NSW GOVERNMENT

# Menangle Sand and Soil Quarry

*Section 75W Modification Assessment*

*(DA 85/2865 MOD 1)*

October 2018



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# Contents

# 1. Introduction

## 1.1 Background

Menangle Quarry is a sand and soil quarry located off Menangle Road just north of the township of Menangle, adjacent to the Hume Highway and Nepean River. The quarry area covers 123 hectares (ha) and spans both the Wollondilly and Campbelltown local government areas (LGA) (see **Figure 1**). The quarry has been operating since 1978 and is currently owned and operated by Menangle Sand and Soil Pty Limited (MSS).

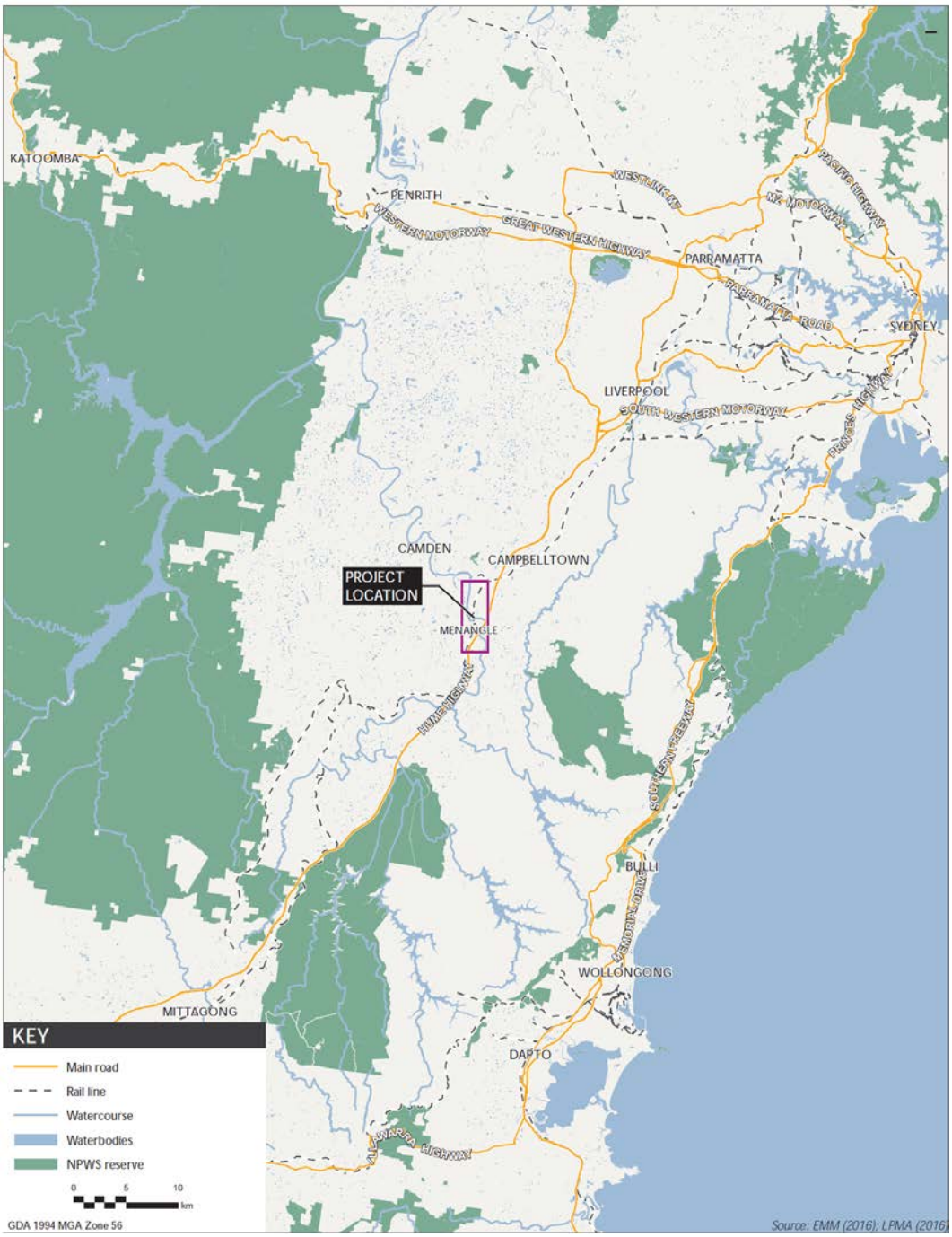


**Figure 1** | Location of the Menangle Sand and Soil Quarry

The quarry is located in a semi-rural environment characterised by scattered residential properties, recreational and agricultural land and other extractive industries within the Nepean Valley. More recently, the surrounding area has experienced a rapid growth in urbanisation; however, these residential developments have not yet encroached on the quarry.

Extractive operations at Menangle Quarry were approved by the then Minister for Planning on 15 March 1989, following a commission of inquiry under DA 85/2865. The consent allows MSS to conduct staged extraction of 7.7 million tonnes (Mt) of sand and soil from the bed and banks of the Nepean River at a maximum rate of 350,000-400,000 tonnes per annum (tpa) until the year 2020. This rate includes 50,000-100,000 tpa of dredge material; however, no dredging has occurred to date.

