# Noise Management Plan

## Menangle Sand and Soil Quarry

**Prepared for Menangle Sand and Soil Pty Ltd**
**February 2022**


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February 2022

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# Menangle Sand and Soil Quarry

## Noise Management Plan

**Report Number**

J190166 RP29

**Client**

Menangle Sand and Soil Pty Ltd

**Date**

25 February 2022

**Version history**

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# 1 Introduction

## 1.1 Background

Menangle Sand and Soil Pty Ltd (Menangle Sand and Soil) operates the Menangle Sand and Soil Quarry at 15 Menangle Road, Menangle (Figure 1.1). Quarrying has been undertaken in the location for over 40 years by a number of operators and at varying rates of production. Extraction, processing and rehabilitation activities have been undertaken by Menangle Sand and Soil since 1978.

The quarry, located in the Wollondilly and Campbelltown local government areas, extracts sand and soil along the Nepean River as approved by Development Consent 85/2865, granted by the Minister for Planning on 15 November 1989.

To date, sand and soil has been extracted from Stages 1 to 2 and 4 to 7 (Figure 1.2). While previously approved, sand and soil will not be extracted from Stage 3.

On 10 September 2020, the NSW Land and Environment Court (LEC) approved the Menangle Quarry Extension – Modification 1 (MOD1) to Development Consent 85/2865. Consent Conditions are provided in the Notice of Orders for LEC 2018/342158.

On 5 November 2021, the Minister for Planning and Public Spaces approved the Menangle Quarry Extension – Modification 2 (MOD2). Changes to the Consent conditions are provided in the Notice of Modification for Development Consent DA 85/2865.

The Consolidated Consent ('the Consent') allows the extraction of sand and soil in a new area, the Stage 8 area, that is about 13 ha, and extends about 2 kilometres (km) along the Nepean River south of the Stage 7 area. The quarry is approved to extract sand and soil from the Stage 8 area at a rate of up to 150,000 tpa.

The extracted material will be transported to the processing area where it will be stockpiled, processed and blended with materials imported to the site, prior to being dispatched from the quarry. Operations (but not extraction) will continue in the Stage 6 and Stage 7 areas.

Modification 2 removed the requirement for an overland conveyor and replaced it with the operation of an off-road haul truck for the transfer of extracted materials from the Stage 8 area to the processing area using existing roads.

This Noise Management Plan (NMP) has been prepared to address the requirements of the Consent.

## 1.2 Project overview

The quarry has consent to extract the sand and soil resource in the Stage 8 area to 2035. Stage 8 has been split up into 15 sub-stages (Figure 1.3) which have been further categorised into seven extraction phases (Table 1.1).


Source: EMM (2022); DFSI (2017); GA (2011); ASGC (2006)

0 5 10 km

GDA 1994 MGA Zone 56

N

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KEY

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- Local government area

INSET KEY

- Main road
- State forest

Regional context

Menangle Sand and Soil Quarry
Figure 1.1

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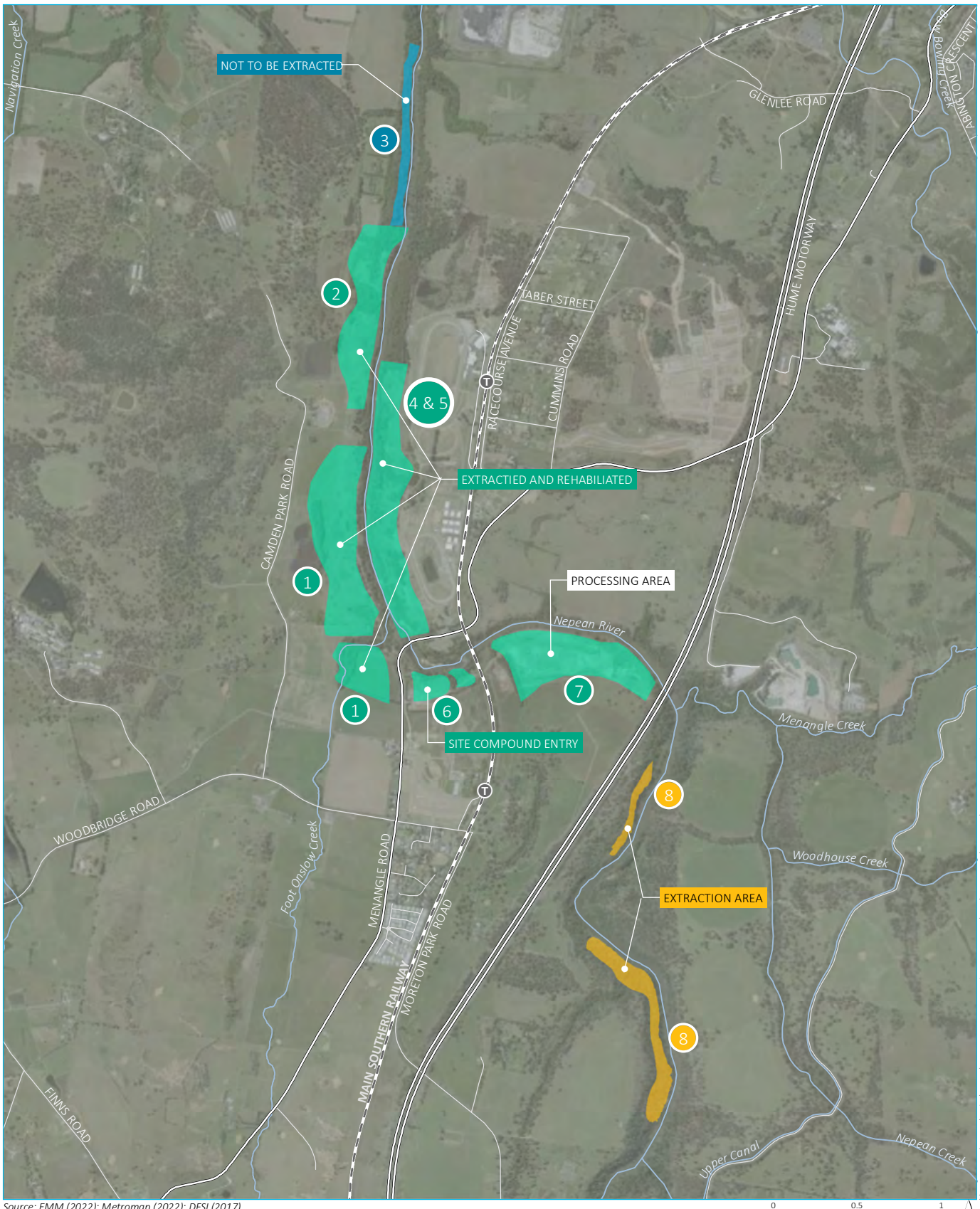


*Source: EMM (2022); Metromap (2022); DFSI (2017)*

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KEY

- Train station
- Rail line
- Main road
- Local road
- Named watercourse
- Extractive operations (approved)
- Extractive operations (approved but not extracted)
- Stage 8 - extraction/rehabilitation area

Menangle Quarry stages 1 to 8

Menangle Sand and Soil Quarry
Figure 1.2

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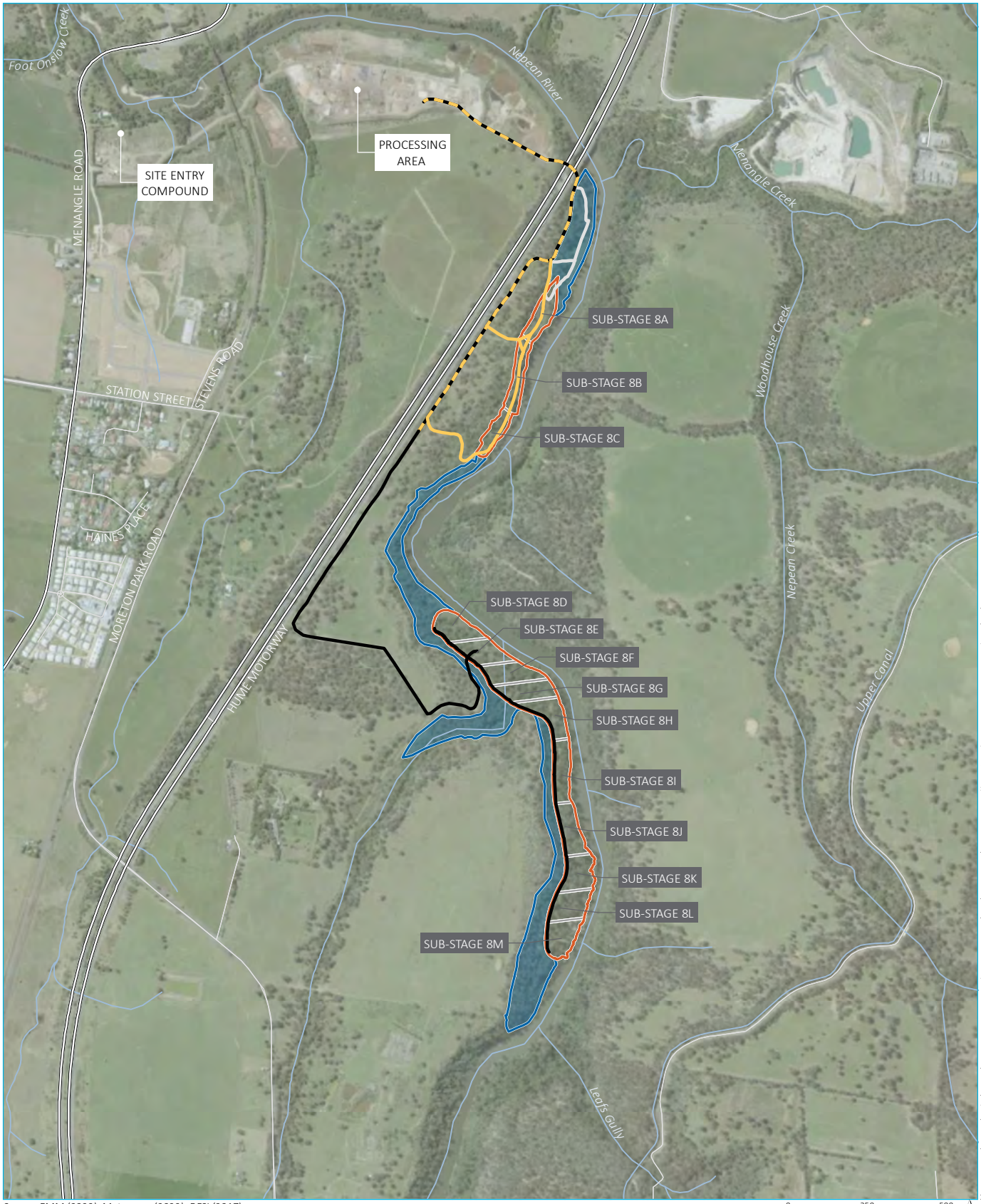


*Source: EMM (2022); Metromap (2022); DFSI (2017)*

0 250 500 m

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KEY

- Stage 8 - extraction/rehabilitation area
- Stage 8 - restoration area (no extraction)
- Main road
- Local road
- Watercourse/drainage line
- Access track

Haul roads

- Substage 8A-8M
- Substage 8A-8C
- Substage 8D-8M

- Substage boundary

Phase 1 Sub-stages 8A - 8B
Phase 2 Sub-stage 8C
Phase 3 Sub-stages 8D - 8E
Phase 4 Sub-stages 8F - 8G
Phase 5 Sub-stages 8H - 8I
Phase 6 Sub-stages 8J - 8K
Phase 7 Sub-stages 8L - 8M

# Stage 8 area

Menangle Sand and Soil Quarry
Figure 1.3

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**Table 1.1 Stage 8 phases**

| Phase | Substage |
|---|---|
| 1 | 8A–8B |
| 2 | 8C |
| 3 | 8D–8E |
| 4 | 8F–8G |
| 5 | 8H–8I |
| 6 | 8J–8K |
| 7 | 8L–8M |

As well as the extraction areas, key components of the quarry include:

- a wheel wash and weighbridge;
- a site office and amenity building;
- a workshop west of the site office;
- fuel supply tanks north of the storage shed;
- materials storage and processing area; and
- other minor infrastructure.

These components will be used to support activities in the Stage 8 area which include:

- extraction in the Stage 8 extraction area followed by rehabilitation;
- restoration of areas adjacent to the extraction areas; and
- internal haul roads.

## 1.3 Operations

### 1.3.1 Activities

Operations at the quarry comprises the following activities:

- vegetation management and clearance;
- sand and soil excavation;
- material transport by off-road haul truck;
- sorting and screening of excavated material;
- processing of excavated material;

- blending of excavated material with imported materials;
- stockpiling;
- loading of product into trucks; and
- product dispatch via trucks.

### 1.3.2 Plant and equipment

Condition A33 of the development consent states:

> All plant and equipment used on site, or to monitor the performance of the development must be:
>
> (a) maintained in a proper and efficient condition; and
>
> (b) operated in a proper and efficient manner.

Regular maintenance of all plant and equipment will be logged and stored on site available for review at any time.

## 1.4 Quarry life

The Stage 8 Operations may be carried out on the site until 31 December 2035.

## 1.5 Operating hours

The quarry will operate during the approved hours in accordance with development consent Table 1, Condition A26 (see Table 1.2 below).

**Table 1.2 Operating hours**

| Activity | Permissible hours |
|---|---|
| Construction work | • 7 am to 5 pm Monday to Friday<br>• 7 am to 1 pm Saturday<br>• At no time on Sundays or public holidays |
| Quarrying operations including loading and dispatch of laden trucks | • 6 am to 5 pm Monday to Friday<br>• 6 am to 12 noon Saturday<br>• At no time on Sundays or public holidays |
| Maintenance, security, office work, cleaning, etc | • May be conducted at any time, provided that these activities are not audible at any residence on privately-owned land |

Condition A27 of the development consent states that where police or other public authorities request that deliveries or dispatching of materials are to be carried out outside operating hours and emergency work to avoid the loss of lives, property or to prevent environmental harm is required, then these activities are permitted outside the normal operating hours. In such circumstances, the Applicant must notify the Department and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

## 1.6 Access

### 1.6.1 Site access

The main access to the site is from Menangle Road. Menangle Road is an arterial road which provides sub-regional access.

### 1.6.2 Access to the Stage 8 area

The existing access under the Hume Motorway was retained when the Road Transport Authority (now Transport for NSW, TfNSW) bisected the lands when acquiring the corridor for the original Hume Highway in 1969. The existing access road under the bridge will be sealed and will comply with TfNSW drainage and pavements standards.

Material will be transported beneath the Hume Motorway Menangle Bridge by off-road haul truck using existing tracks.

The earthmoving equipment, off-road haul truck and other plant to service the Stage 8 area may also access the area via Moreton Park Road. Major plant is expected to remain onsite through-out the duration of the quarrying operations except for major servicing or replacement.

### 1.6.3 Product dispatch

Truck movements at the site (ie combined inbound and outbound movements) will not exceed an average of:

- 147 per day on Monday to Friday; and
- 80 per day on Saturday.

## 1.7 Document purpose

EMM Consulting Pty Limited (EMM) has been engaged by Menangle Sand and Soil to prepare this NMP as required by development consent conditions (DA 85/2865) prior to commencing Stage 8 quarrying operations.

This NMP addresses operations across the quarry for Phases 1–7 (see Table 1.1).

The NMP, as approved by the Planning Secretary, will be implemented.

## 1.8 Report preparation

This NMP has been prepared by EMM's Senior Acoustic Consultant, Lucas Adamson. Lucas is a Member of the Australian Acoustical Society (MAAS) with over five years' experience specialising in noise and vibration assessment and measurement. Lucas has extensive project experience working on industrial developments and has conducted attended noise monitoring surveys at numerous industrial sites.

The NMP has been reviewed by EMM's National Technical Leader – Acoustics and EMM Director, Najah Ishac. Najah has over two decades of experience in acoustics. He has significant experience relating to noise and vibration, including impact assessment studies for numerous quarries and similar extractive industry operations.

## 1.9 Consultation

### 1.9.1 NMP preparation

There is a requirement of the Consent that this NMP be prepared in consultation with the EPA.

A letter was sent via email to the NSW Environmental Protection Authority (EPA) on 14 October 2020 inviting input to the contents of this NMP (Appendix B). The EPA responded via a letter on 26 November that the documents appear appropriate to manage activities at the site and that the EPA supports the development of Environmental Management Plans (EMPs) as part of good environmental management but does not generally approve specific EMPs for industry operations. The letter is attached in Appendix C.

The draft NMP was provided to the EPA for their information.

Following the Department of Planning, Industry and Environment's (now Department of Planning and Environment, DPE) review of the draft NMP, the NMP (version 6, 4 March 2021) was approved by the Planning Secretary on 21 June 2021 (Appendix D).

