Aquaterra Groundwater Report
Attachment 8:	Site Environmental Management Plan
Attachment 9:	Cross sections over proposed additional extraction area
Attachment 10:	Copy of Title to Lots 29 and 196, DP 752025
Attachment 11:	Reduced copy of the Extractions Precincts Plan over Lots 29 and 196, DP 752025 and Lots 1 and 2, DP 547255
Attachment 12:	Development Consent No.165-7-2005
Attachment 13:	Cross sections AA and BB through the modified final landform plan

STATEMENT OF VALIDITY

Submission of Environmental Assessment

Prepared under Section 75W of the Environmental Planning and Assessment Act 1979

Environmental Assessment prepared by

Name: Neil Richard Kennan
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Address: PO Box 212
CONCORD NSW 2137
In respect of: Section 75W Modification of Development Consent No.250-09-01

Applicant and Land Details

Applicant name: Dixon Sand (Penrith) Pty Ltd
Applicant address: PO Box 148
PENRITH NSW 2751
Land to be developed: Lots 196 & 29, DP 752025 and Lots 1 & 2, DP 547255
Old Northern Road
MAROOKA NSW 2756

Environmental Assessment An Environmental Assessment is attached

Statement of Validity

I certify that I have prepared the contents of this Environmental Assessment in accordance with the Director-General's Requirements dated 27 April 2010 and that, to the best of my knowledge, the information contained in the Environmental Assessment is neither false nor misleading.

Signature: 

Name: Neil Kennan

Date: 8 December 2011

EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Assessment has been prepared on behalf of Dixon Sand (Penrith) Pty Ltd (**Dixon Sand**) in support of an application to modify Development Consent No.250-09-01 pursuant to Section 75W of the Environmental Planning and Assessment Act 1979.

The objectives of the proposed modification are:

- (a) To extend the life of extractive operations on the Site.
- (b) To increase the volume of sand product to provide graded sand and gravel products suitable for use in the construction industry and specialty markets.
- (c) To realise the economic potential and maximise the efficient recovery of natural resources on the Site.
- (d) To successfully rehabilitate the extracted areas of the Site into an integrated, continuous agricultural landform.

THE SITE

The land to which Development Consent No.250-09-01 relates (**the Site**) is:

Lots 29 & 196, DP 752025 and Lots 1 & 2, DP 547255

Old Northern Road

MARROTA

The Site is located on the western side of Old Northern Road, approximately 600 metres north of the intersection of Old Northern Road with Wisemans Ferry Road.

Access to the Site is via a sealed Crown Road from Old Northern Road.

The Site is within The Hills Shire Council local government area. The Site is zoned Rural 1(b) pursuant to the Baulkham Hills Local Environmental Plan 2005.

The Site has been extensively disturbed by the extraction of sand for over 25 years.

Maroota Public School is located on Lot 2, DP 752025.

BACKGROUND TO THE PROPOSED MODIFICATION

Development Consent No.796/00/HE

Development Consent No.796/00/HE was issued by the Land and Environment Court on 7 July 2000 for:

.... sand extraction, processing and rehabilitation on lots 29 and 196 DP 752025 Old Northern Road, Maroota subject to conditions in Annexure "A" ...

Of relevance are conditions 3.1 and 3.5 which state:

3.1 Life of Consent

Consent for the purposes of extraction of material and rehabilitation is limited to a period of ten (10) years effective from the endorsed date of this consent (operational consent is twenty-eight (28) days after consent is issued, i.e. consent lapses on 22 March 2010).

The continuation of extraction on the site is subject to review on an annual basis, in accordance with Part 6 of this consent.

3.5 Extraction Depth

- (a) The extraction depth is to be in accordance with details provided in the Environmental Impact Statement and supporting details, except as amended by these conditions of consent.*
- (b) Extraction is not to occur within 2m of the wet weather high groundwater level, or otherwise to the requirements of the Department of Land & Water Conservation.*
- (c) Extraction should not exceed 15.24m from original ground level, as this would encroach onto Crown land title.*

Development Consent No.250-09-01

Development Consent No.250-09-01 was issued by the Land and Environment Court on 24 May 2004 (refer *Diamond v Minister for Planning New South Wales and Another (No 2)* [2004] NSWLEC 254) for:

The operation of an extractive industry on Lots 1 and 2 DP 547255; the continued use of the existing central processing plant on Lot 196, DP 752025; and water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025

Relevantly, condition 1.5 states:

Period of Approval

1.5 *This consent provides approval for sand extraction on Lots 1 and 2, DP 547255, until 24 May 2022 and for the:*

- a) *continued use of processing facilities, haul roads, water management, weighbridge, offices, and associated infrastructure on site;*
- b) *transport of extracted sand and concrete product to the site, and sand product from the site; and*
- c) *decommissioning of equipment, rehabilitation and revegetation of the site,*

for a period of twenty-five (25) years from the commencement of the development consent for the Haerses Road quarry (DA 165-7-2005).

Extraction on Lots 29 and 196 DP 752025 shall not occur beyond the period of approval under development consent 796/00/HE.

Condition 3.25 states:

3.25 *The Applicant shall ensure that no extraction or excavation works occur within two (2) metres of the highest recorded wet weather groundwater level.*

THE PROPOSED MODIFICATION

Pursuant to Development Consent No.796/00/HE, consent for the purposes of extraction and rehabilitation on Lots 29 & 196, DP 752025 ceased on 22 March 2010.

Development Consent No.250-09-01, however, permits:

- (a) development for the purposes of an extractive industry on Lots 1 and 2, DP 547255;
- (b) the continued use of the existing central processing plant on Lot 196, DP 752025; and
- (c) water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025.

The extractive resource on Lot 29 & 196, DP 752025 has not been exhausted and, as such, Dixon Sand seeks approval for the continued extraction on Lots 29 & 196, DP 752025. Dixon Sand has determined that the most appropriate course of action would be to:

- (a) amend Development Consent No.250-09-01 to include extraction on Lots 29 & 196, DP 752025, and

- (b) surrender Development Consent No.796/00/HE issued by the Land and Environment Court on 7 July 2000.

The adoption of the above strategy would see the continued extraction of Lots 29 & 196 being encompassed in Development Consent No.250-09-01, i.e. a single integrated consent, thus having the Minister for Planning and Infrastructure as the consent authority for all activity within Lots 1 & 2, and Lots 29 & 196.

Development Consent No.250-09-01 already applies to Lots 29 & 196 and, as such, any proposed modification:

- (a) would not be seeking the inclusion of additional land into that consent.
- (b) would not be seeking any additional extraction on Lot 29, only an increase in the time for previously approved extraction to take place.
- (c) would be seeking additional extraction on Lot 196 to a depth of a minimum 2m above the wet weather groundwater table.

Lot 29, DP 752025

The proposed modification as it relates to Lot 29, DP 752025 is as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction of Lot 29 as per condition 3.5 of Development Consent No.796/00/HE.
- (b) maintain the depth of extraction on Lot 29 as that which was previously approved.

Lot 196, DP 752025

The proposed modification as it relates to Lot 196, DP 752025 is as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction on Lot 196.
- (b) permit extraction of Lot 196 below the 15.24 metre requirement of development consent No.796/00/HE to a level not within 2 metres of the wet weather high groundwater level. It is proposed that the new extraction level be RL 127.5 metres.

IMPACT OF THE PROPOSED MODIFICATION

Baulkham Hills Local Environmental Plan 2005

Clause 32 of LEP 2005 deals with extractive industry. Following is clause 32 of LEP 2005 with comments as appropriate.

Extractive industries

Consent must not be granted to the carrying out of development for the purpose of extractive industries unless the consent authority has given consideration to the following:

- (a) *social, economic and environmental impacts of the proposed development and the management of those impacts,*

Comment: The proposed modification to Development Consent No.250-09-01 seeks to extend the life of the previously approved extraction on Lots 29 and 196. The impact of that development from an economic perspective is positive in that a recognised resource which is vital to the construction industry would be utilised.

As detailed in this Environmental Assessment, the proposed modification seeks approval for additional extraction of the sand resource on Lot 196. The environmental impact associated with that additional extraction is minimal and manageable within the existing environmental protection, management practices and development approvals operating on the Site.

The social impact would also be positive in that a recognised resource can be utilised to the advantage of the wider community without the introduction of a new quarrying activity to an otherwise undisturbed environment.

- (b) *the extent to which internationally and nationally recognised environmental standards may be implemented in carrying out the proposed development,*

Comment: The proposed modification seeks to incorporate the continued extraction of Lots 29 and 196 into the existing Development Consent No.250-09-01. The current environmental standards which govern the undertaking of extraction, processing and rehabilitation on the Site would be maintained following approval of the proposed modification.

- (c) *the extent of community consultation about and involvement in all phases of the proposed development,*

Comment: Previous extraction on Lots 29 and 196 and the current extraction on Lots 1 and 2 have been and are subject to conditions which require extensive on going consultation with the local community and the Maroota Public School. That consultation process would not alter as a result of the proposed modification.

- (d) *the existence, nature and level of detail of sound technical parameters for carrying out the proposed development in an environmentally sensitive manner,*

Comment: Previous extraction on Lots 29 and 196, and the current extraction on Lots

1 and 2 have been and are subject to conditions which require the approved extraction activities to be undertaken in accordance with strict conditions of development consent. Those conditions of consent not only govern the operation of the activity on the Site, but require extensive monitoring of that activity to ensure that any impact to the environment of the Site and its surroundings is mitigated. The proposed amendment would not impact on the continuation of those monitoring activities. Indeed, the additional extraction of material on Lots 29 and 196 would be governed by the existing monitoring activities.

- (e) *the conservation of the biological and cultural diversity and quality of land within the Baulkham Hills local government area,*

Comment: The conservation of the biological and cultural diversity of The Hills Shire is addressed in the extensive conditions of the existing consent which governs extraction of Lots 1 and 2. Those conditions would also apply to any continuation of extraction on Lots 29 and 196 following approval of the proposed modification.

- (f) *the impact of the proposed development on the archaeological resources of the site,*

Comment: The impact of extraction on the archaeological resources of the Site was canvassed in the Environmental Impact Statements which were prepared for the previous development applications for that extraction. The proposed modification, which seeks continuation of the previously approved extraction on Lots 29 and 196, together with a deeper extraction of Lot 196, would have no adverse impact on the archaeological resources of the Site. Existing conditions of consent relating to archaeological resources would not alter as part of the proposed modification.

- (g) *the impact on the cultural landscape, including any significant views and vistas to or from heritage items located in the vicinity of the proposed development,*

Comment: The cultural landscape of Lots 29 and 196 would not alter as a result of the continuation of extraction on Lots 29 and 196 as proposed.

- (h) *a proposed program for remediation of the site and for post extractive industry usage,*

Comment: Remediation of the Site would remain as per that which has already been approved, albeit with change to the final landform plan which would provide for a better end use of the Site for agricultural purposes. The applicant has advised that there is sufficient spoil material generated in the extraction of both the Site and the Haerses Road quarry to ensure that the approved finished ground levels are attained.

- (i) *the impact of the proposed development on surface water and groundwater*

resources,

Comment: The impact of the proposed modification on surface water would be as per that which has previously been approved. There is, however, potential for impact on groundwater as a result of the additional extraction in the north western corner of Lot 196.

The proposed modification would not alter the previously approved depth of extraction on Lot 29. Any additional depth of extraction on Lot 196 would not proceed below RL 127.5 metres which is significantly above the requirement that extraction not proceed within 2 metres above the wet weather groundwater level. This aspect on the proposed amendment is discussed in more detail in Part 3.5 of this Environmental Assessment.

(j) *the impact of the proposed development on native vegetation (trees, shrubs and groundcover species) including threatened species,*

Comment: The proposed modification seeks to continue the life of the previously approved extraction on Lots 29 and 196 and to increase the depth of extraction on Lot 196 to RL 127.5 metres. The lateral extent of previous extraction on both Lot 29 and Lot 196 would not be increased. As such, no native vegetation, including threatened species, would be impacted by that continued extraction of the Site.

(k) *the impact of the proposed development on native fauna habitat,*

Comment: The proposed modification would not expand the boundary of the previously approved extraction on Lots 29 and 196. As such, there is not likely to be any impact on native fauna as a result of the proposed modification.

(l) *the provision of an adequate setback of not less than 40 metres from the top bank of a watercourse to the extraction operations.*

Comment: Approved setbacks would not alter as a result of the proposed modification.

Baulkham Hills Development Control Plan 2005

Part D, Section 6 of the Baulkham Hills Development Control Plan 2005 (**DCP 2005**) relates to extractive industry.

The approved extractive industry on the Site has been conducted in accordance with the principal objectives of DCP 2005 and is continually monitored to ensure that those objectives are maintained. The proposed modification would continue extraction of the Site within the principal objectives of DCP 2005.

Section 2.16 of Part D, Section 6 of DCP 2005 relates to extractive industry in the Maroota area.

The proposed modification would be undertaken in accordance with the existing conditions of Development Consent No.250-09-01 which have been designed to ensure:

- (a) that extraction of the Site is undertaken in an environmentally responsible manner, and
- (b) that community consultation is undertaken to address concerns raised by both the general public and the community of the Maroota Public School.

Comprehensive environmental monitoring programs are in place to provide both the public and the relevant authorities with data which is used to ensure that the extraction of the Site is undertaken in an environmentally responsible manner. Those monitoring programs would encompass the continued extraction on Lots 29 and 196 to ensure the integrity of the environment of the Site and its surroundings.

The proposed additional extraction of sand in the north western corner of Lot 196 would be monitored such that there would be no adverse impact to the groundwater of the Site.

The proposed modification would:

- (a) Maintain and not alter the existing approved access to the Site from Old Northern Road.
- (b) Maintain the approved sequence of extraction of the Site, albeit with an increased depth of extraction in the north western corner of Lot 196 to RL 127.5 metres.
- (c) Ensure that the approved rehabilitation plan, as modified by this modification application, is implemented to provide a finished landform which would be in keeping with the rural character of the area and provide a platform for agricultural pursuits.
- (d) Maintain the approved buffers to adjoining development and native species as per conditions of the modified consent.
- (e) Maintain approved internal access ways.
- (f) Maintain approved and existing community consultation programs which include consultation with the local community.

Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2 - 1995)

Clause 7 of SREP 9 states that a person may, with consent, carry out extractive industry on land specified in Schedule 1 or 2 of SREP 9.

The extraction of resources from the Site has been the subject of thorough environmental assessment procedures and, indeed, has been the subject of consideration by the Land and Environment Court. The general conclusion has been that the extraction activity which has been and is being undertaken on the Site has been and is being undertaken within the environmental parameters which govern environmentally responsible extractive activities.

The approved extraction on the Site is subject to a comprehensive rehabilitation and management

regime which is implemented as part of the extraction of the Site. The proposed modification would be undertaken in accordance with that approved rehabilitation plan as altered by this modification application.

Detailed assessment of the approved extraction with regard to acoustic impact was undertaken as part of the approval process which has resulted in appropriate conditions of consent which require continued monitoring of the acoustic impact of the development. The proposed modification would not alter the process of extraction which has been and is being undertaken on the Site and would be subject to the existing conditions of consent and on going monitoring regime which operates on the Site.

The proposed modification would extend the life of the previously approved extraction on Lot 29, however, the modification would also increase the depth of the previously approved extraction on Lot 196 to RL 127.5 metres which is no closer than 2 metres above the wet weather groundwater level as determined by Aquaterra (refer **Attachment 7**).

The approved 15.24 metre extraction depth was not based on a desire to protect the groundwater resources of the Maroota area. Rather, it was imposed due to 15.24 metres being the depth of the resource which was not in the ownership of the Crown.

The proposed modification seeks approval to extend the extraction into the Crown owned resource but does not seek approval to extract that resource within 2 metres of the wet weather groundwater level on Lot 196.

Sydney Regional Environmental Plan No. 20 Hawkesbury-Nepean River (No. 2 - 1997)

Sydney Regional Environmental Plan No. 20 Hawkesbury-Nepean River (No. 2 - 1997) (**SREP 20**) applies to The Hills Shire local government area.

Clause 6 of SREP 20 identifies specific planning policies and recommended strategies for development. Those specific strategies applicable to extractive industries are reproduced below with comments.

- (1) *Total catchment management:*
 - (b) *Consider the impact of the development concerned on the catchment.*
 - (c) *Consider the cumulative environmental impact of development proposals on the catchment.*

Comment: The impact of the extraction of resources from the Site on the hydrology and ecology of the area was considered at the time of the assessment of the original development applications. The proposed modification would not result in additional impacts.

- (2) *Environmentally sensitive areas*

- (b) *Minimise adverse impacts on water quality, aquatic habitats, riverine vegetation and bank stability.*

Comment: The existing extraction incorporates approved erosion, sediment and stormwater controls to divert clean runoff away from disturbed areas, and dirty runoff into sediment basins and ponds. The proposed modification would not affect these controls.

- (c) *Minimise direct and indirect adverse impacts on land reserved or dedicated under the National Parks and Wildlife Act 1974 or the Forestry Act 1916 and conservation area sub-catchments in order to protect water quality and biodiversity.*

Comment: The proposed modification would not have adverse impact on these areas.

- (d) *Protect wetlands (including upland wetlands) from future development and from the impacts of land use within their catchments.*

Comment: The proposed modification would not impact the quality or amount of surface or ground water leaving the Site nor would it affect the integrity of wetland areas in the catchment.

- (e) *Consider the need to include buffer zones (such as adequate fire radiation zones) for proposals on land adjacent to land reserved or dedicated under the National Parks and Wildlife Act 1974 or the Forestry Act 1916.*

Comment: The proposed modification would not impact on these areas.

- (g) *Consideration should be given to the impact of the development concerned on the water table and the formation of acid sulphate soils.*

Comment: The proposed modification, with existing conditions in place requiring extraction not to proceed closer than 2 metres above the wet weather high groundwater level, would not affect the water table or potential acid sulphate soils. The proposed new depth of extraction on Lot 196 is RL 127.5 metres which is significantly above the high wet weather groundwater level.

- (3) *Water quality:*

- (a) *Quantify, and assess the likely impact of, any predicted increase in pollutant loads on receiving waters.*

Comment: The approved erosion, sediment and stormwater controls would be maintained and the proposed modification would not result in an increase in any pollutants leaving the Site.

- (f) *Consider the need for an Erosion and Sediment Control Plan (to be in*

place at the commencement of development) where the development concerned involves the disturbance of soil.

Comment: An erosion and sediment control plan has been approved for the Site. The proposed modification would not affect that approved plan.

(4) *Water quantity:*

(b) *Ensure the amount of stormwater run-off from a site and the rate at which it leaves the site does not significantly increase as a result of development. Encourage on-site stormwater retention, infiltration and (if appropriate) reuse.*

Comment: The proposed modification would not increase the amount of stormwater runoff leaving the Site.

(d) *Consider the impact of development on the level and quality of the water table.*

Comment: The proposed modification, which proposes to limit extraction to RL 127.5 metres, is significantly more than 2 metres above the wet weather high groundwater level, and would not result in any significant impacts to the water table (refer **Attachments 6 and 7**).

(5) *Cultural heritage:*

(b) *Protect Aboriginal sites and places of significance.*

Comment: The proposed modification would not impact on any protected Aboriginal sites or places of significance.

(c) *Consider an Aboriginal site survey where predictive models or current knowledge indicate the potential for Aboriginal sites and the development concerned would involve significant site disturbance.*

Comment: The archaeological assessment carried out for the original development applications did not identify any Aboriginal archaeological sites or areas of potential archaeological deposits.

(6) *Flora and fauna:*

(a) *Conserve and, where appropriate, enhance flora and fauna communities, particularly threatened species, populations and ecological communities, aquatic habitats, wetland flora, rare flora and fauna, riverine flora, flora with heritage value, habitats for indigenous and migratory species of fauna, and existing or potential fauna corridors.*

Comment: The proposed modification would not affect threatened species,

populations or ecological communities, or existing conservation areas on the Site.

- (c) *Minimise adverse environmental impacts, protect existing habitat and, where appropriate, restore habitat values by the use of management practices.*

Comment: The proposed modification would not increase any environmental impacts to existing habitats.

- (e) *Consider the range of flora and fauna inhabiting the site of the development concerned and the surrounding land, including threatened species and migratory species, and the impact of the proposal on the survival of threatened species, populations and ecological communities, both in the short and longer terms.*

Comment: The proposed modification would not impact threatened or migratory species, populations or ecological communities of the area or impact their long term survival.

- (f) *Consider the need to provide and manage buffers, adequate fire radiation zones and building setbacks from significant flora and fauna habitat areas.*

Comment: The proposed modification would not alter existing approved buffers or setbacks.

State Environmental Planning Policy No.55 - Remediation of Land

State Environmental Planning Policy No.55 - Remediation of Land (SEPP 55) aims:

.... to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

The Site was subject to assessment for contamination as part of the original development application process. The proposed modification would not permit disturbance of any part of the Site which has not already been the subject of extraction. As such, further assessment pursuant to SEPP 55 is not warranted.

State Environmental Planning Policy No.44 - Koala Habitat Protection

SEPP 44 aims to encourage the proper conservation and management of areas of natural vegetation which provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

The Site has an area greater than 1 hectare. An assessment pursuant to SEPP 44 has been undertaken as part of the original development application process. The proposed modification is such that no additional assessment is required pursuant to SEPP 44.

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (**SEPP Infrastructure**) has as its aim:

... to facilitate the effective delivery of infrastructure across the State ...

The existing extractive industry on the Site has access to Old Northern Road. The assessment of the impact that access would have on the function of Old Northern Road was canvassed in the assessment of the original development application. The proposed modification would not affect the operation of the existing, approved, access to the Site. During the operation of the existing extractive industry, annual environmental monitoring has concluded that the Dixon Sand developments are operating within the conditions of the relevant consents with regard to traffic impact.

Protection of the Environment Operations Act 1997

Section 43 of the Protection of the Environment Operations Act 1997 (**POEO Act**) requires an Environment Protection Licence to be obtained from the NSW Department of Environment, Climate Change and Water (**DECCW**) for the carrying out of *scheduled development works* which would enable a *scheduled activity* to be carried out.

The proposed development would fall within the category of Land-Based Extractive Industry and, as such, an Environment Protection Licence is required.

The existing extractive industry on the Site operates within Environment Protection Licence No.3916. The proposed modification would fall within the existing Environment Protection Licence and no modification would be required to that licence.

Commonwealth Legislation

The **Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)** came into force from 16 July 2000. The EPBC Act requires actions which are likely to have a significant impact on matters of National Environmental Significance or which have a significant impact on Commonwealth land to be referred to the Commonwealth Minister for the Environment for approval.

The Site is not listed as a national heritage place and the proposed modification would not impact on any national heritage places.

The proposed modification would not impact on any threatened species and communities.

No National Environmental Significance matters would be impacted by the proposed modification. As such, the proposed modification has not been referred to the Commonwealth Minister for the Environment and approval pursuant to the EPBC Act is not required.

Groundwater

The proposed modification seeks approval for an increase in the previously approved depth of extraction on Lot 196 to RL 127.5 metres.

E3 Consulting Australia Pty Ltd has prepared a report titled *Preliminary Assessment of Potential Impacts to Groundwater of Proposed Extension of Dixon Sand Operations, Lot 196 DP 752025, Maroota NSW (Attachment 6)*.

With regard to *potential sensitive receptors* of groundwater in the Maroota area, the E3 Report states:

The Site is located within a region that comprises national parks and bushland, extractive industry, agricultural uses and a local residential community. The surrounding native bushland and the local residential populations are potentially sensitive receptors to above ground impacts, such as noise and dust, generated from the extractive operations that are conducted on the Site. However, for the purposes of this report, it is necessary to identify potentially sensitive receptors to groundwater migrating from the Site and the primary sensitive receptors have been identified to potentially include local users of groundwater and nearby groundwater dependant ecosystems.

With regard to the proposed modification of the Consent to permit extraction on Lot 196 to a depth not exceeding 2 metres above the highest recorded wet weather groundwater level, the E3 Report states:

It is noted that a high wet weather groundwater level on Lot 196 has not yet been established and while groundwater levels in the southern part of the extraction area on Lot 196 have been monitored for a number of years, the absence of information on the hydrogeological conditions at this location make it difficult to calculate such a level. The monitoring data indicates that groundwater levels at this location are between 4.5 to 5.5 m below the top of the well casing and are therefore perhaps 3.5 to 4.5 m BNS. However, these groundwater levels are not considered to be indicative of depth to water bearing zone/s and the geological information for areas to the west and north of this location indicates that the depth to water bearing zone/s is much greater and could be deeper than 30 m BNS. It is likely that the groundwater levels are indicative of the fact that the water bearing zone/s intersected are present in semi-confined to confined conditions.