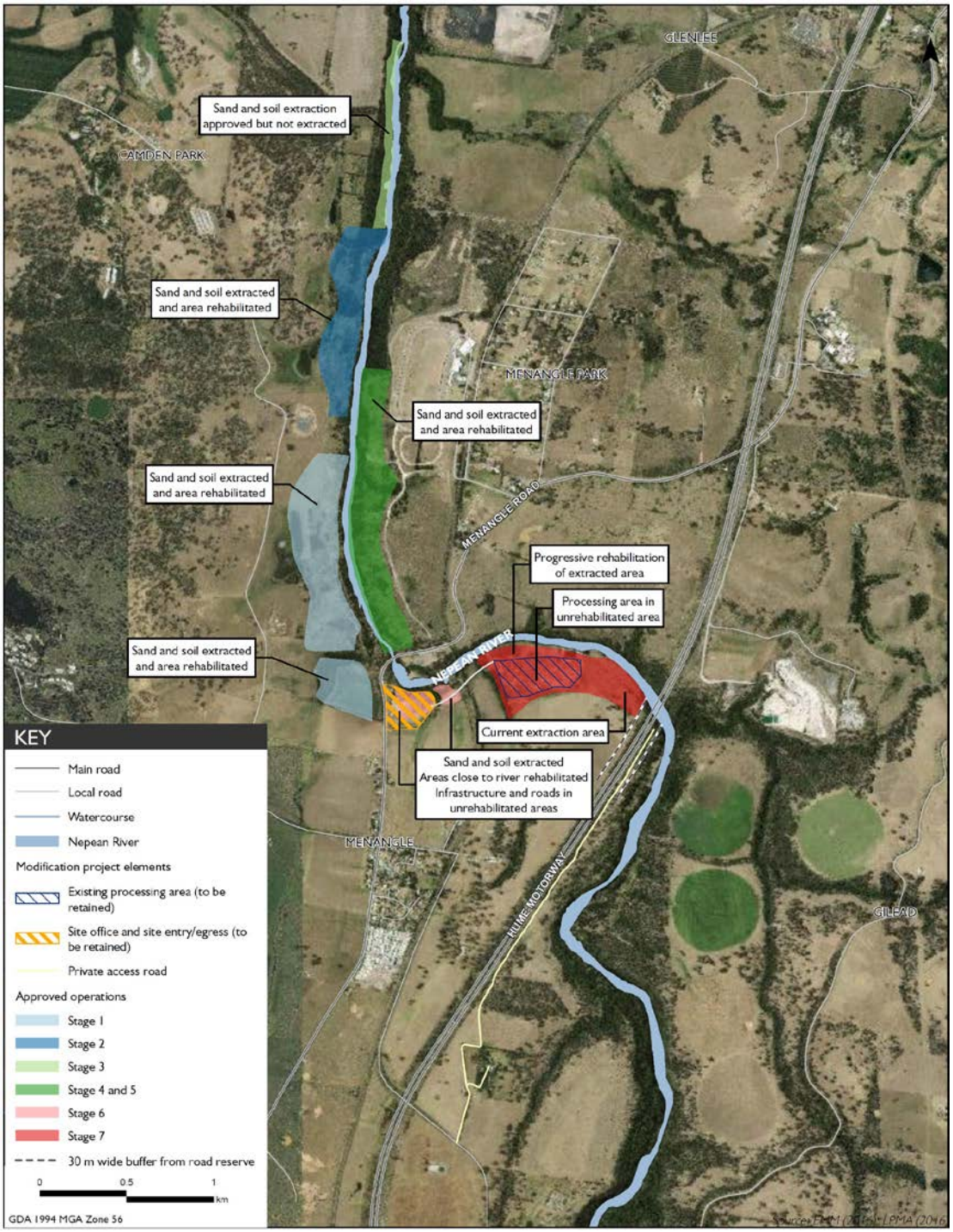


**Figure 2** | Current approved operations

The seven extraction stages are shown in **Figure 2**. Stages 4 and 5 are located on the north/east side of the river within the Campbelltown LGA and the remaining stages are on the south/west side of the river in the Wollondilly LGA. Extraction and rehabilitation have been completed in five of these Stages (1, 2, 4, 5 and 6) with the rehabilitation being accepted and bonds returned to MSS by the respective councils. Extraction and progressive rehabilitation is currently underway within Stage 7.

No extraction has occurred in Stage 3 which was originally identified as having a potential resource of 700,000 tonnes of material to be recovered via dredging and dry extraction of the riverbank. MSS has now identified an opportunity to extend the life of the quarry by expanding to the south, removing the need to develop Stage 3.

# 2. Proposed Modification

MSS is seeking to modify DA 85/2865 under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The modification application was lodged on 22 May 2017 and accompanied by an Environmental Assessment (EA) prepared by EMM Consulting (see **Appendix A)**.

The proposed modification includes extending the life of the quarry by 15 years until 2035 by developing a new 13 ha, 2.8 kilometre (km) long southern extraction area (Stage 8). The proposed Stage 8 area is located along the western bank of the Nepean River, on the eastern side of the Hume Highway (see **Figure 3**). The overall resource within the Stage 8 area includes 500,000 $m^3$ of sand and soil material (approximately 890,000 tonnes) which equates to 760,000 tonnes (t) of saleable material. Development of the Stage 8 area would be used as substitute for the Stage 3 area, which is to instead be relinquished and returned to the Department of Primary Industries (DPI) Elizabeth Macarthur Agricultural Institute (EMAI). The Stage 8 area is entirely within the Wollondilly Shire LGA.

The proposed modification also includes the installation and operation of a 500 metre (m) long overland conveyer under the Hume Highway bridge to transfer material from the proposed Stage 8 area to the existing processing area.

The extraction of the Stage 8 resource would include progressive clearing and rehabilitation in line with the methods currently used at the quarry. Extraction would be undertaken in 13 sub-stages commencing in the north (downstream) and progressively moving south (upstream). Each of these sub-stages would cover of an area of approximately 1 ha, comprising 0.34 ha of active extraction and 0.66 ha of stabilised ground awaiting revegetation, and would take approximately a year to complete.

The proposed extraction method would be dry extraction (ie no dredging). There would be no other changes to the operational workforce, the hours of operations or the current transport rates. A summary of the key aspects of the existing and proposed development are shown in **Table 1**.

**Table 1:** Key aspects of the existing and proposed development

| Aspect | Existing | Proposed |
|---|---|---|
| Resource | 7.7 Mt | • Additional 890,000 tonne resource from the proposed Stage 8 area<br>• Relinquishment of 700,000 tonne resource from Stage 3 area |

| Aspect | Existing | Proposed |
|---|---|---|
| Extraction rate | • Maximum rate of 350,000 - 400,000 tpa, including 50,000 - 100,000 tpa of dredge-recovered material<br>• Average rate over the last three years of 176,000 tpa | • Maximum rate of 150,000 tpa |
| Quarrying methods | Dry excavation and dredging | Dry excavation only |
| Quarrying equipment | 35 t excavator, front end loader and 40 t haul trucks | No change |
| Proximity to Nepean River | 10 m measured from 64 m AHD | No change |
| Extraction depth | 1 m above the normal alluvial water table which is usually 62 m AHD | No change |
| Processing methods | Screening, washing and blending, including blending with imported recycled material | No change |
| Production rate | Average of 260,000 tpa saleable material | No change |
| Timber milling | Periodic milling of felled trees to be reused for fencing | No change |
| Total disturbance footprint | 123 ha | 136 ha (including the proposed Stage 8 extraction area) |
| Quarry life | to 2020 | to 2035 |
| Hours of operation | 6.00 am - 5.00 pm Monday to Friday<br>6.00 am - 12.00 pm Saturdays | No change |
| Transportation method | Via road (Menangle Road, Narellan Road and the Hume Highway) | No change |
| Transportation rate | Up to 84 light vehicle movements and 248 heavy vehicle movements per weekday | No change |
| Employees | 16 full-time on-site employees | No change |
| Infrastructure | Site office, wheel wash and weighbridge, workshop, fuel supply tanks, water, electricity and waste infrastructure | • Additional overland conveyor from the proposed Stage 8 area, under the Hume Highway to the existing processing area. The length of the conveyer would be approximately 500 m in length and 1 m wide<br>• Construction of a temporary haul road to haul extracted sand and soil to the conveyor load point |
| Rehabilitation | Progressive rehabilitation to restore land back to high quality native ecosystem | • No major change<br>• Additional exotic tree and weed removal surrounding the Stage 8 area, including the upper slopes and the intact lower 10 m bank to protect the rehabilitated areas from long-term weed re-establishment |
| Offsets | None | • Relinquish the Stage 3 area<br>• Establish a 13.28 ha restoration area to the west of the Stage 8 area and secure in perpetuity |