### 1.9.2 Plan update

Agencies, including EPA were consulted during the MOD2 application process. Their comments were considered by Menangle Sand and Soil during the application process and by DPE on behalf of the Minister in approving the application and amending the Consent conditions.

There have only been small changes to this plan to reflect changed wording in Consent. Therefore, EPA were not consulted during the update of this plan.

# 2 Environmental requirements

## 2.1 Legislation

The NMP provides recommended noise management measures for the quarry. The NMP has been prepared to address the requirements of the approval conditions, guided by the following guidelines and policies:

- Australian Standards AS IEC 61672.1-2019 Electroacoustics – Sound Level Meters – Specifications;
- Australian Standards AS 1055.1-2018 Acoustics – Description and Measurement of Environmental Noise – General Procedures;
- German Standard DIN 4150-3 (2016-12) Part 3 Structural Vibration in Buildings. Effects on Structures;
- NSW Department of Environment and Conservation (DEC) 2006, Assessing Vibration: a Technical Guideline;
- NSW Land and Environment Court 2020, Development Consent DA 85/2865 (approved 10 September 2020);
- NSW Environment Protection Authority (EPA) 2000, Industrial Noise Policy (INP); and
- NSW Environment Protection Authority (EPA) 2017, Noise Policy for Industry (NPfI);

It is noted that the INP has been replaced by the NPfI. However, the INP continues to be applicable for the assessment of the facility. This is discussed further in Section 5.2.

Several technical terms are required for the discussion of noise and vibration. These are explained in Appendix A.

## 2.2 Project consent conditions

This NMP has been prepared to address the requirements of the development consent. Table 2.1 lists the requirements of the development consent and references the section of the report where each of these requirements has been addressed.

**Table 2.1 Project approval conditions and relevant section of the report**

| Condition Number | Condition | Relevant report section |
|---|---|---|
| A26 | The Applicant must comply with the operating hours set out in Table 1. | 1.5 |
| A27 | The following activities may be carried out outside the hours specified in Table 1.<br>• delivery or dispatch of materials as requested by Police or other public authorities; and<br>• emergency work to avoid the loss of lives, property or to prevent environmental harm.<br>In such circumstances, the Applicant must notify the Department and affected residents prior to undertaking the activities, or as soon as is practical thereafter. | 1.5 |

## Table 2.1 Project approval conditions and relevant section of the report

| Condition Number | Condition | Relevant report section |
|---|---|---|
| A33 | All plant and equipment used on site, or to monitor the performance of the development must be: | 1.3.2 |
| | • maintained in a proper and efficient condition; and | |
| | • operated in a proper and efficient manner. | |
| B4 | The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any Residence on privately-owned land. | 3, 4, 5 |
| B5 | The noise criteria in condition B4 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement. | 3 |
| B6 | The Applicant must: | |
| | • take all reasonable steps to minimise all noise from operational activities, including low frequency noise and other audible characteristics, as well as road noise associated with the development; | 4 |
| | • take all reasonable steps to minimise the noise impacts of the development during noise-enhancing meteorological conditions, particularly when the noise criteria in this consent do not apply (see Appendix 4); | 4.3 |
| | • carry out regular attended noise monitoring (every three months unless otherwise agreed with the Planning Secretary) to determine whether the development is complying with the relevant conditions of Schedule 2; and | 5 |
| | • regularly assess the noise monitoring data and modify or stop operations on the site to ensure compliance with the relevant conditions of Schedule 2. | 5 |
| B7 | The Applicant must prepare a Noise Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: | |
| | 1. be prepared by a suitably qualified and experienced person/s; | 1.8 |
| | 2. be prepared in consultation with the EPA; | 1.9 |
| | 3. describe the measures to be implemented to ensure: | |
| | a) compliance with the noise criteria and operating conditions in this consent; | 3, 4, 5, 6 |
| | b) best practice noise management is being employed; and | 4.2 |
| | c) noise impacts of the development are minimised during noise-enhancing meteorological conditions; under which the noise criteria in this consent do not apply (see Appendix 4); and | 4.3 |
| | 4. include a monitoring program that: | |
| | a) is capable of evaluating the performance of the development against the noise criteria; | 3, 5 |
| | b) monitors noise at the nearest and/or most affected residences; and | 5.3 |
| | c) includes a protocol for identifying any noise-related exceedance, incident or non-compliance and for notifying the Department and relevant stakeholders of these events. | 5 |
| B8 | The Applicant must not commence Quarrying Operations in the Stage 8 Area until the Noise Management Plan is approved by the Planning Secretary. | 1.9.1 |
| B9 | The Applicant must implement the Noise Management Plan as approved by the Planning Secretary. | 1.7 |

## Table 2.1 Project approval conditions and relevant section of the report

| Condition Number | Condition | Relevant report section |
|---|---|---|
| B17 | Prior to the commencement of Quarrying Operations in the Stage 8 Area, and for the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in close proximity to the site that: | - |
| | a) complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales (DEC 2007); and | 5.6 |
| | b) is capable of measuring meteorological conditions in accordance with the NSW Industrial Noise Policy (EPA 2000), | 5.6 |
| | unless a suitable alternative is approved by the Planning Secretary following consultation with the EPA. | - |
| C1 | As soon as practicable and no longer than 7 days after obtaining monitoring results showing an exceedance of any noise or air quality criterion in PART B of Schedule 2 following the date of commencement of Quarrying Operations in the Stage 8 Area, the Applicant must provide details of the exceedance to any affected landowners/tenants if the Applicant has not otherwise reached an agreement to exceed the relevant criteria with the affected landowner pursuant to condition B5 or B12. For any exceedance of any air quality criterion in PART B of this consent, the Applicant must also provide to any affected land owners and tenants a copy of the fact sheet entitled "Mine Dust and You" (NSW Health 2017). | Section 6.2<br>EMS Section 8.3.2 |
| C2 | If, at any time following the date of commencement of Quarrying Operations in the Stage 8 Area, a landowner considers the development to be exceeding any noise or air quality criterion in PART B of Schedule 2, they may ask the Planning Secretary in writing for an independent review of the impacts of the development on their land. | Section 7<br>EMS Section 8.3.3 |
| C3 | If the Planning Secretary is not satisfied that an independent review is warranted, the Planning Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review. | |
| C4 | If the Planning Secretary is satisfied that an independent review is warranted, then within 3 months of the Planning Secretary's decision, or as otherwise agreed by the Planning Secretary and the landowner, the Applicant must:<br>a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:<br>(i) consult with the landowner to determine their concerns;<br>(ii) conduct monitoring to determine whether the development is complying with the relevant criteria in PART B of Schedule 2; and<br>(iii) if the development is not complying with that criteria, identify measures that could be implemented to ensure compliance with the relevant criteria; and<br>b) give the Planning Secretary and landowner a copy of the independent review; and<br>c) comply with any written requests made by the Planning Secretary to implement any findings of the review. | |

AQMP – Air Quality Management Plan
EMS –Environmental Management System

# 3 Noise criteria

Noise criteria for the facility are stipulated in Table 2 of development consent Condition B4. The noise criteria are specified for the day and shoulder periods and apply at all residential receivers which have the potential to be impacted by operational noise from the quarry (refer to Figure 3.1 for the nearest residential receivers). The noise criteria for the facility are reproduced in Table 3.1.

**Table 3.1 Noise criteria**

| Residences[a] | Day | Shoulder period 6 am to 7 am Monday to Saturday | |
|---|---|---|---|
| | $L_{Aeq,15\ minute}$ dB(A) | $L_{Aeq,15\ minute}$ dB(A) | $L_{Amax}$ dB(A) |
| 2, 3, 5[b], 6, 7, 8, 9 | 45 | 45 | 55 |
| 4 | 54 | 52 | 62 |
| 10, 11 | 35 | 35 | 45 |
| All other Residences | 35 | 35 | 45 |

Notes:

a Residence locations are shown as "Assessment Locations" in Figure 6 in Appendix 3 [of the Consent].

b Receiver location 5 is representative of Residences in Menangle Village as identified in the red polygon on Figure 6 in Appendix 3 [of the consent].

1. Day period is between 7 am–6 pm Monday to Saturday and 8 am-6 pm Sundays and Public Holidays.

2. Shoulder period is between 6 am–7 am Monday to Saturday.

Condition B4 also states:

> Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (EPA 2000). Appendix 4 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

The noise criteria in Table 3.1 do not apply if Menangle Sand and Soil has negotiated an agreement with the owner/s of the relevant residence or land to exceed the noise criteria. As of the date of this report, Menangle Sand and Soil have not negotiated any agreements with any landowners or residents. As per Condition B5 of Schedule 2, Menangle Sand and Soil will advise the relevant authorities in writing of the terms of any negotiated agreements.

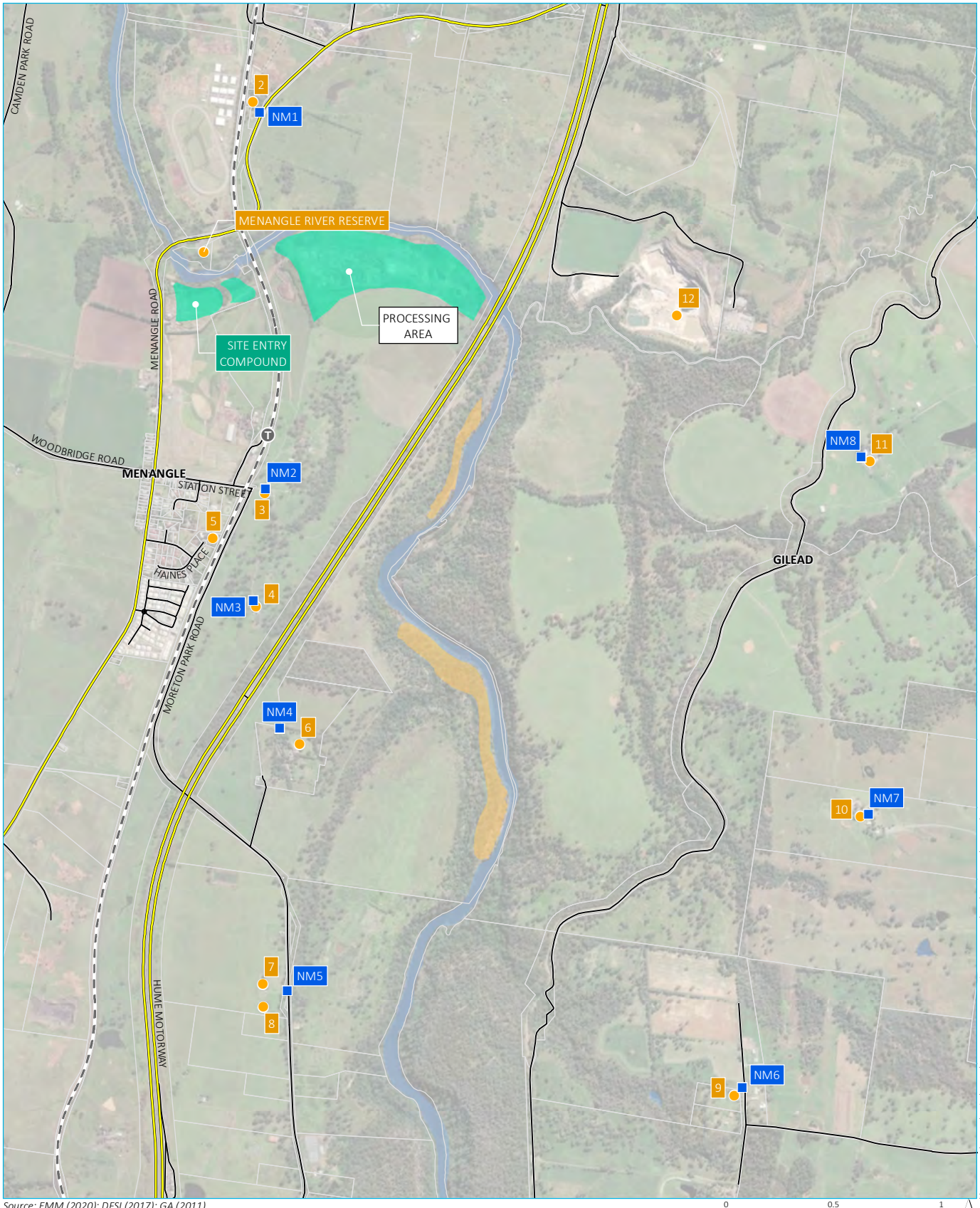
Compliance monitoring will adhere to the requirements of the EPA's policies and guidelines.

As per Condition 3 of Appendix 4, a noise compliance assessment will be undertaken within two months of commencement of Quarrying Operations in the Stage 8 Area, with a report provided to the EPA within 1 month of the assessment. The assessment will be conducted by a suitably qualified and experienced acoustical practitioner and will assess compliance with noise criteria outlined in Table 3.1.

## 3.1 Sensitive receivers

The nearest noise sensitive receivers most likely to be affected by operational noise from the site is long-term living accommodation approximately 700 m to the south-west/west of the Stage 8 extraction area. There are also surrounding industrial premises including the Camden Coal Seam Gas (CSG) plant (no longer operational) and the Hi-Quality Menangle Park Quarry, which is approximately 300 m to the north-east of Stage 8 operations. Menangle River Reserve is approximately 1.3 km west of Stage 8 operations.

Figure 3.1 shows the site boundary, the nearest sensitive receivers and the attended noise monitoring locations.




Source: EMM (2020); DFSI (2017); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Monitoring location
- Assessment location
- Train station
- Rail line
- Main road
- Local road
- Nepean River
- Cadastral boundary
- Extractive operations
- Stage 8

Site boundary, sensitive receivers and noise monitoring locations

Menangle Sand and Soil
Noise management plan
Figure 3.1

EMM creating opportunities

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# 4 Mitigation and management

The noise assessment report *Noise Impact Assessment – Menangle Sand and Soil Quarry Continuation Project* (EMM 2017) prepared as part of the environmental impact assessment (EIS), provides predicted operational noise levels from the quarry including for worst-case meteorological conditions. The site-specific noise mitigation and management measures that have been adopted at the facility are provided in the following sections.

## 4.1 Project consent conditions

The following conditions related to noise management and mitigation were included in the project consent under Condition B6 and have been reproduced below:

> B6. The Applicant must:
>
> (a) take all reasonable steps to minimise all noise from operational activities, including low frequency noise and other audible characteristics, as well as road noise associated with the development;
>
> (b) take all reasonable steps to minimise the noise impacts of the development during noise-enhancing meteorological conditions, particularly when the noise criteria in this consent do not apply (see Appendix 4);

## 4.2 Best practice management

Management practices will be reviewed annually to ensure that current practices align with contemporary industry best practice. These practices will be documented and their implementation monitored. Menangle Sand and Soil will maintain awareness of new technologies for noise mitigation through participation in relevant industry groups. Menangle Sand and Soil will implement noise mitigation measures in line with industry best practice quarry noise management where feasible and reasonable to do so.

### 4.2.1 Design controls

Menangle Sand and Soil is committed to implementing and maintaining the following controls to manage noise generation:

- regular reinforcement via site inductions of the need to minimise noise;
- regular identification of noisy activities and adoption of improvement techniques;
- working in shielded areas when practicable (ie between the Nepean River and the escarpment);
- avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents;
- where possible, avoiding the use of equipment that generates impulsive noise;
- minimising the need for vehicle reversing on site;
- minimising the movement of materials and plant and unnecessary metal-on-metal contact;
- operation of the portable mill (that will be used periodically to mill felled trees) during the daytime period only (7 am to 5 pm);

- scheduling respite periods for intensive works (such as timber milling);
- all plant and equipment will be regularly maintained in a proper and efficient condition, and serviced in accordance with manufacturer specifications;
- all plant and equipment will be operated in a proper and efficient manner;
- all plant and equipment will be switched off when not in use;
- site contact details will be provided at the front of the site and on the Menangle Sand and Soil website;
- a noise complaints management system will be implemented to handle complaints promptly and will include a complaint register. This is discussed further in Section 4.4;
- Noise monitoring will be completed at the nearest residences or at equivalent (representative) locations. Compliance noise monitoring will be on-going and completed on a quarterly basis at representative monitoring locations. This is discussed further in Section 5; and
- management actions will be taken to address any exceedances of the criteria (refer to Table 3.1).

### 4.2.2 Meteorological forecasting

Meteorological forecasts are considered and discussed at the daily production meetings and/or prior to pre-start meetings. Supervisors consider this information when planning activities for that shift. For example, when a strong temperature inversion is predicted, the Supervisor would consider this in equipment placement, particularly during the early morning periods.

### 4.2.3 Change management

Menangle Sand and Soil will implement a change management process to assess the potential noise impacts associated with operational changes. The change management process will be implemented, as a minimum, in the following instances:

- significant changes to the number of equipment or type of equipment utilised on site, which may result in an increase to operational noise levels;
- when a proposed quarry plan or hours of operation is substantially different to that which has been assessed in the relevant environmental assessment; or
- prior to purchase or rental of equipment which has the potential to increase operational noise levels – noise modelling may be required to confirm that the use of the equipment will not result in additional noise impacts on residential receivers.