If the Maroota Sand Unit is present underlying Lot 196, then the depths to groundwater reported by ERM may represent the depth to the water bearing zone and could be used to establish the high wet weather groundwater level and subsequently the maximum depth of extraction. However, based on the surrounding surface topography, the geological and water bearing zone information provided on the production bore licences, the logs from Lots 1 and 2 and the information provided in the Maroota Groundwater Study, it is considered that it is more likely that Lot 196 is directly underlain by a non-water bearing shallow horizon of weathered sandstone and then the Hawkesbury Sandstone and that the water bearing zone intersected by MW5 on Lot 196 is part of a confined or semi-confined system of the Deep Aquifer and that the depths to groundwater measured in MW5 are not representative of the depth to the water bearing or saturated

zone, which could be subsequently be [sic] defined as the high wet weather groundwater level. It is considered that the depth to the high wet weather groundwater level, present for the Deep Aquifer, beneath Lot 196 could be at greater than 30 m BNS.

The E3 Report continues:

The geology and the hydrogeological system underlying Lot 196 are currently not well understood and the potential impacts to groundwater of the proposed extension of the depth of extraction on Lot 196 cannot be adequately assessed until further information is available on the sub-surface conditions at Lot 196. This information could be provided by conducting well installation and monitoring works on Lot 196, particularly in areas proximal to the proposed extraction areas. It is recommended that at least one monitoring well is installed along the northern or western boundary of the proposed extraction areas where extraction activities will not extend to ensure that the well will not be destroyed during future quarrying activities. The information from the drilling of this well will be able to be used in conjunction with information from the production bore logs to determine the high wet weather groundwater level underlying Lot 196.

As recommended by E3, a bore has been located in the north western corner of Lot 196, outside the area the subject of extraction, which:

- (a) provides data on the extent of the resource, and
- (b) provides data on the level of groundwater to ensure that extraction does not proceed less than 2 metres above the wet weather high groundwater level.

The process involved in sinking the core and the detailed data received is canvassed in the report of Aquaterra titled *Groundwater Assessment for Dixon Sand Operations, Lot 196, DP 752025, Maroota NSW (the Aquaterra Report)* a copy of which is at **Attachment 7**.

Aquaterra has developed a conceptual site model to describe the groundwater conditions on Lot 196. In this regard, the Aquaterra report (p.7) states:

Based on the bore logs of BH1, the production bores located on Lot 196 and monitoring wells located on Lots 1 and 2, it appears that the Maroota Sands unit and its shallow aquifer do not underlie these areas. Information from the logs indicate that Lot 196 and the remainder of the site is underlain by a shallow and narrow non water bearing unconsolidated horizon of weathered clays, sandstones and shales which may be part of the Eluvial Sand unit that grades rapidly to massive sandstones of the Hawkesbury Sandstone. The Maroota Groundwater Study indicated that the Maroota Sand unit potentially extends laterally only to the very eastern parts of Lot 1 and Lot 2 and is not present over Lot 196.

MW5 which is located on Lot 196 revealed evidence of a shallow water table at about 5.0m below ground level (162mAHD). Shallow perched groundwater zones are commonly found to exist above relatively impermeable layers (aquitards) such as clay lenses, shale or ironstone bands throughout the area. These shallow groundwater bodies are commonly referred to as 'perched' Aquifers and are defined as 'an aquifer that forms

in the otherwise generally unsaturated zone above the regional aquifer in the saturated zone'. The use of term 'perched aquifer' in this case, can be misleading as it suggests that the perched aquifer could be of significant importance hydrogeologically and from a potential resource perspective. The perched groundwater identified in this area is reported to have limited resource value because of its isolated nature, limited extent and low storage capacity (DWLC, 2001).

The lateral extent and depth of the perched groundwater zones can be inferred from the observations made from the drilling program. The drill logs indicate the presence of clay bands across the site at depths ranging from approximately 180 to 165mAHD or around 10 to 20m below ground level (Refer to Table 5.1) [of the Aquaterra Report]. The drilling records also indicate that the first water strike (during drilling) was observed between these low permeability layers. The occurrence of thinly banded clay layers does appear to be relatively common across the middle of the site (BH2, 6 and 7) with two separate bands observed approximately 5m apart. The clay bands do not appear to be as prevalent in BH1 and BH3 (located to the east) indicating that the clay sequence is likely to thin and pinch out to the east and west, reducing the capacity of the layer to retain water (Figure 5.2) [of the Aquaterra Report].

The groundwater levels recently monitored in MW1 and MW4 did not respond greatly to a 53mm rainfall event, which occurred on the 3rd to 5th of November 2010. The flat line hydrographs (Figure 5.3) [of the Aquaterra Report] supports the theory that the shallow groundwater encountered in this area is not indicative of a significant perched aquifer. Typically, rainfall is the principal mechanism of recharge to a perched system therefore a response to rainfall would normally be apparent following rainfall recharge capture and containment. In this case, it is likely that rainfall recharge gradually drains where the semi-confining layers discontinue or thin out, supporting the interpretation that storage in these shallow groundwater zones is both temporary and of limited capacity.

Due to the short duration of groundwater monitoring on BH1, the seasonal variations of the groundwater elevations in the deep Hawkesbury Sandstone aquifer have not yet been established. However, longer term groundwater monitoring has been carried out on monitoring bores VEL-MW1 to VEL-MW3 at the neighbouring quarry (PF Formation). The groundwater levels show an annual seasonal fluctuation of up to 1 m, with a long-term climate-driven range of 1 to 3 m. Receding groundwater levels were evident across most bores during extended periods of below average rainfall.

Therefore, it is expected that the seasonal fluctuations of BH1 would also show a seasonal range of about 1 m, or up to 3 m over a longer term and therefore the 'wet weather high groundwater level' beneath lot 196 would be a minimum elevation of about 109 m to 111mAHD. This is 16.5 to 18.5 m below the proposed extraction depth of 127.5 m AHD.

An east to west cross section of the north western extraction area (Figure 5.1) [of the Aquaterra Report] shows the estimated groundwater elevation of the underlying regional Hawkesbury Sandstone aquifer (108.65mAHD). The proposed extraction depth of the north western pit (108.65m AHD) is also shown for reference, indicating approximately

18.5m of separation between the proposed base of the excavation and the regional groundwater table.

Groundwater levels in the deep aquifer of the Hawkesbury Sandstone, underlying Lot 196, have been confirmed by BH1. The groundwater levels recorded to date are shown in Figure 5.3 [of the Aquaterra report]. The most current groundwater elevation was measured on 11 November 2010 at 59.94m below ground level (108mAHD).

As part of this assessment a conceptual model was developed to graphically represent the various hydrogeological processes identified in the vicinity of Lot 196 and how these localised processes link in with more regional systems. The conceptual model has been developed based on the information obtained from previous studies (E3, 2010; and ERM, 2005), licensed bores and the monitoring bores (BH1, BH2, BH3, BH6 and BH7).

Diagram 1 (Figure 5.2) [of the Aquaterra Report] shows the conceptual model section at a more regional scale. The groundwater divide, (which coincides with the topographic divide of the Maroota Ridge) permits groundwater flow both to the east and west towards the upper tributaries of the Hawkesbury River.

At lower elevations, the tributaries represent areas of possible groundwater discharge from the Hawkesbury Sandstone aquifer. To the west and away from the divide (towards Lot 196) the regional groundwater table exhibits a steep hydraulic gradient (due to low permeability and secondary porosity) towards a topographic low / tributary discharge point to the west of Lot 196.

The 'wet weather' regional groundwater level is shown to occur well below the base of the proposed extraction area (127.5mAHD), with the groundwater elevations observed from BH1 showing approximately 16.5 to 18.5m of separation. The model also serves to show that the shallow groundwater encountered is representative of semi-isolated pockets of groundwater that accumulate temporarily above discontinuous combinations of low permeability clay bands and iron stone. Due to the limited storage potential of these low permeability layers, the shallow groundwater will gradually drain, providing some slow and low volume recharge to the regional aquifer (Diagram 2) [of the Aquaterra Report].

The Aquaterra Report concluded:

The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, other than potentially increasing the rate of rainfall recharge (due to the partial removal of low permeability layers) to the regional aquifer system. As mentioned, the shallow groundwater system will recharge the deeper aquifer via gradual drainage, however, this level of recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.

These mechanisms would include mass infiltration via complex networks of structurally controlled fracturing (secondary porosity) at a more regional level throughout the sandstone unit.

No information was made available as to whether there had been any impacts by sand extraction previously, either on this or on the adjoining quarry sites.

The impact of the extended quarrying is also likely to have a minimal impact on existing users in the immediate vicinity.

A review of the database has indicated that there are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers observed in the site investigation drilling and from the borehole log review. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity. Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.

Following a review of the information made available and from the findings made in this assessment the following conclusions have been drawn:

- *Lot 196 and the remainder of the site is underlain by a series of shallow and limited extent zones of non water-bearing unconsolidated horizons of weathered clays, sandstones and shales. These low permeability layers permit temporary storage of groundwater at various shallow depths. These temporary perched storages have limited resource value because, like the Maroota Sand, they are discontinuous and of limited extent and low storage.*
- *Seasonal groundwater fluctuations observed from BH1 show seasonal ranges of about 1m. These fluctuations could range up to 3m over the longer term. Therefore the 'wet weather high groundwater level' beneath Lot 196 would be at a minimum elevation of about 109 to 111m AHD. This is 18.5 to 16.5m below the proposed extraction depth of 127.5m AHD.*
- *The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, or to the regional aquifer system, other than potentially increasing the rate of rainfall recharge to the regional aquifer system. However, this potential increase in recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.*
- *There are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity.*
- *Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.*

Acoustic Impact

The previously approved extraction of Lots 29 and 196 was subject to conditions of consent relating to acoustic impact and the monitoring of that impact.

The proposed modification would bring any continued extraction on Lots 29 and 196 under the umbrella of these acoustic impact conditions to ensure that the continued extraction of the Site is undertaken such that an acceptable acoustic environment is maintained.

Dixon Sand, as part of its fulfilment of the conditions of consent for its Maroota operations, has prepared annual environment site audits. Those audits, which can be seen on the Dixon Sand web site, clearly show that sand extraction on all of the Dixon Sand sites at Maroota are operating within the acoustic criteria contained in the conditions of consent. The audit reports note that no complaints have been received relating to acoustic impacts from the Dixon Sand operations at Maroota.

Traffic Impact

Apart from the modification to condition 3.30 detailed in **Part 2** of this Environmental Assessment to remove reference to Development Consent No.796/00/HE which is to be surrendered, no modification is proposed to the already approved truck movements to and from the Site. As such, the previously approved condition which applied to the extraction of Lots 29 and 196 remains unaltered.

Dixon Sand, as part of its annual environmental reporting, has monitored the number of trucks entering and leaving the Site. There has been no exceedance of the approved truck numbers. The annual environmental monitoring reports clearly state that a minor number of complaints have been made with regard to the conduct of truck drivers in the Maroota area with the number of complaints ranging from zero in some years to 4 in one year. In all cases, complaints related to trucks speeding. In all cases, Dixon Sand has reprimanded the driver concerned and reiterated the truck management plan which applies to trucks entering and leaving the Site.

Air Quality

Conditions 3.2 - 3.8 of Development Consent No.250-09-01 relate to air quality impact and provide for the performance criteria to be adopted for extraction of the Site. The incorporation of extraction on Lots 29 and 196 would mean that any extraction on Lots 29 and 196 would be governed by conditions 3.2 - 3.8 to ensure the integrity of the air quality of the locality is maintained.

A review of the annual environmental monitoring reports for the Dixon Sand extractive industry operations at Maroota reveals that, generally, dust emissions from the extractive industry have been within the criteria referred to in conditions of consent.

Biodiversity

The proposed modification would not result in any disturbance to the Site which has not already

been approved. The issue of impact to the biodiversity of the locality was canvassed in the assessment of the previous development applications.

Heritage

Condition 3.51 of Development Consent No.250-09-01 states:

- 3.51 If, during the course of any activities conducted under this consent, the Applicant becomes aware of any heritage or archaeological sites not previously identified, all work likely to affect the site shall cease immediately. The Applicant shall then consult with relevant authorities and decide on an appropriate course of action prior to recommencement of work. The relevant authorities may include DECC, the NSW Heritage Office, and the relevant local Aboriginal community. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.*

The proposed modification does not seek approval to extract material on Lots 29 and 196 outside the area previously approved in Development Consent 796/00/HE. That area has already been disturbed and it is unlikely that heritage items or archaeological sites would be encountered should the modification be approved. Notwithstanding, Condition 3.51 would ensure that appropriate measures are employed to ensure the integrity of any such items of heritage or archaeological sites.

Waste

Conditions 3.52 - 3.54 of Development Consent No.250-09-01 state:

- 3.52 The Applicant shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing or disposal, or any waste generated at the site to be disposed of at the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997. This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the site if it requires an Environment Protection Licence under the Protection of the Environment Operations Act 1997.*
- 3.53 All liquid and non-liquid wastes generated at the development shall be assessed, classified and managed in accordance with the DECC s Environmental Guidelines Assessment, Classification and Management of Liquid and Non-Liquid Wastes (EPA, 1999).*
- 3.54 Any waste generated at the development shall only be transported to an DECC - approved waste management facility for treatment, recycling and/or disposal, where relevant.*

The proposed modification would be subject to the above conditions of Development Consent No.250-09-01.

Rehabilitation

Condition 1.15 of Development Consent No.250-09-01 deals with the payment of a bond to the Director-General... *to ensure completion of the rehabilitation and landscaping works at the site.* This condition would relate to Lots 29 and 196 upon approval of the proposed modification.

Condition 6.3 (e) requires the preparation of a *Rehabilitation and Landscape Plan*. The proposed modifications would be the subject of that *Rehabilitation and Landscape Plan*.

Dixon Sand, as part of its fulfilment of the conditions of consent No.796/00/HE, has paid a rehabilitation bond to The Hills Shire Council for rehabilitation of the Site. As part of the modifications proposed, which includes the surrender of consent No.796/00/HE, Dixon Sand proposes to recover the bond from The Hills Shire Council and transfer that bond money to the Department as part of Condition 1.15 of Development Consent No.250-09-01.

The Site Environmental Management Plan contains, as its Figure EP15.2, a plan of the approved final landform for Lots 196 and 29, DP 752025 and Lots 1 & 2, DP 547255. An extract from that plan is at **Figure 3-2**.

Dixon Sand, as part of the review process for this modification application, has ascertained that a more appropriate and suitable final landform could be achieved on the Site following completion of the extraction of Lots 196 & 29 as now proposed. As a result, it is now proposed to modify Development Consent No.250-09-01 such that the final landform shown in **Figure 3-3** is substituted for that which is currently approved.

Social and Economic Impact

Conditions 4.1 - 4.12 of Development Consent No.250-09-01 provide the environmental monitoring conditions under which the existing development on the Site operates. These conditions would also relate to the use of Lots 29 and 196 upon approval of the proposed modification.

Conditions 5.1 - 5.7 of Development Consent No.250-09-01 relate to *Community Information, Consultation and Involvement*. Those conditions would not alter as a result of the proposed modification.

The proposed modification would not involve any increase in activity on the Site over and above that which has already been approved in the past. No additional employment would be generated, and the existing market for product would remain. No economic impact is expected to result from the proposed modification.

CONCLUSION

Dixon Sand seeks the approval of the Minister for Planning and Infrastructure to modify Development Consent No.250-09-01 to permit further extraction on Lots 29 and 196, DP

752025, Old Northern Road, Maroota.

Dixon Sand has determined that the most appropriate course of action would be to:

- (a) amend Development Consent No.250-09-01 to include extraction on Lots 29 & 196, DP 752025, and
- (b) surrender Development Consent No.796/00/HE issued by the Land and Environment Court on 7 July 2000.

The adoption of the above strategy would see the continued extraction of Lots 29 & 196 being encompassed in Development Consent No.250-09-01, i.e. a single integrated consent, thus having the Minister for Planning and Infrastructure as the consent authority for all activity within Lots 1 & 2, and Lots 29 & 196.

This Environmental Assessment has concluded that, with the proposed modification to Development Consent No.250-09-01, there would be no impact to the environment of the Site and its environs over and above that which was identified in the assessment of Development Application No.796/00/HE and Development Application No.250-09-01.

The proposed modification would ensure that a valuable resource is utilised and ensure that the Site would be rehabilitated to be consistent with the agricultural landscape of the area.

GLOSSARY OF TERMS AND ABBREVIATIONS

Consent Authority	In relation to a project application under Part 3A of the Environmental Planning and Assessment Act 1979, the Minister for Planning and Infrastructure.
Project	The carrying out of development that is declared to be a project: (a) by a State environmental planning policy, or (b) by order of the Minister published in the Gazette.
Designated development	Section 77A of the Environmental Planning and Assessment Act 1979 states that " <i>Designated development is development that is declared to be designated development by an environmental planning instrument or the regulations.</i> " Schedule 3 of the Environmental Planning and Assessment Regulation 2000 defines the type of development which is classified as designated development.
Integrated development	Development which requires development consent and one or more of the approvals listed in Section 91 of the Environmental Planning and Assessment Act 1979.
Local Environmental Plan	Local Environmental Plans are planning documents prepared by a Council which detail the zoning of land and the type of development which is permitted with consent in a particular zone. Controls on development are also provided.
Regional Environmental Plan	A planning instrument made by the State. Regional Environmental Plans deal with planning issues of regional significance.
State Environmental Planning Policy	A planning instrument made by the State. State Environmental Planning Policies deal with issues of State significance.
The Site	Refers to the land upon which the proposed development is to take place.

OEH	Office of Environment and Heritage
DP	Deposited Plan
EA	Environmental Assessment
EMP	Environmental Management Plan
EPBA Act	Environment Protection and Biodiversity Conservation Act 1999
LEP	Local Environmental Plan
POEO Act	Protection of the Environment Operations Act 1997
REP	Regional Environmental Plan
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy

*Part One***INTRODUCTION****1.1 Introduction**

This Environmental Assessment has been prepared on behalf of Dixon Sand (Penrith) Pty Ltd (**Dixon Sand**) in support of an application to modify Development Consent No.250-09-01 pursuant to Section 75W of the Environmental Planning and Assessment Act 1979.

1.2 The Site

The land to which Development Consent No.250-09-01 relates (**the Site**) is:

Lots 29 & 196, DP 752025 and Lots 1 & 2, DP 547255
Old Northern Road
MARROOTA

The Site is located on the western side of Old Northern Road, approximately 600 metres north of the intersection of Old Northern Road with Wisemans Ferry Road.

Access to the Site is via a sealed Crown Road from Old Northern Road.

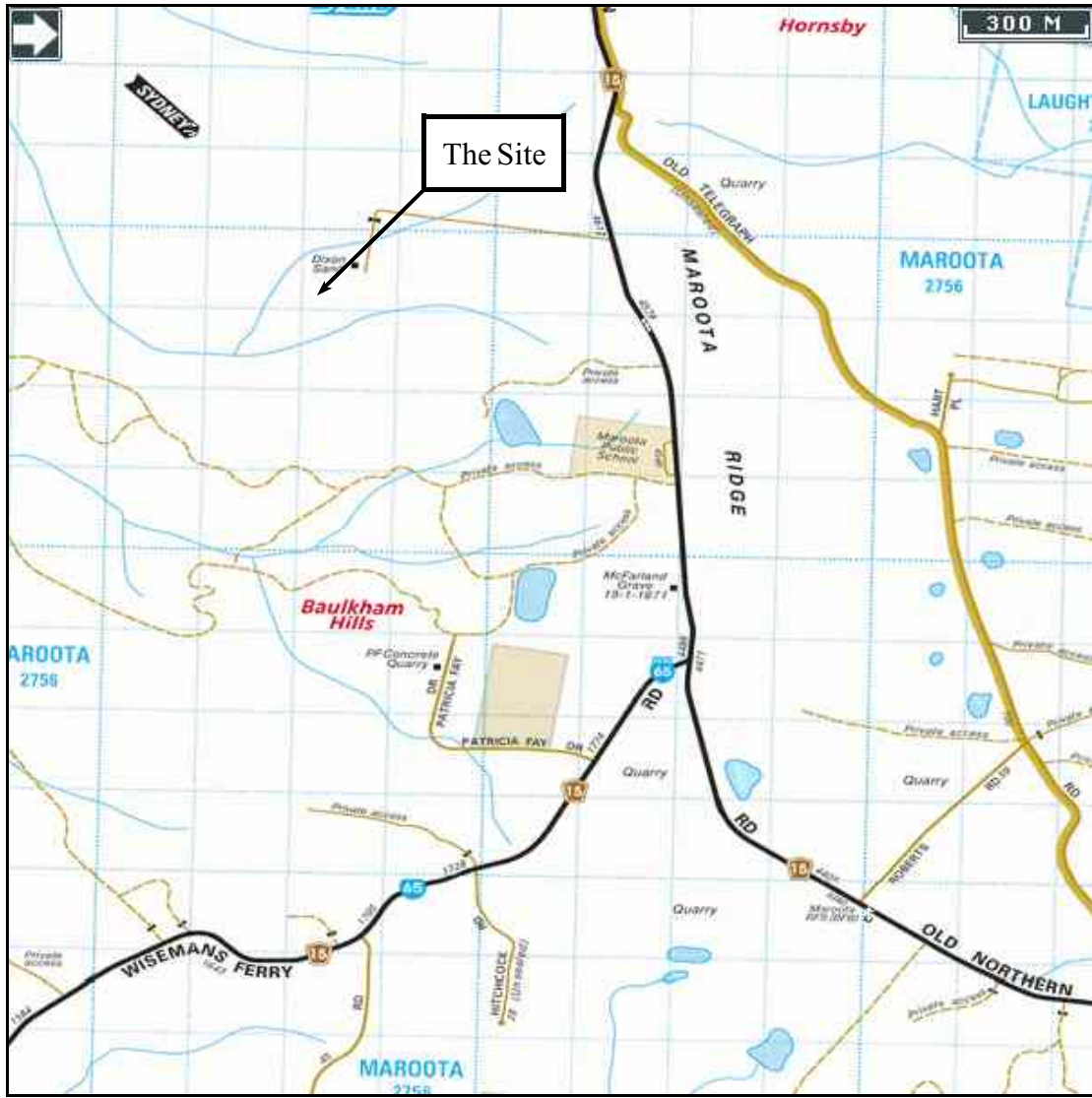
The Site is owned by Manaldo Pty Ltd and the Estate of the late C Gouskos, however, any resource greater than 15.24 metres below the natural surface level is owned by the Crown.

The Site is within The Hills Shire Council local government area. The Site is zoned Rural 1(b) pursuant to the Baulkham Hills Local Environmental Plan 2005.

The Site has been extensively disturbed by the extraction of sand for over 25 years.

Maroota Public School is located on Lot 2, DP 752025.

Figure 1-1 shows the Site location. **Figure 1-2** shows the Site in more detail.