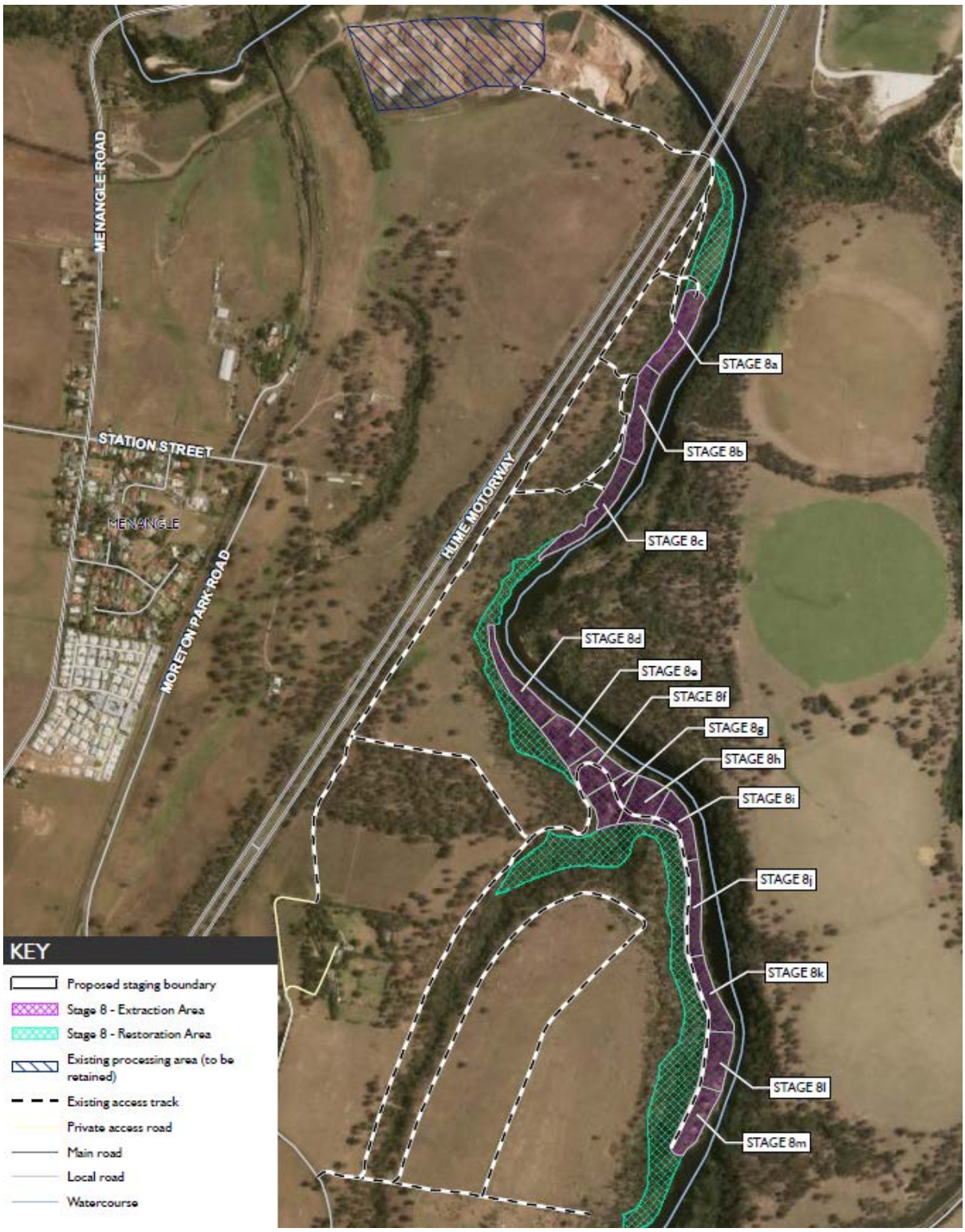


**Figure 3** | Proposed Stage 8 area

## 2.1 Justification

MSS asserts that the modification is required to ensure continued supply of sand and soil products to the growing Sydney construction and landscaping markets. MSS stated that the quarry currently supplies more than 70% of Sydney's topsoil market and the Stage 8 area is likely to be one of Sydney's last remaining extractable topsoil reserves.

MSS considers that the Stage 8 area is a suitable and logical extension area because of its proximity to the existing quarry, distance from sensitive receivers and resource availability. MSS also considers that the proposed modification would provide long-term environmental benefits because, post extraction, the proposed rehabilitation and restoration works would restore a higher quality riparian ecosystem than the current degraded state and it would halt the spread of invasive species that currently dominate the area.

MSS has a vested interest in ensuring the long-term stability of the land as well as maintaining the environmental values of the Nepean River. MSS also stated that it is a long-standing member of the community and its parent company has beneficial ownership over 1,400 ha of land within and around the project area, and it has long-term plans for residential development.

# 3. Statutory Context

## 3.1 Development Consent

The original development application was classified as designated development; however, the then Minister of Planning and Environment issued a direction on 2 June 1986 under section 101 of the EP&A Act to Campbelltown, Camden and Wollondilly councils that all development applications for sand and soil extraction operations be referred to him for determination.

Following a Commission of Inquiry, the development application (DA 85/2865) was granted by the then Minister under Part 4 of the EP&A Act on 15 March 1989. Of note, this consent was granted prior to the introduction of integrated development provisions under the EP&A Act. As such, MSS was and continues to be required to gain all necessary authorities and approvals under other legislation. This is reiterated in condition 3 of Schedule 2 of DA 85/2865 which states that the 'applicant shall obtain all necessary approvals, licences and permits from statutory authorities and departments'.

## 3.2 Section 75W

The development is now considered a 'transitional Part 3A project' under Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*. The power to modify transitional Part 3A projects under section 75W of the Act, as in force immediately before its repeal on 1 October 2011, is being wound up but, as the request for this modification was made before the 'cut-off date' of 1 March 2018, the provisions of Schedule 2 (clause 3) of this Regulation continue to apply. Consequently, this report has been prepared in accordance with the requirements of Part 3A and the Regulation, and the approval authority may approve or disapprove the carrying out of the project under section 75W of the EP&A Act.

The Department is satisfied that the proposed modification to the existing development consent is within the scope of section 75W of the EP&A Act, and may be determined accordingly. It is important to note that section 75W is used only for the purposes of modification, and the development is not an 'approved project' for the purposes of section 75U and 75V of the EP&A Act.

## 3.3 Consent Authority

The Minister for Planning is the consent authority for the proposed modification. Under the Minister's delegation of 11 October 2017, the Executive Director, Resource Assessments and Compliance may determine the application as one public objection was received, no political donations have been declared, and Wollondilly Shire Council and the Campbelltown City Council did not object to the modification.

## 3.4 Permissibility

The proposed Stage 8 area (Lot 203 DP 590247) is zoned RU1 rural under the *Wollondilly Local Environmental Plan (LEP) 2011* and development for the purposes of extractive industries is permissible with consent on this land in accordance with clause 7(3) of the *State Environmental Planning Policy (SEPP) (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP).

## 3.5 Other Licences or Approvals

Activities at the quarry are also regulated under an environment protection licence (EPL 3991) granted under the *Protection of the Environment Operations Act 1997.*

MSS currently holds a Water Use Approval (10WA104627) under the *Water Management Act 2000* (WM Act) which was issued on 1 July 2011. In July 2014, the approval was extended by 10 years to 18 June 2025. The approval permits the extraction of 26 ML of water from the Nepean River for use as dust suppression and sand washing.

MSS also holds a controlled activity approval (CAA) under section 91 of the WM Act as the activities are located on 'waterfront land'. The current CAA was granted on 25 February 2015 and covers part of the Stage 7 area. The Department understands that new CAAs would also be required for the Stage 8 area, if approved.

### 3.5.1 Additional background on the WM Act

The WM Act provides for the 'protection, conservation and ecologically sustainable development of the water sources of the State' and provides arrangements for controlling land-based activities that affect the quality and quantity of the State's water resources. Additional approvals are required under the WM Act for water use, water management works and controlled activities.

Under the WM Act a CAA is required for the removal of material or vegetation from waterfront land (within 40 m of the highest bank of the river). Section 97(4) of the WM Act provides that a CAA is not to be granted unless the Minister is satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any waterfront land as a consequence of the carrying out of the proposed controlled activity.

To assist in the practical application of this provision, Department of Industry – Lands and Water (DoI Water) has produced a series of guidelines, collectively referred to as the *Guidelines for Controlled Activities on Waterfront Land* (CA Guidelines). The CA Guidelines are not statutory in nature; however, all CAA applications need to demonstrate that no more than minimal harm will occur to waterfront land before a CAA can be issued.