The change management process will consider the existing noise performance at the site and potential noise increases associated with the change. Where changes are planned that may significantly increase noise emissions, the review will include modelling of the predicted noise emissions of the operation to confirm that compliance with the relevant statutory approval will be maintained following the proposed change.

### 4.2.4 Training

To ensure the effective implementation of this NMP, all quarry personnel and contractors will undertake noise management training as part of the site induction. Toolbox talks are conducted to reinforce the importance of noise management and mitigation on an as needs basis.

### 4.2.5 Road traffic

The dispatch of laden trucks from the site is limited to the hours of 6:00 am to 5:00 pm Monday to Friday and 6:00 am to 12:00 pm on Saturdays. No operations are allowed on Sundays or Public Holidays.

Menangle Sand and Soil is committed to implementing and maintaining the following controls to manage site generated road traffic noise:

- heavy vehicle movements (ie combined inbound and outbound movements) at the site will not exceed an average of 147 movements per day on Monday to Friday and 80 movements per day on Saturday;
- a driver code of conduct has been implemented (as described in the Traffic Management Plan) outlining policies regarding behaviour, speed, fatigue, vehicle cleanliness, haulage, incident response, and complaint management;
- a record of all truck movements to and from the site (including time of arrival and dispatch) will be kept and a summary of records will be published on the company's website every 6 months;
- truck drivers are instructed to use the arterial road network where possible and only use local roads where there is no alternative to reach their destination;
- truck drivers are required to report their intended travel routes and submit a copy of the proposed route to the site office when requested;
- all Menangle Sand and Soil and Benedict trucks will undergo regular maintenance to ensure that they are operating efficiently (ie not generating excessive noise during operation); and
- a 20 km/h speed limit is enforceable whilst on the site – speed limits are signposted at the entrance of the site.

The Quarry Manager will be responsible for the implementation of these procedural noise controls.

## 4.3 Management measures during adverse meteorological conditions and extraordinary events

The INP discusses the effects that adverse meteorological conditions such as temperature inversion conditions and high winds can have on noise levels from a development. Temperature inversion conditions may occur in the site area and hence may increase noise levels from the facility at receivers (EMM 2017). Such influences on noise are limited to the night-time period, and hence could be a consideration during the site's shoulder period. Increased noise levels from the facility at receivers may also occur during high winds blowing from source-to-receiver direction.

The on-site weather station will be used to inform site personnel on the daily weather conditions. Management measures will be implemented at the quarry during adverse meteorological conditions and extraordinary events.

In the event of noise-enhancing meteorological conditions, the Quarry Manager will maintain vigilance for increased noise emissions from the site and implement appropriate mitigation strategies. Primarily, the management measures listed in Section 4.2.1 will be re-enforced. Supplementary measures will be developed and enforced on an as-needs basis for the life of the quarry.

The Quarry Manager (or a site representative) will regularly monitor the real-time meteorological data from the on-site meteorological station. If the Quarry Manager (or site representative) considers that noise-enhancing meteorological conditions are present, and have the potential for site noise emissions to unduly impact upon surrounding residences, an investigation may be carried out to measure and review noise levels and determine if supplementary measures are warranted. This will be done using visual site inspections and using a handheld noise meter where appropriate. The supplementary measures may include:

- modifying, limiting or relocating operations for the duration of noise-enhancing meteorological conditions;
- substituting typical equipment or activities with a quieter alternative for the duration of noise-enhancing meteorological conditions; and/or
- the temporary restriction and/or cessation of the activity until noise-enhancing meteorological conditions have eased.

## 4.4 Complaints management system

A complaint management system to engage in active community consultation and maintain positive relations with local residents will be implemented for the site. The purpose of this system is to minimise complaints by addressing their concerns upfront and monitor the environmental performance of the site.

### 4.4.1 Registering complaints

Any enquiries or complaints made by members of the public to site personnel will be directed to the Quarry Manager.

Complaints may be made to the quarry's direct line during business hours (02 4633 8239) or to the Quarry Manager's mobile phone (up-to-date number provided at www.benedict.com.au/locations/menangle) outside of business hours or for emergencies. These numbers will be provided on a sign at the site entrance.

### 4.4.2 Complaint response

Any complaint received by Menangle Sand and Soil regarding noise impacts from the quarry will be acted on within 24-hours in the following manner:

- details of the complaint (date, time, specifics, complainants contact details) will be recorded;
- activities occurring during the complaint period will be investigated;
- findings of operations during the complaint period will be recorded in the complaints register;
- relevant management practices will be reviewed as necessary; and
- with findings of the review will be communicated to the complainant.

### 4.4.3 Complaints register

The details of any complaint will be logged in the complaints register, with investigation findings and actions noted. The record of a complaint will be kept for at least 4 years after the complaint was made. The record will produced to any authorised officer of the EPA who asks to see them.

The complaints register will be available on the project website and will be updated monthly.

Should the complaint be relevant to any of the conditions of the Consent, it will be handled as per the Consent conditions relevant to that environmental aspect.

### 4.4.4 Response strategy

A response strategy, which would be adopted following complaints in relation to noise and/or vibration, is discussed in Section 6.3.

# 5 Noise monitoring

## 5.1 Objective

The following conditions related to noise monitoring were included in the project consent under Condition B6 and have been reproduced below:

> B6. The Applicant must:
>
> (c) carry out regular attended noise monitoring (every three months unless otherwise agreed with the Planning Secretary) to determine whether the development is complying with the relevant conditions of Schedule 2; and
>
> (d) regularly assess the noise monitoring data and modify or stop operations on the site to ensure compliance with the relevant conditions of Schedule 2.

The noise monitoring program is designed to verify that noise emissions from the quarry complies with the relevant noise criteria at the most affected residential receivers.

## 5.2 Noise monitoring standards

Noise monitoring will be undertaken in accordance with the relevant Australian standards and EPA guidelines including:

- AS 1055.1-2018 Acoustics – Description and Measurement of Environmental Noise – General Procedures;
- AS IEC 61672.1-2019 'Electroacoustics – Sound Level Meters – Specifications';
- INP (EPA 2000) and Application Notes; and
- NPfI (EPA 2017).

It is noted that the INP has been replaced by the NPfI. However, the INP continues to apply in accordance with the EPA's *Implementation and Transitional Arrangements for the Noise Policy for Industry* (EPA 2017) where the INP is referenced in existing statutory instruments, as is the case from Menangle Quarry).

Further, the INP Application Notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing potentially annoying characteristics of a noise source. Fact sheet C of the NpfI (EPA 2017) provides guidelines for applying corrections to account for annoying noise characteristics such as tonal noise and low frequency noise.

The INP and Fact Sheet C of the NpfI have been adopted for the purpose of this NMP.

All acoustic instrumentation proposed for monitoring under the noise monitoring program will have current NATA or manufacturer calibration certificates as per the relevant Australian standards.

## 5.3 Noise monitoring locations

Quarterly attended monitoring locations will be representative of the nearest privately owned receptors to active operations at the time of monitoring. The pool of attended monitoring locations are listed in Table 5.1 and shown on Figure 3.1. A selection of attended monitoring locations will be used each quarter from a pool of eight locations to represent the nearest affected privately-owned residences.

In order to satisfy Conditions B4 and B6, Menangle Sand and Soil will conduct quarterly attended noise monitoring at a representative sample of the points identified in Table 5.1 and shown in Figure 3.1. Data used for determining meteorological conditions will be sourced from the on-site meteorological station.

**Table 5.1 Pool of attended noise monitoring locations**

| ID | Description | Easting (MGA) | Northing (MGA) | Representative residences | Representative direction |
|---|---|---|---|---|---|
| NM1 | Menangle Road North | 291937 | 6223124 | R2 | NW |
| NM2 | Station Street North | 291964 | 6221374 | R3, R5 | W |
| NM3 | Station Street East | 291907 | 6220855 | R4 | W |
| NM4 | Morton Park Road North | 292028 | 6220262 | R6 | SW |
| NM5 | Morton Park Road South | 292064 | 6219045 | R7, R8 | SW |
| NM6 | Bulli Appin Road South | 294179 | 6218595 | R9 | SE |
| NM7 | Bulli Appin Road North | 294766 | 6219863 | R10 | E |
| NM8 | Appin Road | 294732 | 6221523 | R11 | NE |

## 5.4 Noise monitoring program

The attended noise monitoring will be completed on a quarterly basis to verify that noise emissions from the facility satisfy the relevant noise criteria at representative residential receivers. The attended noise monitoring program will be used to:

- estimate the site noise contribution from the measured noise levels;
- determine the individual noise sources contributing to the ambient noise environment wherever possible;
- determine whether a correction for annoying noise characteristics should be applied to the site noise level before comparison with the relevant noise criteria in accordance with the Npfl; and
- gain an understanding of the effects of meteorological conditions on the propagation of noise from site to surrounding residential receivers.

The attended noise monitoring will be completed during the morning shoulder (6 am–7 am) and day (7 am–6 pm) periods.

During the morning shoulder period, attended noise monitoring will only occur at NM4, as NM4 is the only assessment location with a more stringent morning shoulder noise criteria compared with daytime noise criteria.

During the day period, the noise monitoring locations selected for each monitoring event will be dependent on the location of quarrying operations and the meteorological conditions present on the day of the noise monitoring. As such, the quarterly noise monitoring events will target the worst affected noise monitoring locations from the pool detailed in Table 5.1.

In summary, each quarterly monitoring event will entail:

- attended noise monitoring at NM4 during the morning shoulder period (6 am–7 am); and

- attended noise monitoring at the predicted worst-case noise monitoring locations (selected based on quarry operations and meteorological conditions) during the day period (7 am–6 pm).

For each 15-minute attended noise measurement, the following information will be recorded:

- name of monitoring personnel;
- monitoring location;
- date(s) and time(s) at which the monitoring measurement started and ended at each location;
- height of the microphone above the ground and, if relevant, distances to building facades or property boundaries (if monitoring cannot be completed within the property boundary);
- quantitative meteorological data such as wind speed (including the height above ground at which the measurement was taken), wind direction, temperature and humidity;
- qualitative meteorological information such as cloud cover, fog or rainfall;
- instrument type and in-field calibration details before and after the monitoring period;
- the $L_{Aeq,15min}$ noise level for the 15-minute period;
- statistical noise level descriptors over the 15-minute interval: $L_{Amin}$, $L_{A90}$, $L_{A10}$, $L_{A1}$ and $L_{Amax}$;
- notes that identify the noise sources that contribute to the overall noise environment;
- an estimate of the noise contribution from the facility and from other identifiable noise sources;
- measurement in one-third octave bands from 10 Hz to 8 kHz inclusive (or a broader range of bands) for the 15-minute interval to assess if site noise exhibit tonal characteristics that may require the application of a correction for annoying noise characteristics in accordance with Fact Sheet C of the NPfI. The method for determining if a correction for tonal noise is applicable is presented in Section 5.8.1;
- measurement of C-weighted and A-weighted site noise levels to identify the likely presence of low frequency noise in accordance with Fact Sheet C of the NPfI. The method for determining if a correction for low frequency noise is applicable is presented in Section 5.8.2;
- data suitable for assessing the relative contribution of site noise to the overall noise level being measured by using a low-pass filter, which will be developed during the first round of monitoring (eg with a low-pass frequency of 630 Hz); and
- recommendations or comments where considered appropriate.

In accordance with the methodology outlined in Section 3 of the INP (EPA 2000), if any of the data in a 15-minute period is affected by rain or wind speeds in excess of 3 m/s, and where possible, another entire 15-minute period of data unaffected by rain or adverse wind conditions shall be undertaken.

## 5.5 Instrumentation

All noise monitoring instrumentation will meet the requirements of AS IEC 61672.1-2019 and carry current NATA or manufacturer calibration certificates. Instrument in-field calibration will be checked before and after each survey, with the variation in calibrated levels not exceeding ±0.5 dB.

The sound level meter will be programmed to record statistical noise level indices continuously for each 15-minute interval, including $L_{A1}$, $L_{A10}$, $L_{A90}$, $L_{Amin}$, $L_{Aeq}$ and $L_{Amax}$, using 'fast' time response.

## 5.6 Meteorological monitoring

Condition B17 of the development consent relates to the establishment of a meteorological monitoring station in the vicinity of the quarry and states the following:

> Prior to the commencement of Quarrying Operations in the Stage 8 Area, and for the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in close proximity to the site that:
>
> (a) complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales (DEC 2007); and
>
> (b) is capable of measuring meteorological conditions in accordance with the NSW Industrial Noise Policy (EPA 2000),
>
> unless a suitable alternative is approved by the Planning Secretary following consultation with the EPA.

The meteorological station at the quarry will be located to the east of the site entry compound and will satisfy requirements of the NSW Industrial Noise Policy and Australian Standard AS 3580.14-2014 *Methods for sampling and analysis of ambient air Part 14: Meteorological monitoring for ambient air quality monitoring applications.*

## 5.7 Meteorological parameters

Consent Condition B4 states:

> Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (EPA 2000). Appendix 4 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

The meteorological conditions during the noise monitoring will be recorded including wind speed (including the height above ground at which the measurement was taken), wind direction, temperature, humidity, cloud cover and the presence of fog and rain (if any).

The meteorological conditions will be used to determine if the noise criteria (refer to Table 3.1) apply in accordance with the INP. Condition 1 of Appendix 4 states that:

> The noise criteria in condition B4 of Schedule 2 are to apply under all meteorological conditions except the following:
>
> (a) where 3°C/100 metres (m) lapse rates have been assessed, then:
>
> (i) wind speeds greater than 3 metres/second (m/s) measured at 10m above ground level;
>
> (ii) temperature inversion conditions between 1.5°C and 3°C/100m and wind speeds greater than 2m/s measured at 10m above ground level; or

(iii) temperature inversion conditions greater than 3°C/100m.

(b) where Pasquill Stability Classes have been assessed, then:

(i) wind speeds greater than 3m/s at 10m above ground level;

(ii) stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or

(iii) stability category G temperature inversion conditions.

## 5.8 Corrections for annoying noise characteristics

The INP application notes state that Section 4 of the INP has been withdrawn and the corrections outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source. The NPfI specifies corrections for noise with annoying characteristics such as tonal noise and low frequency noise. These are discussed in the following sections.

### 5.8.1 Tonal noise

Tonal noise can be defined as noise levels containing a prominent frequency and characterised by a definite pitch. Examples of tonal noise sources include ventilation fans, reversing beepers or alarms. The method for assessing the presence of tonal noise involves comparing differences in noise levels between neighbouring one-third octave centre frequency bands.

Fact sheet C of the NPfI provides guidelines for applying a correction to account for tonal noise emissions. The NPfI specifies that a 5 dB positive adjustment is applicable where the level of any of the one-third octave bands exceeds the level of both adjacent bands by:

- 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz;
- 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz; or
- 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz.

### 5.8.2 Low frequency noise

Low frequency noise can be characterised as noise containing dominant energy within the low frequency range (ie less than 200 Hz). Examples of low frequency noise sources can include screens and centrifuges in coal washeries, as well as pumps, fans, boilers, ventilation plant, electrical installations and wind turbines.

Fact sheet C of the NPfI provides guidelines for applying a correction to account for low frequency noise emissions. The NPfI specifies that a difference of 15 dB or more between site ‘C-weighted' and site ‘A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance. Where a difference of 15 dB or more between site ‘C-weighted' and site ‘A-weighted' noise emission levels is identified, the measured one-third octave noise levels should be compared to the values in Table C2 of the NPfI, which has been reproduced in Table 5.2.

**Table 5.2 One-third octave low-frequency noise thresholds**

| | One-third octave $L_{Zeq,15min}$ threshold level | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (Hz) | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
| dB (Z) | 92 | 89 | 86 | 77 | 69 | 61 | 54 | 50 | 50 | 48 | 48 | 46 | 44 |

The following correction is to be applied where the site 'C-weighted' minus site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 5.2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 5.2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured A-weighted levels applies for the evening/night period and a 2 dB positive adjustment to measured A-weighted levels applies for the day period.

Hence, where possible throughout each survey the difference between site 'C-weighted' and site 'A-weighted' noise emission levels will be estimated by the operator by matching audible sounds with the response of the analyser ($L_{Ceq}$-$L_{Aeq}$). Where this is deemed to be 15 dB or greater, the measured one-third octave frequencies will be compared to the values in Table 5.2 to identify the relevant correction (if applicable). It is of note that the NPfI states that low frequency noise correction does not apply during adverse meteorological conditions, including during wind speeds above 3 m/s at 10 m above ground level, stability category F with wind speeds above 2 m/s at 10 m above ground level, or during stability category G.