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Figure 1-1: Site Location Map

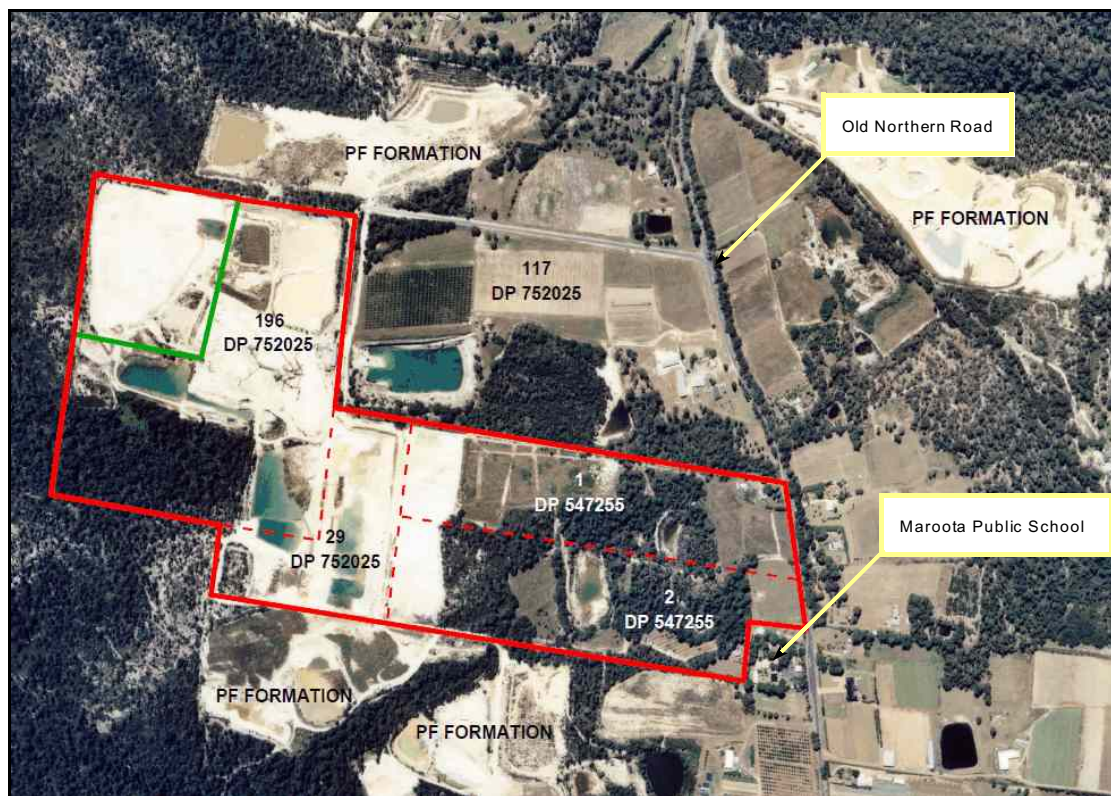


Figure 1-2: Aerial photograph indicating the location of the Site bound by solid red lines with the general area where increased depth of extraction is proposed shown bounded by the solid green lines.

1.3 Statement of the Proposal

Dixon Sand seeks the approval of the Minister for Planning and Infrastructure to modify Development Consent No.250-09-01 to permit further extraction on Lots 29 and 196, DP 752025, Old Northern Road, Maroota.

The objectives of the proposed modification are:

- (a) To extend the life of extractive operations on the Site.
- (b) To increase the volume of sand product to provide graded sand and gravel products suitable for use in the construction industry and specialty markets.
- (c) To realise the economic potential and maximise the efficient recovery of natural resources on the Site.
- (d) To successfully rehabilitate the extracted areas of the Site into an integrated, continuous agricultural landform.

1.4 Background to the Proposed Modification

1.4.1 Development Consent No.796/00/HE

Development Consent No.796/00/HE was issued by the Land and Environment Court on 7 July 2000 for:

.... sand extraction, processing and rehabilitation on lots 29 and 196 DP 752025 Old Northern Road, Maroota subject to conditions in Annexure "A"

A copy of Development Consent No.796/00/HE is at **Attachment 1**.

Of relevance are conditions 3.1 and 3.5 which state:

3.1 Life of Consent

Consent for the purposes of extraction of material and rehabilitation is limited to a period of ten (10) years effective from the endorsed date of this consent (operational consent is twenty-eight (28) days after consent is issued, i.e. consent lapses on 22 March 2010).

The continuation of extraction on the site is subject to review on an annual basis, in accordance with Part 6 of this consent.

3.5 Extraction Depth

- (a) The extraction depth is to be in accordance with details provided in the Environmental Impact Statement and supporting details, except as amended by these conditions of consent.*
- (b) Extraction is not to occur within 2m of the wet weather high groundwater level, or otherwise to the requirements of the Department of Land & Water Conservation.*
- (c) Extraction should not exceed 15.24m from original ground level, as this would encroach onto Crown land title.*

The limit on the depth of extraction to 15.24 metres from the original ground level was imposed due to the resource below that level being in the ownership of the Crown as per the title to that part of the Site. A copy of the Title for Lots 29 and 196, DP 752025 is at **Attachment 10**.

A copy of the Extraction Precincts approved over Lots 29 and 196, DP 752025 is shown as **Attachment 11**.

1.4.2 Development Consent No.250-09-01

Development Consent No.250-09-01 was issued by the Land and Environment Court on 24 May 2004 (refer *Diamond v Minister for Planning New South Wales and Another (No 2) [2004] NSWLEC 254*) for:

The operation of an extractive industry on Lots 1 and 2 DP 547255; the continued use of the existing central processing plant on Lot 196, DP 752025; and water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025

A copy of Development Consent No.250-09-01 is at **Attachment 2**.

Relevantly, condition 1.5 states:

Period of Approval

1.5 *This consent provides approval for sand extraction on Lots 1 and 2, DP 547255, until 24 May 2022 and for the:*

- a) *continued use of processing facilities, haul roads, water management, weighbridge, offices, and associated infrastructure on site;*
- b) *transport of extracted sand and concrete product to the site, and sand product from the site; and*
- c) *decommissioning of equipment, rehabilitation and revegetation of the site,*

for a period of twenty-five (25) years from the commencement of the development consent for the Hearses Road quarry (DA 165-7-2005).

Extraction on Lots 29 and 196 DP 752025 shall not occur beyond the period of approval under development consent 796/00/HE.

A copy of Development Consent No.165-7-2005 for the Hearses Road quarry is at **Attachment 12**.

Condition 3.25 states:

3.25 *The Applicant shall ensure that no extraction or excavation works occur within two (2) metres of the highest recorded wet weather groundwater level.*

A copy of the Extraction Precincts approved over Lots 1 and 2, DP 547255 is shown as **Attachment 11**.

1.4.3 Environment Protection Licence

The existing extraction on the Site is undertaken in accordance with Environment Protection Licence No.3916.

1.4.4 Existing Environmental Management and Monitoring

As per Development Consent No.796/00/HE and Development Consent No.250-09-01, Dixon Sand has developed a comprehensive environmental management and monitoring program which is contained in the *Dixon Sand Maroota Quarry Lots 1, 2, 29 & 196, 4610 Old Northern Road, Site Environmental Management Plan* a copy of which is at **Attachment 8**.

Dixon Sand also prepares an Annual Environmental Monitoring Report, copies of which are available on the Dixon Sand web site.

1.5 The Proposed Modification

As noted in **Part 1.4.1** above, pursuant to Development Consent No.796/00/HE, consent for the purposes of extraction and rehabilitation on Lots 29 & 196, DP 752025 ceased on 22 March 2010.

As noted in **Part 1.4.2** above, however, Development Consent No.250-09-01 permits:

- (a) development for the purposes of an extractive industry on Lots 1 and 2, DP 547255;
- (b) the continued use of the existing central processing plant on Lot 196, DP 752025; and
- (c) water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025.

The extractive resource on Lots 29 & 196, DP 752025 has not been exhausted. As such, Dixon Sand wishes to seek approval for the continued extraction on Lots 29 & 196, DP 752025. Dixon Sand has advised that the following situation applies with regard to extraction of material from Lots 29 and 196:

Lot 29 There is additional material available for extraction as previously approved by Development Consent No.796/00/HE, however, there is no need to extract below the previously approved depth of 15.24 metres below the original ground level.

Lot 196 There is additional material available for extraction as per Development Consent No.796/00/HE, however, the topography of this part of the Site is such that a significant amount of material is available below the previously approved depth of 15.24 metres below the original ground level. The additional material is generally located in the area shown within the green border on **Figure 1-2**.

Dixon Sand has determined that the most appropriate course of action would be to:

- (a) amend Development Consent No.250-09-01 to include extraction on Lots 29 & 196, DP 752025, and
- (b) surrender Development Consent No.796/00/HE issued by the Land and Environment Court on 7 July 2000 for:

.... sand extraction, processing and rehabilitation on lots 29 and 196 DP 752025 Old Northern Road, Maroota subject to conditions in Annexure "A"...

The adoption of the above strategy would see the continued extraction of Lots 29 & 196 being encompassed in Development Consent No.250-09-01, i.e. a single integrated consent, thus having the Minister for Planning and Infrastructure as the consent authority for all activity within Lots 1 & 2, and Lots 29 & 196.

Development Consent No.250-09-01 already applies to Lots 29 & 196 and, as such, any proposed modification:

- (a) would not be seeking the inclusion of additional land into that consent.
- (b) would not be seeking any additional depth of extraction on Lot 29, only an increase in the time for the previously approved extraction to take place.
- (c) would be seeking additional time for extraction of the previously approved extraction plus additional depth of extraction on Lot 196 below the previously approved 15.24 metres to a depth of a minimum 2m above the groundwater table. **The new depth of extraction on Lot 196 would be RL 127.5 metres.** The highest point of Lot 196 prior to the commencement of extraction was RL 188 metres. As such, the existing consent allowed for extraction to RL 172.76 metres (15.24 metres below the then existing level) which was the level at which the Crown resource commenced. The now proposed additional depth of extraction to RL 127.5 metres would mean an additional depth of extraction of 45 metres over the north western corner of Lot 196.

As indicated above, condition 3.5 (b) & (c) of Development Consent No.796/00/HE state:

3.5 Extraction Depth

- (a)

- (b) *Extraction is not to occur within 2m of the wet weather high groundwater level, or otherwise to the requirements of the Department of Land & Water Conservation.*
- (c) *Extraction should not exceed 15.24m from original ground level, as this would encroach onto Crown land title.*

Lot 29, DP 752025

The proposed modification as it relates to Lot 29, DP 752025 would be as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction of Lot 29 as per condition 3.5 of Development Consent No.796/00/HE, and
- (b) maintain the depth of extraction on Lot 29 as that which was previously approved.

Lot 196, DP 752025

The proposed modification as it relates to Lot 196, DP 752025 would be as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction on Lot 196, and
- (b) permit extraction of Lot 196 below the 15.24 metre requirement of Development Consent No.796/00/HE to a level not within 2 metres of the wet weather high groundwater level. **The new level of extraction would be to RL 127.5 metres.**

The proposed increase in the depth of extraction on Lot 196 would require the approval of the Land and Property Management Authority for the lodgement of the s75W application as the resource below 15.24 metres remains in the ownership of the Crown. By letter dated 16 February 2010 (refer **Attachment 3**), the Land and Property Management Authority provided landowner's consent to the lodgement of the s75W application.

Any increase in the depth of extraction on Lot 196 would remain subject to the general requirement in the Maroota area that extraction not be undertaken within 2 metres of the wet weather high groundwater level.

To determine the wet weather high groundwater level in the Lot 196, RPS Aquaterra has prepared a report titled *Groundwater Assessment for Dixon Sand Operations, Lot 196 DP 752025, Maroota NSW (the Aquaterra Report)*. A copy of the Aquaterra Report is at **Attachment 7**.

The objectives of the Aquaterra report were:

- *Review existing hydrogeological studies, with reference to the location of Lot 196 and the Maroota area.*

- *Install a monitoring piezometer on the western boundary of Lot 196 to refine the conceptual model of Lot 196 that was developed during previous assessments.*
- *Determine the wet weather groundwater level beneath Lot 196, such that the depth of extraction can be determined.*
- *Ascertain the significance of the shallow groundwater body in order to provide regulators with sufficient information to make informed decisions in relation to the modification of the current consent condition.*

The Aquaterra Report (p.3), when dealing with previous groundwater studies in the Maroota area, states:

The hydrogeological system underlying Lot 196 has been previously assessed by ERM (2005) and in more recent times by E3 (2010). However, due to the limited groundwater data available, the regional hydrogeological system was not well understood, and the potential impacts to groundwater of the proposed extension of the depth of extraction could not be adequately assessed.

Five monitoring bores were established in the area by ERM in 2005 (MW1 to MW5). The bores are shallow and are reported to be monitoring a shallow perched aquifer, which is discontinuous and only exists during and shortly after wet periods (E3, 2010; and ERM, 2005). The elevation of the perched water table ranges from 170 to 200 m AHD.

The presence of a shallow groundwater body was also identified in logs of boreholes drilled in the Maroota area by Farley and Lewers Ltd (1978) and DLWC (2001), which reported the presence of shallow clay lenses that are of limited lateral extent.

MW5 is located on Lot 196 and reported a groundwater level of about 5.0 m below ground level. This piezometer is likely to be monitoring groundwater sitting above a thin low permeability layer such as clay, a shale lens or ironstone band, all of which are commonly found at shallow depths.

These low permeability units can cause temporary perched aquifer systems to occur well above the deeper regional groundwater level of the Hawkesbury Sandstone, and have limited resource value because they have small extent and storage (DLWC, 2001).

The 'wet weather' regional groundwater level beneath Lot 196 could not be established on the basis of MW5 alone. The E3 study concluded that Lot 196 is underlain by a non water-bearing shallow horizon of weathered sandstone which overlies the Hawkesbury Sandstone, and that the water-bearing zone intercepted by MW5 is not representative of the depth to water-bearing or saturated regional aquifer system. However, information obtained from the drilling records of deeper production bores GW105044 and GW105047 located to the west and north, indicated that the depth to water bearing zone(s) is likely to be greater

than 30 m below ground level (E3, 2010).

The Aquaterra Report (p.5) continues:

Following on from the recommendation made in the E3 report, a new monitoring bore (BH1) was installed on the western boundary of the north western extraction area. The bore was drilled to a depth of 75 m so that the wet weather groundwater level of the regional aquifer underlying Lot 196 can be established.

In addition, two monitoring bores (BH2 and BH3) were drilled on Lot 1, DP204159 to determine the groundwater elevation to the east.

The three monitoring bores (BH1, BH2 and BH3) were drilled along an east to west transect and completed within the Hawkesbury Sandstone Aquifer. BH1 is located on the western boundary of the north western extraction area, and BH2 and BH3 are located on Lot 1, DP204159. These three bores, together with other deeper bores in the area, have been used to infer the regional groundwater levels beneath and around Lot 196.

Aquaterra has developed a conceptual site model to describe the groundwater conditions on Lot 196. In this regard, the Aquaterra report (p.7) states:

Based on the bore logs of BH1, the production bores located on Lot 196 and monitoring wells located on Lots 1 and 2, it appears that the Maroota Sands unit and its shallow aquifer do not underlie these areas. Information from the logs indicate that Lot 196 and the remainder of the site is underlain by a shallow and narrow non water bearing unconsolidated horizon of weathered clays, sandstones and shales which may be part of the Eluvial Sand unit that grades rapidly to massive sandstones of the Hawkesbury Sandstone. The Maroota Groundwater Study indicated that the Maroota Sand unit potentially extends laterally only to the very eastern parts of Lot 1 and Lot 2 and is not present over Lot 196.

MW5 which is located on Lot 196 revealed evidence of a shallow water table at about 5.0m below ground level (162mAHD). Shallow perched groundwater zones are commonly found to exist above relatively impermeable layers (aquicludes) such as clay lenses, shale or ironstone bands throughout the area. These shallow groundwater bodies are commonly referred to as 'perched' Aquifers and are defined as 'an aquifer that forms in the otherwise generally unsaturated zone above the regional aquifer in the saturated zone'. The use of term 'perched aquifer' in this case, can be misleading as it suggests that the perched aquifer could be of significant importance hydrogeologically and from a potential resource perspective. The perched groundwater identified in this area is reported to have limited resource value because of its isolated nature, limited extent and low storage capacity (DWLC, 2001).

The lateral extent and depth of the perched groundwater zones can be inferred from the observations made from the drilling program. The drill logs indicate the

presence of clay bands across the site at depths ranging from approximately 180 to 165mAHD or around 10 to 20m below ground level (Refer to Table 5.1) [of the Aquaterra Report]. The drilling records also indicate that the first water strike (during drilling) was observed between these low permeability layers. The occurrence of thinly banded clay layers does appear to be relatively common across the middle of the site (BH2, 6 and 7) with two separate bands observed approximately 5m apart. The clay bands do not appear to be as prevalent in BH1 and BH3 (located to the east) indicating that the clay sequence is likely to thin and pinch out to the east and west, reducing the capacity of the layer to retain water (Figure 5.2) [of the Aquaterra Report].

The groundwater levels recently monitored in MW1 and MW4 did not respond greatly to a 53mm rainfall event, which occurred on the 3rd to 5th of November 2010. The flat line hydrographs (Figure 5.3) [of the Aquaterra Report] supports the theory that the shallow groundwater encountered in this area is not indicative of a significant perched aquifer. Typically, rainfall is the principal mechanism of recharge to a perched system therefore a response to rainfall would normally be apparent following rainfall recharge capture and containment. In this case, it is likely that rainfall recharge gradually drains where the semi-confining layers discontinue or thin out, supporting the interpretation that storage in these shallow groundwater zones is both temporary and of limited capacity.

Due to the short duration of groundwater monitoring on BH1, the seasonal variations of the groundwater elevations in the deep Hawkesbury Sandstone aquifer have not yet been established. However, longer term groundwater monitoring has been carried out on monitoring bores VEL-MW1 to VEL-MW3 at the neighbouring quarry (PF Formation). The groundwater levels show an annual seasonal fluctuation of up to 1 m, with a long-term climate-driven range of 1 to 3 m. Receding groundwater levels were evident across most bores during extended periods of below average rainfall.

Therefore, it is expected that the seasonal fluctuations of BH1 would also show a seasonal range of about 1 m, or up to 3 m over a longer term and therefore the 'wet weather high groundwater level' beneath lot 196 would be a minimum elevation of about 109 m to 111mAHD. This is 16.5 to 18.5 m below the proposed extraction depth of 127.5 m AHD.

An east to west cross section of the north western extraction area (Figure 5.1) [of the Aquaterra Report] shows the estimated groundwater elevation of the underlying regional Hawkesbury Sandstone aquifer (108.65mAHD). The proposed extraction depth of the north western pit (108.65m AHD) is also shown for reference, indicating approximately 18.5m of separation between the proposed base of the excavation and the regional groundwater table.

Groundwater levels in the deep aquifer of the Hawkesbury Sandstone, underlying Lot 196, have been confirmed by BH1. The groundwater levels recorded to date are shown in Figure 5.3 [of the Aquaterra report]. The most current groundwater elevation was measured on 11 November 2010 at 59.94m below ground level

(108mAHD).

As part of this assessment a conceptual model was developed to graphically represent the various hydrogeological processes identified in the vicinity of Lot 196 and how these localised processes link in with more regional systems. The conceptual model has been developed based on the information obtained from previous studies (E3, 2010; and ERM, 2005), licensed bores and the monitoring bores (BH1, BH2, BH3, BH6 and BH7).

Diagram 1 (Figure 5.2) [of the Aquaterra Report] shows the conceptual model section at a more regional scale. The groundwater divide, (which coincides with the topographic divide of the Maroota Ridge) permits groundwater flow both to the east and west towards the upper tributaries of the Hawkesbury River.

At lower elevations, the tributaries represent areas of possible groundwater discharge from the Hawkesbury Sandstone aquifer. To the west and away from the divide (towards Lot 196) the regional groundwater table exhibits a steep hydraulic gradient (due to low permeability and secondary porosity) towards a topographic low / tributary discharge point to the west of Lot 196.

The 'wet weather' regional groundwater level is shown to occur well below the base of the proposed extraction area (127.5mAHD), with the groundwater elevations observed from BH1 showing approximately 16.5 to 18.5m of separation. The model also serves to show that the shallow groundwater encountered is representative of semi-isolated pockets of groundwater that accumulate temporarily above discontinuous combinations of low permeability clay bands and iron stone. Due to the limited storage potential of these low permeability layers, the shallow groundwater will gradually drain, providing some slow and low volume recharge to the regional aquifer (Diagram 2) [of the Aquaterra Report].

1.6 Additional Resource to be Extracted

VGT Environmental Compliance Solutions (VGT) has undertaken a resource assessment. The VGT assessment is based upon the following assumptions:

1. Site area 6.7 hectares.
2. On average there is 5 to 10 per cent inter-burden material that is made up of siltstone (8 per cent has been adopted for this assessment).
3. The quarry will commence in the southern portion of the Site and this will create a sump, and will progress northwards.
4. The floor of the resource is RL 127.5 metres. This is based upon the intersection of a major siltstone band found in BH1 which occurs below this level.

5. Volume calculations have been based upon batter slopes of 75 degrees, with 2 metre benches every 10 metres.
6. The basal 15 metres of the deposit is hard sandstone which will produce approximately 40 per cent waste, consisting of a hard un-washable sandstone. This material will be used to construct fines dams and capping material.
7. The wash reject is around 15 per cent, and all of the raw material will be washed.

The volume calculation was undertaken using SURPAC, a three dimensional computer package and the above itemised data.

The total volume of material is calculated as 2,780,000 bank m³.

Basal sandstone as discussed in item 6 is will produce 750,000 bank m² of sandstone, of which 300,000 m³ will be waste and used for dam construction and rehabilitation works.

The remainder of the resource (i.e. above the basal 15 metres) will provide 2,030,000 bank m³. There will be 304,000 m³ of wash reject and 162,000 m³ of siltstone, which will be used in the rehabilitation of the void.

Cross sections across the proposed additional extraction area are provided as **Attachment 9**.

1.7 Need for an Environmental Assessment

Pursuant to **Schedule 3** of the Environmental Planning and Assessment Regulation 2000, the proposed development is Designated Development being *Extractive industry* which is defined as:

19 Extractive industries

- (1) *Extractive industries (being industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process extractive materials by methods including washing, crushing, sawing or separating):*
 - (a) *that obtain or process for sale, or reuse, more than 30,000 cubic metres of extractive material per year, or*
 - (b) *that disturb or will disturb a total surface area of more than 2 hectares of land by:*
 - (i) *clearing or excavating, or*

- (ii) *constructing dams, ponds, drains, roads or conveyors, or*
 - (iii) *storing or depositing overburden, extractive material or tailings, or*
 - (c) *that are located:*
 - (i) *in or within 40 metres of a natural waterbody, wetland or an environmentally sensitive area, or*
 - (ii) *within 200 metres of a coastline, or*
 - (iii) *in an area of contaminated soil or acid sulphate soil, or*
 - (iv) *on land that slopes at more than 18 degrees to the horizontal, or*
 - (v) *if involving blasting, within 1,000 metres of a residential zone or within 500 metres of a dwelling not associated with the development, or*
 - (vi) *within 500 metres of the site of another extractive industry that has operated during the last 5 years.*
- (2) *This clause does not apply to:*
 - (a) *extractive industries on land to which the following environmental planning instruments apply:*
 - (i) *Sydney Regional Environmental Plan No 11 - Penrith Lakes Scheme,*
 - (ii) *Western Division Regional Environmental Plan No 1 - Extractive Industries, or*
 - (b) *maintenance dredging involving the removal of less than 1,000 cubic metres of alluvial material from oyster leases, sediment ponds or dams, artificial wetland or deltas formed at stormwater outlets, drains or the junction of creeks with rivers, provided that:*
 - (i) *the extracted material does not include contaminated soil or acid sulphate soil, and*
 - (ii) *any dredging operations do not remove any seagrass or native vegetation, and*

- (iii) *there has been no other dredging within 500 metres during the past 5 years, or*
- (c) *extractive industries undertaken in accordance with a plan of management (such as river, estuary, land or water management plans), provided that:*
 - (i) *the plan is prepared in accordance with guidelines approved by the Director-General and includes consideration of cumulative impacts, bank and channel stability, flooding, ecology and hydrology of the area to which the plan applies, approved by a public authority and adopted by the consent authority and reviewed every 5 years, and*
 - (ii) *less than 1,000 cubic metres of extractive material is removed from any potential extraction site that is specifically described in the plan, or*
- (d) *the excavation of contaminated soil for treatment at another site, or*
- (e) *artificial waterbodies, contaminated soil treatment works, turf farms, or waste management facilities or works, specifically referred to elsewhere in this Schedule, or*
- (f) *development for which State Environmental Planning Policy No 52 - Farm Dams and Other Works in Land and Water Management Plan Areas requires consent, or*
- (g) *maintenance dredging of alluvial material from oyster leases and adjacent areas in Wallis Lake, but only if the dredging is undertaken in accordance with the document entitled Protocol for Wallis Lake Oyster Lease Maintenance Dredging approved by the Director-General and published in the Gazette, as amended by the Director-General from time to time by publication of an amended Protocol in the Gazette.*

Section 75A of Part 3A of the Environmental Planning and Assessment Act 1979 (the **Act**) defines a *project* as:

project means development that is declared under section 75B to be a project to which this Part applies.