Similarly, the *NSW Aquifer Interference Policy* (AIP) describes the water licensing and assessment processes for aquifer interference activities. It also establishes and objectively defines minimal impact considerations as they relate to water-dependent assets, including impacts on groundwater sources, connected water sources, and their dependent ecosystems, culturally significant sites and water users.

The CA Guidelines and the AIP are also relied on by the Department when assessing development applications or modifications.

## 3.6 Environmental Planning Instruments

In assessing the proposed modification, a number of environmental planning instruments (EPIs) were taken into consideration, including the:

- SEPP (State and Regional Development) 2011;
- Mining SEPP 2007;
- SEPP No 33 Hazardous and Offensive Development;
- SEPP (Sydney Drinking Water Catchment) 2011;
- SEPP No 55 Remediation of Land;

- SEPP No 44 Koala Habitat Protection;
- Sydney Regional Environmental Plan (SREP) No.20 – Hawkesbury-Nepean River (No 2 – 1997);
- SREP No.9 – Extractive Industry (No 2-1995);
- Wollondilly LEP 2011; and
- Campbelltown LEP 2011.

The Department has considered the modification against the relevant provisions of these EPIs, as well as MSS' consideration of these matters.

### 3.6.1 Local planning provisions for the Nepean River riparian corridor

The proposed Stage 8 area is identified as 'sensitive land' under the Wollondilly LEP 2011 Natural Resources – Water Map which requires special consideration of impacts on water quality of receiving waters, the natural flow regime, the natural flow paths of waterways, the stability of the bed, shore and banks of waterways, the flows, capacity and quality of groundwater systems (clause 7.3). Under this clause, the consent authority must not grant consent unless it can be satisfied that adverse impacts on water resources can be avoided, minimised or mitigated.

The proposed Stage 8 area is also identified as being below the 'flood planning level', which requires special consideration of flood risks and flood behaviour (clause 7.4). Under this clause, the consent authority must not grant consent unless it can be satisfied that appropriate measures are in place to manage flood risk, avoid significantly adversely affecting flood behaviour and affection, or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

## 3.7 Objects of the EP&A Act

The Minister or delegate must consider the objects of the EP&A Act when making decisions under the Act. The objects of the EP&A Act changed on 1 March 2018. The Department has assessed the proposed modification against the current objects of the EP&A Act (see section 1.3 of the EP&A Act). The objects of most relevance to the decision on whether or not to approve the proposed modification are:

- Object 1.3(a): to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;
- Object 1.3(b): to facilitate ecologically sustainable development (ESD) by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;
- Object 1.3(c): to promote the orderly and economic use and development of land;
- Object 1.3(d): to promote the delivery and maintenance of affordable housing;
- Object 1.3(e): to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;
- Object 1.3(f): to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage); and
- Object 1.3(j): to provide increased opportunity for community participation in environmental planning and assessment.

The Department has considered these objects in its assessment of the modification.

# 4. Engagement

Following receipt of the modification application and the accompanying Environmental Assessment (EA), the Department:

- placed a public exhibition notice in the Macarthur Chronicle on 6 June 2017 and The Advertiser (Campbelltown/Camden-Narellan/Wollondilly) on 7 June 2017;
- publicly exhibited the application and accompanying EA from 7 to 21 June 2017 on the Department's website and at its Information Centre, Wollondilly Shire Council's office and the Nature Conservation Council's office; and
- notified relevant State government authorities and Wollondilly Shire Council and Campbelltown City Council.

The Department is satisfied that the above notification process met the requirements of the EP&A Act and the EP&A Regulation. In response to the notification process, the Department received nine submissions from government agencies and one submission from a special interest group, the National Parks Association of NSW (NPA) (see **Appendix B**). A summary of the issues raised is provided below.

## 4.1 Agency Advice

**Campbelltown City Council** commented on the proposal and highlighted their interest in the morphological processes of the Nepean River, water quality, aquatic ecosystems, measures to mitigate heavy vehicle movements on the local road network, and controls to mitigate air quality and noise impacts, particularly for nearby residential land at Menangle Park and Mount Gilead.

**DoI Water** recommended that the proposal be amended to ensure consistency with the CA Guidelines and requested further information including cross sectional survey plans of the proposal and a scaled plan showing the details of the proposal. DoI Water raised concerns over the proximity of the proposed quarrying operation to the river, and the geomorphic stability and erosive capability of the alluvial soil during flooding events, noting that the impact of flooding could potentially destabilise the entire bank and release large quantities of sediment into the Nepean River. DoI Water requested that MSS provide additional information on the geomorphic stability of the proposed site and mitigation measures to reduce mobilisation of sediment during flood events.

In relation to groundwater, DoI Water stated that insufficient information was provided in the EA and requested further information to justify predicted groundwater impacts, and proposed monitoring and management measures. DoI Water requested an assessment against the AIP and recommended staged monitoring of groundwater levels to establish baseline conditions. DoI Water emphasised the need for stage specific monitoring of groundwater levels to support the assumptions outlined in the EA. DoI Water further requested details of the groundwater monitoring program be provided, including locations of bores, timing, parameters and schedules.

**Department of Primary Industries (DPI) - Agriculture** noted that the Stage 3 area (to be relinquished) is situated within DPIs EMAI and it supports the proposal to leave the area to its natural and agricultural setting.

The **Environment Protection Authority (EPA)** raised concerns regarding dust levels on the site, the quality of blended soil materials being sold, water quality and waterway health, appropriateness of water management measures and the adequacy of the noise impact assessment.

**Division of Resources & Geoscience, Geological Survey of New South Wales (GSNSW)** acknowledged that the quarry represents an important source of sand and soil products for local and regional markets. GSNSW was also satisfied that the EA had adequately assessed the resource potential. GSNSW also noted it collects data

on the quantity and value of construction materials produced annually throughout the State and any recommended conditions should require the Applicant to supply this data. Lastly, GSNSW also recommended that any biodiversity offset areas should avoid resource sterilisation.

The **Heritage Council of NSW (Heritage Council)** noted that no heritage listed items are situated within the proposed Stage 8 area and it is unlikely that the proposal would impact on any historic heritage items or archaeology. The Heritage Council recommends an unexpected finds protocol to be included in the conditions of consent.

The **Office of Environment and Heritage (OEH)** raised concerns over the adequacy of site selection and the proposed biodiversity offsets and recommended that the offset strategy be amended to offset the full impacts of the proposal. OEH raised concern that the proposed swapping of extraction areas was inconsistent with *NSW Biodiversity Offsets Policy for Major Projects*. OEH also noted that there is low potential for Aboriginal cultural heritage around the Stage 8 area.

**Roads and Maritime Services (RMS)** requested a detailed design of the proposed conveyor and related works at the Menangle bridges and the Hume Highway.

**WaterNSW** noted that the proposal would not impact the Menangle Weir and associated fish ladder, and therefore WaterNSW had no further comment on the proposal.

**Wollondilly Shire Council** commented that it was satisfied that the EA had addressed its concerns and requested that, should the consent be granted, the entire consent should be reviewed and reissued to ensure that the format and content of the conditions are brought in line with contemporary requirements.

## 4.2 Special Interest Group Submissions

NPA objected to the proposal and raised concerns with the scale of the operation, potential flooding impacts, the vulnerability of the river bank, rehabilitation obligations and resource exhaustion. NPA requested that, if approved, conditions should be imposed regarding community representation and the provision of annual inspections.