## 5.9 Data analysis

The $L_{Aeq,15min}$ noise level contribution from the facility as well as the overall ambient noise levels together with the weather and site operating conditions will be reported on a quarterly basis.

The contributed noise emissions from operations at the facility will be evaluated and assessed against the noise level criteria given in Table 2 of development consent Condition B4 (refer to Table 3.1) during each quarterly noise monitoring event. Compliance may be determined by:

- post analysis of data (including through the review of audio recordings);
- direct measurement against the $L_{Aeq,15min}$ criteria;
- operator estimated $L_{Aeq,15min}$ contribution;
- by calculation from near field measurements;
- by measurement at a representative location; or
- a combination of any or all the above methods as approved by the EPA or in accordance with the INP or NPfI as relevant.

## 5.10 Noise exceedance protocol

If attended noise monitoring identifies that the noise criteria as per Table 3.1 have been exceeded, the person conducting the attended noise monitoring will follow the noise exceedance protocol presented in Figure 5.1.

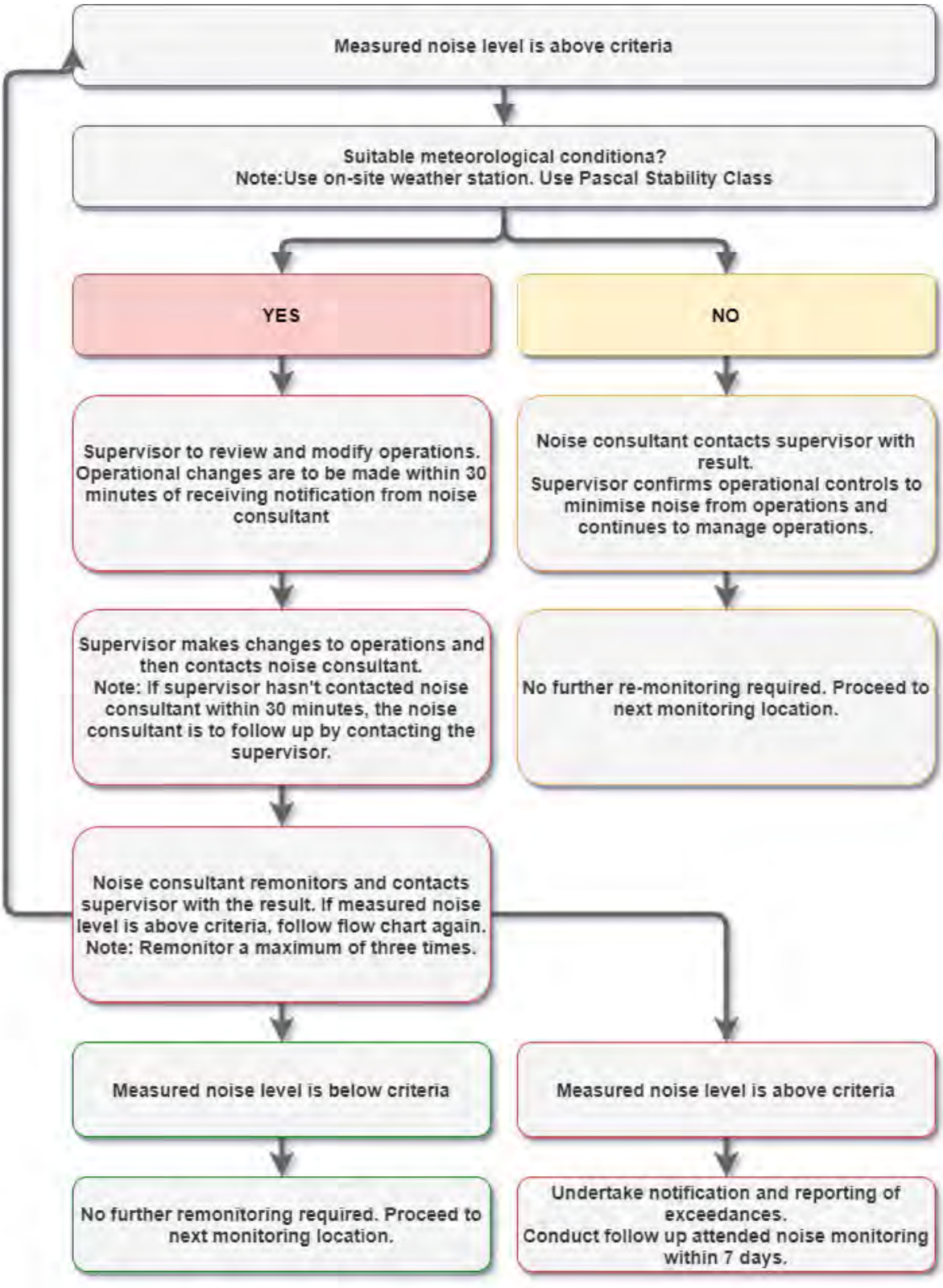



**Figure 5.1 Noise exceedance protocol**

The relevant supervisor will document and report to the Quarry Manager any actions implemented following the notification of the exceedance. The exceedance is required to be reported to DPE and EPA by the Quarry Manager (or delegate) immediately upon Menangle Sand and Soil becoming aware of the exceedance. An additional attended noise monitoring survey will be completed within one week if the exceedance could not be effectively reduced below the relevant criteria on the night of noise monitoring.

Within 7 days of detecting an exceedance of the noise criteria as per Table 3.1, Menangle Sand and Soil shall provide a written report of the exceedance to DPE. This report must:

- describe the date, time, and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

Any exceedance above the noise limits identified in Table 3.1 will be reported in the annual noise compliance assessment report required under Condition R4.3 of EPL and noise monitoring reports will be available upon request.

## 5.11 Noise monitoring report

All routine monitoring results will be documented and reported initially on a quarterly basis.

Quarterly reports will consist of the following information:

- summary of all attended noise monitoring results;
- measured, calculated and/or operator estimated site $L_{Aeq,15min}$ contributed noise levels for each monitoring location;
- statement of compliance/non-compliance; and
- details of any complaints relating to noise and their state of resolution.

The noise monitoring contractor undertaking the monitoring on behalf of Menangle Sand and Soil will provide the site representative with a monitoring report outlining the results and outcome of the survey.

The site representative will review the monitoring report provided by the contractor to assess compliance with the criteria outlined in Table 2 of development consent Condition B4 (refer to Table 3.1). A summary of quarterly noise monitoring results will be published on the Menangle Sand and Soil website, as per Condition D15.

# 6 Noise incidents

## 6.1 Definition

For the purpose of this NMP, a noise incident can be defined as noise emissions from the quarry causing or threatening to cause material harm at surrounding receivers, and/or an exceedance of the noise criteria. A noise incident will be deemed to have occurred if a non-compliance of the noise criteria provided in Table 3.1 has been recorded during noise monitoring.

## 6.2 Reporting

As soon as Menangle Sand and Soil becomes aware of a noise incident, it will immediately notify DPE via the Major Projects Website.

Within seven days of a noise incident, Menangle Sand and Soil will submit an incident notification via the Major Projects Website. Notification will be sent to DPE within this period even if:

- Menangle Sand and Soil fails to notify DPE immediately after it becomes aware of an incident; or
- having given such notification, subsequently forms the view that an incident has not occurred.

Within 30 days of a noise incident, or as otherwise agreed to by the Planning Secretary, Menangle Sand and Soil will submit a detailed report notification via the Major Projects Website and any relevant public authorities (as determined by the Planning Secretary).

As soon as practicable and no longer than 7 days after obtaining monitoring results showing an exceedance of noise criterion (ie as listed in Part B of the Consent), following the date of commencement of quarrying operations in the Stage 8 Area, Menangle Sand and Soil will provide details of the exceedance to any affected landowners/tenants if Menangle Sand and Soil has not otherwise reached an agreement to exceed the relevant criteria with the affected landowner pursuant to Consent Condition B5 or B12.

### 6.2.1 Notification to DPE

On becoming aware of a noise incident, Menangle Sand and Soil will notify DPE via the Major Projects Website. within seven days after the Applicant becomes aware of an incident. Notification requirements are outlined in the EMS in the incident notification section.

### 6.2.2 Notification to the EPA

Within 24-hours of a noise incident, an initial letter report outlining basic details of the incident will be sent to the EPA's Regional Manager Planning Section. Within 14 days of an incident, a detailed report will be prepared and submitted to the EPA's Regional Manager Planning Section documenting incident investigation findings, causes of the incident and additional mitigation measures proposed to prevent a reoccurrence.

A register of verified incidents will be maintained by Menangle Sand and Soil and made available for review on request.

## 6.3 Response strategy

In the event of an exceedance or potential exceedance of the relevant noise criteria, a response strategy will be followed. The response measures will include:

- identifying the noise source that has caused the exceedance. This would be done in consultation with the complainant and by conducting a noise survey to quantify the level of disturbance. Additional noise measurement methods such as near-field attended monitoring may be utilised to investigate where site noise emissions are difficult to quantify at the representative residences. The noise, weather and plant operating data shall be documented so that the matter can be investigated and appropriate actions undertaken accordingly;

- reassessing the Best Management Practice (BMP) mitigation techniques employed at the site to reduce the impact of the noise source in question;

- following the adoption of additional or alternative mitigation, a further noise and/or vibration survey would be conducted at the complainant's location to demonstrate the effectiveness of the mitigation strategy; and

- if a management strategy is unsuccessful, re-evaluate the Best Available Technology Economically Achievable (BATEA) mitigation strategies being used.

## 6.4 Recording noise incidents

Menangle Sand and Soil will keep a record of any noise and/or vibration incidents in relation to operations at the facility.

# 7 Review and improvement

A comprehensive review of the complaint and incident records will be completed as part of the project annual review of operations, and each year thereafter, and will be provided to DPE.

The noise monitoring program will be reviewed at least every three years, when updates to the plan are required, or as directed by the Secretary in consultation with other agencies. The review process is to reflect changes in environmental legislation and guidelines, and changes in technology or operational procedures.

As per Condition D5, a review of this NMP will take place if monitoring records indicate that it is warranted or in the event of any significant change to noise quality management procedures at the facility. Any modifications to the NMP will be undertaken in consultation with the appropriate government agencies.

As per Conditions C2–4 (and as addressed in Section 8.3.3 of the EMS) if, at any time following the date of commencement of quarrying operations in the Stage 8 Area, a landowner considers the development to be exceeding any noise criterion, they may ask the Planning Secretary in writing for an independent review of the impacts of the development on their land.

If the Planning Secretary is not satisfied that an independent review is warranted, the Planning Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.

If the Planning Secretary is satisfied that an independent review is warranted, then within three months of the Planning Secretary's decision, or as otherwise agreed by the Planning Secretary and the landowner, Menangle Sand and Soil will:

a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:

   i) consult with the landowner to determine their concerns;

   ii) conduct monitoring to determine whether the development is complying with the relevant noise or air quality criteria;

   iii) if the development is not complying with that criteria, identify measures that could be implemented to ensure compliance with the relevant criteria; and

b) give the Planning Secretary and landowner a copy of the independent review; and

c) comply with any written requests made by the Planning Secretary to implement any findings of the review.

# References

EMM 2017, *Noise Impact Assessment – Menangle Sand and Soil Quarry Continuation Project*. Report prepared by EMM Consulting Pty Limited for Menangle Sand and Soil Pty Ltd.

EPA 2000, *Industrial Noise Policy*. NSW Environment Protection Authority.

EPA 2017, *Noise Policy for Industry*. NSW Environment Protection Authority.

DECC 2006, *Assessing Vibration: a Technical Guideline.* NSW Department of Environment and Conservation.

Australian Standards AS 1055.1-2018 *Acoustics – Description and measurement of environmental noise – General procedures.*

Australian Standards AS IEC 61672.1-2019 *Electroacoustics – Sound level meters – Specifications*.

German Standard DIN 4150-3 (2016-12) *Part 3 Structural Vibration in Buildings. Effects on Structures*.

Appendix A

# Glossary of acoustic terms

A number of technical terms are required for the discussion of noise. These are explained in Table A.7.1.

### Table A.7.1 Glossary of acoustic terms

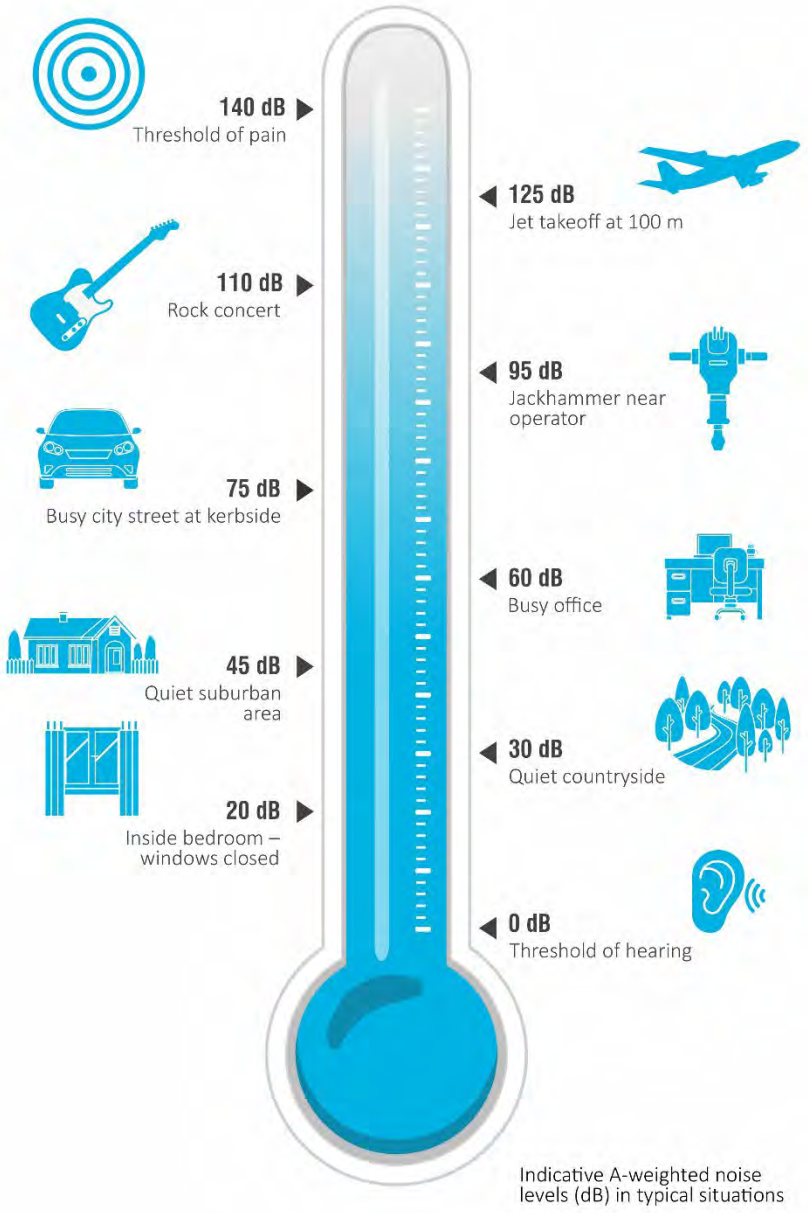
| Term | Description |
|---|---|
| dB | Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear. |
| DEC | The NSW Department of Environment and Conservation |
| DPE | The NSW Department of Planning, Industry and Environment |
| DECCW | The NSW Department of Environment, Climate Change and Water |
| EPA | The NSW Environment Protection Authority |
| INP | The NSW Industrial Noise Policy |
| $L_{A1}$ | The A-weighted noise level exceeded for 1% of the time. |
| $L_{A10}$ | The noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level. |
| $L_{A90}$ | The noise level that is exceeded 90% of the time. Commonly referred to as the background noise level. |
| $L_{Aeq}$ | The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The $L_{eq,15\ minute}$ descriptor refers to an $L_{eq}$ noise level measured over a 15-minute period. |
| $L_{Amax}$ | The maximum root mean squared sound pressure level received at the microphone during a measuring interval. |
| NPfI | The NSW Noise Policy for Industry |

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.7.2 gives an indication as to what an average person perceives about changes in noise levels:

### Table A.7.2 Perceived change in noise

| Change in sound pressure level (dB) | Perceived change in noise |
|---|---|
| 1 to 2 | typically indiscernible |
| 3 | just perceptible |
| 5 | noticeable difference |
| 10 | twice (or half) as loud |
| 15 | large change |
| 20 | four times (or quarter) as loud |

Examples of common noise levels are provided in Figure A.1.




Source: Road Noise Policy (Department of Environment, Climate Change and Water 2011)

**Figure A.1 Common noise levels**

Appendix B

# Letter to NSW EPA (October 2020)

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12 October 2020

Mr Chris Kelly
NSW Environment Protection Authority

planning.matters@epa.nsw.gov.au

**Re: Menangle Sand and Soil Quarry - Air Quality and Noise Management Plans**

Dear Chris,

Menangle Sand and Soil Pty Ltd operates the Menangle Sand and Soil Quarry (the 'Quarry') at 15 Menangle Road Menangle. A modification to the Quarry's approval has recently been approved. The updated approval requires that air quality and noise management plans are prepared in consultation with the Environment Protection Authority (EPA).