Sub-section 75B (1) (a) of the Act states:

Projects to which Part applies

(1) **General**

This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:

(a) *by a State environmental planning policy, or*

Sub-clause 6 (1) of State Environmental Planning Policy (Major Development) 2005 states:

Identification of Part 3A projects

(1) *Development that, in the opinion of the Minister, is development of a kind:*

(a) *that is described in Schedule 1 or 2, or*

(b) *that is described in Schedule 3 as a project to which Part 3A of the Act applies, or*

(c) *to the extent that it is not otherwise described in Schedules 1–3, that is described in Schedule 5,*

is declared to be a project to which Part 3A of the Act applies.

Schedule 1 of State Environmental Planning Policy (Major Development) 2005 contains the following definition:

Extractive Industries

(1) *Development for the purpose of extractive industry that:*

(a) *extracts more than 200,000 tonnes of extractive materials per year, or*

(b) *extracts from a total resource (the subject of the development application (or other relevant application under the Act)) of more than 5 million tonnes, or*

(c) *extracts from an environmentally sensitive area of State significance.*

(1A) *Subclause (1) (c) does not apply to extraction:*

(a) *by a public authority in maintenance dredging of a tidal waterway, or*

(b) *in maintenance dredging of oyster lease areas, or adjacent areas,*

in Wallis Lake.

- (2) *Development for the purpose of extractive industry related works (including processing plants, water management systems, or facilities for storage, loading or transporting any construction material or waste material) that:*
 - (a) *is ancillary to or an extension of another Part 3A project, or*
 - (b) *has a capital investment value of more than \$30 million.*

The proposed development will extract more than 200,000 tonnes per annum of sandstone material and, as such, is a *Part 3A project* for the purposes of State Environmental Planning Policy (Major Development) 2005.

The then NSW Department of Planning has advised that Section 75W of the Act can be utilised to give effect to the proposed modification. Section 75W states:

75W *Modification of Minister's approval*

- (1) *In this section:*

Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.

modification of approval means changing the terms of a Minister's approval, including:

- (a) *revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
 - (b) *changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
- (2) *The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
 - (3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
 - (4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification.*

- (5) *The proponent of a project to which section 75K applies who is dissatisfied with the determination of a request under this section with respect to the project (or with the failure of the Minister to determine the request within 40 days after it is made) may, within the time prescribed by the regulations, appeal to the Court. The Court may determine any such appeal.*
- (6) *Subsection (5) does not apply to a request to modify:*
- (a) *an approval granted by or as directed by the Court on appeal, or*
- (b) *a determination made by the Minister under Division 3 in connection with the approval of a concept plan.*
- (7) *This section does not limit the circumstances in which the Minister may modify a determination made by the Minister under Division 3 in connection with the approval of a concept plan.*

1.8 Director-General's Requirements

Pursuant to sub-section 75W (3) of the Act, by letter dated 27 April 2010, the Director-General provided the requirements for the Environmental Assessment. A copy of the Director-General's Requirements is at **Appendix 4**. A summary of the Director-General's Requirements is outlined in **Table 1-1** together with the relevant section of the Environmental Assessment which addresses those matters.

Table 1-1: Summary of Director-General's Requirements

Issue	Summary of matter to be addressed in EA	Reference in EA
Description of the existing approved operations.		Part 1.4 Attachment 1 Attachment 2
Existing environmental management and monitoring regime.	A summary of the existing environmental management and monitoring regime at the quarry.	Part 1.4.4 Attachment 8
Description and Justification of the modification.	Include a detailed description and justification of the proposed modification.	Parts 1.5-1.7 Part 2
Risk assessment.	A risk assessment of the potential environmental impacts of the modification, identifying the key issues for further assessment.	Part 3
Description of the Existing Environment.	A detailed description of the existing environment.	Part 1 Part 3

Issue	Summary of matter to be addressed in EA	Reference in EA
A draft Statement of Commitments.	Describe in detail how the environmental performance of the proposal would be monitored and managed over time.	Part 4
Impacts of the Modification.	An assessment of the potential impacts of the proposed modification, including any cumulative impacts.	Part 3
Conclusion		Part 5
Soil and water.	Include a detailed assessment (including modelling) of the potential groundwater impacts of the proposal, with explicit consideration of the modification against the relevant findings of the Maroota Groundwater Study.	Part 3.5 Attachment 6 Attachment 7
Noise.		Part 3.6
Transport.		Part 3.7
Air quality.		Part 3.8
Biodiversity.		Part 3.9
Heritage.	Including Aboriginal and non-Aboriginal heritage.	Part 3.10
Waste.		Part 3.11
Quarry Closure and Rehabilitation.	<p>Include:</p> <ul style="list-style-type: none"> - a detailed description of the proposed measures that would be undertaken during the closure of the Old Northern Road Quarry. - a detailed revision of the quarry rehabilitation strategy, including justification for the final landform and consideration of the objectives of any relevant land use objectives. - the measure that would be undertaken to ensure that sufficient financial resources are available to implement the proposed rehabilitation strategy. 	Part 3.12 Attachment 8
Social and Economic.		Part 3.13

1.9 Local Government, Government and Statutory Authority Consultation

In the preparation of this Environmental Assessment, consultation was undertaken with:

- The Hills Shire Council,

- The then NSW Department of Environment, Climate Change and Water.
- NSW Office of Water.
- NSW Department of Industry and Investment.
- NSW Roads and Traffic Authority.

Copies of the responses received are provided as **Attachment 5**.

The Hills Shire Council, by letter dated 6 July 2010, indicated:

The following comments are provided for your inclusion in the Environmental Assessment (EA).

1. *The submission of full details describing the proposal. In this respect it is assumed that the proposed modification will be, in effect, the same development approved under Land and Environment Consent Court Orders 10273 of 2000 with the exception of the depth of extraction on Lot 196.*
2. *The submission of full details in the EA confirming the proposal's relationship with the existing extractive industry operations upon the site.*
3. *The preparation of a comprehensive review of the proposal in terms of impact upon the groundwater resources having regard to the findings of the Maroota Groundwater Study. This will require consultation with the NSW Office of Water. The submission must confirm that the extractive industry operation will be restricted in depth to ensure that a 2 metre freeboard above the high (wet weather) groundwater level, at any part of the site.*
4. *The submission of plans and supporting written evidence showing the proposed final landform configuration and use of land. Specific details are to be provided regarding rehabilitation and landscape works upon cessation of extractive operations on the site.*
5. *The submission of a comprehensive staging plan and an associated rehabilitation staging program, if staging is proposed.*
6. *The submission of full details regarding the proposal's compliance with the requirements of Council's Development Control Plan Part D Section 6 - Extractive Industries and the provisions of Sydney Regional Environmental Plan No.9 - Extractive Industry (Amendment No.2), Sydney Regional Environmental Plan No.20 - Hawkesbury-Nepean River & Baulkham Hills Local Environmental Plan 2005 and other relevant legislation, including the Section 91 "Integrated Development" provisions of the NSW EP & A Act, 1979 if relevant.*

7. *The EA is required to identify the maximum yearly extraction rate and the life of the extraction (based on resource within the quarry) and also the subsequent timeframe for the completion of rehabilitation works upon the site.*
8. *The submission of a detailed traffic impact assessment report addressing the maximum number of truck movements associated with the operation.*

The then Department of Environment, Climate Change and Water, by letter dated 27 May 2010, indicated:

DECCW understands that the Department of Planning ... issued the Director General's Requirements ("DGRs") for the modification on 27 April 2010. We have no additional requirements to those already issued in the DGRs.

The Department of Industry & Investment, by letter dated 2 June 2010, indicated:

This is a coordinated response from the Mineral Resources, Fisheries and Agriculture branches of Industry & Investment NSW (I & I NSW).

Details should be provided in the EA of the additional resources that will be extracted on Lot 196 if extraction to 2 metres above the groundwater table is approved.

I & I has no other additional requirements for the EA.

The Roads and Traffic Authority, by letter dated 24 June 2010, indicated:

1. *The subject property is affected by a road proposal, in the manner illustrated by pink colour on the attached plan.*
However, the RTA would raise no objection to the application on property grounds provided that any new buildings or structures are erected clear of the land required for road.
2. *Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need / associated funding for upgrading of road improvement works (if required).*
3. *Details of any restrictions to the time of day / number of vehicle movements.*
4. *Provision of information detailing how truck movements will be mitigated during morning and afternoon school hours along Old Northern Road near the site.*
5. *Provision of information detailing how the Old Northern Road pavement*

in the vicinity of the site's intersection will be regularly maintained by the applicant and kept free of sand, clay and soil.

6. *Provision of information detailing how traffic will be minimised.*
7. *Provision of information relating to the payment of contributions to Council in accordance with The Hills Shire Council's - Contributions Plan No.6 - Extractive Industries.*

1.10 Structure of the Environmental Assessment

Part 2 of the Environmental Assessment describes the modifications which would be required to Development Consent No.250-09-01 if approval is granted. **Part 3** details the net impact of the proposed modification to Development Consent No.250-09-01. **Part 4** contains a draft Statement of Commitments and **Part 5** is the conclusion to the Environmental Assessment.

1.11 Project Team

Nexus Environmental Planning	Project Management and Planning
RPS Aquaterra	Groundwater Impact
E3 Consulting Australia Pty Ltd	Groundwater Impact
VGT Pty Ltd	Geology and Resource Estimation.

1.12 Future Modifications

In addition to the current modification application, Dixon Sand proposes to make further applications to modification Development Consent No.250-09-01. It is envisaged that the additional modification applications will be made following further detailed assessment of environmental issues on both Lots 1 and 2 and on other land in the vicinity of Lots 1 and 2 which might be suitable for extraction. Following is a brief explanation of the possible future modification applications.

Exclusion Area Lots 1 and 2, DP547255

As part of the preparation of the Environmental Impact Statement for extraction of Lots 1 and 2, it was determined that a portion of that land was of such significance that it should be denoted as an *Exclusion Area*. The *Exclusion Area* relates to:

- An area identified as containing flora and species worthy of retention, and
- An area of high groundwater table.

The protection of the flora and fauna species identified as being worthy of retention is reflected in conditions of Development Consent No.250-09-01.

During the preparation of documents for submission for this modification, Dixon Sand engaged Cumberland Ecology to undertake an assessment of the flora and fauna within the *Exclusion Area*.

On the basis of the conclusions of the Cumberland Ecology report, Dixon Sand proposes to pursue the most appropriate means by which the *Exclusion Area* can now be extracted in conjunction with the approved extraction of the remaining area of the Site.

Groundwater Level

Condition 3.25 of Development Consent No.250-09-01 states:

- 3.25 *The Applicant shall ensure that no extraction or excavation works occur within two (2) metres of the highest recorded wet weather groundwater level.*

The Environmental Impact Statement which was prepared for the original development application No.250-09-01 attempted to ascertain the depth of the wet weather groundwater on the Site.

Dixon Sand has commissioned Aquaterra to investigate the location of the wet weather groundwater on Lots 1 & 2 to ascertain if there is scope for further depth of extraction over the Site.

The key technical issues pertinent to Lots 1 and 2 addressed by Aquaterra are as follows:

- The total depth of extraction that will be permitted on Lots 1 and 2 will be limited by the depth of the regional water table *to a depth not exceeding 2 metres above the highest recorded wet weather groundwater level*, which until recently has not been well defined.
- The current depth of extraction permitted on Lots 1 and 2 was based on the information obtained from shallow monitoring bores which have been monitoring localised perched aquifers and not the regional aquifer system.
- Information obtained from a recent drilling program carried out in areas surrounding Lots 1 and 2 indicated that the regional water table is about 35-60 metres below ground level.

The preliminary conclusions of Aquaterra are such that there is considerable scope for the depth of extraction on Lots 1 & 2 to be greater than that which was envisaged in the

Environmental Impact Statement which was submitted with the development application. As such, Dixon Sand proposes to seek modification of Development Consent No.250-09-01 to extend the depth of extraction to a depth recommended by Aquaterra.

Lot 1, DP 204159, Old Northern Road, Maroota

Lot 1, DP 204159 has been identified as containing significant quantities of sand which is suitable for the construction industry. The extracted material would be processed on site and delivered to the market place as required.

In order to have the Dixon Sand operations in this section of Maroota contained within one consent, it is proposed to pursue a further amendment of Development Consent No.250-09-01 to include extraction of Lot 1, DP 204159.

Part Two**DETAILS OF PROPOSED MODIFICATION****2.1 Introduction**

As discussed in **Part 1.5** of this Environmental Assessment, the extractive resource on Lots 29 & 196, DP 752025 has not been exhausted and, as such, Dixon Sand seeks approval for the continued extraction on Lots 29 & 196, DP 752025. Dixon Sand has determined that the most appropriate course of action would be to:

- (a) amend Development Consent No.250-09-01 to include extraction on Lots 29 & 196, DP 752025, and
- (b) surrender Development Consent No.796/00/HE issued by the Land and Environment Court on 7 July 2000.

The adoption of the above strategy would see the continued extraction of Lots 29 & 196 being encompassed in Development Consent No.250-09-01, i.e. a single integrated consent, thus having the Minister for Planning and Infrastructure as the consent authority for all activity within Lots 1 & 2, and Lots 29 & 196.

2.2 Proposed Modification to Development Consent No.250-09-01

The proposed modification to Development Consent No.250-09-01 would allow the continued extraction of sand from both Lots 29 and 196, DP 752025 as follows:

Lot 29, DP 752025

The proposed modification as it relates to Lot 29, DP 752025 would be as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction of Lot 29 as per condition 3.5 of Development Consent No.796/00/HE, and
- (b) maintain the depth of extraction on Lot 29 as that which was previously approved.

Lot 196, DP 752025

The proposed modification as it relates to Lot 196, DP 752025 would be as follows:

- (a) amend Development Consent No.250-09-01 to permit the continued extraction on Lot 196.

- (b) permit extraction of Lot 196 below the 15.24 metre requirement of Development Consent No.796/00/HE to a level not within 2 metres of the wet weather high groundwater level. **It is proposed that the new extraction level be RL127.5 metres** which would result in an additional 45 metres in the previously approved extraction (refer **page 1-7** of this Environmental Assessment).

To achieve the above modification, a number of amendments would be required to Development Consent No.250-09-01 as it now stands.

If, as proposed, Development Consent No.796/00/HE is surrendered as part of the proposed modification, there are a number of conditions within that development consent which would need to be retained and incorporated, with appropriate amendment, into Development Consent No.250-09-01.

Following are details of the proposed modifications to Development Consent No.250-09-01.

2.2.1 General Modifications

Development Consent No.250-09-01, as amended, contains numerous conditions of consent. It is noted that the numbering of those conditions is inconsistent. To remedy the anomaly, the following general modifications are proposed:

1. Changes proposed would result in changes to the numbering of conditions. After amendments, condition numbers should be amended so that they are in sequential order.
2. Some conditions make incorrect reference to other conditions. Cross checking of conditions should be undertaken after amendments are made.

2.2.2 Specific Modifications

Page 1

The following modifications are proposed to page 1:

1. Remove red and blue reference to Modifications 1 & 2.
2. Amend definition of *Proposed Development* to include extraction of Lots 29 and 196, DP 752025. Add reference to Annexure "D" which will be the Environmental Assessment for this s.75W modification.
3. Include the following definitions:

Final Access Route (insert appropriate wording as per Condition 3.7 of Development Consent No.796/00/HE).

Haul Road (insert appropriate wording as per Conditions 2.22, 2.23 and 3.7 of Development Consent No.796/00/HE).

Page 2

The following modifications are proposed to page 2:

1. Change *DECC* to *OEH* and alter throughout where *DECC* occurs.
2. Delete *Existing Quarry* as this is no longer relevant if Development Consent No.796/00/HE is surrendered.
3. Delete *Existing Consent* as this is no longer relevant if Development Consent No.796/00/HE is surrendered.
4. Delete *Quarry Extension* as this is no longer relevant if Development Consent No.796/00/HE is surrendered.

Page 3

The following modifications are proposed to page 3:

1. Insert in Condition 1.2 the following:
 - h) *The Environmental Assessment titled "Environmental Assessment. Section 75W Modification. DA 250-09-01. Dixon Sand (Penrith) Pty Ltd), dated 8 December 2011 prepared by Nexus Environmental Planning Pty Ltd forming Annexure "D" of this consent.*
2. Delete Condition 1.4 as this condition is no longer relevant if Development Consent No.796/00/HE is surrendered.
3. Amend Condition 1.5 to include reference to Lots 29 and 196, DP 752025.

Page 4

The following modifications are proposed to page 4:

1. Amend Condition 1.5 by deleting the words:

Extraction on Lots 29 and 196 DP 752025 shall not occur beyond the period of approval under development consent 796/00/HE.

This is no longer relevant if Development Consent No.796/00/HE is surrendered.

2. Amend Condition 1.11 a) by deleting the words:
and the existing consent.

Page 5

The following modifications are proposed to page 5:

1. Amend Condition 1.15 to make reference to Lots 29 and 196, DP 752025.
2. Amend Condition 1.15 to amend reference to 8.5 ha to the now relevant area.

Page 6

The following modification is proposed to page 6:

1. Amend Condition 3.1 to include the relevant sections of Condition 3.3 of Development Consent No.796/00/HE.

Page 7

The following modification is proposed to page 7:

1. Amend Condition 3.9 to read:

3.9 *The Applicant shall ensure that extraction is undertaken:*
 - a) *in accordance with the extraction plan and sequence in the EIS (Annexure "B"), and*
 - b) *The Environmental Assessment (Annexure "D").*

Page 8

The following modifications are proposed to page 8:

1. Before Condition 3.10, insert the heading ***Lots 1 and 2, DP 547255*** such that conditions 3.10 to 3.16 inclusive relate to Lots 1 and 2, DP 547255.
2. After Condition 3.16, insert the heading ***Lots 29 and 196, DP 752025*** and insert any relevant conditions from Development Consent No.796/00/HE.

Page 9

The following modifications are proposed to page 9:

1. Amend Condition 3.24 to make reference to the bores on Lots 29 and 196, DP 752025.

2. Amend Condition 3.28 to remove the words:

on the existing quarry site

as these words will not be relevant if Development Consent No.796/00/HE is surrendered.

Page 10

The following modifications are proposed to page 10:

1. Amend condition 3.30 by removal of reference to Development Consent No.796/00/HE.
2. Amend condition 3.35A to reflect current times for the 40 kph speed limit.

Page 16

The following modifications are proposed to page 16:

1. Delete Condition 4.6 as this is no longer relevant.
2. Amend Condition 4.8 to include reference to Lots 29 and 196, DP 752025 and the bores on those lots.

Page 20

The following modification is proposed to page 20:

1. Amend Condition 6.2 so that the 2nd sentence reads:
The SEMP shall cover operations on the Site.

Page 23

The following modification is proposed to page 23:

1. Amend Condition 6.3 (g) to reflect the current 40 kph speed limit times as per Condition 3.35A on Page 10.

Page 25

The following modification is proposed to page 25:

1. Amend Condition 7.2 (c) to read:
c) A comparison of the environmental impacts and performance of the development against the environmental impacts and performance

predicted in the EIS, the SEE for DA 250-09-01, and the Environmental Assessment prepared by Nexus Environmental Planning Pty Ltd.

2.3 Limits on Production

Conditions 1.6 and 1.7 of Development Consent No.250-09-01 state:

- 1.6 *The combined production of quarry products from the site (Lots 196 and 29 DP 752025, and Lots 1 and 2 DP 547255, Old Northern Road, Maroota) and from the Haerses Road sand quarry shall not exceed 495,000 tonnes per annum.*
- 1.7 *Processing of extracted sandstone on the site shall not exceed 1750 tonnes per day.*

No modification is proposed to the above approved limits on production.

2.4 Traffic and Transport

Condition 3.30 of Development Consent No.250-09-01 states:

- 3.30 *Truck movements at the site, including those provided for in consents 796/00/HE, 250-9-01 and 165-7-2005, shall not exceed:*
 - a) *a total of 180 per day (ie inbound combined with outbound);*
 - b) *40 between the hours of 6.00am and 7.00am (inbound combined with outbound); and*
 - c) *118 laden per day, of which no more than 28 may be inbound.*

Apart from the modification to condition 3.30 detailed above to remove reference to Development Consent No.796/00/HE which is to be surrendered, **no modification is proposed to the already approved truck movements to and from the Site.**

2.5 Hours of Operation

Condition 3.41 of Development Consent No.250-09-01 states:

- 3.41 *Loading of trucks and truck movements at the site must only be carried out between 6am and 6pm Monday to Saturday, and at no time on Sundays and Public Holidays. All other activities at the premises must only be carried out between 7am and 6pm Monday to Saturday, and at no*

times on Sundays and Public Holidays.

The above approved hours of operation would not be modified as part of the s.75W application.

2.6 Rehabilitation

Condition 6.3 (e) of Development Consent No.250-09-01 requires the preparation of a Rehabilitation and Landscape Plan which forms part of the Site Environmental Management Plan (refer **Attachment 8**).

The Rehabilitation and Final Landscape component of the Site Environmental Management Plan has as its objective:

To ensure rehabilitation works are implemented progressively to enhance the scenic and environmental quality of the site, increase habitat for threatened species, and utilises areas suitable for agricultural pursuits.

The Site Environmental Management Plan contains, as its Figure EP15.2, a plan of the approved final landform for Lots 196 and 29. An extract from that plan is at **Figure 2-1** below.

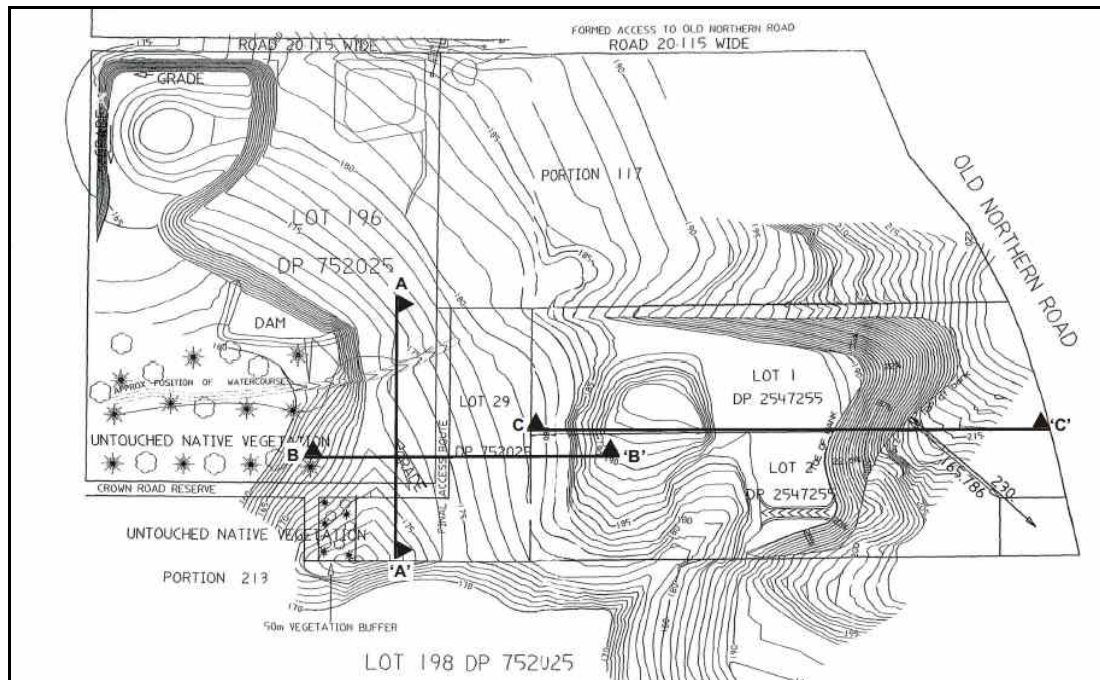


Figure 2-1: Extract from the approved final landform for Lots 196 and 29 contained in the Site Environmental Management Plan (refer **Attachment 8**).

Dixon Sand, as part of the review process for this modification application, has ascertained that a more appropriate and suitable final landform could be achieved on the Site following completion of the extraction of Lots 196 & 29 as now proposed. As a result, it is now proposed to modify Development Consent No.250-09-01 such that the final landform shown in **Figure 2-2** is substituted for that which is currently approved.