## 4.3 Response to Submissions

On 14 September 2017, MSS provided a Response to Submissions (RTS) (see **Appendix C**). The Department forwarded the RTS to the agencies and made the document publicly available on the Department's website. Following review of the RTS, further advice was provided on the proposed modification by DoI Water, GSNSW, EPA, OEH and RMS (see **Appendix D**).

**DoI Water** considered that insufficient information had been provided in the RTS to justify conclusions regarding potential groundwater impacts and the deemed aquifer interference activity. DoI Water further requested MSS to propose a detailed plan for groundwater monitoring in the alluvium including locations of bores, timing, parameters and schedules. DoI Water stated that an appropriate level of demonstration is required for any aquifer interference activity and recommended that MSS consult with DoI Water in relation to this issue. DoI Water further reiterated that the proposal should demonstrate consistency with the CA Guidelines, in that the Stage 8 extraction area should be located a minimum of 40 m back from the top of the highest bank of the river unless it can demonstrate that no more than minimal harm would occur to waterfront land.

**GSNSW** commented that it was satisfied with how its submission was addressed in the RTS.

**EPA** acknowledged that a number of its concerns had been addressed but requested that receival and storage of waste on the premises should be clarified in conditions, if approved. EPA also advised that any flocculants used for treating water must meet the requirements of the *Protection of the Environment Operations Act 1997*.

**OEH** maintained concerns with the 'land swap' and considered that the Stage 8 restoration areas were not ideal Biobanking sites because of their fragmentation and size; however, this could not be definitively decided until a Biobanking application was received and assessed by OEH. As such, if the proposed Biobanking sites were deemed unsuitable, alternative offsets would be required prior to commencement, if the modification was approved. OEH also requested additional information regarding the presence of the Brown Pommaderris (*Pommaderris brunnea*). OEH requested that a species habitat polygon be included in the Biobanking Credit Calculator (BBCC) calculations and that surveys of the Brown Pommaderris be undertaken in flowering periods to improve the reliability of their surveys.

EMM undertook additional targeted surveys for the Brown Pommaderris on 18 October 2017 to verify its previous assumptions that the species was not present on the site. On 23 November 2017, OEH confirmed that its concerns regarding this species had been addressed.

**RMS** stated it was generally satisfied with the additional information provided in the RTS and provided recommended conditions, if the modification was to be approved. These conditions included the requirement to obtain Section 138 under the *Roads Act 1993* prior to undertaking any works in the Hume Highway Road Reserve.

## 4.4 Additional Information post RTS

Following receipt of agency comments on the RTS, and over a period of approximately 10 months, the Department, in consultation with DoI Water, sought and received additional information from MSS on the potential water-related impacts of the proposal and its compatibility with current policy governing sand and soil extraction within river channels. The two primary unresolved matters related to the proposed activities being classified as 'controlled activities' and 'aquifer interference activities' under the WM Act, and the associated policies or guidelines that must be taken into account for these activities. The correspondence between the Department, MSS and DoI Water is provided in **Appendix E** and summarised in **Table 2**, below.

**Table 2:** Summary of additional correspondence

| Date | Event or Correspondence |
|---|---|
| October 2017 | • The Department requested that DoI Water provide MSS with additional advice on the requirements to demonstrate consistency with the CA Guidelines and the AIP. |
| November 2017 | • DoI Water provided additional advice on CAA requirements and the AIP.<br>• MSS provided additional assessment against the Objectives for Riparian Corridor Management under the CA Guidelines. This assessment confirmed that the proposed Stage 8 area would be on waterfront land and within the riparian corridor, confirming that a CAA would be required.<br>• MSS provided additional details on its proposed groundwater monitoring program. |

| Date | Event or Correspondence |
|---|---|
| December 2017 | • Following review of this information, DoI Water again raised fundamental concerns with the proposal, including:<br>o that it was in contravention with the CA Guidelines and therefore it is unlikely that a CAA could be issued for the proposal in its current form because it could not be demonstrated that 'no more than minimal harm would be done to waterfront land as a consequence of carrying out the controlled activity'; and<br>o that insufficient assessment against the AIP had been undertaken.<br>• The Department supported DoI Water's concerns and advised MSS that based on the current information and DoI Water advice, it was likely to recommend that the modification be refused, unless MSS could demonstrate that the proposal was in keeping with current policy.<br>• Minter Ellison, on behalf of MSS, responded to the Department and argued that:<br>o MSS has successfully extracted material from on or in close proximity to the Nepean River for the past 40 years and that this demonstrates MSS' ability to meet the objectives of the CA Guidelines;<br>o the CA Guidelines should not be applied rigidly and that they are not statutory in nature;<br>o DoI Water should inspect the site to better understand the subjective features;<br>o the resource is the last remaining topsoil reserve in the Sydney region; and<br>o refusing to grant a CAA would lead to a poor environmental outcome because noxious weeds would proliferate the site. |
| February 2018 | • A joint site visit was undertaken with Department officers and DoI Water.<br>• DoI Water provided further advice to MSS on why the proposal did not pass the minimal harm test. |
| March 2018 | • MSS provided additional information in response to DoI Water's advice of February 2018. |
| April 2018 | • DoI advised that, based on all information provided to date, it would be unable to issue a CAA for the proposed extraction.<br>• DoI Water requested that appropriate geomorphic assessment be provided to support conclusions relating to geomorphic integrity of the channel, bank and floodplain pockets of the Nepean River. |
| May 2018 | • MSS provided an additional Review of Fluvial Geomorphology prepared by Fluvial Systems. |
| June 2018 | • MSS provided an additional Flood Impact Assessment prepared by Advisian. |
| August 2018 | • Following review of the additional studies, DoI Water advised that insufficient assessment of the potential impacts on the geomorphic stability of the Nepean River has been presented to demonstrate that adequate arrangements are in place to ensure no more than minimal harm would occur to waterfront land as a result of the proposal, and it would therefore be unable to issue a CAA for the proposed extraction.<br>• MSS provided a response to DoI Water's letter of August 2018. |

# 5. Assessment

The Department has assessed the merits of the proposed modification in accordance with the relevant objects and requirements of the EP&A Act. As part of this assessment, the Department has considered the:

- modification application and accompanying EA;
- the RTS and additional information provided by MSS;
- agency advice on the EA, RTS and additional information;
- the special interest group submission;
- the Environmental Impact Statement for original development application (1987 EIS);
- existing conditions of consent; and
- relevant EPIs, policies and guidelines.

The Department considers that the key assessment issues of the proposed modification are water and biodiversity. The Department's assessment of these and other issues for consideration are summarised below.

It is important to preface the assessment section with details on the history of environmental assessment and management at the site. DA 85/2865 was granted more than 30 years ago and during this time environmental monitoring and management standards and regulation of extractive industries has significantly advanced. As such, the current conditions of consent for the quarry are not consistent with contemporary requirements. There are no performance criteria in the consent and likewise there are minimal monitoring, reporting or auditing requirements to demonstrate success (or lack thereof) or conformance to predictions made in the 1987 EIS. Other than visual inspections and the occasional rehabilitation inspection report there is virtually no site-based data or evidence for MSS to rely on to demonstrate that maintaining existing management practices in the Stage 8 area would meet contemporary standards.

Despite this lack of data and evidence, MSS heavily relies on its prior 'track record' to support its environmental impact assessment for the proposal and that positive long-term environmental outcomes could be achieved. In general, a sites performance history is not a primary consideration when assessing the merits of a proposal. However, it is considered in this merit assessment as it is heavily relied upon by MSS to justify the proposal. The Department requires the assessment to be supported by evidence-based information.