This letter seeks the EPA's input to these plans.

# 1 Quarry overview

Menangle Sand and Soil Pty Ltd operates the Menangle Sand and Soil Quarry at 15 Menangle Road Menangle. Quarrying has been undertaken in the location for over 40 years by a number of operators and at varying rates of production. Extraction, processing and rehabilitation activities have been undertaken by Menangle Sand and Soil since 1978.

Current extractive activities were approved in 1989 (DA 85/2865) and have involved the construction and operation of the quarry in seven stages. Sand and soil has been extracted from Stages 1 to 2 and 4 to 6 and is currently being extracted from Stage 7. While previously approved, sand and soil will not be extracted from Stage 3.

In September 2020, the NSW Land and Environment Court approved 'Menangle Quarry Extension – Modification 1' (MOD1). This allows the extraction of sand and soil in a new area, the Stage 8 area, that is about 13 ha, and extends about 2 kilometres along the Nepean River south of the Stage 7 area. The extension will increase the life of the quarry by 15 years. The extracted material will be transported to the existing processing area where it will be stockpiled, processed and blended with materials imported to the site, prior to being dispatched from the quarry.

A description of the quarry, including MOD1, is provided in Appendix A. The Notice of Orders Made by the Land and Environment Court (the 'consent') is provided in Appendix B.

# 2 Previous assessments

The preparation of the environmental assessment for the modification application included the preparation of air quality and noise assessments addressing the matters the NSW Environment Protection Agency (EPA) requested be considered in the Environmental Assessment (EMM 2017).

In summary, the assessment found that the proposed modified operations at the Quarry are unlikely to result in exceedances of the applicable NSW EPA assessment criteria or NEPM assessment goals for any of the assessed pollutants at the surrounding sensitive receptors and that cumulative noise is predicted to satisfy the relevant amenity criteria.

These reports are available on the Major Projects website:
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

# 3 Management plans

EMM Consulting Pty Limited (EMM) is preparing:

- a Noise Management Plan (NMP) in accordance with Part B, Condition B7 (b) of the consent.
- an Air Quality Management Plan (AQMP) in accordance with Part B, Condition B14 (b) of the consent.

The NMP and AQMP will address the matters raised in the conditions and Menangle Sand and Soil's Summary of Commitments provided in Table 3.1 of Appendix A.

## 3.1 Noise Management Plan

The NMP will include the following:

- overview of noise mitigation and management;
- relevant noise criteria;
- monitoring method(s);
- location, frequency and duration of monitoring;
- record keeping;
- response mechanisms;
- compliance reporting; and
- review and improvement.

## 3.2 Air Quality Management Plan

The AQMP will include the following:

- overview of emission sources and ranking by emissions magnitude;
- review of mitigation measures;
- key performance indicator(s);
- monitoring method(s);
- location, frequency and duration of monitoring;
- record keeping;

- response mechanisms; and
- compliance reporting.

This letter seeks your input on the contents and preparation of the NMP and AQMP. We will also provide the draft management plans to you for your review and comment. We would welcome the opportunity to meet, via teleconference, to discuss the plan.

It is requested that any comments you may have are provided by 26 October 2020 to allow them to be considered during preparation of the plan.

Should you wish to discuss anything specific please call me on the below number.

Please do not hesitate to contact me if you have any questions.

Yours sincerely

**Jeremy Slattery**
Associate, Environmental Management
Phone: 0421 827 231
jslattery@emmconsulting.com.au

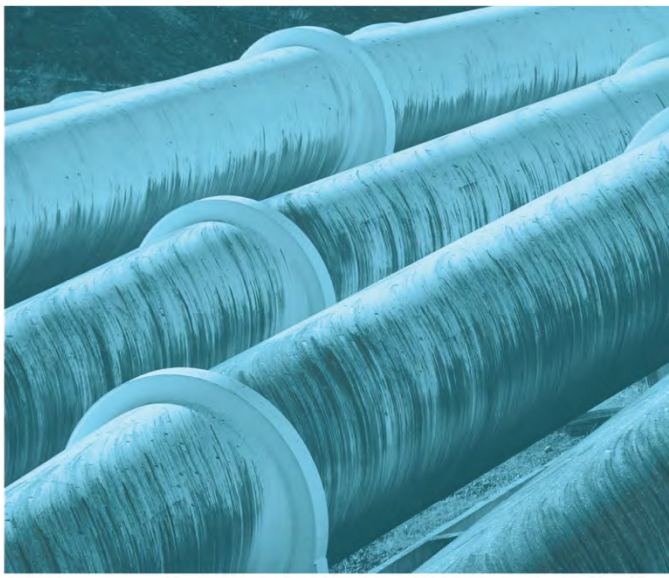
Appendix A

# Project description


# Land and Environment Court Proceedings 342158 of 2018

## Applicant's Description of Amended Project

Menangle Sand & Soil Pty Limited v Minister for Planning
24 August 2020

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# Land and Environment Court Proceedings 342158 of 2018

Applicant's Description of Amended Project

Prepared for Menangle Sand & Soil Pty Limited v Minister for Planning
24 August 2020

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# Land and Environment Court Proceedings 342158 of 2018

## Applicant's Description of Amended Project

**Report Number**

J190166 RP#4

Menangle Sand & Soil Pty Limited v Minister for Planning

**Date**

24 August 2020

**Version**

v7 Final

**Approved by**

**Dr P. Towler**
Associate Director
24 August 2020

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# 1 Introduction

Menangle Sand and Soil Pty Ltd (Menangle Sand and Soil) seek a modification to Development Consent 85/2865 to extend the life of the quarry by 15 years while removing the need to re-establish quarrying activities, clear vegetation, and extract sand and soil from the approved Stage 3 area (the Menangle Sand and Soil Quarry Extension Project, the 'extension project'). It is proposed to forego approved land extraction (as well as dredging rights to another 200,000 tonnes) of 500,000 tonnes of sand and soil in the Stage 3 area and instead extend their current operations to extract sand and soil from an additional stage of the quarry (Stage 8). The Stage 8 area will extend approximately 2.8 km along the Nepean River on Company-controlled lands, within Lot 203//Deposited Plan 590247 on the eastern side of the Hume Highway. Approximately 760,000 tonnes of sand and soil will be extracted from the Stage 8 area land over about 15 years. Extraction will be in sequential substages so the active extraction area will be a small proportion of the total Stage 8 extraction area at any given time. No riverine extraction is proposed.

A modification application and accompanying environmental assessment (EA) report for the extension project was lodged in May 2017 and subsequently refused by the Department of Planning and Environment on 25 October 2018. The application is before the NSW Land and Environment Court (2018/342158).

An amended application was placed on public exhibition between 19 February 2020 and 4 March 2020. Amendments to the proposed modification are summarised in *NSW Land and Environment Court (2018/342158) Menangle Quarry - Project Amendments and Information Summary* (EMM [Towler] 2019a).

Given the application's history, the currently proposed modification is described in a range of documents.

This consolidated project description report provides a description of the currently approved quarry, based on Chapter 2 of the *Menangle Quarry Extension Environmental Assessment* (EA) (EMM 2017a), and the currently proposed modification (as amended) as described in Chapter 3 of the EA and subsequently amended in:

- *Supplementary Biodiversity Assessment* (EMM [Ward] 2019b);
- *Menangle Quarry - Amended Extraction Area and Setback* (EMM [Towler] 2019c);
- *Restoration Area Weed Strategy* (EMM [Grant] 2019d);
- *Groundwater Management* (EMM [Webb] 2019e); and
- *Flood Mitigation* (EMM [Towler] 2019f).

No modification amendments were proposed in the *Menangle Quarry Extension Response to Submissions* (RTS) (EMM 2017b).

The allotments subject to the development application modification, 'the site', are provided in Appendix A.

**This consolidated project description report outlines the current proposal incorporating all of the changes to the project made since the Refusal and presents an updated statement of commitments.**

# 2 Approved and proposed operations

## 2.1 Introduction

The extension project will increase the quarry life by 15 years (to 2035) by extracting the sand and soil resource in the Stage 8 area. The Stage 8 area extends approximately 2.8 km upstream of the currently active Stage 7 area. The project will require installation and operation of a conveyor between the existing processing area and the Stage 8 area. Menangle Sand and Soil will relinquish the approved extraction of resource (as well as its perpetual right to the resource located on the Elizabeth Macarthur Agricultural Institute land) from the approved Stage 3 area as part of the extension project.

The layout of the approved and proposed quarry is presented in Figure 2.1.

As well as the extraction areas, key components of the quarry include:

- an existing wheel wash and weighbridge;
- an existing site office and amenity building;
- an existing workshop west of the site office;
- existing fuel supply tanks north of the storage shed;
- existing sand and soils storage and processing area; and
- other existing minor infrastructure.

These components will be used to support activities in the Stage 8 area which will also include:

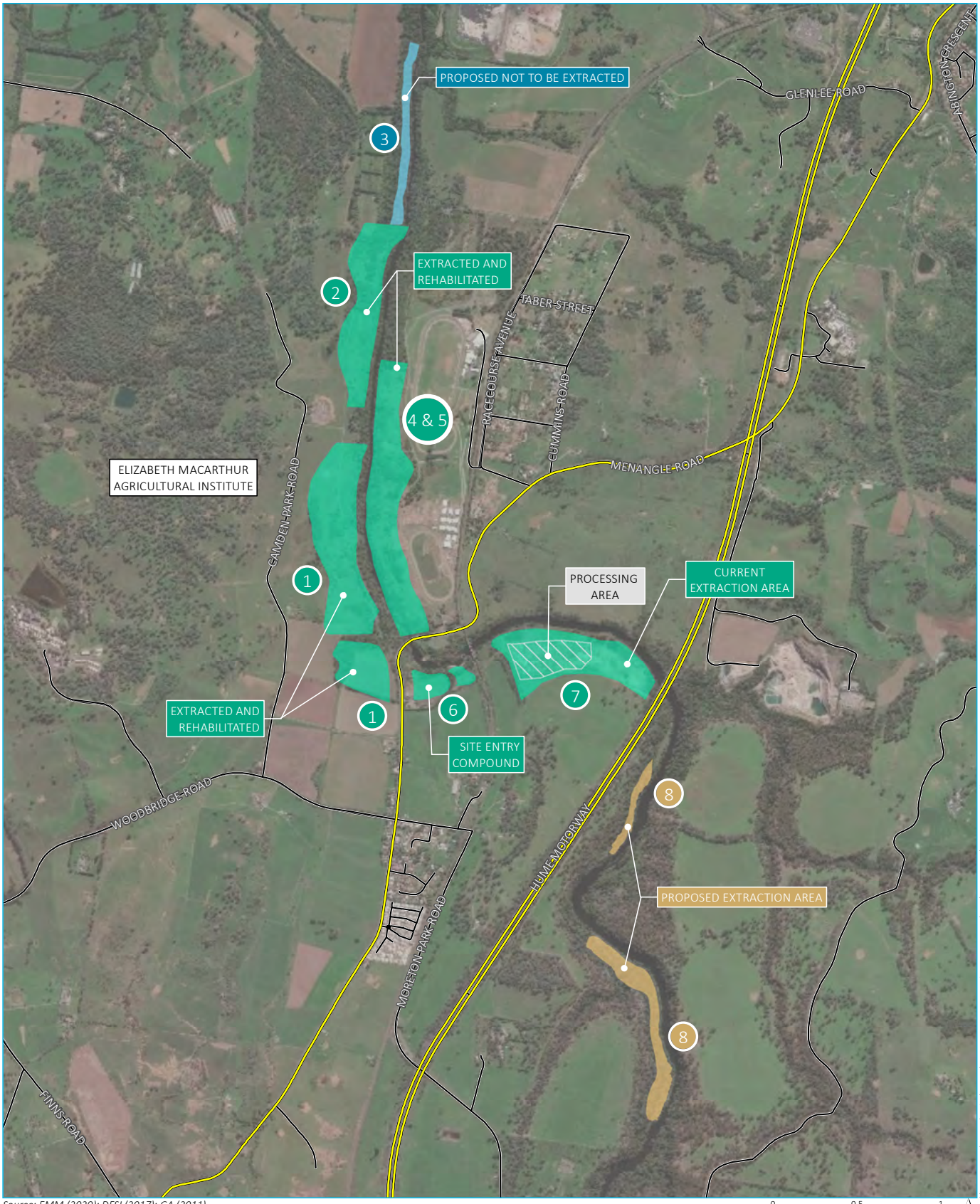
- extraction in the Stage 8 extraction area followed by rehabilitation;
- restoration of areas adjacent to the extraction areas;
- a conveyor; and
- a haul road.

These are described below.

## 2.2 Resource

The total resource in the 1989-approved quarry is approximately 7.7 million tonnes, made up of approximately 5.9 million tonnes of soil and 1.8 million tonnes of sand. The approved extraction area is approximately 123 ha. An extraction rate of up to 350,000–400,000 tonnes per annum (tpa) of soil and sand is approved. To date, the resource has been extracted in all but the Stage 3 (approximately 300,000 tonnes soil and 400,000 tonnes sand) and the remaining part of the of Stage 7 area.

It is proposed to extract 760,000 tonnes of sand and soil from the Stage 8 area at a rate of no more than 150,000 tpa.




*Source: EMM (2020); DFSI (2017); GA (2011)*

0 0.5 1 km

GDA 1994 MGA Zone 56

N

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KEY

- Main road
- Local road
- Existing processing area (to be retained)
- Extractive operations (approved)
- Extractive operations (approved but not extracted)
- Stage 8 - extraction/rehabilitation area

Menangle Quarry Stages 1 to 8

Menangle Quarry Extension
Figure 2.1

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It is proposed to extract sand and soil from the Stage 8 extraction area (Figure 2.2) which has a total area of 13.22 ha.

Given that the width of horizontal setback area (see Section 2.3.2i) is variable and to ensure that any biodiversity impacts are fully compensated for, the 'extraction area' is defined as including the horizontal setback area, although extraction will not occur within this setback. This also reflects the previous intent to grade parts of the horizontal setback area where there are no trees. However, it is now proposed to leave the entire horizontal setback area undisturbed, save for hand weeding of the extensive existing noxious weeds.

The 'active extraction area' is the area where the overlying vegetation will be cleared (removing extensive understory weeds and mature native trees) and the sand and soil resource extracted.

## 2.3 Quarrying

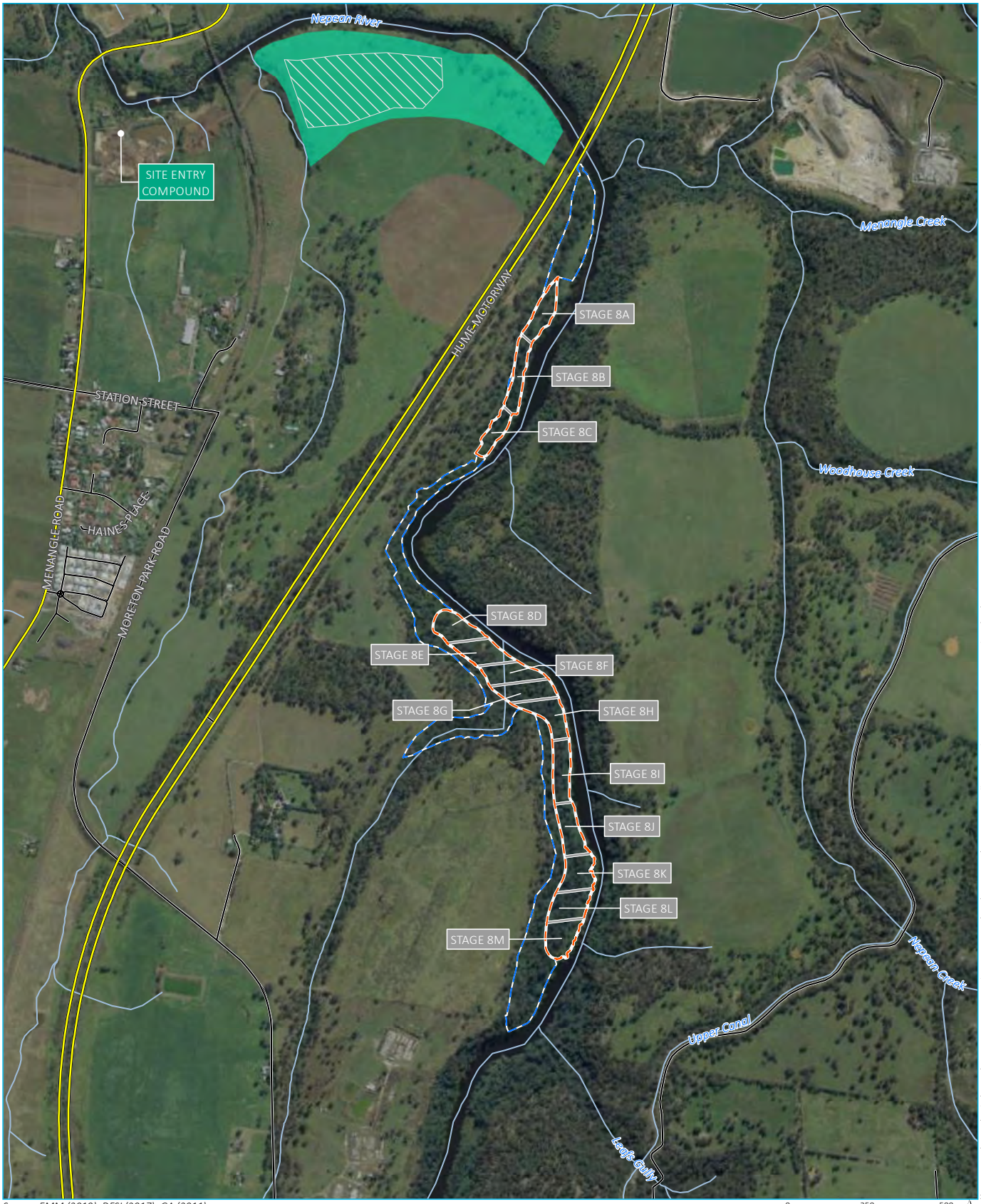
### 2.3.1 Quarry progression

Historically, quarrying has progressed from south to north (Stages 1–2) and from west to east (Stages 4–7). Quarrying activities in the Stage 7 area are progressing from west to east. Extraction in the Stage 8 area will occur in sub-stages such that only a small portion of the overall Stage 8 area will be the active excavation area at any one time. Extraction will progressively move upstream in thirteen sub-stages, with each sub-stage each covering about 1 ha (Figures 2.2 to 2.4). Each of these sub-stages will be a basic operating cell and will take approximately 1 year to complete, depending on demand for product. Each sub-stage will be progressively rehabilitated using similar methods to those as implemented in the Stage 1–2 and Stage 4–5 areas but with a more intensively managed native planting regime implemented.