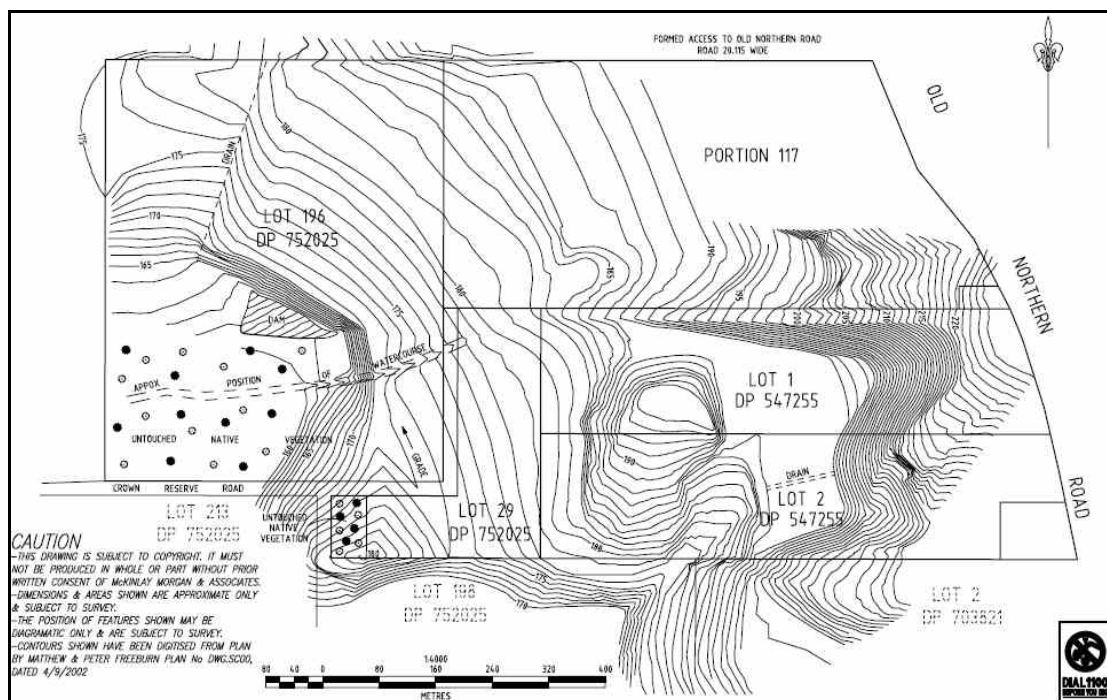


Figure 2-2: An extract from the proposed modified final landform after the completion of extraction of Lots 196 & 29.

Scale copies of the above modified final landform plan are submitted with the modification application.

To assist in the understanding of the final landform proposed for the north western corner of Lot 196 as depicted in **Figure 2-2**, cross sections AA and BB have been prepared by McKinlay Morgan & Associates Pty Ltd, Consulting Surveyors.

The location of the cross sections AA and BB is shown in **Figure 2-3** below.

Reduced copies of the cross sections AA and BB are contained as **Attachment 13**.

Scale copies of the cross sections AA and BB have been submitted with the modification application.

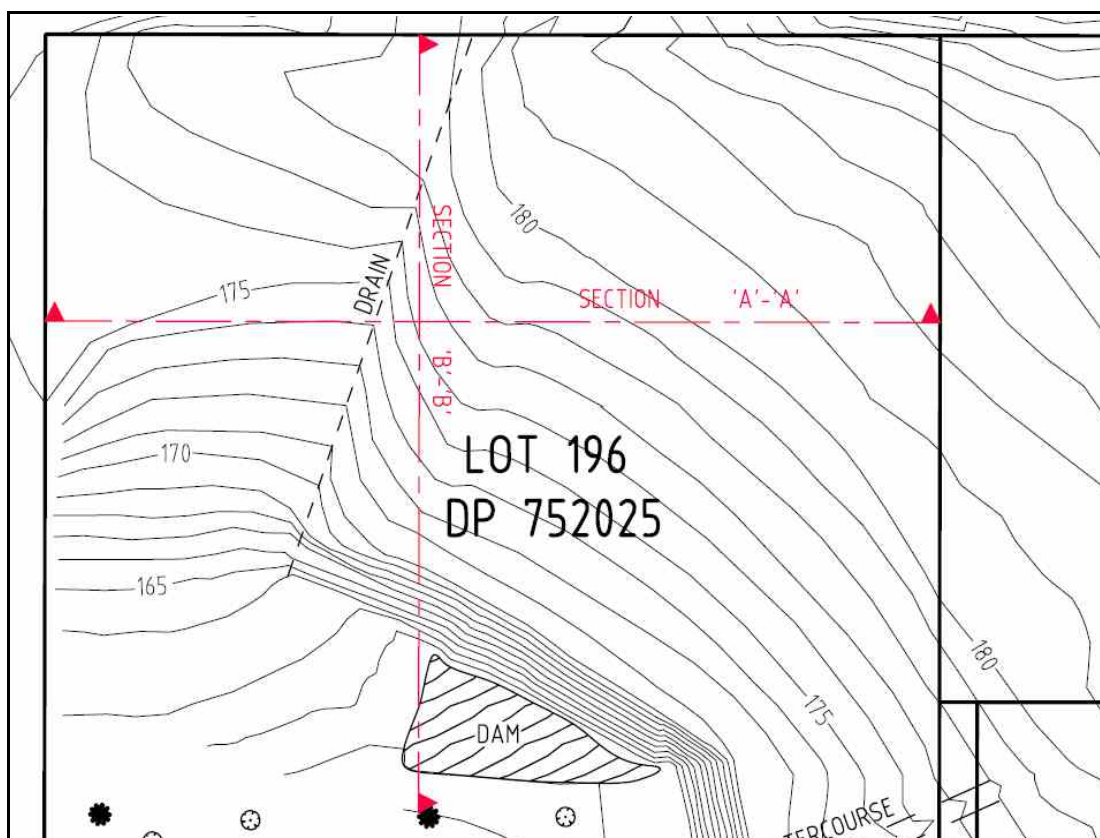


Figure 2-3: Extract from the amended final landform plan showing the location of cross sections AA and BB (refer also to **Attachment 13**)

2.7 Right of Carriageway

Condition 3.7 of Development Consent No.796/00/HE relates to a *Final Access Route* and makes provision for the establishment of a Right of Carriageway. The Right of Carriageway was originally established over Lot 29, DP 752025 pursuant to an earlier consent. The purpose of the Right of Carriageway was to maintain vehicular access over Lot 29 to the adjoining PF Formation land while Dixon Sand extracted material from the Crown Road. This access was referred to as the Temporary Access Road.

Once the extraction of the Crown Road was finalised, the Crown Road was reinstated by Dixon Sand to the satisfaction of the then Baulkham Hills Shire Council.

Notwithstanding that the Right of Carriageway no longer serves any purpose as a vehicular access due to the Crown Road being the access road, the Right of Carriageway has not been removed from the title.

2.8 Existing Acoustic Wall

Condition 4.12 of Development Consent No.796/00/HE states:

A noise attenuation wall is to be erected inside the eastern boundary of Lot 29, adjacent to the temporary internal haul road, in order to mitigate the impacts of noise on the adjoining properties and the Maroota Public School to the east. Details of the wall are to be submitted to Council for approval, and the wall erected prior to the implementation of the temporary haul road. The wall should remain in place until extraction on Lot 29 and the use of the temporary haul road has ceased.

An acoustic wall has been erected in accordance with Condition 4.12. As indicated above, the temporary haul road is no longer in use, however, Dixon Sand will maintain the acoustic wall until such time as extraction on Lot 29 ceases. This commitment is provided for in **Part 4.5** of this Environmental Assessment.

Part Three**IMPACT OF THE PROPOSED MODIFICATION****3.1 Local Planning****3.1.1 Baulkham Hills Local Environmental Plan 2005**

The Site is zoned Rural 1(b) pursuant to the Baulkham Hills Local Environmental Plan 2005 (LEP 2005). An extract from the LEP 2005 Map is at **Figure 3-1**.

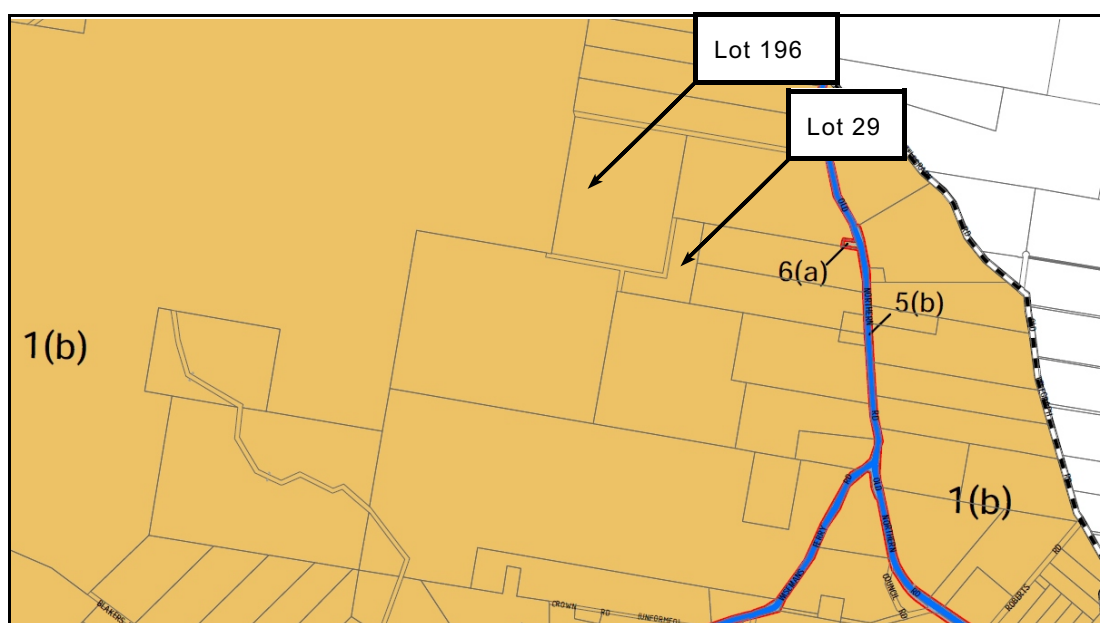


Figure 3-1: Extract from the Baulkham Hills Local Environmental Plan 2005 Map

Sub-clause 13(2) of LEP 2005 states:

- (2) *Except as otherwise provided by this plan, consent must not be granted for development unless the consent authority is satisfied that the proposed development:*
 - (a) *is consistent with one or more of the aims of this plan and any relevant objectives for development, and*
 - (b) *is not contrary to achieving the objectives of the zone within which it will be carried out.*

The proposed modification is consistent with the following aim of LEP 2005:

- (c) *with respect to use of resources within that area, to promote the efficient utilisation of land, services and support facilities in existing urban areas*

and to provide for the orderly growth of new urban areas that promote a high level of residential amenity, and

The proposed modification is consistent with the following objectives of the 1(b) zone:

- (a) to ensure that existing or potentially productive agricultural land is not withdrawn unnecessarily from agricultural production, and*
- (c) to ensure that development is carried out in a manner that minimises risks from natural hazards and does not unreasonably increase demand for public services and public facilities, and*
- (f) to ensure that development is designed and carried out having regard to the rural and heritage character of surrounding land, and*
- (g) to ensure that development is designed and carried out having regard to adjoining land uses and the natural environment.*

Clause 32 of LEP 2005 deals with extractive industry. Following is clause 32 of LEP 2005 with comments as appropriate.

Extractive industries

Consent must not be granted to the carrying out of development for the purpose of extractive industries unless the consent authority has given consideration to the following:

- (a) social, economic and environmental impacts of the proposed development and the management of those impacts,*

Comment: The proposed modification seeks to extend the life of the previously approved extraction on Lots 29 and 196. The impact of that development from an economic perspective is positive in that a recognised resource which is vital to the construction industry would be better utilised.

As detailed in this Environmental Assessment, the proposed modification seeks approval for:

- continuation of previously approved extraction on Lots 29 and 196, and
- additional depth of extraction of the sand resource on Lot 196.

The environmental impact associated with that additional extraction is minimal and manageable within the existing environmental protection, management practices and development

approvals operating on the Site.

The social impact would also be positive in that a recognised resource can be utilised to the advantage of the wider community without the introduction of a new quarrying activity to an otherwise undisturbed environment.

- (b) *the extent to which internationally and nationally recognised environmental standards may be implemented in carrying out the proposed development,*

Comment: The proposed modification seeks to incorporate the continued extraction of Lots 29 and 196 into the existing Development Consent No.250-09-01. The current environmental standards which govern the undertaking of extraction, processing and rehabilitation on the Site would be maintained following approval of the proposed modification (refer **Attachment 8**).

- (c) *the extent of community consultation about and involvement in all phases of the proposed development,*

Comment: Previous extraction on Lots 29 and 196 and the current extraction on Lots 1 and 2 have been and are subject to conditions which require extensive on going consultation with the local community and the Maroota Public School. That consultation process would not alter as a result of the proposed modification (refer **Attachment 8**).

- (d) *the existence, nature and level of detail of sound technical parameters for carrying out the proposed development in an environmentally sensitive manner,*

Comment: Previous extraction on Lots 29 and 196, and the current extraction on Lots 1 and 2 have been and are subject to conditions which require the approved extraction activities to be undertaken in accordance with strict conditions of development consent. Those conditions of consent not only govern the operation of the activity on the Site, but require extensive monitoring of that activity to ensure that any impact to the environment of the Site and its surroundings is mitigated. The proposed amendment would not impact on the continuation of those monitoring activities. Indeed, the additional extraction of material on Lots 29 and 196 would be governed by the existing monitoring activities (refer **Attachment 8**).

- (e) *the conservation of the biological and cultural diversity and quality of land within the Baulkham Hills local government area,*

Comment: The conservation of the biological and cultural diversity of The Hills Shire is addressed in the extensive conditions of the existing consent which governs extraction of Lots 1 and 2. Those conditions would also apply to any continuation of extraction on Lots 29 and 196 following approval of the proposed modification (refer **Attachment 2**).

(f) *the impact of the proposed development on the archaeological resources of the site,*

Comment: The impact of extraction on the archaeological resources of the Site was canvassed in the Environmental Impact Statements which were prepared for the previous development applications for that extraction. The proposed modification, which seeks continuation of the previously approved extraction on Lots 29 and 196, together with a deeper extraction of Lot 196, would have no adverse impact on the archaeological resources of the Site. Existing conditions of consent relating to archaeological resources would not alter as part of the proposed modification (refer **Attachment 2**).

(g) *the impact on the cultural landscape, including any significant views and vistas to or from heritage items located in the vicinity of the proposed development,*

Comment: The cultural landscape of Lots 29 and 196 would not alter as a result of the continuation of extraction on Lots 29 and 196 as proposed.

(h) *a proposed program for remediation of the site and for post extractive industry usage,*

Comment: As detailed in **Part 2.6** of this Environmental Assessment, an approved final landform is contained in the Site Environmental Management Plan for the Site. It is proposed to modify that final landform plan as part of the modification application as detailed in **Figure 2-2** of this Environmental Assessment. The applicant has advised that there is sufficient spoil material generated in the extraction of both the Site and the Haerses Road quarry to ensure that the approved finished ground levels are attained.

(i) *the impact of the proposed development on surface water and groundwater resources,*

Comment: The impact of the proposed modification on surface water would be as per that which has previously been approved. There is, however, potential for impact on groundwater as a result of the additional extraction in the north western corner of Lot 196.

E3 Consult has prepared a report titled *Preliminary Assessment of Potential Impacts to Groundwater of Proposed Extension of Dixon Sand Operations, Lot 196 DP 752025, Maroota NSW*, a copy of which is at **Attachment 6**.

The proposed modification would not alter the previously approved depth of extraction on Lot 29. **Any additional depth of extraction on Lot 196 would not proceed below RL 127.5 metres** which is significantly above the requirement that extraction not proceed within 2 metres above the wet weather groundwater level. This aspect on the proposed amendment is discussed in more detail in **Part 3.5** of this Environmental Assessment.

- (j) *the impact of the proposed development on native vegetation (trees, shrubs and groundcover species) including threatened species,*

Comment: The proposed modification seeks to continue the life of the previously approved extraction on Lots 29 and 196 and to increase the depth of extraction on Lot 196 to RL 127.5 metres. The lateral extent of previous extraction on both Lot 29 and Lot 196 would not be increase. As such, no native vegetation, including threatened species, would be impacted by that continued extraction of the Site.

- (k) *the impact of the proposed development on native fauna habitat,*

Comment: The proposed modification would not expand the boundary of the previously approved extraction on Lots 29 and 196. As such, there is not likely to be any impact on native fauna as a result of the proposed modification.

- (l) *the provision of an adequate setback of not less than 40 metres from the top bank of a watercourse to the extraction operations.*

Comment: Approved setbacks would not alter as a result of the proposed modification (refer **Attachment 2** and **Attachment 8**).

Clause 34 of LEP 2005 states:

Environmental management and monitoring

Consent must not be granted to development within Zone 1 (a), 1 (b), 1 (c), 1 (d), 7 (a) or 8 (a), unless the consent authority is satisfied that the proposed development takes into account the following environmental features adequately and that those features will continue to be monitored:

- (a) *water quality,*

- (b) *soil erosion,*
- (c) *air quality,*
- (d) *noise,*
- (e) *salinity,*
- (f) *bush fire hazard,*
- (g) *flora and fauna,*
- (h) *the continued monitoring of the above issues.*

The proposed modification seeks to:

- (a) continue the previously approved extraction on Lots 29 and 196, and
- (b) increase the previously approved depth of extraction on Lot 196 to no closer than 2 metres of the wet weather groundwater level. **The new depth of extraction would be RL 127.5 metres.**

As detailed in Part 2 of this Environmental Assessment, the proposal to continue extraction on Lots 29 and 196 would come under the umbrella of Development Consent No.250-09-01 (refer **Attachment 2**). The abovementioned environmental features, and the impact extraction of the Site would have on those features, were adequately addressed in the Environmental Impact Statements prepared for the original development applications. A series of monitoring measures are contained within the conditions of Development Consent No.250-09-01 to ensure the continued monitoring of the abovementioned environmental features. The proposed modification to continue extraction on Lots 29 and 196 would continue to be monitored under that environmental monitoring regime (refer **Attachment 2** and **Attachment 8**).

3.1.2 Baulkham Hills Development Control Plan 2005

Part D, Section 6 of the Baulkham Hills Development Control Plan 2005 (**DCP 2005**) relates to extractive industry and has as its principal objectives:

- (i) *To consider the social, economic and environmental issues in the assessment and management of extractive industries; implement the objectives of international and nationally recognised environmental standards;*
- (ii) *To encourage community participation in all phases of extractive industry development;*

- (iii) *To provide sound technical parameters to facilitate the orderly development of extractive resources within environmentally sensitive regions;*
- (iv) *To conserve the biological and cultural diversity and quality of the Baulkham Hills Shire; and*
- (v) *To implement the requirements of the Environmental Planning & Assessment Act 1979 and other relevant environmental statutes.*

The approved extractive industry on the Site has been conducted in accordance with the principal objectives of DCP 2005 and is continually monitored to ensure that those objectives are maintained. The proposed modification would continue extraction of the Site within the principal objectives of DCP 2005.

Section 2.16 of Part D, Section 6 of DCP 2005 relates to extractive industry in the Maroota area and has as its objectives:

- (i) *To facilitate and ensure extraction occurs in a controlled and environmentally acceptable manner.*
- (ii) *To facilitate Community participation and encourage local employment.*
- (iii) *To maintain and upgrade the safety and efficiency of the existing external road networks.*
- (iv) *To protect and maintain the safety and amenity of the Maroota Public School and residences not associated with extraction.*
- (v) *To conserve the biological and cultural diversity of Maroota.*
- (vi) *To conserve and protect the integrity pattern and quality of the Maroota ground water regime.*

The proposed modification would be undertaken in accordance with the existing conditions of Development Consent No.250-09-01 (refer **Attachment 2**) which have been designed to ensure:

- (a) that extraction of the Site is undertaken in an environmentally responsible manner, and
- (b) that community consultation is undertaken to address concerns raised by both the general public and the community of the Maroota Public School.

Comprehensive environmental monitoring programs are in place to provide both the public and the relevant authorities with data which are used to ensure that the extraction of the Site is undertaken in an environmentally responsible manner (refer **Attachment 8**). Those monitoring programs would encompass the continued extraction on Lots 29

and 196 to ensure the integrity of the environment of the Site and its surroundings.

Part 3.5 of this Environmental Assessment details how the proposed additional extraction of sand in the north western corner of Lot 196 would be monitored such that there would be no adverse impact to the groundwater of the Site.

When dealing with development controls, Section 2.16 of DCP 2005 states:

- (a) *Proponents should provide and maintain controlled and limited access points to Old Northern Road and Wisemans Ferry Road.*
- (b) *Proponents should employ an orderly sequence of extraction so as [sic] protect areas not associated with extraction.*
- (c) *Extractive operations should maintain the natural qualities, landform characteristics and environmental attributes of Maroota.*
- (d) *Extractive industries should provide and maintain an effective buffer capable of protecting and enhancing opportunities for native species, including threatened species, population, and ecological communities like Yellow Belly Glider, Maroota Sand Swamp Forest, Kunzea rupestris and Tetretheca glandulosa.*
- (e) *Proponents should negotiate and implement Internal Access ways where ever appropriate by way of legal binding agreements with all affected landowners for the life of the operation.*
- (f) *Proponents should participate with the Maroota community in the preparation and monitoring of extraction and rehabilitation processes.*

The proposed modification would:

- (a) Maintain and not alter the existing approved access to the Site from Old Northern Road.
- (b) Maintain the approved sequence of extraction of the Site, albeit with an increased depth of extraction in the north western corner of Lot 196.
- (c) Ensure that the approved rehabilitation plan, as proposed to be modified as part of this application, is implemented to provide a finished landform which would be in keeping with the rural character of the area and provide a platform for agricultural pursuits.
- (d) Maintain the approved buffers to adjoining development and native species as per conditions of the modified consent.
- (e) Maintain approved internal access ways.

- (f) Maintain approved and existing community consultation programs which include consultation with the local community.

3.2 Regional Planning

3.2.1 Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2 - 1995)

The Site is located within the area to which Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2 - 1995) (**SREP 9**) applies. The aims of SEPP 9 are:

- (a) *to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance, and*
- (b) *to permit, with the consent of the council, development for the purpose of extractive industries on land described in Schedule 1 or 2, and*
- (c) *to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential, and*
- (d) *to promote the carrying out of development for the purpose of extractive industries in an environmentally acceptable manner, and*
- (e) *to prohibit development for the purpose of extractive industry on the land described in Schedule 3 in the Macdonald, Colo, Hawkesbury and Nepean Rivers, being land which is environmentally sensitive.*

Both Development Consent No.796/00/HE and Development Consent No.250-09-01 were approved having regard to SREP 9 and, specifically, the above aims of that plan, with the conclusion that the then proposed development was consistent with those aims.

The proposed modification does not seek to alter the approved extraction on Lots 1 and 2 or that which was approved on Lot 29, however, it does seek to extend the depth of extraction which was previously approved on Lot 196 to RL 127.5 metres.

The proposed modification would not expand the previously approved lateral extent of extraction on the Site or result in any adverse impacts to the environment which would offend the aims of SREP 9.

Clause 7 of SREP 9 states that a person may, with consent, carry out extractive industry on land specified in Schedule 1 or 2 of SREP 9. In this regard, the consent authority:

... must not grant such a consent unless:

- (a) it has considered the effect of the development on flood behaviour, the water quality, quantity and hydrodynamics of any watercourse or underground waters and also the effect of flood behaviour on the development and operations associated with the development in the vicinity, and*
- (b) it has considered a rehabilitation plan prepared in accordance with the Guidelines for Rehabilitation Plans in the Extractive Industry Report, and*
- (c) it is satisfied that, while the development is being carried out, noise and vibration levels will generally be in accordance with the guidelines in the State Pollution Control Commission Environmental Noise Manual (1985 edition) available at the offices of the Environment Protection Authority and the councils of the areas specified in Schedule 4, and*
- (d) it is satisfied that rehabilitation measures will be carried out in accordance with the guidelines in the Urban Erosion and Sediment Control Handbook (1992) prepared by the Department of Conservation and Land Management and available at the offices of the Department of Land and Water Conservation.*

The previously approved extraction of resources from the Site has been the subject of thorough environmental assessment procedures and, indeed, has been the subject of consideration by the Land and Environment Court. The general conclusion has been that the extraction activity which has been and is being undertaken on the Site has been and is being undertaken within the environmental parameters which govern environmentally responsible extractive activities.

The approved extraction on the Site is subject to a comprehensive rehabilitation and management regime which is implemented as part of the extraction of the Site. The proposed modification would be undertaken in accordance with that approved management and rehabilitation regime, albeit with modification to the final landform plan as provided for in this modification application (refer **Figure 2-2**).