## 5.1 Water

The EA included a Flooding, Geomorphology and Onsite Water Management Assessment, prepared by National Project Consultants Pty Ltd (NPC study), to assess the potential impacts of the proposed modification on water resources including flooding, sedimentation and geomorphological processes. As summarised in Table 2, additional water-related information was also later provided by EMM, Fluvial Systems (Review of Fluvial Geomorphology) and Advisian (Flood Impact Assessment).

The key water-related impacts of the proposal are flooding and bank stability. DoI Water advised that the proposal requires consideration under the CA guidelines which are in place to protect waterfront land and the sensitive riparian corridor. Where a proposal is inconsistent with these guidelines, it must demonstrate that no more than minimal harm would occur to waterfront land.

### 5.1.1 Geomorphological, Hydrological and Hydrogeological Setting

The proposed Stage 8 extraction area is located on the western banks of the Nepean River, upstream of the Menangle Weir. The incised narrow river valley is characterised by lower and upper depositional terraces containing alluvial sand and soil sediments that have accumulated during flood events over tens of thousands of years. The area remains within the present day Nepean River floodplain and is flooded often. While this setting is similar to MSS' previous extraction areas downstream, the landscape of the Stage 8 area is notably different with a much narrower valley and steeper terraces (see **Figures 4** and **5**). This confined landscape provides less area for lateral dispersion of flood waters and results in higher water velocities.

The geomorphology of the Nepean River varies along the Stage 8 area, with the northern end being relatively straight with sediments deposited on both sides of the river. The southern end is a more confined semi-incised formation with a rocky escarpment on the eastern side of the bend and sediments largely deposited on the western side.

The river bank is notably degraded with previous evidence of slumping and weeds within the mid-story and ground cover which threaten the remaining native riparian vegetation (see **Section 5.2** for further discussion on biodiversity impacts).

The hydrogeology of the site is characterised by the Quaternary alluvial sediments (the resource), underlain by the Triassic Ashfield Shale in places, and the Triassic Hawkesbury Sandstone. The alluvium supports perched and unconfined groundwater that is highly permeable and directly connected with the Nepean River. The alluvium is recharged by rainfall, runoff and the river water.

The alluvium is understood to be hydraulically disconnected with the regional groundwater system where the impermeable shale is present above the sandstone. The underlying sandstone acts as an extensive confined to semi-confined regional aquifer within the Sydney Basin sequence, which is recharged through lateral through-flow from up-gradient areas. This system is an important groundwater source for the Greater Metropolitan Region.