The maximum area of each substage is provided in Table 2.1.

**Table 2.1 Maximum area of each substage**

| Substage | Area (ha) |
|---|---|
| 8a | 0.93 |
| 8b | 0.93 |
| 8c | 0.69 |
| 8d | 1.07 |
| 8e | 1.07 |
| 8f | 1.07 |
| 8g | 1.07 |
| 8h | 1.07 |
| 8i | 1.07 |
| 8j | 1.07 |
| 8k | 1.07 |
| 8l | 1.07 |
| 8m | 1.07 |
| **Total** | **13.25** |




*Source: EMM (2019); DFSI (2017); GA (2011)*

0 250 500 m

GDA 1994 MGA Zone 56

N

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KEY

- Processing area (to be retained)
- Stage 7 - current extractive operations
- Stage 8 - extraction/rehabilitation area
- Stage 8 - restoration area (no extraction)
- Main road
- Local road
- Watercourse/drainage line

## Overall staging plan

Menangle Quarry Extension
Figure 2.2

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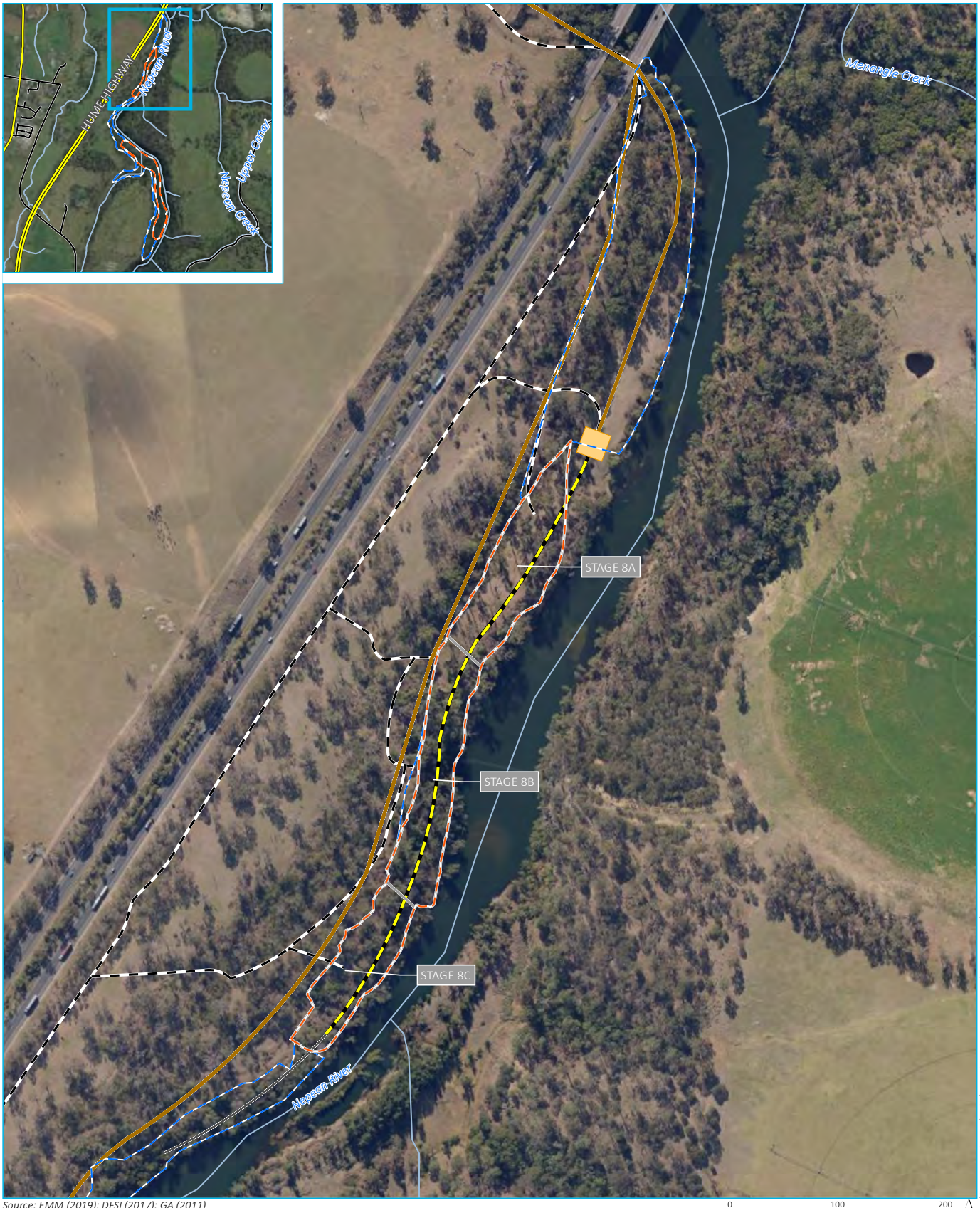


*Source: EMM (2019); DFSI (2017); GA (2011)*

0 100 200 m

GDA 1994 MGA Zone 56

N

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KEY

- Stage 8 - extraction/rehabilitation area
- Stage 8 - restoration area (no extraction) boundary
- Substage boundary
- Conveyor head
- Indicative conveyor location
- Haul road
- Access road
- Existing access track
- Watercourse/drainage line

# Stage 8 Extraction and restoration areas Stage 8A to 8C

Menangle Quarry Extension
Figure 2.3

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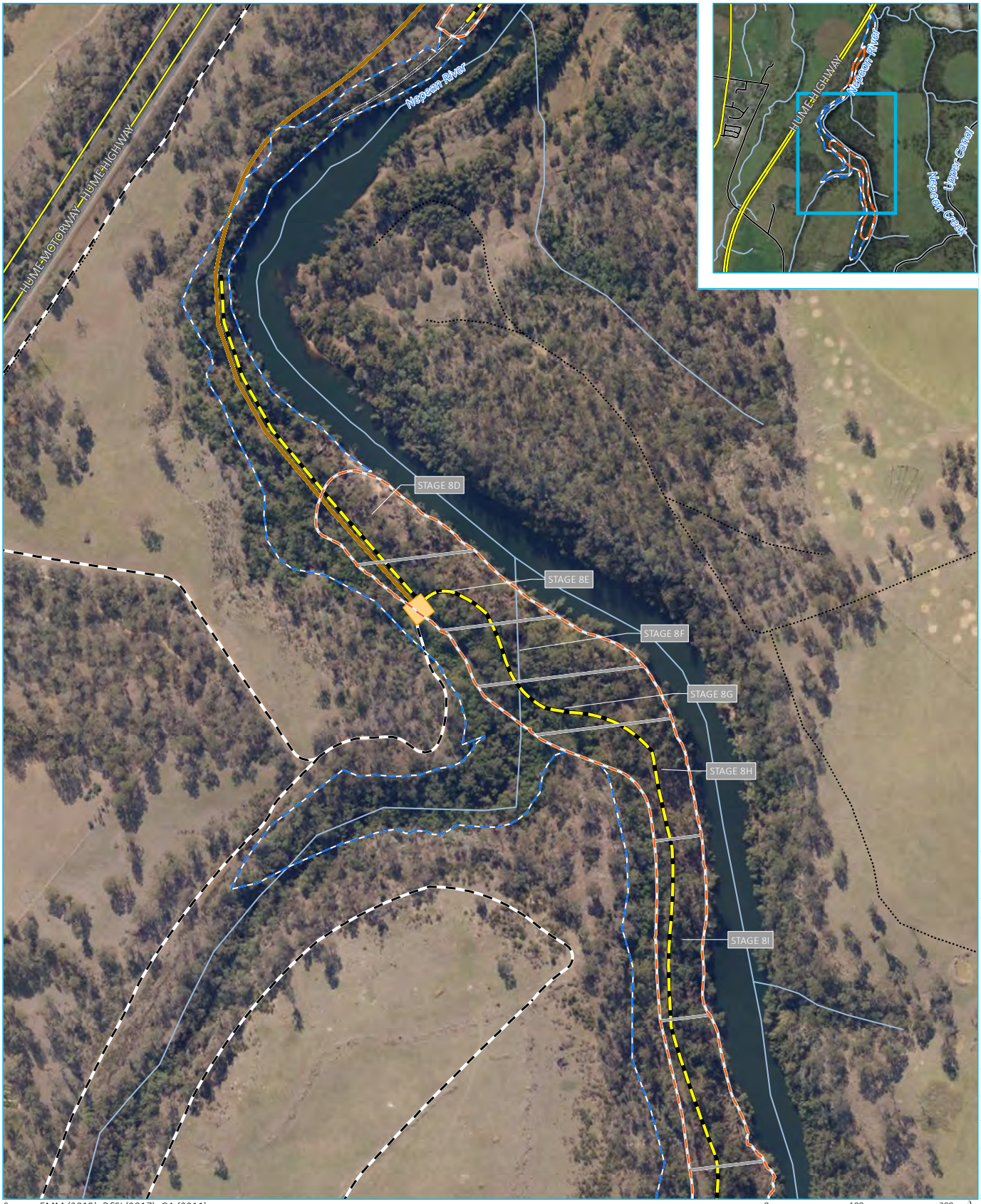


*Source: EMM (2019); DFSI (2017); GA (2011)*

0 100 200 m

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm\Jobs\2019\J190166 - Menangle Quarry LEC\GIS\02_Maps\G013_StagingPlanD_I_20200512_04.mxd 12/05/2020

KEY

- Stage 8 - extraction/rehabilitation area
- Stage 8 - restoration area (no extraction) boundary
- Substage boundary
- Conveyor head
- Indicative conveyor location
- Haul road
- Access road
- Existing access track
- Main road
- Vehicular track
- Watercourse/drainage line

# Stage 8 extraction and restoration areas – Stages 8D–8I

Menangle Quarry Extension
Figure 2.4

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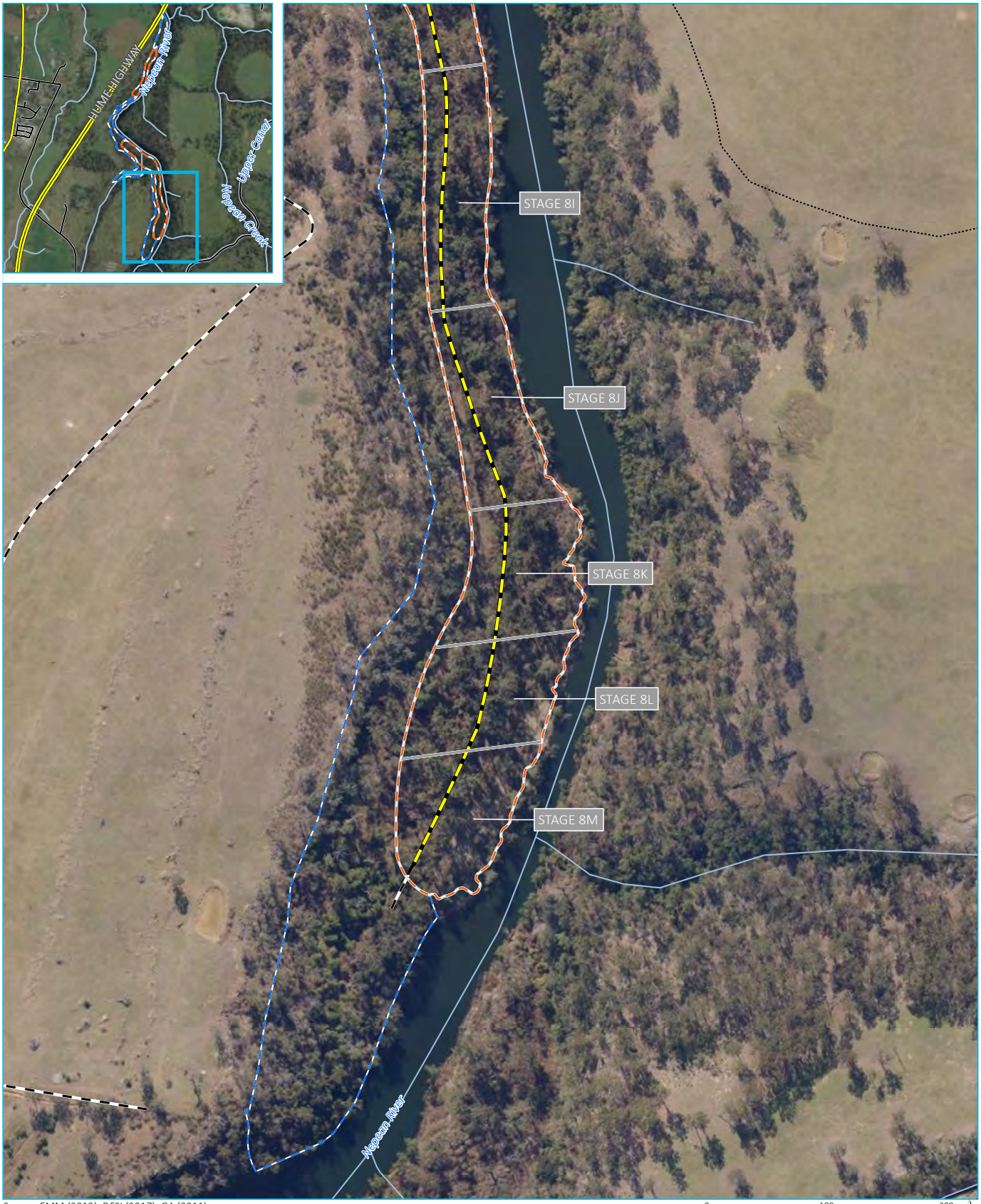


*Source: EMM (2019); DFSI (2017); GA (2011)*

0 100 200 m

GDA 1994 MGA Zone 56

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KEY

- Stage 8 - extraction/rehabilitation area
- Stage 8 - restoration area (no extraction) boundary
- Substage boundary
- Haul road
- Existing access track
- Local road
- Vehicular track
- Watercourse/drainage line

# Stage 8 extraction and restoration areas – Stages 8I–8M

Menangle Quarry Extension
Figure 2.5

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### 2.3.2 Stage 8 area quarry design

The Stage 8 quarry design is presented in Chapter 3 of the EA. Subsequently, the design has been amended to incorporate changes made since the Refusal. The amened proposed quarry design is summarised below.

Schematics showing the quarry progression in plan-view and in cross-section are is presented in Figure 2.6 and Figure 2.7 respectively. An indicative cross-section perpendicular to the bank is presented in Figure 2.8 and Figure 2.9.

#### i Lower riverbank and horizontal setback retention

The level of the Nepean River adjacent to the Stage 8 area is controlled by the downstream Menangle Weir so as to be about 61 mAHD during normal low flow.