Detailed assessment of the approved extraction with regard to acoustic impact was undertaken as part of the approval process which has resulted in appropriate conditions of consent which require continued monitoring of the acoustic impact of the development (refer **Attachment 2** and **Attachment 8**). The proposed modification would not alter the process of extraction which has been and is being undertaken on the Site and would be subject to the existing conditions of consent and the on going monitoring regime which operates on the Site. The acoustic impact is discussed in more detail in **Part 3.6** of this Environmental Assessment.

The proposed modification would extend the life of the previously approved extraction on Lots 29 and 196, however, the modification would also increase the depth of the previously approved extraction on Lot 196 to RL 127.5 metres which is no closer than

2 metres above the wet weather groundwater level. As detailed in **Attachment 7**, to determine the wet weather high groundwater level in the Lot 196, RPS Aquaterra has prepared a report titled *Groundwater Assessment for Dixon Sand Operations, Lot 196 DP 752025, Maroota NSW (the Aquaterra Report)*.

The objectives of the Aquaterra Report were to:

- *Review existing hydrogeological studies, with reference to the location of Lot 196 and the Maroota area.*
- *Install a monitoring piezometer on the western boundary of Lot 196 to refine the conceptual model of Lot 196 that was developed during previous assessments.*
- *Determine the wet weather groundwater level beneath Lot 196, such that the depth of extraction can be determined.*
- *Ascertain the significance of the shallow groundwater body in order to provide regulators with sufficient information to make informed decisions in relation to the modification of the current consent condition.*

The Aquaterra Report (p.3), when dealing with previous groundwater studies in the Maroota area, states:

The hydrogeological system underlying Lot 196 has been previously assessed by ERM (2005) and in more recent times by E3 (2010). However, due to the limited groundwater data available, the regional hydrogeological system was not well understood, and the potential impacts to groundwater of the proposed extension of the depth of extraction could not be adequately assessed.

Five monitoring bores were established in the area by ERM in 2005 (MW1 to MW5). The bores are shallow and are reported to be monitoring a shallow perched aquifer, which is discontinuous and only exists during and shortly after wet periods (E3, 2010; and ERM, 2005). The elevation of the perched water table ranges from 170 to 200 m AHD.

The presence of a shallow groundwater body was also identified in logs of boreholes drilled in the Maroota area by Farley and Lewers Ltd (1978) and DLWC (2001), which reported the presence of shallow clay lenses that are of limited lateral extent.

MW5 is located on Lot 196 and reported a groundwater level of about 5.0 m below ground level. This piezometer is likely to be monitoring groundwater sitting above a thin low permeability layer such as clay, a shale lens or ironstone band, all of which are commonly found at shallow depths.

These low permeability units can cause temporary perched aquifer systems to occur well above the deeper regional groundwater level of the Hawkesbury

Sandstone, and have limited resource value because they have small extent and storage (DLWC, 2001).

The 'wet weather' regional groundwater level beneath Lot 196 could not be established on the basis of MW5 alone. The E3 study concluded that Lot 196 is underlain by a non water-bearing shallow horizon of weathered sandstone which overlies the Hawkesbury Sandstone, and that the water-bearing zone intercepted by MW5 is not representative of the depth to water-bearing or saturated regional aquifer system. However, information obtained from the drilling records of deeper production bores GW105044 and GW105047 located to the west and north, indicated that the depth to water bearing zone(s) is likely to be greater than 30 m below ground level (E3, 2010).

The Aquaterra Report (p.5) continues:

Following on from the recommendation made in the E3 report, a new monitoring bore (BH1) was installed on the western boundary of the north western extraction area. The bore was drilled to a depth of 75 m so that the wet weather groundwater level of the regional aquifer underlying Lot 196 can be established.

In addition, two monitoring bores (BH2 and BH3) were drilled on Lot 1, DP204159 to determine the groundwater elevation to the east.

The three monitoring bores (BH1, BH2 and BH3) were drilled along an east to west transect and completed within the Hawkesbury Sandstone Aquifer. BH1 is located on the western boundary of the north western extraction area, and BH2 and BH3 are located on Lot 1, DP204159. These three bores, together with other deeper bores in the area, have been used to infer the regional groundwater levels beneath and around Lot 196.

Aquaterra has developed a conceptual site model to describe the groundwater conditions on Lot 196. In this regard, the Aquaterra report (p.7) states:

Based on the bore logs of BH1, the production bores located on Lot 196 and monitoring wells located on Lots 1 and 2, it appears that the Maroota Sands unit and its shallow aquifer do not underlie these areas. Information from the logs indicate that Lot 196 and the remainder of the site is underlain by a shallow and narrow non water bearing unconsolidated horizon of weathered clays, sandstones and shales which may be part of the Eluvial Sand unit that grades rapidly to massive sandstones of the Hawkesbury Sandstone. The Maroota Groundwater Study indicated that the Maroota Sand unit potentially extends laterally only to the very eastern parts of Lot 1 and Lot 2 and is not present over Lot 196.

MW5 which is located on Lot 196 revealed evidence of a shallow water table at about 5.0m below ground level (162mAHD). Shallow perched groundwater zones are commonly found to exist above relatively impermeable layers (aquifers) such as clay lenses, shale or ironstone bands throughout the area. These shallow

groundwater bodies are commonly referred to as 'perched' Aquifers and are defined as 'an aquifer that forms in the otherwise generally unsaturated zone above the regional aquifer in the saturated zone'. The use of term 'perched aquifer' in this case, can be misleading as it suggests that the perched aquifer could be of significant importance hydrogeologically and from a potential resource perspective. The perched groundwater identified in this area is reported to have limited resource value because of its isolated nature, limited extent and low storage capacity (DWLC, 2001).

The lateral extent and depth of the perched groundwater zones can be inferred from the observations made from the drilling program. The drill logs indicate the presence of clay bands across the site at depths ranging from approximately 180 to 165mAHD or around 10 to 20m below ground level (Refer to Table 5.1) [of the Aquaterra Report]. The drilling records also indicate that the first water strike (during drilling) was observed between these low permeability layers. The occurrence of thinly banded clay layers does appear to be relatively common across the middle of the site (BH2, 6 and 7) with two separate bands observed approximately 5m apart. The clay bands do not appear to be as prevalent in BH1 and BH3 (located to the east) indicating that the clay sequence is likely to thin and pinch out to the east and west, reducing the capacity of the layer to retain water (Figure 5.2) [of the Aquaterra Report].

The groundwater levels recently monitored in MW1 and MW4 did not respond greatly to a 53mm rainfall event, which occurred on the 3rd to 5th of November 2010. The flat line hydrographs (Figure 5.3) [of the Aquaterra Report] supports the theory that the shallow groundwater encountered in this area is not indicative of a significant perched aquifer. Typically, rainfall is the principal mechanism of recharge to a perched system therefore a response to rainfall would normally be apparent following rainfall recharge capture and containment. In this case, it is likely that rainfall recharge gradually drains where the semi-confining layers discontinue or thin out, supporting the interpretation that storage in these shallow groundwater zones is both temporary and of limited capacity.

Due to the short duration of groundwater monitoring on BH1, the seasonal variations of the groundwater elevations in the deep Hawkesbury Sandstone aquifer have not yet been established. However, longer term groundwater monitoring has been carried out on monitoring bores VEL-MW1 to VEL-MW3 at the neighbouring quarry (PF Formation). The groundwater levels show an annual seasonal fluctuation of up to 1 m, with a long-term climate-driven range of 1 to 3 m. Receding groundwater levels were evident across most bores during extended periods of below average rainfall.

Therefore, it is expected that the seasonal fluctuations of BH1 would also show a seasonal range of about 1 m, or up to 3 m over a longer term and therefore the 'wet weather high groundwater level' beneath lot 196 would be a minimum elevation of about 109 m to 111mAHD. This is 16.5 to 18.5 m below the proposed extraction depth of 127.5 m AHD.

An east to west cross section of the north western extraction area (Figure 5.1) [of the Aquaterra Report] shows the estimated groundwater elevation of the underlying regional Hawkesbury Sandstone aquifer (108.65mAHD). The proposed extraction depth of the north western pit (108.65m AHD) is also shown for reference, indicating approximately 18.5m of separation between the proposed base of the excavation and the regional groundwater table.

Groundwater levels in the deep aquifer of the Hawkesbury Sandstone, underlying Lot 196, have been confirmed by BH1. The groundwater levels recorded to date are shown in Figure 5.3 [of the Aquaterra report]. The most current groundwater elevation was measured on 11 November 2010 at 59.94m below ground level (108mAHD).

As part of this assessment a conceptual model was developed to graphically represent the various hydrogeological processes identified in the vicinity of Lot 196 and how these localised processes link in with more regional systems. The conceptual model has been developed based on the information obtained from previous studies (E3, 2010; and ERM, 2005), licensed bores and the monitoring bores (BH1, BH2, BH3, BH6 and BH7).

Diagram 1 (Figure 5.2) [of the Aquaterra Report] shows the conceptual model section at a more regional scale. The groundwater divide, (which coincides with the topographic divide of the Maroota Ridge) permits groundwater flow both to the east and west towards the upper tributaries of the Hawkesbury River.

At lower elevations, the tributaries represent areas of possible groundwater discharge from the Hawkesbury Sandstone aquifer. To the west and away from the divide (towards Lot 196) the regional groundwater table exhibits a steep hydraulic gradient (due to low permeability and secondary porosity) towards a topographic low / tributary discharge point to the west of Lot 196.

The 'wet weather' regional groundwater level is shown to occur well below the base of the proposed extraction area (127.5mAHD), with the groundwater elevations observed from BH1 showing approximately 16.5 to 18.5m of separation. The model also serves to show that the shallow groundwater encountered is representative of semi-isolated pockets of groundwater that accumulate temporarily above discontinuous combinations of low permeability clay bands and iron stone. Due to the limited storage potential of these low permeability layers, the shallow groundwater will gradually drain, providing some slow and low volume recharge to the regional aquifer (Diagram 2) [of the Aquaterra Report].

Clause 11 of SREP 9 states:

Special requirements for extractive industry at Maroota

(1) *This clause applies to land described in Schedule 2.*

- (2) *The council must not grant consent to the carrying out of development for the purpose of extractive industry on land to which this clause applies unless the council is satisfied that the proposed development:*
- (a) *is unlikely to have a significant adverse impact on the Maroota groundwater resource or on other groundwater users in the region, and*
 - (b) *will conserve the environmentally sensitive and significant areas and features of the Maroota locality, including the environment of threatened species, populations and ecological communities, and*
 - (c) *will involve controlled and limited access points to main roads, and*
 - (d) *will result in a final landform capable of supporting sustainable agricultural production or other post-extraction land uses compatible with the established character and the landscape and natural quality of the Maroota locality.*

The proposed modification seeks to continue the previously approved extraction of sand resources on Lot 29 which would not impact the groundwater of the area. The modification does, however, seek to continue the previously approved extraction on Lot 196 and also to permit extraction to a depth greater than the previously approved 15.24 metres below the original ground level on that lot; **the proposed level of extraction being to RL 127.5 metres.**

The approved 15.24 metre extraction depth was not based on a desire to protect the groundwater resources of the Maroota area. Rather, it was imposed due to 15.24 metres being the depth of the resource which was not in the ownership of the Crown.

The proposed modification seeks approval to extend the extraction into the Crown owned resource but does not seek approval to extract that resource within 2 metres of the wet weather groundwater level on Lot 196. As indicated above, the proposed new depth of extraction on Lot 196 is RL 127.5 metres.

The proposed modification would not increase the previously approved lateral extent of extraction and, as such, no impact is expected to the flora and fauna of the area or any environmentally sensitive areas.

The proposed modification would not alter the approved access to the Site and would not involve any amendment to the number of truck movements to and from the Site.

An approved rehabilitation plan has been established for the Site which has as its aim to rehabilitate the Site such that it can be utilised for agricultural purposes (refer **Attachment 8**). No amendment to the approved rehabilitation process is proposed as part of this modification application other than to modify the final rehabilitated landform

to that which is detailed in **Figure 2-2**.

3.2.2 Sydney Regional Environmental Plan No. 20 Hawkesbury-Nepean River (No. 2 - 1997)

Sydney Regional Environmental Plan No. 20 Hawkesbury-Nepean River (No. 2 - 1997) (**SREP 20**) applies to The Hills Shire local government area.

The aim of SREP 20 is:

to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

Clause 6 of SREP 20 identifies specific planning policies and recommended strategies for development. Those specific strategies applicable to extractive industries are reproduced below with comments.

- (1) *Total catchment management:*
 - (b) *Consider the impact of the development concerned on the catchment.*
 - (c) *Consider the cumulative environmental impact of development proposals on the catchment.*

Comment: The impact of the extraction of resources from the Site on the hydrology and ecology of the area was considered at the time of the assessment of the original development applications. The proposed modification would not result in additional impacts.

- (2) *Environmentally sensitive areas*
 - (b) *Minimise adverse impacts on water quality, aquatic habitats, riverine vegetation and bank stability.*

Comment: The existing extraction incorporates approved erosion, sediment and stormwater controls to divert clean runoff away from disturbed areas, and dirty runoff into sediment basins and ponds (refer **Attachment 8**). The proposed modification would not affect these controls.

- (c) *Minimise direct and indirect adverse impacts on land reserved or dedicated under the National Parks and Wildlife Act 1974 or the Forestry Act 1916 and conservation area sub-catchments in order to protect water quality and biodiversity.*

Comment: The proposed modification would not have adverse impact on these areas.

- (d) *Protect wetlands (including upland wetlands) from future development and from the impacts of land use within their catchments.*

Comment: The proposed modification would not impact the quality or amount of surface or ground water leaving the Site nor would it affect the integrity of wetland areas in the catchment.

- (e) *Consider the need to include buffer zones (such as adequate fire radiation zones) for proposals on land adjacent to land reserved or dedicated under the National Parks and Wildlife Act 1974 or the Forestry Act 1916.*

Comment: The proposed modification would not impact on these areas.

- (g) *Consideration should be given to the impact of the development concerned on the water table and the formation of acid sulphate soils.*

Comment: The proposed modification, with existing conditions in place requiring extraction not to proceed closer than 2 metres above the wet weather high groundwater level, would not affect the water table or potential acid sulphate soils. The proposed new depth of extraction on Lot 196 is RL 127.5 metres which is significantly above the high wet weather groundwater level.

(3) *Water quality:*

- (a) *Quantify, and assess the likely impact of, any predicted increase in pollutant loads on receiving waters.*

Comment: The approved erosion, sediment and stormwater controls (refer **Attachment 8**) would be maintained and the proposed modification would not result in an increase in any pollutants leaving the Site.

- (f) *Consider the need for an Erosion and Sediment Control Plan (to be in place at the commencement of development) where the development concerned involves the disturbance of soil.*

Comment: An erosion and sediment control plan has been approved for the Site (refer **Attachment 8**). The proposed modification would not affect that approved plan.

(4) *Water quantity:*

- (b) *Ensure the amount of stormwater run-off from a site and the rate at which it leaves the site does not significantly increase as a result of development. Encourage on-site stormwater retention,*

infiltration and (if appropriate) reuse.

Comment: The proposed modification would not increase the amount of stormwater runoff leaving the Site.

(d) *Consider the impact of development on the level and quality of the water table.*

Comment: The proposed modification, which proposes to limit extraction to RL 127.5 metres, is significantly more than 2 metres above the wet weather high groundwater level, and would not result in any significant impacts to the water table (refer **Attachments 6 and 7**).

(5) *Cultural heritage:*

(b) *Protect Aboriginal sites and places of significance.*

Comment: The proposed modification would not impact on any protected Aboriginal sites or places of significance.

(c) *Consider an Aboriginal site survey where predictive models or current knowledge indicate the potential for Aboriginal sites and the development concerned would involve significant site disturbance.*

Comment: The archaeological assessment carried out for the original development applications did not identify any Aboriginal archaeological sites or areas of potential archaeological deposits. The proposed modification would not allow disturbance of any land which has not already been disturbed as part of the previous approvals for extraction.

(6) *Flora and fauna:*

(a) *Conserve and, where appropriate, enhance flora and fauna communities, particularly threatened species, populations and ecological communities, aquatic habitats, wetland flora, rare flora and fauna, riverine flora, flora with heritage value, habitats for indigenous and migratory species of fauna, and existing or potential fauna corridors.*

Comment: The proposed modification would not affect any land which has not been extracted as part of previous approvals. As such, threatened species, populations or ecological communities, or existing conservation areas on the Site would not be affected.

(c) *Minimise adverse environmental impacts, protect existing habitat and, where appropriate, restore habitat values by the use of management practices.*

Comment: The proposed modification would not increase any environmental impact to existing habitats. The approved rehabilitation plan (refer **Attachment 8**), as modified as per **Figure 2-2** of this Environmental Assessment, would ensure that appropriate rehabilitation of the Site is undertaken as extraction ceases.

(e) *Consider the range of flora and fauna inhabiting the site of the development concerned and the surrounding land, including threatened species and migratory species, and the impact of the proposal on the survival of threatened species, populations and ecological communities, both in the short and longer terms.*

Comment: The proposed modification would not impact threatened or migratory species, populations or ecological communities of the area or impact their long term survival.

(f) *Consider the need to provide and manage buffers, adequate fire radiation zones and building setbacks from significant flora and fauna habitat areas.*

Comment: The proposed modification would not alter existing approved buffers or setbacks (refer **Attachment 8**).

3.3 State Environmental Planning Legislation

3.3.1 State Environmental Planning Policy No.55 - Remediation of Land

State Environmental Planning Policy No.55 - Remediation of Land (**SEPP 55**) aims:

.... to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 7 of SEPP 55 states:

7. (1) *A consent authority must not consent to the carrying out of any development on land unless:*
- (a) *it has considered whether the land is contaminated, and*
 - (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
 - (c) *if the land requires remediation to be made suitable for*

the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

- (2) *Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.*
- (3) *The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.*
- (4) *The land concerned is:*
 - (a) *land that is within an investigation area,*
 - (b) *land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,*
 - (c) *to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital land:*
 - (i) *in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and*
 - (ii) *on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).*

The then Department of Urban Affairs and Planning publication *Managing Land Contamination - Planning Guidelines SEPP 55 - Remediation of Land* provides advice on the process of determination as to whether a site is contaminated. In this regard, sections 2.1 and 2.2 of the Guidelines state:

When carrying out planning functions under the EP & A Act, a planning authority must consider the possibility that a previous land use has caused contamination of the site as well as the potential risk to health or the environment from that contamination.

When an authority carries out a planning function, the history of the land use needs to be considered as an indicator of potential contamination. Where there is no reason to suspect contamination after acting substantially in accordance with these Guidelines, the proposal may be processed in the usual way.

The Guidelines continue at section 3.2.1 by stating that:

The potential for contamination is often linked to past uses of land and a good early indicator of possible uses is land zoning. Contamination is more likely to have occurred if the land is currently, or was previously, zoned for industrial, agricultural or defence purposes.

The Site was subject to assessment for contamination as part of the original development application process. The proposed modification would not permit disturbance of any part of the Site which has not already been the subject of extraction. As such, further assessment pursuant to SEPP 55 is not warranted.

3.3.2 State Environmental Planning Policy No.44 - Koala Habitat Protection

State Environmental Planning Policy No.44 - Koala Habitat Protection (**SEPP 44**) applies in The Hills Shire local government area.

SEPP 44 aims to encourage the proper conservation and management of areas of natural vegetation which provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. The aims and objectives of SEPP 44 are:

... to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:

- (a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and*
- (b) by encouraging the identification of areas of core koala habitat, and*
- (c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.*

Clause 6 of SEPP 44 states:

This Part applies to land:

- (a) that is land to which this Policy applies, and*
- (b) that is land in relation to which a development application has been made, and*
- (c) that:*
 - (i) has an area of more than 1 hectare, or*
 - (ii) has, together with any adjoining land in the same ownership, an area of more than 1 hectare,*

whether or not the development application applies to the whole, or only part, of the land.

The Site has an area greater than 1 hectare. An assessment pursuant to SEPP 44 has been undertaken as part of the original development application process. The proposed modification is such that no additional assessment is required pursuant to SEPP 44.

3.3.3 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (**SEPP Infrastructure**) has as its aim:

... to facilitate the effective delivery of infrastructure across the State by:

- (a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and*
- (b) providing greater flexibility in the location of infrastructure and service facilities, and*
- (c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and*
- (d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and*
- (e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and*
- (f) providing for consultation with relevant public authorities about certain*

development during the assessment process or prior to development commencing.

Clause 101 of SEPP Infrastructure states:

101 Development with frontage to classified road

- (1) *The objectives of this clause are:*
 - (a) *to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and*
 - (b) *to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.*
- (2) *The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that:*
 - (a) *where practicable, vehicular access to the land is provided by a road other than the classified road, and*
 - (b) *the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:*
 - (i) *the design of the vehicular access to the land, or*
 - (ii) *the emission of smoke or dust from the development, or*
 - (iii) *the nature, volume or frequency of vehicles using the classified road to gain access to the land, and*
 - (c) *the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.*

The existing extractive industry on the Site has access to Old Northern Road. The assessment of the impact that access would have on the function of Old Northern Road was canvassed in the assessment of the original development applications. The proposed modification would not affect the operation of the existing, approved, access to the Site.

3.3.4 Protection of the Environment Operations Act 1997

Section 43 of the Protection of the Environment Operations Act 1997 (**POEO Act**) requires an Environment Protection Licence to be obtained from the NSW Office of Environment and Heritage (**DOH**) for the carrying out of *scheduled development works* which would enable a *scheduled activity* to be carried out.

Schedule 1 of the POEO Act defines the following scheduled activities for which an Environment Protection Licence is required:

19 *Extractive activities*

(1) *This clause applies to the following activities:*

land-based extractive activity, meaning the extraction, processing or storage of extractive materials, either for sale or re-use, by means of excavation, blasting, tunnelling, quarrying or other such land-based methods.

water-based extractive activity, meaning the extraction of extractive materials, either for sale or re-use, by means of dredging or other such water-based methods.

(2) *In this clause, extractive materials means clay, sand, soil, stone, gravel, rock, sandstone or similar substances that are not minerals within the meaning of the Mining Act 1992.*

(3) *Each activity referred to in Column 1 of the Table to this clause is declared to be a scheduled activity if it meets the criteria set out in Column 2 of that Table.*

Table

Column 1	Column 2
Activity	Criteria
<i>land-based extractive activity</i>	<i>involves the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials</i>
<i>water-based extractive activity</i>	<i>involves the extraction of more than 30,000 cubic metres per year of extractive materials.</i>

The proposed development would fall within the above category of Land-Based

Extractive Industry and, as such, an Environment Protection Licence is required.

The existing extractive industry on the Site operates within Environment Protection Licence No.3916. The proposed modification would fall within the existing Environment Protection Licence and no modification would be required to that licence.

3.4 Commonwealth Legislation

The **Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)** came into force from 16 July 2000. The EPBC Act requires actions which are likely to have a significant impact on matters of National Environmental Significance or which have a significant impact on Commonwealth land to be referred to the Commonwealth Minister for the Environment for approval.

The Site is not listed as a national heritage place and the proposed modification would not impact on any national heritage places.

The proposed modification would not impact on any threatened species and communities.

No National Environmental Significance matters would be impacted by the proposed modification. As such, the proposed modification has not been referred to the Commonwealth Minister for the Environment and approval pursuant to the EPBC Act is not required.

3.5 Groundwater

The proposed modification seeks approval for an increase in the previously approved depth of extraction on Lot 196 to RL 127.5 metres.

In order to ascertain the impact that additional depth of extraction would have on the groundwater of Lot 196 and the Maroota area in general, E3 Consulting Australia Pty Ltd has prepared a report titled *Preliminary Assessment of Potential Impacts to Groundwater of Proposed Extension of Dixon Sand Operations, Lot 196 DP 752025, Maroota NSW (the E3 Report)*, a copy of which is at **Attachment 6**.

The scope of the E3 Report is:

- *Conduct a site inspection and walkover;*
- *Review of information and documents provided by Nexus and Dixon Sand with reference to the location of Lot 196 and the proposed increase to the extraction depths on Lot 196;*
- *Update the conceptual model for Lot 196 that was developed during*

previous assessments;

- *Assess for potential interactions and impacts to identified groundwater aquifers present of the proposed increase to the extraction depths on Lot 196; and*
- *Preparation of this report in accordance with the relevant requirements of the guidelines endorsed by NSW Department of Environment, Climate Change & Water (NSW DECCW).*

When discussing the hydrogeology of the Maroota area, the E3 Report states:

The hydrogeological setting of the Maroota region is described in detail in the Maroota Groundwater Study (DLWC, 2001). The Maroota Groundwater Study referred to the groundwater present within the Maroota Sands as the 'Shallow Aquifer' and the groundwater present within the Hawkesbury Sandstone as the 'Deep Aquifer'.