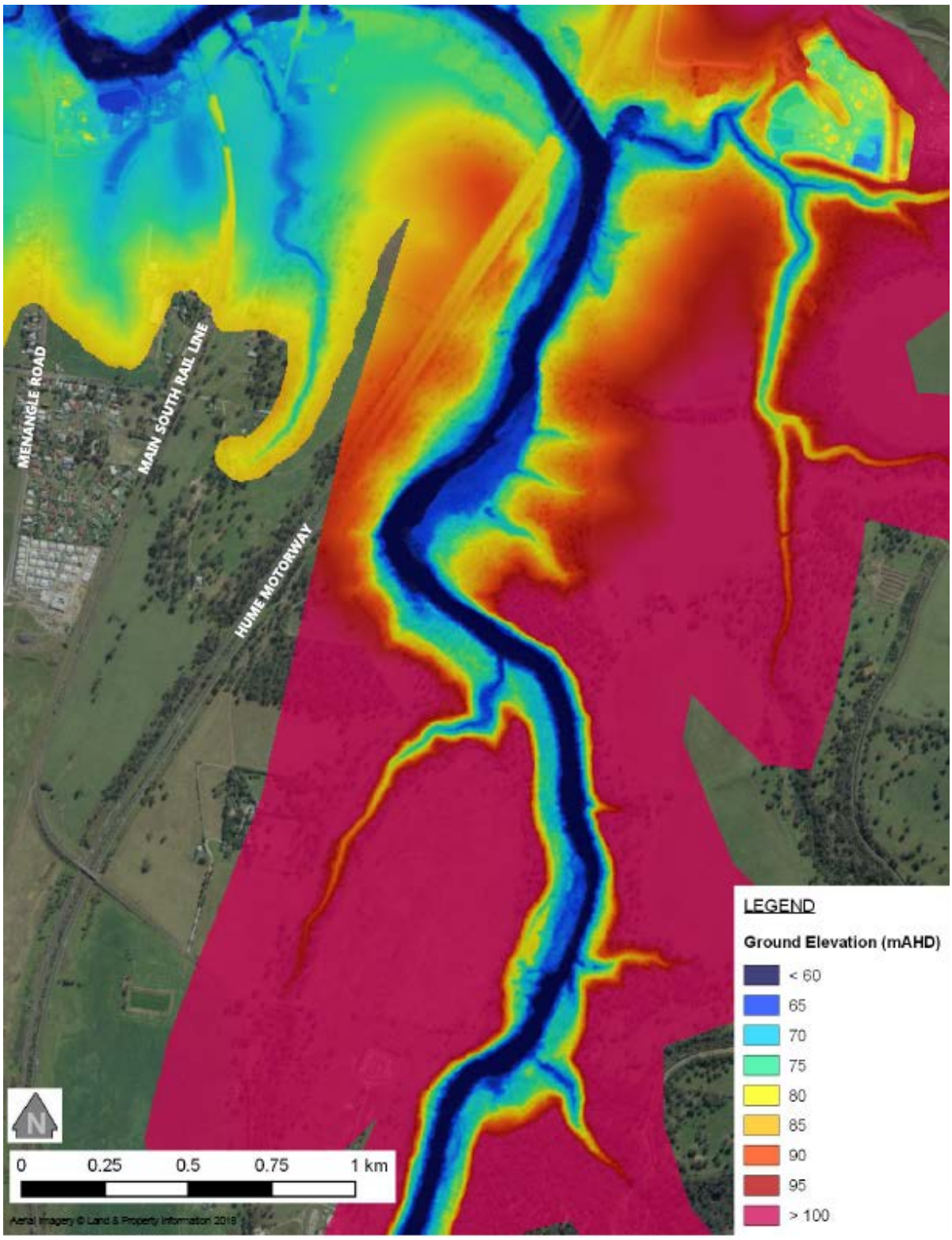


**Figure 4** | Existing site topography

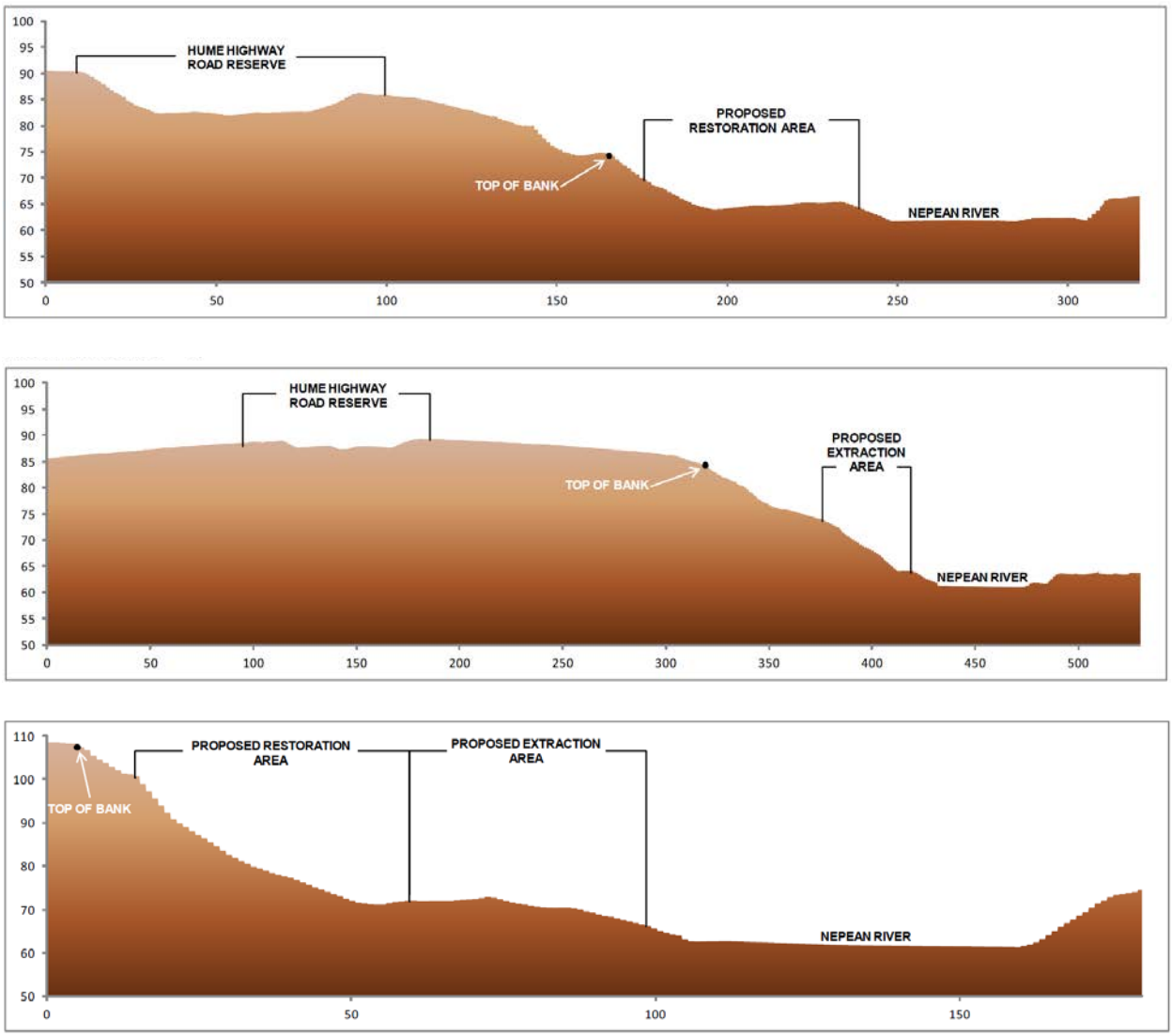


**Figure 5**| Example cross sections of the proposed Stage 8 area

### 5.1.2 Predicted Impacts

*Flooding*

The EA concluded that the proposal would have no adverse impact on flooding despite the fact that the Stage 8 area would be significantly inundated by flood events.

The EA stated that the higher floodplain terraces would be inundated less regularly and only for floods greater than a 20 year Annual Recurrence Interval (ARI) event, and the lower terraces would likely be inundated by 5 year ARI and greater floods. However, the elevation associated with these terrace levels was undefined.

Additional information provided by EMM reproduced flood recurrence data from the 1987 EIS which stated that the river is filled to near floodplain level approximately once every two years (ie above 71 m AHD) and a substantial part of the floodplain (ie above 75.75 m AHD) is inundated once every 50 years. This information also advised that generally the water level in the main river channel is lower than 63.4 m AHD over 99% of the time. MSS has used this height to set a 10 m buffer between the river and the extraction areas. This retained 10 m bank would be used as a bund to keep 'normal flow' river water from inundating the extraction area. This setback is further discussed in **Section 5.1.3** below.

The EA also concluded that the velocity of overbank flood water would reduce as it spreads over the extraction area due to increased flow area with a consequential increase in deposition and reduction of scour potential.

DoI Water raised concerns with this simplistic analysis of the floodplain and the potential impacts of flooding on the proposed operations and surrounds. Given the loose nature of the alluvial sand and soil, it would be likely that a flood event could mobilise sediment and bank material leading to the destabilisation of the retained 10 m bank between the extraction area and the river. This could also have potential detrimental implications for the downstream function and health of the Nepean River.

MSS engaged Advisian to undertake a Flood Impact Assessment (FIA) in response to DoI Water's concerns. As there was no existing flood model for the proposed extraction area, Advisian utilised inputs from the *Nepean River Flood Study* (2015) prepared for Camden Council to create a modified model of this area. This model simulated flooding impacts under a 'mid-construction' scenario, which assumed:

- stage 8J (see **Figure 3**) to be in an excavated condition;
- all downstream stages (8A, 8B, 8C and 8I) to be in a rehabilitated state; and
- all remaining upstream stages to be in their existing state.

The FIA indicated that the river along the extraction area would overtop the bank during a 50% Annual Exceedance Probability (AEP) event (ie approximately a 2 year ARI event). The Department notes that this frequency is inconsistent with previous documentation provided by MSS. Based on the information provided, it is clear that the proposed extraction areas would be inundated often, but the exact frequency is unclear.

The FIA predicted that the proposal would result in a redistribution of flows in the area. In general, the lower terraces would become inundated earlier and remain inundated for longer periods of time. There would be increased flow velocities along much of the Stage 8 area as a result of the lower elevation from extraction and cleared vegetation, and likewise decreased flow velocities in the main river channel adjacent to the Stage 8 area due to the extra lateral flow area providing flood conveyance. As a result of this inundation, there would also be an increase in the deposition of sediment relative to severity of the flooding event. The Department notes that these FIA findings do not readily align with the broad floodplain assessment in the EA.

Based on predicted flood velocities and inundation duration, the FIA assessed the risk of erosion within the proposed Stage 8 area. The results indicate that the risk of erosion increases with severity, extent and duration of flood events. It was predicted that there would be a low risk of erosion during a frequent 50% AEP event and increased localised risks during an intermediate 5% AEP event (ie 20 year ARI). However, under a rare 1% AEP event (ie 100 year ARI), there would be an increased risk of erosion across the site. The FIA does not formally categorise this increased risk as high, moderate or low.

The effect of this erosion on net sediment loads was not quantified; however, the FIA found that peak river flow velocities during intermediate and rare flood events would remain high enough such that there would be no material increase in sedimentation of the channel.

Despite the increased risk of erosion during intermediate and rare flood events, the FIA concluded that this increase would be localised and that the proposal would not materially change the current depositional regime. The Department considers that the acceptability of this increased risk of localised erosion depends on the flow on effects to river geomorphology and bank stability. This is discussed further below.

Lastly, the Department notes that this section has focused on the impacts of overbank flood events; however, the extraction area would also be affected by less significant high flow events (ie between 61 and 64 m). Due to the connected nature of the river and the alluvium, the alluvial water table would also rise during high flow events leading to operational disruptions and the retained bank being frequently saturated.

*River Geomorphology and Bank Stability*

Vegetation removal and extraction along the river has the potential to affect bank stability from increased fluvial scour, particularly during flood events. DoI Water raised concern over the proposal's potential impact on the

geomorphic integrity of the river bank and considered that MSS had not demonstrated that the proposal would maintain the existing or natural hydraulic, geomorphic and ecological functions of the river.