During extraction of the resource from the previous quarry stages, the lower riverbank was retained and a horizontal setback from a contour approximately 3 m above the normal river level was provided. For example, in the Stage 7 area, the lower riverbank (below 64 mAHD) was retained and a horizontal setback of 10 m from the 64 mAHD contour on the natural riverbank (ie 3 m above the normal level of the Nepean River) was provided.

A similar setback was proposed for the Stage 8 area. However, the proposed setback method has since been amended to protect all native trees in the 10-m wide horizontal setback area as follows:

- The lower riverbank will be retained below the 64 mAHD contour and remain untouched (except for hand removal of weeds, felling of non-native trees leaving the roots in place, and very selective herbicide application).
- The riverbank will also be retained in a horizontal setback that extends at least 10 m (measured horizontally) inland from the 64 mAHD contour up the bank (referred to as the '10-m-wide horizontal setback area')[1].
- Where there are native trees[2] within the 10-m-wide horizontal setback area, the width of the setback will be increased so that edge of the setback area/start of extraction area is at least 7.5 m (measured horizontally) from the trunk of these trees.

Therefore, the active extraction area will be separated from the river by the lower riverbank (ie between 61 mAHD and 64 mAHD) and additionally by the horizontal setback that will be between 10 and 17.5 m wide. The undisturbed bank (ie the combined lower riverbank and horizontal setback) will vary in height but will be at least 3 m above the low-flow river level where the bank slope is shallow but will be higher where the bank slope is steeper.

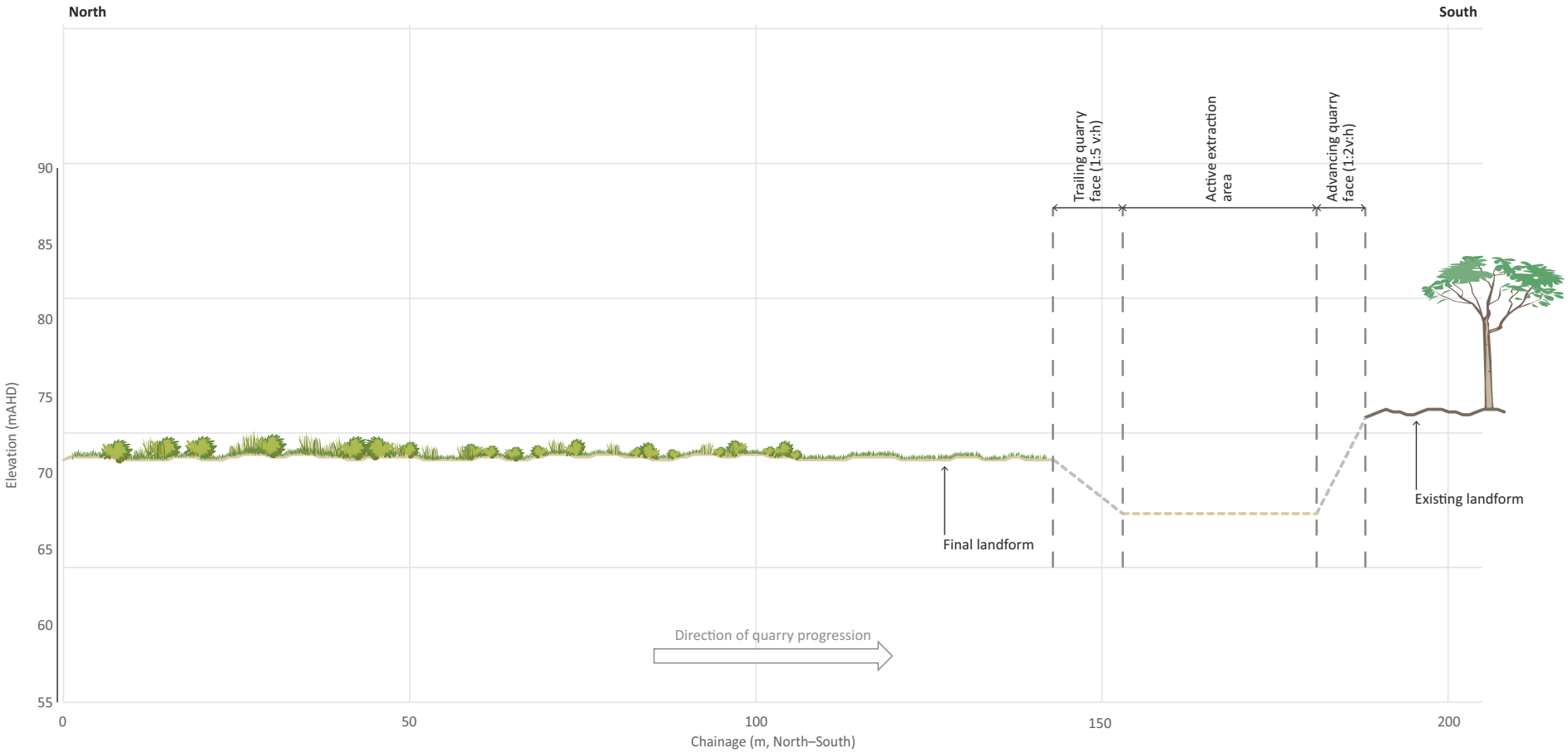
[1] It was previously proposed to grade the horizontal setback to a slope of 1:50 where there are no native trees within the horizontal setback area. This is no longer proposed and the existing landform within the horizontal setback area will be retained, including where there are no trees.

[2] Native trees with a trunk diameter of >0.1 m diameter at breast height (DBH).


Quarry progression schematic

Menangle Quarry Extension

Figure 2.6




Quarry progression cross-section

Menangle Quarry Extension

Figure 2.7

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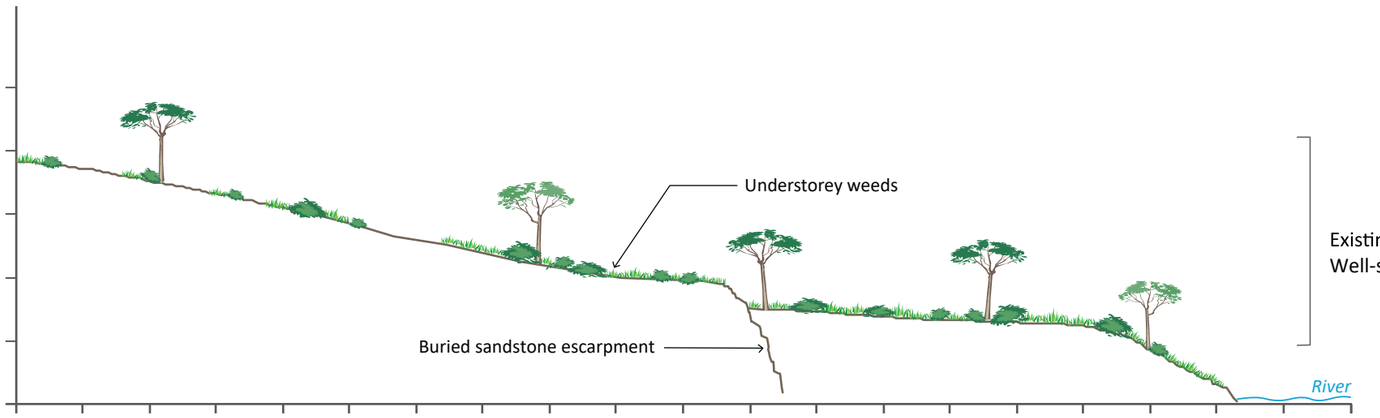
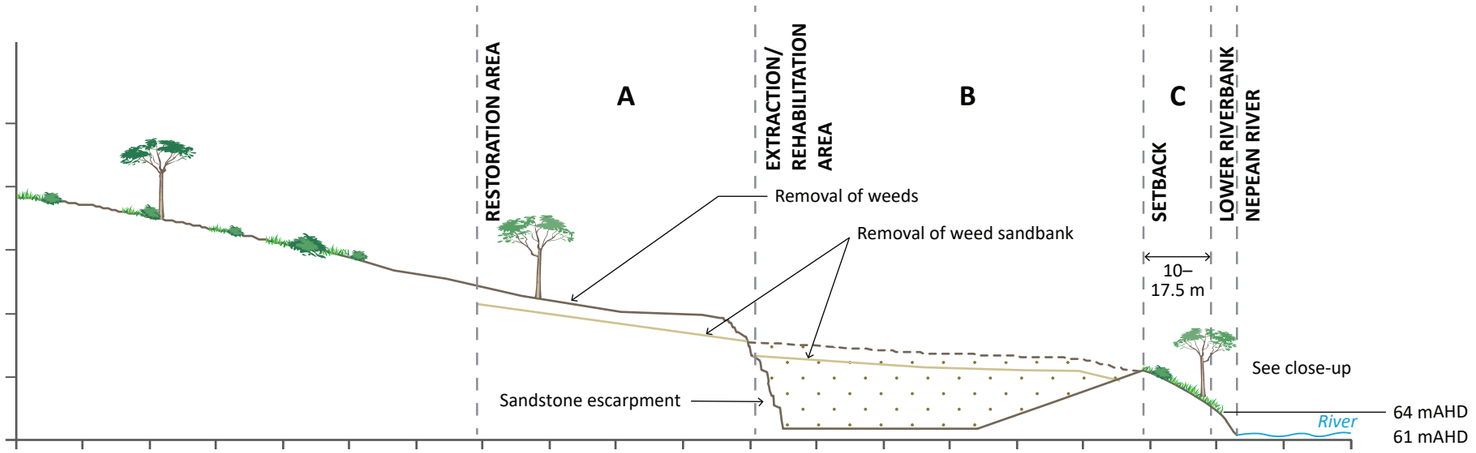
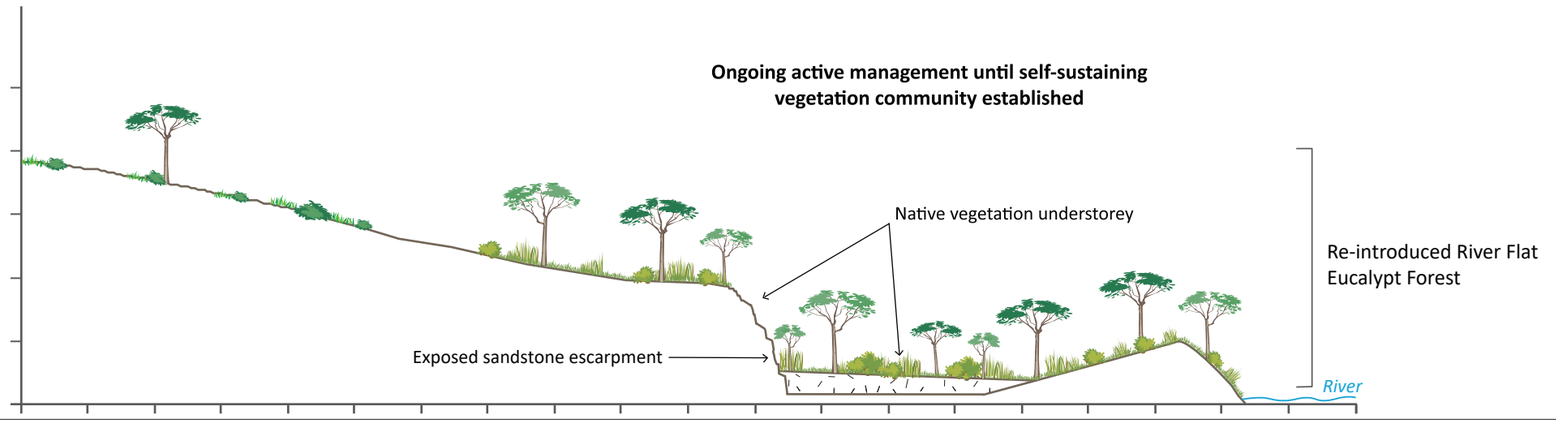
**EXISITNG LANDFORM**




**EXTRACTION**




**FINAL LANDFORM**




**A. Restoration area**

1. Understorey invasive weeds cleared
2. Large trees retained
3. Topsoil (containing weed seedbank) and weeds removed and buried in base of pit
4. Revegetation using species to form a high-quality vegetation community
5. Ongoing active management for years until self-sustaining vegetation community established

**B. Extraction and rehabilitation**

1. Clear vegetation
2. Topsoil (containing weed seedbank) removed and buried in base of pit
3. Extract sand and soil resource, remaining 1 m above water table
4. Place weed-infested soil in base of the pit followed by scalps to form final landform self-draining slope (≤1:50)
5. Revegetate final landform to form high-quality River Flat Eucalypt Forest
6. Ongoing active management until self-sustaining vegetation community established

**C. Setback and lower river bank**

1. Survey outer edge of buffer bank (64 m AHD contour)
2. Provide 10–17.5 m setback from 64 m AHD contour
3. Remove exotic trees and weeds from lower bank by hand
4. Ongoing active management for years until self-sustaining vegetation community established

**KEY**

Resource to be extracted including weed seed bed to be buried

Soil/scalps with weed infested soil placed at base of pit

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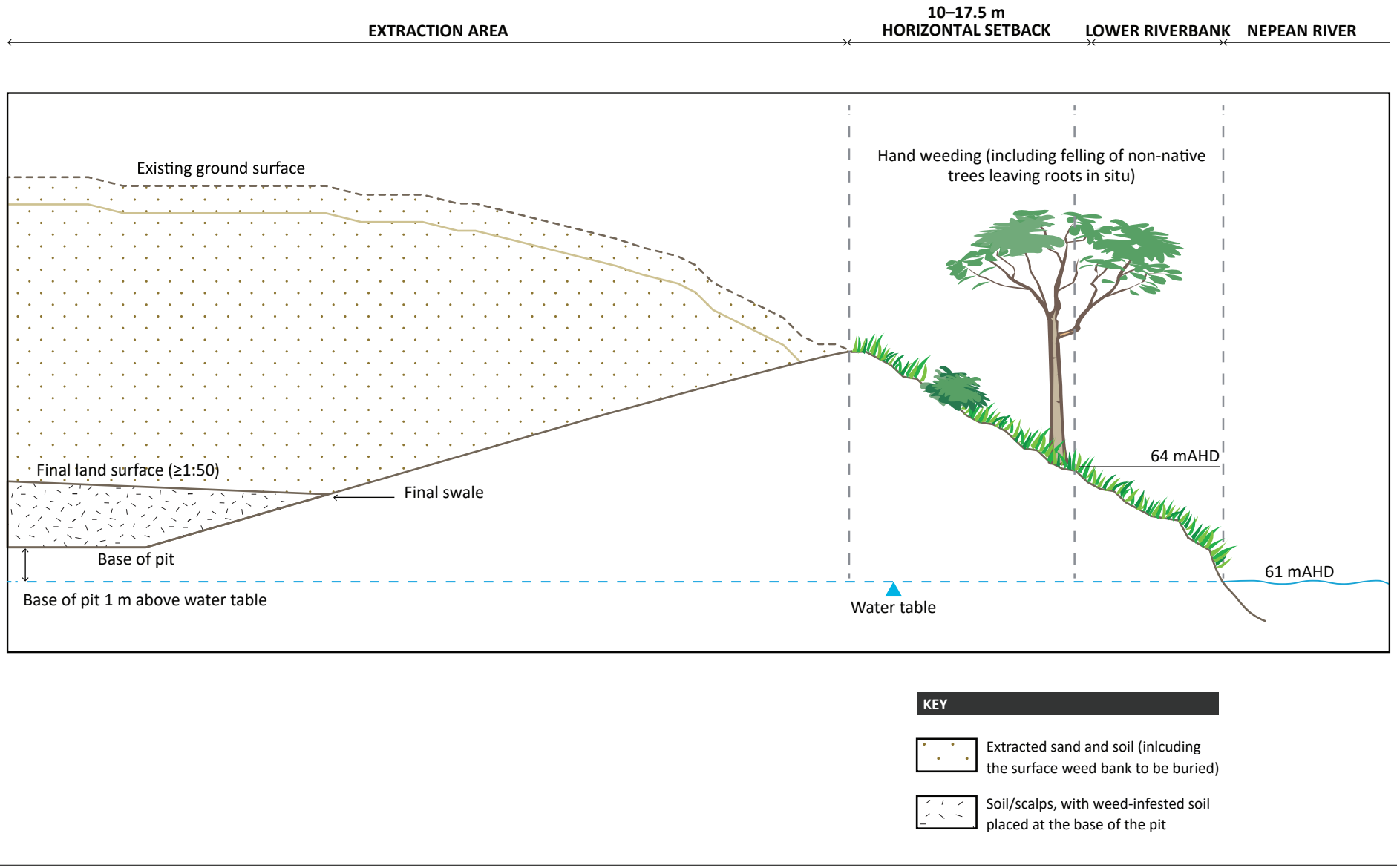
Indicative cross-section

Menangle Quarry Extension

Figure 2.8




Indicative cross-section – close-up

Menangle Quarry Extension

Figure 2.9

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### ii Riverside batter

The riverside batter will be inland of the horizontal setback area (Figure 2.6).