Shallow Aquifer

The groundwater within the Shallow Aquifer is present in unconfined aquifer system within the layers or lenses of quartz sands, silty clays and clayey sands and flows laterally along contacts between the layers. In addition, the interface of the Maroota Sands and the Hawkesbury Sandstone may provide significant migration pathways for groundwater present in the Shallow Aquifer.

Deep Aquifer

The capacity of the underlying massive units of the Hawkesbury Sandstone to contain and transmit groundwater is low, however, where jointing is well developed and bedding planes are present, the ability for groundwater to migrate through the bedrock is significantly higher. Groundwater present in the sandstone bedrock is expected to be confined to zones of relatively higher permeability within jointing, bedding planes, fractures and weathered features in the sandstone and it is likely that groundwater would flow along both vertical and horizontal migration pathways within the sandstone.

With regard to *potential sensitive receptors* of groundwater in the Maroota area, the E3 Report states:

The Site is located within a region that comprises national parks and bushland, extractive industry, agricultural uses and a local residential community. The surrounding native bushland and the local residential populations are potentially sensitive receptors to above ground impacts, such as noise and dust, generated from the extractive operations that are conducted on the Site. However, for the purposes of this report, it is necessary to identify potentially sensitive receptors to groundwater migrating from the Site and the primary sensitive receptors have been identified to potentially include local users of groundwater and nearby

groundwater dependant ecosystems.

Further discussion of the *potential sensitive receptors* can be found in Section 2.8 of the E3 Report.

E3 has developed a conceptual site model to ... *describe the conditions on the Site and on Lot 196 so as to assist in the identification and assessment of potential impacts to groundwater of the proposed extension of the extraction on Lot 196.* The conceptual site model is discussed in more detail in Section 3.1 of the E3 Report.

With regard to the proposed modification of the Consent to permit extraction on Lot 196 to a depth not exceeding 2 metres above the highest recorded wet weather groundwater level, the E3 Report states:

It is noted that a high wet weather groundwater level on Lot 196 has not yet been established and while groundwater levels in the southern part of the extraction area on Lot 196 have been monitored for a number of years, the absence of information on the hydrogeological conditions at this location make it difficult to calculate such a level. The monitoring data indicates that groundwater levels at this location are between 4.5 to 5.5 m below the top of the well casing and are therefore perhaps 3.5 to 4.5 m BNS. However, these groundwater levels are not considered to be indicative of depth to water bearing zone/s and the geological information for areas to the west and north of this location indicates that the depth to water bearing zone/s is much greater and could be deeper than 30 m BNS. It is likely that the groundwater levels are indicative of the fact that the water bearing zone/s intersected are present in semi-confined to confined conditions.

If the Maroota Sand Unit is present underlying Lot 196, then the depths to groundwater reported by ERM may represent the depth to the water bearing zone and could be used to establish the high wet weather groundwater level and subsequently the maximum depth of extraction. However, based on the surrounding surface topography, the geological and water bearing zone information provided on the production bore licences, the logs from Lots 1 and 2 and the information provided in the Maroota Groundwater Study, it is considered that it is more likely that Lot 196 is directly underlain by a non-water bearing shallow horizon of weathered sandstone and then the Hawkesbury Sandstone and that the water bearing zone intersected by MW5 on Lot 196 is part of a confined or semi-confined system of the Deep Aquifer and that the depths to groundwater measured in MW5 are not representative of the depth to the water bearing or saturated zone, which could be subsequently be [sic] defined as the high wet weather groundwater level. It is considered that the depth to the high wet weather groundwater level, present for the Deep Aquifer, beneath Lot 196 could be at greater than 30 m BNS.

Section 4 of the E3 Report discusses the potential impact of the further extraction of Lot 196 below the previously approved 15.24 metres. In this regard, a highly conservative approach has been adopted which assumes:

- *The Maroota Sands and the Shallow Aquifer maybe present directly underlying Lot 196 and that it overlies the Hawkesbury Sandstone and the Deep Aquifer;*
- *The rate of migration of groundwater present in the Shallow Aquifer is within the published values for a sand aquifer; and*
- *The direction of groundwater flow within the Shallow Aquifer from Lot 196 may be to either the south-west, south or south-east.*

Based on the above assumptions, the E3 Report concludes that the potential impacts to groundwater of the proposed modification to the depth of extraction on Lot 196 are:

- *Increase in recharge rates to the aquifer - via increased infiltration of rate through the decrease in the thickness of the overlying materials and a reduction in vertical infiltration distance;*
- *Change in aquifer properties - increased recharge rates may create mounding of groundwater which may influence groundwater flow directions and pathways and rates of migration;*
- *Increase in risk of change to groundwater quality - via changes in the chemistry of water recharging to the aquifer due to the decrease in the thickness of the overlying materials and a reduction in vertical infiltration distance;*
- *Increase in risk of contamination of aquifer - from the equipment used on Lot 196, in particular the equipment used in the extraction activities. This risk is increased from the current risk of this occurring due to the decrease in the thickness of the overlying materials and a reduction in vertical infiltration distance;*
- *Increase in risk of adverse impact to potentially sensitive receptors - from groundwater migrating from Lot 196 that has changed/been impacted. Sensitive receptors may include local users of groundwater and nearby groundwater dependant ecosystems.*

The E3 Report continues:

The geology and the hydrogeological system underlying Lot 196 are currently not well understood and the potential impacts to groundwater of the proposed extension of the depth of extraction on Lot 196 cannot be adequately assessed until further information is available on the sub-surface conditions at Lot 196. This information could be provided by conducting well installation and monitoring works on Lot 196, particularly in areas proximal to the proposed extraction areas. It is recommended that at least one monitoring well is installed along the northern or western boundary of the proposed extraction areas where extraction activities will not extend to ensure that the well will not be destroyed

during future quarrying activities. The information from the drilling of this well will be able to be used in conjunction with information from the production bore logs to determine the high wet weather groundwater level underlying Lot 196.

As recommended by E3, a bore has been located in the north western corner of Lot 196, outside the area the subject of extraction, which:

- (a) provides data on the extent of the resource, and
- (b) provides data on the level of groundwater to ensure that extraction does not proceed less than 2 metres above the wet weather high groundwater level.

The process involved in sinking the bore and the detailed data received is canvassed in the report of Aquaterra titled *Groundwater Assessment for Dixon Sand Operations, Lot 196, DP 752025, Maroota NSW (the Aquaterra Report)* a copy of which is at **Attachment 7**.

The objectives of the Aquaterra report were:

- *Review existing hydrogeological studies, with reference to the location of Lot 196 and the Maroota area.*
- *Install a monitoring piezometer on the western boundary of Lot 196 to refine the conceptual model of Lot 196 that was developed during previous assessments.*
- *Determine the wet weather groundwater level beneath Lot 196, such that the depth of extraction can be determined.*
- *Ascertain the significance of the shallow groundwater body in order to provide regulators with sufficient information to make informed decisions in relation to the modification of the current consent condition.*

The overall scope of the Aquaterra Report was:

... to refine the conceptual hydrogeological model for Lot 196, which included:

- *A site inspection and walk over.*
- *Review of existing hydrogeological information.*
- *Coordination and supervision of a drilling program.*
- *Groundwater monitoring, data analysis and reporting.*

The Aquaterra Report (p.3), when dealing with previous groundwater studies in the Maroota area, states:

The hydrogeological system underlying Lot 196 has been previously assessed by ERM (2005) and in more recent times by E3 (2010). However, due to the limited groundwater data available, the regional hydrogeological system was not well understood, and the potential impacts to groundwater of the proposed extension of the depth of extraction could not be adequately assessed.

Five monitoring bores were established in the area by ERM in 2005 (MW1 to MW5). The bores are shallow and are reported to be monitoring a shallow perched aquifer, which is discontinuous and only exists during and shortly after wet periods (E3, 2010; and ERM, 2005). The elevation of the perched water table ranges from 170 to 200 m AHD.

The presence of a shallow groundwater body was also identified in logs of boreholes drilled in the Maroota area by Farley and Lewers Ltd (1978) and DLWC (2001), which reported the presence of shallow clay lenses that are of limited lateral extent.

MW5 is located on Lot 196 and reported a groundwater level of about 5.0 m below ground level. This piezometer is likely to be monitoring groundwater sitting above a thin low permeability layer such as clay, a shale lens or ironstone band, all of which are commonly found at shallow depths.

These low permeability units can cause temporary perched aquifer systems to occur well above the deeper regional groundwater level of the Hawkesbury Sandstone, and have limited resource value because they have small extent and storage (DLWC, 2001).

The 'wet weather' regional groundwater level beneath Lot 196 could not be established on the basis of MW5 alone. The E3 study concluded that Lot 196 is underlain by a non water-bearing shallow horizon of weathered sandstone which overlies the Hawkesbury Sandstone, and that the water-bearing zone intercepted by MW5 is not representative of the depth to water-bearing or saturated regional aquifer system. However, information obtained from the drilling records of deeper production bores GW105044 and GW105047 located to the west and north, indicated that the depth to water bearing zone(s) is likely to be greater than 30 m below ground level (E3, 2010).

The Aquaterra Report (p.5) continues:

Following on from the recommendation made in the E3 report, a new monitoring bore (BH1) was installed on the western boundary of the north western extraction area. The bore was drilled to a depth of 75 m so that the wet weather groundwater level of the regional aquifer underlying Lot 196 can be established.

In addition, two monitoring bores (BH2 and BH3) were drilled on Lot 1, DP204159 to determine the groundwater elevation to the east.

The three monitoring bores (BH1, BH2 and BH3) were drilled along an east to

west transect and completed within the Hawkesbury Sandstone Aquifer. BH1 is located on the western boundary of the north western extraction area, and BH2 and BH3 are located on Lot 1, DP204159. These three bores, together with other deeper bores in the area, have been used to infer the regional groundwater levels beneath and around Lot 196.

Aquaterra has developed a conceptual site model to describe the groundwater conditions on Lot 196. In this regard, the Aquaterra report (p.7) states:

Based on the bore logs of BH1, the production bores located on Lot 196 and monitoring wells located on Lots 1 and 2, it appears that the Maroota Sands unit and its shallow aquifer do not underlie these areas. Information from the logs indicate that Lot 196 and the remainder of the site is underlain by a shallow and narrow non water bearing unconsolidated horizon of weathered clays, sandstones and shales which may be part of the Eluvial Sand unit that grades rapidly to massive sandstones of the Hawkesbury Sandstone. The Maroota Groundwater Study indicated that the Maroota Sand unit potentially extends laterally only to the very eastern parts of Lot 1 and Lot 2 and is not present over Lot 196.

MW5 which is located on Lot 196 revealed evidence of a shallow water table at about 5.0m below ground level (162mAHD). Shallow perched groundwater zones are commonly found to exist above relatively impermeable layers (aquiclards) such as clay lenses, shale or ironstone bands throughout the area. These shallow groundwater bodies are commonly referred to as 'perched' Aquifers and are defined as 'an aquifer that forms in the otherwise generally unsaturated zone above the regional aquifer in the saturated zone'. The use of term 'perched aquifer' in this case, can be misleading as it suggests that the perched aquifer could be of significant importance hydrogeologically and from a potential resource perspective. The perched groundwater identified in this area is reported to have limited resource value because of its isolated nature, limited extent and low storage capacity (DWLC, 2001).

The lateral extent and depth of the perched groundwater zones can be inferred from the observations made from the drilling program. The drill logs indicate the presence of clay bands across the site at depths ranging from approximately 180 to 165mAHD or around 10 to 20m below ground level (Refer to Table 5.1) [of the Aquaterra Report]. The drilling records also indicate that the first water strike (during drilling) was observed between these low permeability layers. The occurrence of thinly banded clay layers does appear to be relatively common across the middle of the site (BH2, 6 and 7) with two separate bands observed approximately 5m apart. The clay bands do not appear to be as prevalent in BH1 and BH3 (located to the east) indicating that the clay sequence is likely to thin and pinch out to the east and west, reducing the capacity of the layer to retain water (Figure 5.2) [of the Aquaterra Report].

The groundwater levels recently monitored in MW1 and MW4 did not respond greatly to a 53mm rainfall event, which occurred on the 3rd to 5th of November

2010. The flat line hydrographs (Figure 5.3) [of the Aquaterra Report] supports the theory that the shallow groundwater encountered in this area is not indicative of a significant perched aquifer. Typically, rainfall is the principal mechanism of recharge to a perched system therefore a response to rainfall would normally be apparent following rainfall recharge capture and containment. In this case, it is likely that rainfall recharge gradually drains where the semi-confining layers discontinue or thin out, supporting the interpretation that storage in these shallow groundwater zones is both temporary and of limited capacity.

Due to the short duration of groundwater monitoring on BH1, the seasonal variations of the groundwater elevations in the deep Hawkesbury Sandstone aquifer have not yet been established. However, longer term groundwater monitoring has been carried out on monitoring bores VEL-MW1 to VEL-MW3 at the neighbouring quarry (PF Formation). The groundwater levels show an annual seasonal fluctuation of up to 1 m, with a long-term climate-driven range of 1 to 3 m. Receding groundwater levels were evident across most bores during extended periods of below average rainfall.

Therefore, it is expected that the seasonal fluctuations of BH1 would also show a seasonal range of about 1 m, or up to 3 m over a longer term and therefore the 'wet weather high groundwater level' beneath lot 196 would be a minimum elevation of about 109 m to 111m AHD. This is 16.5 to 18.5 m below the proposed extraction depth of 127.5 m AHD.

An east to west cross section of the north western extraction area (Figure 5.1) [of the Aquaterra Report] shows the estimated groundwater elevation of the underlying regional Hawkesbury Sandstone aquifer (108.65m AHD). The proposed extraction depth of the north western pit (108.65m AHD) is also shown for reference, indicating approximately 18.5m of separation between the proposed base of the excavation and the regional groundwater table.

Groundwater levels in the deep aquifer of the Hawkesbury Sandstone, underlying Lot 196, have been confirmed by BH1. The groundwater levels recorded to date are shown in Figure 5.3 [of the Aquaterra report]. The most current groundwater elevation was measured on 11 November 2010 at 59.94m below ground level (108m AHD).

As part of this assessment a conceptual model was developed to graphically represent the various hydrogeological processes identified in the vicinity of Lot 196 and how these localised processes link in with more regional systems. The conceptual model has been developed based on the information obtained from previous studies (E3, 2010; and ERM, 2005), licensed bores and the monitoring bores (BH1, BH2, BH3, BH6 and BH7).

Diagram 1 (Figure 5.2) [of the Aquaterra Report] shows the conceptual model section at a more regional scale. The groundwater divide, (which coincides with the topographic divide of the Maroota Ridge) permits groundwater flow both to the east and west towards the upper tributaries of the Hawkesbury River.

At lower elevations, the tributaries represent areas of possible groundwater discharge from the Hawkesbury Sandstone aquifer. To the west and away from the divide (towards Lot 196) the regional groundwater table exhibits a steep hydraulic gradient (due to low permeability and secondary porosity) towards a topographic low / tributary discharge point to the west of Lot 196.

The 'wet weather' regional groundwater level is shown to occur well below the base of the proposed extraction area (127.5mAHD), with the groundwater elevations observed from BH1 showing approximately 16.5 to 18.5m of separation. The model also serves to show that the shallow groundwater encountered is representative of semi-isolated pockets of groundwater that accumulate temporarily above discontinuous combinations of low permeability clay bands and iron stone. Due to the limited storage potential of these low permeability layers, the shallow groundwater will gradually drain, providing some slow and low volume recharge to the regional aquifer (Diagram 2) [of the Aquaterra Report].

The Aquaterra Report concluded:

The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, other than potentially increasing the rate of rainfall recharge (due to the partial removal of low permeability layers) to the regional aquifer system. As mentioned, the shallow groundwater system will recharge the deeper aquifer via gradual drainage, however, this level of recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.

These mechanisms would include mass infiltration via complex networks of structurally controlled fracturing (secondary porosity) at a more regional level throughout the sandstone unit.

No information was made available as to whether there had been any impacts by sand extraction previously, either on this or on the adjoining quarry sites.

The impact of the extended quarrying is also likely to have a minimal impact on existing users in the immediate vicinity.

A review of the database has indicated that there are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers observed in the site investigation drilling and from the borehole log review. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity. Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.

Following a review of the information made available and from the findings

made in this assessment the following conclusions have been drawn:

- *Lot 196 and the remainder of the site is underlain by a series of shallow and limited extent zones of non water-bearing unconsolidated horizons of weathered clays, sandstones and shales. These low permeability layers permit temporary storage of groundwater at various shallow depths. These temporary perched storages have limited resource value because, like the Maroota Sand, they are discontinuous and of limited extent and low storage.*
- *Seasonal groundwater fluctuations observed from BH1 show seasonal ranges of about 1m. These fluctuations could range up to 3m over the longer term. Therefore the 'wet weather high groundwater level' beneath Lot 196 would be at a minimum elevation of about 109 to 111m AHD. This is 18.5 to 16.5m below the proposed extraction depth of 127.5m AHD.*
- *The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, or to the regional aquifer system, other than potentially increasing the rate of rainfall recharge to the regional aquifer system. However, this potential increase in recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.*
- *There are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity.*
- *Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.*

3.6 Acoustic Impact

The Environmental Impact Statement which accompanied development application No.796/00/HE contained an assessment of the potential impact of the then proposed extraction on the acoustic environment, and made recommendations with regard to mitigation of identified impacts.

Development Consent No.796/00/HE recognised the above assessment and provided conditions of consent which would ensure that the acoustic integrity of the Maroota area would be maintained during the life of the extraction on Lots 29 and 196.

As detailed in this Environmental Assessment, approved extraction of Lot 29 and Lot 196 ceased on 22 March 2010. The proposed amendment to Development Consent No.250-09-01 seeks to reactivate the extraction of Lot 29 and Lot 196 as part of Development Consent No.250-09-01. Development Consent No.250-09-01, at its:

- conditions 3.34 - 3.47,
- conditions 4.5 - 4.6A, and
- condition 6.3 (c)

provides comprehensive acoustic impact conditions and requirements for continued monitoring of extraction. Environmental management of acoustic impact is provided for in the Site Environmental Management Plan contained as **Attachment 8**.

The proposed modification would bring any continued extraction on Lots 29 and 196 under the umbrella of these acoustic impact conditions to ensure that the continued extraction of the Site is undertaken such that an acceptable acoustic environment is maintained.

Dixon Sand, as part of its fulfilment of the conditions of consent for its Maroota operations, has prepared annual environment site audits. Those audits, which can be seen on the Dixon Sand web site, clearly show that sand extraction on all of the Dixon Sand sites at Maroota are operating within the acoustic criteria contained in the above conditions of consent. Indeed, the audit reports note that no complaints have been received relating to acoustic impacts from the Dixon Sand operations at Maroota.

3.7 Traffic Impacts

Truck movements generated by all Dixon Sand extraction activity in the Maroota area is governed by condition 3.30 of the Development Consent No.250-09-01 which states:

- 3.30 Truck movements at the site, including those provided for in consents 796/00/HE, 250-9-01 and 165-7-2005, shall not exceed:*
- a) a total of 180 per day (ie inbound combined with outbound);*
 - b) 40 between the hours of 6.00am and 7.00am (inbound combined with outbound); and*
 - c) 118 laden per day, of which no more than 28 may be inbound.*

Apart from the modification to condition 3.30 detailed in **Part 2** of this Environmental Assessment to remove reference to Development Consent No.796/00/HE which is to be surrendered, no modification is proposed to the already approved truck movements to and from the Site. As such, the previously approved condition which applied to the extraction

of Lot 29 and Lot 196 remains unaltered.

In addition to the above, conditions 3.30A - 3.35C of Development Consent No.250-09-01 relate to truck and transport impacts and state:

3.30A The Applicant shall:

- a) keep daily records of the amount of sand transported from the site;*
- b) keep daily records of all traffic movements in and out of the site (including records of movements approved under condition 3.30; and*
- c) include detailed reports on these records in the AEMR.*

3.31 All vehicles are to enter and leave the site in a forward direction and prominent and permanent signposting to this effect is to be provided and maintained at all times.

3.32 The Applicant is to ensure that the Old Northern Road pavement in the vicinity of the intersection with the Crown Access Road is regularly maintained and kept free of sand, clay and soil at all times. All costs of these works are to be borne by the Applicant.

3.33 The Applicant shall advise its drivers and its clients not to arrive at the site prior to 5.45am on any day. Certified (under company seal) weighbridge dockets and a log book or equivalent computer records are to be kept to verify the arrival and departure times of vehicles. Copies of these records shall be summarized in the AEMR.

3.35A The Applicant shall ensure all new truck drivers are provided with Site Induction for Drivers outlining site requirements, including the requirements of the Transport Code of Conduct referred to in condition 6.3 of this consent, and expected driver behaviour such as observing the 40 kph speed limit at Maroota School on school days between 8:30 am – 9:00 am and 3:00 pm – 3:30 pm [as amended by this s.75W application] (or such other speed limits as may be imposed from time to time), and not using exhaust brakes, especially during morning periods.

3.35B The Applicant shall liaise with representatives of Maroota Public School as required, but no less than annually, to discuss the effectiveness of traffic management procedures.

3.35C The Applicant shall impose a 20 km/hr speed limit on internal haul roads and shall ensure that all vehicles using internal haul roads do not exceed this speed limit.

These conditions would apply to any modification which would permit the reactivation of extraction on Lot 29 and Lot 196.

Dixon Sand, as part of its annual environmental reporting, has monitored the number of trucks entering and leaving the Site. There has been no exceedance of the approved truck numbers.

The annual environmental monitoring reports also clearly state that a minor number of complaints have been made with regard to the conduct of truck drivers in the Maroota area with the number of complaints ranging from zero in some years to 4 in one year. In all cases, complaints related to trucks speeding. In all cases, Dixon Sand has reprimanded the driver concerned and reiterated the truck management plan which applies to trucks entering and leaving the Site.

3.8 Air Quality

The Environmental Impact Statement which accompanied development application No.796/00/HE contained an assessment of the potential impact of the then proposed extraction would have with regard to air quality, and made recommendations with regard to mitigation of identified impacts.

Development Consent No.796/00/HE recognised the above assessment and provided conditions of consent which would ensure that the integrity of the air quality of the Maroota area would be maintained during the life of the extraction on Lots 29 and 196.

Development Consent No.250-09-01, at its:

- conditions 3.2 - 3.8,
- conditions 4.2 - 4.4, and
- condition 6.3(a)

provides comprehensive air quality impact conditions and requirements for continued monitoring of extraction. Environmental management of air quality impact is provided for in the Site Environmental Management Plan contained as **Attachment 8**.

The proposed modification would bring any continued extraction on Lots 29 and 196 under the umbrella of these air quality impact conditions to ensure that the continued extraction of the Site is undertaken such that an acceptable air quality is maintained.

A review of the annual environmental monitoring reports for the Dixon Sand extractive industry operations at Maroota reveals that, generally, dust emissions from the extractive industry have been within the criteria referred to in conditions of consent. In this regard, the following information is provided from those environmental monitoring reports.

2003 - 2005	All dust gauges located on the Dixon Sand sites recorded dust emissions below the criteria.
2005-2006	Some minor exceedance of the dust criteria. The environmental monitoring report indicates that the non compliance is as result of new operations in the locality other then those operated by Dixon Sand combined with unusually high winds and temperatures at time of recording the non compliance.
2006-2007	Two non compliant readings were recorded in this period which were stated as minor breaches of the criteria.
2007-2010	During this period, all dust gauges recorded readings below the criteria except for dust gauge D1. This gauge is located close to the front gate of the Site and the high levels have been a result of sand being deposited in the gauge.

3.9 Biodiversity

Development Consent No.796/00/HE contains no conditions which relate specifically to biodiversity. The previously approved extraction on Lot 29 and Lot 196 was undertaken in accordance with the Environmental Impact Statement and conditions of that consent.