It is proposed that:

- a temporary riverside batter with a maximum slope of 1:1 m (vertical: horizontal)[3], will be used during sand and soil extraction – this will allow the efficient extraction of the resource;
- following extraction of the resource above this batter, the batter will be then built up with suitable site material to give a permanent slope of 1:5 – this will provide additional assurance that the bank will be stable if the active extraction area is flooded during extraction;
- the maximum length of the riverside batter that has a slope between 1:1 and 1:5 will be restricted to 30-m long so that it can be returned to a 1:5 batter within 12 hours if flooding is predicted;
- regardless of the amount of material required, the maximum length of the riverside batter that has a slope between 1:1 and 1:5 will be restricted to 30 m, measured parallel along the river;
- in the final landform, the riverside batter will have a permanent slope of 1:5 – this will provide additional assurance that the bank will be stable in the long term; and
- if over the life of the quarry, activities temporarily cease in the extraction area such that the excavator is relocated from the Stage 8 area, the riverside batter will be always left as a 1:5 batter.

### iii Advancing quarry face

The quarry will progressively advance upstream at an average rate of about 150 m/year. The advancing quarry face will face downstream.

During large floods, river water may overtop the lower riverbank and horizontal setback area and flow into the active extraction area or may overtop the riverbank upstream of the active extraction area and flow along the bank to enter the active extraction area over the advancing face. A maximum batter angle of 1:2 will be applied to the advancing face so as to minimise any scour occurring as the water initially flows down the batter, until the water level in the extraction area is at the same level as the river.

### iv Trailing quarry face

The trailing quarry face, between the active extraction area and backfilled extracted area, will face upstream.

A maximum landward batter angle of 1:5 is proposed for this face as it will face upstream in a flood. As for the riverside batter, this will mitigate the scour risk.

### v Landward batter

The landward, or inland, batter is on the side of the extraction area furthest from the river (Figure 2.6).

A maximum landward batter angle of 1:1 is proposed as it will be exposed to far lower flood current speeds and peak shear stress than the riverside batter. There may be a steeper angle on the landward side of the extraction area where it is formed by the natural sandstone rock escarpment, which in places, may be vertical.

[3] All slopes in this report are expressed as vertical:horizontal.

#### vi Base of the extraction area

Bores will be installed in the base of the active extraction area prior to the commencement of extraction in each successive substage and the water level will be recorded daily during active operations. The resource will be extracted in a manner that ensures that the base of the extraction area is always at least 1 m above alluvial water table resulting from the normal low flow water level in the Nepean River.

### 2.3.3 Pre-extraction surveys

Prior to any extraction occurring in each substage area, a qualified surveyor will:

- mark the boundary of the extraction area closest to the river as defined by the 64 m AHD contour;
- mark the extent of the 10-m-wide horizontal setback area;
- mark all living native trees with their trunk within the 10-m-wide horizontal setback area;
- place a peg 7.5 m horizontally landward of each tree within the 10-m-wide horizontal setback area – marking the extent to which the existing bank will be retained, ie forming the 10-m to 17.5-m-wide horizontal setback area;
- mark all other boundaries of the extraction area such that the area of each substage does not exceed the area in Table 2.1; and
- mark the boundaries of the adjacent restoration (no resource extraction) area.

### 2.3.4 Vegetation clearing

Vegetation will be cleared in campaigns ahead of sand and soil extraction. The area cleared at any one time will be minimised but will provide sufficient area to allow safe operations in the extraction area (allowing for the height of standing trees). The maximum extent of the cleared, but un-rehabilitated, extraction area will be 1 ha, but it is expected that a smaller portion will actually be cleared at any one time.

The timber will be stored onsite, prior to being periodically milled onsite using a portable mill. The milled timber will be used for fencing and other construction in the local area. Through a related entity, Menangle Sand and Soil control about 600 hectares in the local area where this milled timber will be used.

### 2.3.5 Topsoil removal

Topsoil will be stripped to a depth of approximately 0.2–0.3 m. Given that the topsoil in the Stage 8 area contains the seedbank for the noxious weeds infesting the area, this weed-infested material will be placed in the bottom of the preceding extraction area, following resource extraction, and will be covered by material returned as part of creating the final landform (see Section 2.8.1). It is important to bury these weed-infested soils deeply to prevent weed re-emergence.

### 2.3.6 Resource extraction

The sand and soil resource in the Stage 8 area will be extracted using an excavator and off-road haul truck. It will only be extracted to within 1 m above the water table (see Section 2.3.1). The excavator will load the haul truck, which will then transport the sand and soil to the conveyor head (see Section 2.4.1).

### 2.3.7 Dredging

Historically dredging has been used to extract sand from the Nepean River and is permitted in the existing Consent. Dredging is not proposed as part of the extension project (Stage 8).

## 2.4 Onsite material transport and processing

### 2.4.1 Stage 8 area material transport

Proposed Stage 8 works include the progressive construction of a haul road within the proposed Stage 8 area (see Figures 2.3 to 2.5). This haul road will follow existing cleared tracks.

An off-road haul truck will be used to transport excavated sand and soil from the active extraction area to the start of the conveyor, where it will be tipped.

At the conveyor head, sand and soil will be loaded into a self-powered screen which will remove the oversized material (>4 mm scalps). These scalps will be hauled back to the open excavation for use in rehabilitation. The screen will discharge sand and soil onto a conveyor.

The conveyor will be progressively extended south as the extraction moves south (see Figures 2.3 to 2.5). The conveyor will be a temporary structure (approximately 1.5-m high and 1-m wide) that will be removed upon completion of the project.

### 2.4.2 Processing

Mobile screens within the processing area are used to remove roots and coarse material (>4 mm) 'scalps'. The mobile stacker attached to the screen discharges screened soil into a stockpile for sale or blending. Some material is further screened to create specific blended soil products using mobile screening plants and a washing plant.

The wastes from the washing plant consist of organics such as pebbles, roots and fines (very fine sand, silt, and clay particles) in water. These wet fines are gravity fed to the settling pond in the processing area and are mostly recovered from the pond and blended into products. The remaining silts are used to rehabilitate the site.

No changes to material processing are proposed.

### 2.4.3 Blending

Environment Protection Licence (EPL) 3991 lists the type of wastes that can be accepted by the facility and the limits and conditions imposed on the acceptance and stockpiling of this waste. Extracted material is currently blended with these imported materials, where necessary.

No changes to material blending are proposed.

### 2.4.4 Stockpiling

Very little material is stockpiled in the extraction areas. Stockpiles are mainly kept in the processing area.

No changes to material stockpiling are proposed.

## 2.5 Access

### 2.5.1 Site access

The main access to the site is from Menangle Road. Menangle Road is an arterial road which provides sub-regional access. It is not proposed to change the site access for inbound materials or outbound materials.

### 2.5.2 Access to the Stage 8 area

Light vehicles accessing to the Stage 8 area will use the existing access under the Hume Motorway. The existing access was retained when the RMS bisected the lands when acquiring the corridor for the original Hume Highway in 1969. The existing access road under the bridge will be sealed and will comply with RMS drainage and pavements standards.

The earthmoving equipment, off-road haul truck and other plant to service the Stage 8 area will access the area via Moreton Park Road. Major plant is expected to remain onsite through-out the duration of the quarrying operations except for major servicing or replacement.

### 2.5.3 Product dispatch

No changes to product dispatch are proposed. Truck movements at the site (ie combined inbound and outbound movements) will not exceed an average of:

- 147 per day on Monday to Friday; and
- 80 per day on Saturday.

## 2.6 Quarry life

The proposed modification to the existing consent for the quarry would extend the approved life of the quarry for 15 years, from 2020 to 2035.

## 2.7 Biodiversity protection

A land 'swap' is proposed, surrendering the approval to extract sand and soil from the Stage 3 area (5.68 ha) for the same area (in hectares) of the Stage 8 extraction area on a 1:1 basis.

In addition, it is proposed to restore areas upstream, downstream and upslope of the extraction areas. These restoration areas are shown in Figures 2.3 to 2.5 and will form biodiversity offsets to compensate for the clearing of vegetation in the Stage 8 area that is not part of the land swap. Management of the restoration areas will include the removal of the extensive exotic vegetation in the restoration area, allowing restoration of the entire bank, back to a sustainable, high-quality, native ecosystem.

A Stage 8 area vegetation management plan will be prepared that:

- provides details of the conceptual final landform, soil stripping and vegetation clearing protocols, erosion and sediment control measures, rehabilitation of the extraction area and adjacent restoration activities;
- describes how the implementation of the biodiversity offset strategy will be integrated with the overall rehabilitation of the site; and
- details how connectivity will be managed during the rehabilitation program.

A full-time rehabilitation specialist will be employed as part of the Stage 8 area operations.

## 2.8 Rehabilitation and closure

### 2.8.1 Progressive rehabilitation of the Stage 8 area

Following completion of resource extraction, any weed-infested topsoil will be placed in the base of the extracted area followed by scalps and fines. These will used to build up the base of the extracted area to about 64 mAHD. Following construction of the final landform, the area will be immediately planted with grasses to stabilise the surface. Native vegetation will then be established through planting and seeding. There will be ongoing active management of the rehabilitated extraction area, including weed control.

### 2.8.2 Final landform

The extraction area design (see Section 2.3.2), as amended to incorporate changes made since the Refusal, will result in the following final landform:

- the lower riverbank (below 64 mAHD) landform will be unchanged;
- the landform in the 10-m to 17.5-m wide horizontal setback will be unchanged;
- the land will slope down at 1:5 from the landward edge of the horizontal setback to 64 mAHD (the riverside batter);
- the infiltration swale along the toe of the riverside batter will be retained to prevent runoff from the final landform flowing overland to the river;
- a nearly-level area at about 64 mAHD gently sloping (1:50) down to the infiltration swale at the toe of the riverside batter;
- a 1:1 slope, or the exposed sandstone escarpment, down to the western edge of the extracted area; and
- the landform in the restoration area and outside of the extraction area will be unchanged.

The rate and volume of extraction will be monitored to ensure that a final landform can meet these design parameters.

Conceptual final landforms are provided in Figures 2.10 to 2.13.

As described in Section 2.3.2i, the horizontal setback area will vary between 10-m and 17.5-m wide along the length of the extraction areas, depending on the exact locations of trees within the 10-m wide horizontal setback. Conceptual final landforms are presented for a 10-m wide horizontal setback and a 17.5-m wide horizontal setback. The actual final landform will be a mixture between these two conceptual final landforms.

The accuracy of the existing contours is limited by the digital elevation model accuracy. It is not currently possible to improve this accuracy through a detailed topographic survey of the entire Stage 8 area given the density of woody weeds in much of the area. These weeds need to be cleared prior to a detailed survey which would compromise the stability of the land surface if undertaken in a single campaign across the entire Stage 8 extraction area. A qualified surveyor will survey each substage area prior to any extraction occurring in the substage and a detailed final landform for the substage will be prepared.

The base of the ephemeral creek in the southern part of the extraction area will be left at its present elevation below 64 mAHD.

The inland batter of the extraction area will be a 1:1 (vertical:horizontal) sand and soil slope or the currently buried sandstone escarpment. The exact location and slope of the buried sandstone escarpment will vary along the extraction areas. A nominal, 1:1 (vertical:horizontal) has been assumed in the conceptual final landform. Some of this area may be low exposed sandstone cliffs as currently occur upslope of the extraction area.

Over the coming decades, ongoing sand and soil deposition from the river's floods will fill the low areas, eventually recreating the current terraced benches.

## 2.9 Site infrastructure and services

### 2.9.1 Site buildings

There is a compound containing the administrative offices and allied buildings immediately at the site entrance on Menangle Road. The compound comprises:

- an existing site office and amenities building, housing offices, kitchen amenities and soil laboratory;
- an existing wheel wash and weighbridge are located at the top of an elevated bank, level with the floor level of the main building;
- an existing large workshop housing equipment and machinery as well as a storage area for ancillary machinery; and
- existing fuel supply tanks.

No changes to site buildings and infrastructure are proposed.

### 2.9.2 Lighting

There will be no changes to lighting in the processing and site entry areas.

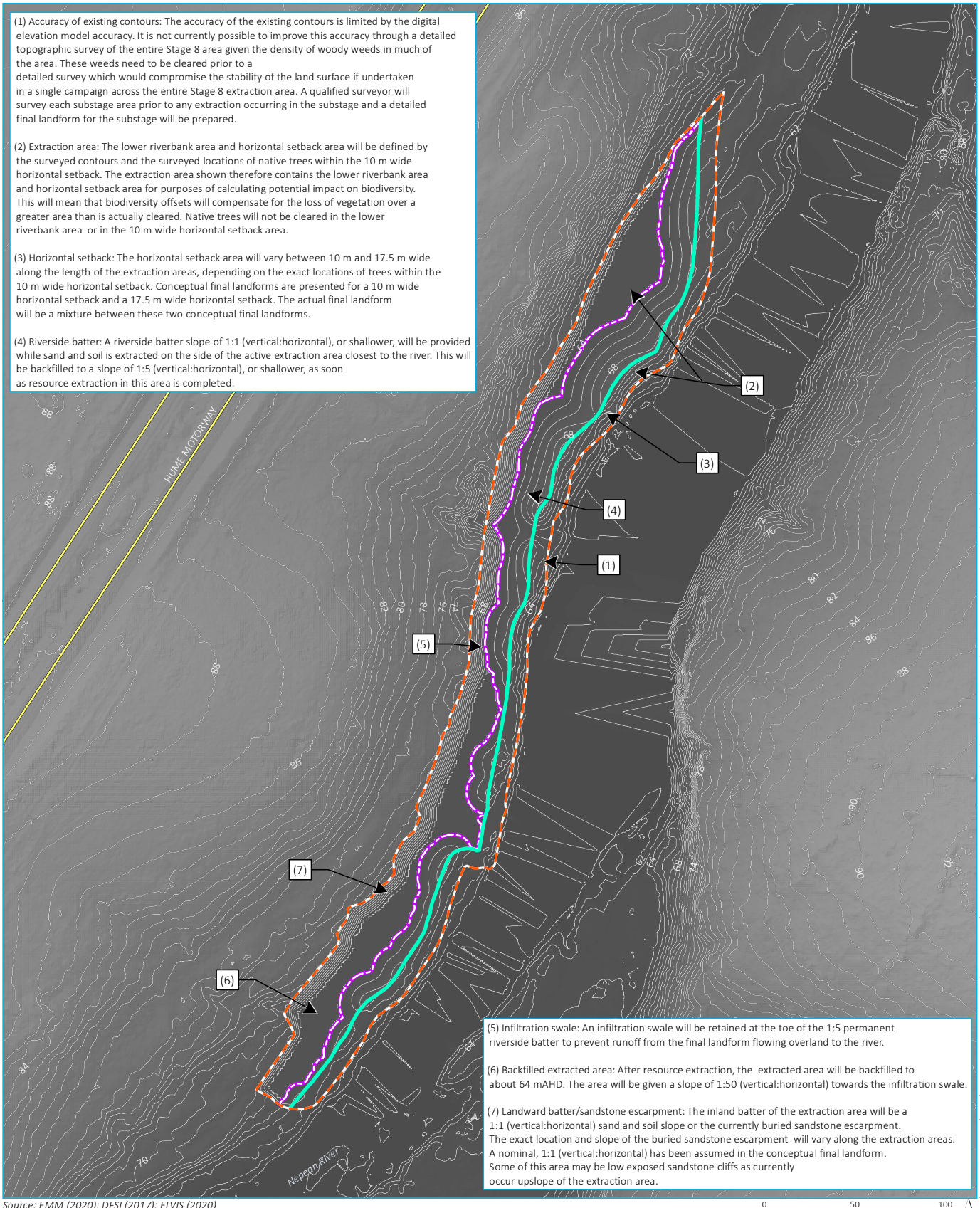
No fixed lighting will be required in the Stage 8 area as extraction will only occur in daylight hours.

## 2.10 Hours of operation

The existing development consent allows the quarry to operate over the following hours:

- 6 am to 5 pm Monday to Friday;
- 6 am to 12 pm Saturday; and
- with no operations on Sundays or public holidays.

No changes to the approved hours of operation are proposed.




*Source: EMM (2020); DFSI (2017); ELVIS (2020)*

0 50 100 m
GDA 1994 MGA Zone 56
N

KEY

- Stage 8 - extraction/rehabilitation area
- Inland extent of horizontal setback (10 m)
- Infiltration swale/toe of riverside 1:5 permanent batter
- Contour (1 m)
- Major road

# Conceptual final landform 10 m setback
# Northern extraction/rehabilitation area

Menangle Quarry Extension
Figure 2.10

EMM creating opportunities