The Environmental Impact Statement for extraction of Lot1 and Lot 2, when referring to biodiversity, stated:

Biological diversity refers to the variety of genes, species, populations, communities and ecosystems and the linkage between them. Biological resources provide food, many medicines, fibres and industrial products. They are also responsible for vital ecological functions such as maintaining soil fertility and the supply of clean and fresh water. Maintenance of biodiversity will ensure life support functions and the provision of environmental resources for future generations.

The quarry plan aims to maximise the protection of biological diversity and ecological integrity by the following:

- *exclusion of the threatened *Tetratheca glandulosa* population and Shale-Sandstone Transition Forest community from the extraction area;*
- *progressively rehabilitation of the extracted areas;*
- *rehabilitation of the site with native species to maximise native fauna habitats and encourage their return to the site after quarrying;*
- *implementation of hazard controls to ensure risks such as fire on the site*

are minimized;

- *ongoing monitoring of flora and fauna communities on the site to monitor viability; and*
- *providing a final landform that integrates elements of the local area.*

The proposed modification would not result in any disturbance to the Site which has not already been approved. The Site Environmental Management Plan (refer **Attachment 8**) provides the means by which the environment of the Site will be managed to ensure minimal impact to the biodiversity of the Site.

3.10 Heritage

The Environmental Impact Statement prepared as part of development application No.796/00/HE, when dealing with the heritage significance of the Site, states:

There are no items of heritage significance on the site.

The approved extraction on Lot 29 and Lot 196 was undertaken with no discovery of heritage items. Should the proposed modification be approved, the continued extraction of Lot 29 and Lot 196 would be subject to condition 3.51 of the Development Consent No.250-09-01 which states:

3.51 If, during the course of any activities conducted under this consent, the Applicant becomes aware of any heritage or archaeological sites not previously identified, all work likely to affect the site shall cease immediately. The Applicant shall then consult with relevant authorities and decide on an appropriate course of action prior to recommencement of work. The relevant authorities may include DECC, the NSW Heritage Office, and the relevant local Aboriginal community. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.

The proposed modification does not seek approval to extract material on Lots 29 and 196 outside the area previously approved in Development Consent 796/00/HE. That area has already been disturbed and it is unlikely that heritage items or archaeological sites would be encountered should the modification be approved. Notwithstanding, Condition 3.51 would ensure that appropriate measures are employed to ensure the integrity of any such items of heritage significance or archaeological sites.

3.11 Waste

Conditions 3.52 - 3.54 of Development Consent No.250-09-01 state:

- 3.52 *The Applicant shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing or disposal, or any waste generated at the site to be disposed of at the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997. This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the site if it requires an Environment Protection Licence under the Protection of the Environment Operations Act 1997.*
- 3.53 *All liquid and non-liquid wastes generated at the development shall be assessed, classified and managed in accordance with the DECC s Environmental Guidelines Assessment, Classification and Management of Liquid and Non-Liquid Wastes (EPA, 1999).*
- 3.54 *Any waste generated at the development shall only be transported to an DECC - approved waste management facility for treatment, recycling and/or disposal, where relevant.*

The proposed modification would be subject to the above conditions of the Consent.

The Site Environmental Management Plan (refer **Attachment 8**) contains details of the waste management practices on the Site, the objective of which is:

To minimise waste generated, maximise reuse and recycling and ensure wastes are managed effectively to minimise impact on the environment.

The following procedures have been adopted which relate to all extractive activities undertaken by Dixon Sand at Maroota:

1. *Maintain separate receptacles for paper, aluminium, glass, plastic and general domestic waste on Lots 29 and 196.*
2. *Recyclables (paper, aluminium, glass and plastic) to be collected by Council and other types (oil, steel and paper) by contractors.*
3. *Pick-up of non-recyclable domestic waste from office, amenity and workshops by Council.*
4. *No building wastes or putrescible material to be disposed on site.*
5. *No waste generated outside site to be stored, treated, processed, or disposed on site except as permitted by a licence.*
6. *Maintain on-site sewage treatment and disposal in an 'enviro-cycle' type plant.*
7. *Waste oil and grease to be collected and stored on Lot 196 in bund 110% size of the volume of largest tank and removed by a licensed waste oil*

recycling contractor. No refuelling of equipment to be undertaken on Lots 1 & 2.

8. *Encouragement of employees to adopt waste-reducing practices.*
9. *Processing plant tailings (fine clays and silts) to be disposed to tailings dams on Lots 29 & 196, to be capped and rehabilitated when at capacity.*

No change to the above waste management practices would evolve as a result of the proposed modification.

3.12 Rehabilitation

Condition 1.15 of Development Consent No.250-09-01 deals with the payment of a bond to the Director-General ... *to ensure completion of the rehabilitation and landscaping works at the site.* This condition would relate to Lots 29 and 196 upon approval of the proposed modification.

Dixon Sand, as part of its fulfilment of the conditions of consent No.796/00/HE, has paid a rehabilitation bond to The Hills Shire Council for rehabilitation of the Site. As part of the modifications proposed, which includes the surrender of consent No.796/00/HE, Dixon Sand proposes to recover the bond from The Hills Shire Council and transfer that bond money to the Department as part of Condition 1.15 of Development Consent No.250-09-01.

Condition 6.3 (e) requires the preparation of a *Rehabilitation and Landscape Plan* which forms part of the Site Environmental Management Plan (refer **Attachment 8**).

The Rehabilitation and Final Landscape component of the Site Environmental Management Plan has as its objective:

To ensure rehabilitation works are implemented progressively to enhance the scenic and environmental quality of the site, increase habitat for threatened species, and utilises areas suitable for agricultural pursuits.

The following procedures have been adopted in the Rehabilitation and Final Landscape component of the Site Environmental Management Plan:

1. *Progressively rehabilitate extraction precincts on Lots 29 and 196 within 3 months of completion of extraction in accordance with the schedule outlined in the Rehabilitation Strategy (DLWC, 2000)*
2. *Progressively rehabilitate buffer areas on lots 1 and 2 (refer to DLWC, 2000 for detail). Retain mature vegetation in designated buffer zones and plant 30m buffer to Old Northern Road upon commencement of strip 1 extraction.*

3. *Rehabilitation works to be supervised by Environmental Officer.*
4. *Carry out rehabilitation and habitat construction works in the conservation area and its buffer zones on lots 1 and 2 upon commencement of strip 1 extraction.*
5. *Undertake rehabilitation and final landform works within 250m of Maroota PS in school holiday periods only.*
6. *Soils used in rehabilitation to be tested to determine fertiliser requirements etc prior to rehabilitation in each precinct on lots 29 and 196.*
7. *Initial cover cropping of lots 29 and 196 with cereals. Once crop has browned off it is to be slashed to create mulch layer, then second seed application with required fertilisers and soil ameliorants (recommended seed mix refer to DLWC, 2000).*
8. *Minimise extraction-related activities to not more than 2 strips (plus one undergoing rehabilitation) on lots 1 and 2 at any one time.*
9. *Transfer topsoil and brush material from adjacent strips prior to excavation.*
10. *Establish native vegetation areas using brush matting and/or tube stock propagated from local seed and other vegetation (orchards) in accordance with the Rehabilitation Strategy (DLWC, 2000) and Plan (Dixon Sand (Penrith) Pty Ltd, 2004b).*
11. *Remove felled trees, logs and rocks from strips and stockpile or lay during rehabilitation to provide fauna habitat.*
12. *Revegetate final batters and slopes as soon as land forming is completed.*
13. *Stockpiles to be kept to less than 3m high, left for less than 12 months and revegetated with non-invasive, sterile species.*
14. *Retain erosion and sediment controls as per EP10 until works complete.*
15. *Remove problem weeds or prevented from spreading; notify local council if noxious weeds found.*
16. *Carry out required rabbit control methods as required per annual inspection during winter months.*
17. *Rehabilitate Lots 1 & 2 with native plants to Class 4 agricultural land (utilising cover crops when necessary).*

18. *Restore the creek line through Lot 2 and precinct 4 of Lots 29 and 196 once extraction is completed in consultation with DLWC (see DLWC, 2000; Dixon Sand (Penrith) Pty Ltd, 2004b).*
19. *Establish a riparian zone 20 metres wide along the entire length of the reconstructed ephemeral waterway & revegetate with local native species.*

The Site Environmental Management Plan contains, as its Figure EP15.2, a plan of the approved final landform for Lots 196 and 29, DP 752025 and Lots 1 & 2, DP 547255. An extract from that plan is at **Figure 3-2** below.

Dixon Sand, as part of the review process for this modification application, has ascertained that a more appropriate and suitable final landform could be achieved on the Site following completion of the extraction of Lots 196 & 29 as now proposed. As a result, it is now proposed to modify Development Consent No.250-09-01 such that the final landform shown in **Figure 3-3** below is substituted for that which is currently approved.

Scale copies of the modified final landform plan are submitted with the modification application.

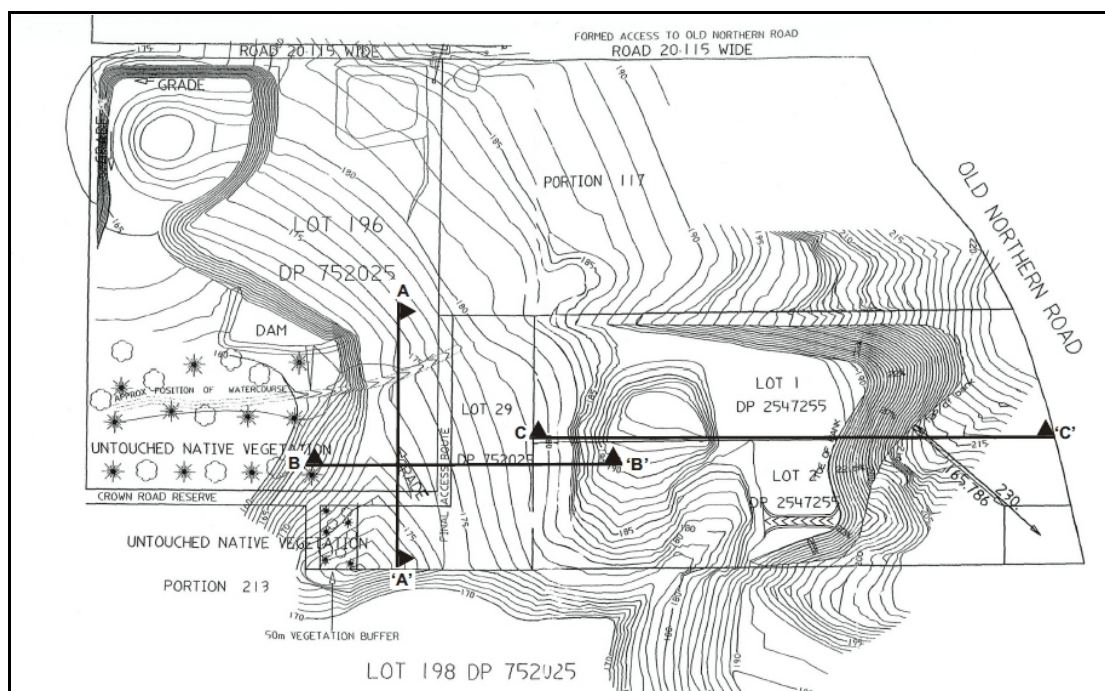


Figure 3-2: Extract from the approved final landform for Lots 196 and 29 contained in the Site Environmental Management Plan (refer **Attachment 8**).

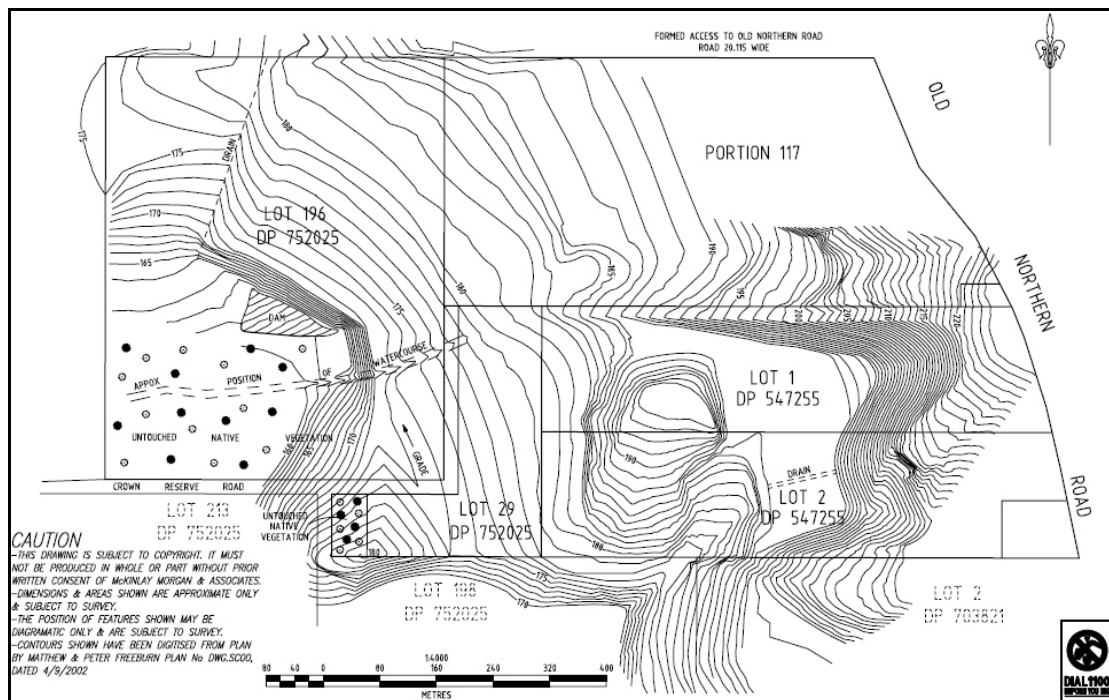


Figure 3-3: An extract from the proposed modified final landform after the completion of extraction of Lots 196 & 29.

3.13 Social and Economic Impact

Conditions 4.1 - 4.12 of Development Consent No.250-09-01 provide the environmental monitoring conditions under which the existing development on the Site operates. These conditions would also relate to the use of Lots 29 and 196 upon approval of the proposed modification.

Conditions 5.1 - 5.7 of Development Consent No.250-09-01 relate to *Community Information, Consultation and Involvement*. Those conditions would not alter as a result of the proposed modification.

The proposed modification would not involve any increase in activity on the Site over and above that which has already been approved in the past. No additional employment would be generated, and the existing market for product would remain. No economic impact, other than the economic use of a valuable sand resource, is expected to result from the proposed modification.

Part Four**DRAFT STATEMENT OF COMMITMENTS****4.1 Introduction**

In accordance with the requirements of the Director-General, this part of the Environmental Assessment provides a draft Statement of Commitments which outlines the measures which Dixon Sand would undertake in respect of the environmental management of the Site. Those commitments would be in addition to those which are currently in place as part of the conditions of consent which direct the existing extraction on the Site.

4.2 General

- (a) The proposed modification would be undertaken in accordance with the Environmental Assessment prepared by Nexus Environmental Planning Pty Ltd, including Attachments.
- (b) The continued extraction of material from Lots 29 and 196, DP 752025 would be undertaken in accordance with the modified conditions of consent of Development Consent No.250-09-01.

4.3 Groundwater

The additional extraction on Lot 196 would be limited to RL 127.5 metres as depicted on the diagrams prepared by Aquaterra and provided in **Attachment 9** of the Environmental Assessment. As concluded by Aquaterra:

Following a review of the information made available and from the findings made in this assessment the following conclusions have been drawn:

- *Lot 196 and the remainder of the site is underlain by a series of shallow and limited extent zones of non water-bearing unconsolidated horizons of weathered clays, sandstones and shales. These low permeability layers permit temporary storage of groundwater at various shallow depths. These temporary perched storages have limited resource value because, like the Maroota Sand, they are discontinuous and of limited extent and low storage.*
- *Seasonal groundwater fluctuations observed from BHI show seasonal ranges of about 1m. These fluctuations could range up to 3m over the*

longer term. Therefore the 'wet weather high groundwater level' beneath Lot 196 would be at a minimum elevation of about 109 to 111m AHD. This is 18.5 to 16.5m below the proposed extraction depth of 127.5m AHD.

- The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, or to the regional aquifer system, other than potentially increasing the rate of rainfall recharge to the regional aquifer system. However, this potential increase in recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.*
- There are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity.*
- Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.*

Dixon Sand is committed to the continued monitoring of the borehole network to ensure that suitable data are obtained with regard to the behaviour of groundwater as per the current licensing requirements..

4.4 Rehabilitation

Consent No.796/00/HE was issued by the Land and Environment Court. Dixon Sand has paid an agreed bond of \$250,000 to The Hills Shire Council for rehabilitation of Lots 29 and 196 following cessation of extraction. The bond has been paid pursuant to Condition 2.25 of consent No.796/00/HE which states:

Rehabilitation Bond

The proponent shall submit a Rehabilitation Bond in the form of an unconditional bank guarantee to be held by Council as a legal document over the life of the development sufficient in amount to cover the cost of rehabilitating the extraction area and other likely disturbed areas in the event of non-compliance with this consent.

In this regard, the Rehabilitation Bond shall be based upon \$2.00 per square metres of all exposed extraction areas at any one time in accordance with the approved extraction and rehabilitation as outlined in the EIS and accompanying

appendices prepared by Southern Environmental Pty Limited date 1 June 1999.

The Rehabilitation Bond will be released upon submission by the proponent of a certificate by a qualified landscape consultant that final landform rehabilitation has been completed in accordance with the conditions of this consent concerning rehabilitation and the Council's satisfaction of that fact.

The bond currently held by Council in favour of Dixon Sands shall be construed as a credit.

Having regard to the above condition, the \$250,000 bond, at \$2.00 per square metre, equates to a disturbed are of 12.5 hectares.

As part of the modifications proposed, which includes the surrender of consent No.796/00/HE, Dixon Sand proposes to recover the bond from The Hills Shire Council and transfer that bond money to the Department as part of Condition 1.15 of Development Consent No.250-09-01.

Condition 1.15 of Development Consent No.250-09-01 has been formulated to require a bond of \$3.00 per square metre. As such, the existing \$250,000 bond would convert to a bond of \$375,000 at \$3.00 per square metre.

Dixon Sand currently has a bond of \$255,000 lodged with the Department of Planning and Infrastructure which applies to Lots 1 and 2. With the proposed modification, the bond would increase to \$630,000 as follows:

New bond for Lots 196 and 29	\$375,000
Existing bond for Lots 1 and 2	\$255,000
Total bond for Condition 1.15	\$630,000

Dixon Sand is committed to implementing a rehabilitation bond of \$630,000 which it considers is sufficient to cover the cost of rehabilitating the extraction areas and other likely disturbed areas in the event that, in the Director-General's opinion, Dixon Sands has failed to make satisfactory progress on the rehabilitation and landscaping of the Site.

4.5 Retention of Acoustic Wall

As discussed in **Part 2.8** of this Environmental Assessment, Condition 4.12 of Development Consent No.796/00/HE states:

A noise attenuation wall is to be erected inside the eastern boundary of Lot 29, adjacent to the temporary internal haul road, in order to mitigate the impacts of noise on the adjoining properties and the Maroota Public School to the east. Details of the wall are to be submitted to Council for approval, and the wall

erected prior to the implementation of the temporary haul road. The wall should remain in place until extraction on Lot 29 and the use of the temporary haul road has ceased.

An acoustic wall has been erected in accordance with Condition 4.12. Notwithstanding that the temporary haul road is no longer in use, Dixon Sand will maintain the acoustic wall until such time as extraction on Lot 29 ceases.

Part Five**CONCLUSION**

Dixon Sand seeks the approval of the Minister for Planning and Infrastructure to modify Development Consent No.250-09-01 to permit further extraction on Lots 29 and 196, DP 752025, Old Northern Road, Maroota.

As noted in **Part 1.4.1** of this Environmental Assessment, pursuant to Development Consent No.796/00/HE, consent for the purposes of extraction and rehabilitation on Lots 29 & 196, DP 752025 ceased on 22 March 2010.

As noted in **Part 1.4.2** of this Environmental Assessment, however, Development Consent No.250-09-01 permits:

- (a) development for the purposes of an extractive industry on Lots 1 and 2, DP 547255.
- (b) the continued use of the existing central processing plant on Lot 196, DP 752025.
- (c) water management and rehabilitation operations over Lots 1 and 2, DP 547255, and Lots 29 and 196, DP 752025.

The extractive resource on Lots 29 & 196, DP 752025 has not been exhausted and, as such, Dixon Sand wishes to seek approval for the continuation of extraction on Lots 29 & 196, DP 752025. Dixon Sand has determined that the most appropriate course of action would be to:

- (a) amend Development Consent No.250-09-01 to include extraction on Lots 29 & 196, DP 752025, and
- (b) surrender Development Consent No.796/00/HE issued by the Land and Environment Court on 7 July 2000.

The adoption of the above strategy would see the continued extraction of Lots 29 & 196 being encompassed in Development Consent No.250-09-01, i.e. a single integrated consent, thus having the Minister for Planning and Infrastructure as the consent authority for all activity within Lots 1 & 2, and Lots 29 & 196.

The objectives of the proposed modification are:

- (a) To extend the life of extractive operations on Lot 29 and Lot 196.
- (b) To increase the volume of sand product to provide graded sand and gravel products suitable for use in the construction industry and specialty markets.
- (c) To realise the economic potential and maximise the efficient recovery of natural

resources on Lot 29 and Lot 196.

- (d) To successfully rehabilitate the extracted areas of Lot 29 and Lot 196 into an integrated, continuous agricultural landform.

Any additional extraction must ensure that the depth of extraction does not proceed closer than 2 metres above the wet weather groundwater level. A bore has been sunk in the northwestern corner of Lot 196 which:

- (a) provides data on the extent of the resource, and
- (b) provides data on the level of groundwater to ensure that extraction does not proceed less than 2 metres above the wet weather high groundwater level. **The now proposed extraction on Lot 196 would be to RL 127.5 metres.**

As detailed in the Aquaterra Report at **Attachment 7**:

The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, other than potentially increasing the rate of rainfall recharge (due to the partial removal of low permeability layers) to the regional aquifer system. As mentioned, the shallow groundwater system will recharge the deeper aquifer via gradual drainage, however, this level of recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.

These mechanisms would include mass infiltration via complex networks of structurally controlled fracturing (secondary porosity) at a more regional level throughout the sandstone unit.

No information was made available as to whether there had been any impacts by sand extraction previously, either on this or on the adjoining quarry sites.

The impact of the extended quarrying is also likely to have a minimal impact on existing users in the immediate vicinity.

A review of the database has indicated that there are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers observed in the site investigation drilling and from the borehole log review. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity. Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.

Following a review of the information made available and from the findings made in this assessment the following conclusions have been drawn:

- *Lot 196 and the remainder of the site is underlain by a series of shallow and limited extent zones of non water-bearing unconsolidated horizons of weathered clays, sandstones and shales. These low permeability layers permit temporary storage of groundwater at various shallow depths. These temporary perched storages have limited resource value because, like the Maroota Sand, they are discontinuous and of limited extent and low storage.*
- *Seasonal groundwater fluctuations observed from BH1 show seasonal ranges of about 1m. These fluctuations could range up to 3m over the longer term. Therefore the 'wet weather high groundwater level' beneath Lot 196 would be at a minimum elevation of about 109 to 111m AHD. This is 18.5 to 16.5m below the proposed extraction depth of 127.5m AHD.*
- *The total or partial removal of the shallow perched groundwater zones is unlikely to have any major impacts to the local hydrogeological regime, or to the regional aquifer system, other than potentially increasing the rate of rainfall recharge to the regional aquifer system. However, this potential increase in recharge is negligible when compared to the larger scale recharge mechanisms associated with the Hawkesbury sandstone.*
- *There are nine registered groundwater abstraction bores within 1km of Lot 196. All of the bores listed were terminated at depths well below the extent of the low permeability layers. Therefore none of these production bores would significantly rely on or abstract from groundwater stored above these layers and would therefore not be significantly impacted by an extension of the quarrying activity.*
- *Continued observations from the borehole network will be required to monitor general groundwater behaviour as part of the ongoing operations licensing requirements.*

This Environmental Assessment has concluded that, with the proposed modification to Development Consent No.250-09-01, there would be no impact to the environment of the Site and its environs over and above that which was identified in the assessment of Development Application No.796/00/HE and Development Application No.250-09-01.

The proposed modification would ensure that a valuable resource is utilised to its economic capacity and ensure that the Site would be rehabilitated to be consistent with the agricultural landscape of the area.

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