MSS engaged Fluvial Systems Pty Ltd to undertake a review of fluvial geomorphology (RFG) in response to DoI Water's concerns. The RFG found that:

- the geomorphic settings of the existing and proposed Stage 8 areas are notably different; however, as both areas have degraded capacity to perform the expected biophysical functions of the river type and have low potential to recover that capacity, it can be argued that past quarrying experience could still inform management of geomorphic risks in the Stage 8 area;
- geomorphic risk of scour would vary considerably along the length of the proposed extraction area due to topographic variation; however, this risk would increase within exposed extraction areas due in part to the removal of vegetation (which provides resistance against fluvial erosion) but primarily due to the decreased elevation;
- extrapolated bed sheer stress and velocity data of a 5% AEP flood event demonstrate that vegetated surfaces would have low risk of scour whereas exposed surfaces would have a moderate risk of scour;
- the additional eroded sediment would be negligible compared to the total sediment load of the river and the area would continue to be dominated by deposition;
- there is some uncertainty around the potential for scour-induced bank slumping and channel migration;
- previous studies identified that catastrophic channel widening in this area would require both clearing of bank vegetation combined with periods of unusually large or frequent floods; and
- it is 'normal practice' to trade short-term geomorphic risk of fluvial scour for long-term biodiversity benefits of restoring riparian corridors.

The RFG utilised modelling results from the 1987 EIS to predict potential impacts of the Stage 8 area. The RFG acknowledged that the confined nature of the channel of the Stage 8 area would create different flood hydraulic characteristics compared to those of previous extraction areas downstream. However, it considered that some sections previously studied in the 1987 EIS remain comparable.

The RFG concluded that there would be a negligible risk of river bank instability as a result of the extraction in the Stage 8 area. This conclusion was based on a:

- 'negligible' consequence as the exposed area at any one time would be small; and
- 'unlikely' likelihood based on historical studies of comparable locations that did not report problematic erosion.

As discussed above, the majority of the Stage 8 area would be inundated by frequent flooding events. When flood levels overtop the bank, the risk of scouring would increase, with the degree of risk dependent on the severity of the flood event. The RFG presented risk categories of maximum permissible velocity and bed sheer stress for the initiation of fluvial scour for both well vegetated and exposed areas. Based on historic predictions of comparable downstream locations, the RFG found that flood velocities would present a moderate risk of scour of bare soil and a low risk of scour on a vegetated surface.

The Department notes that the FIA and RFG utilise different flood models to inform their assessments. In absence of a consistent model between these studies, the Department summarised the risk of scour initiation under frequent, intermediate and rare flood events using the risk categories identified in the RFG and the predicted water velocities under the FIA's mid-construction scenario (see **Tables 3** and **4**).

**Table 3:** Risk of initiation of scour – Mid-construction scenario – Stages 8B 'Rehabilitated'

| AEP Category | Existing condition velocity (m/s) | Increase velocity | Total | Risk Category* Trigger (m/s) | Risk of Scour Well vegetated Flood Plain | Change of risk category |
|---|---|---|---|---|---|---|
| 50% | 0.18 | 0.46 | 0.64 | <2.0 | Low | None |
| 5% | 1.4 | 0.51 | 1.91 | <2.0 | Low | None |
| 1% | 2.81 | 0.6 | 3.41 | 2.1 – 4.0 | Moderate | None |

**Table 4:** Risk of initiation of scour – Mid-construction scenario – Stage 8J 'Exposed Soil'

| AEP Category | Existing condition velocity m/s | Increase velocity | Total | Risk Category* Trigger (m/s) | Risk of Scour Exposed Soil | Change of risk category |
|---|---|---|---|---|---|---|
| 50% | 0.06 | 0.96 | 1.02 | 0.48 – 1.0 | Moderate | Low to Moderate |
| 5% | 0.82 | 0.35 | 1.17 | >1.0 | High | Moderate to High |
| 1% | 1.08 | 0.38 | 1.46 | >1.0 | High | None |

* Risk categories allocated in accordance with Table 4 of the RFG

This summary indicates that there would be a low to moderate risk of scouring of rehabilitated stages (Stage 8B) during the various AEP events, if well vegetated. The Department notes that rehabilitation would be progressive, and the establishment of vegetation would improve over time. On this basis, it is important to recognise that this 'well-vegetated' scenario may not be indicative of surface conditions during the early stages of rehabilitation. Exposed extraction areas (Stage 8J) would be subject to a moderate to high risk of scour initiation across the various AEP events.

The RFG also drew on historical studies of bank stability conducted in 1987 for areas upstream of the Stage 8 area. This study recorded bank slumping in various locations along the riverbank and considered a range of possible causes including channel deepening, climatic conditions, build-up of depositional alluvium and increased shear stress from flood frequency. Sand extraction was also considered as a possible cause. However, it was noted that this instability was present prior to the commencement of extractive activities. No single factor was identified as predominantly responsible for the slumping and it was suggested that slumping was a naturally recurring feature of the river in this area.

Information provided by MSS does not draw a connection between the risk of scour initiation and potential river bank instability along the potentially impacted reaches of the Nepean River. Additionally, no site specific analysis of bank stability has been provided for the Stage 8 area. In its latest correspondence, DoI Water advised that the information provided does not demonstrate that the lateral penetration of bank saturation is well understood, and MSS has not identified potential revegetation and/or bank reinforcement measures that could be implemented, particularly on break out and re-entry points for overbank flows from and back into the river channel. On the basis that there remains uncertainty surrounding the likelihood of scour-induced bank slumping, the Department and DoI Water cannot be satisfied that this risk of scour causing bank instability is acceptable.

*Groundwater*

The EA provided a conceptual groundwater assessment as there is no groundwater monitoring data available that is representative of the Stage 8 area. MSS identified that the groundwater table in the alluvium is largely controlled by the water level in the river due to proximity and high permeability. Extraction activities are proposed to remain 1 m above the normal alluvial water table which is generally the 61 m AHD river level set by the Menangle Weir. However, during floods and/or heavy rainfall events, the alluvial water table would rise and cause some

groundwater inflows into the active pit. MSS advised that this inflow would infiltrate back into the ground as flood or high waters recede.

DoI Water considered that the interactions with the alluvium constitute an aquifer interference activity and requested an assessment against the AIP. DoI Water also advised that the proposal would need stage specific monitoring of groundwater levels in the alluvium to manage extraction in proximity to the groundwater level. MSS initially argued that the water table level could be determined from the adjacent river or by groundwater water seeping into the pit, and that the need for monitoring bores was unjustified, but later committed to undertaking a groundwater monitoring program (see **Section 4**).

The RTS included an assessment against the AIP's minimal impact considerations for highly productive alluvial water sources. This assessment concluded that no groundwater take would occur as part of the proposed activity, however there would be incidental inflow into the extraction area when the alluvial water table is elevated. The assessment recognised that groundwater within the alluvial deposits of the proposed extraction area is mostly perched and disconnected from the regional groundwater system. However, MSS also acknowledges that there are some locations where the shale has been eroded and the alluvial deposits directly overlie the Hawksbury Sandstone. On this basis, there remains uncertainty of the hydraulic connectivity between the alluvium and the regional groundwater source.

DoI Water disagrees with MSS' conclusion and considers that the proposal is an aquifer interference activity and the requirements of the AIP have not been met.

***Water Quality***

MSS considered that the proposal would have no adverse impact on surface water quality, as:

- no chemicals would be used in the extraction area (or processing area);
- extraction would not result in the release of any pollutants or changes in salinity (ie no acid sulfate soils);
- water from the extraction area and sedimentation basins would infiltrate to the alluvium removing any suspended sediment; and
- there is no evidence to suggest that previous sand extraction stages have had any long-term effect on water quality.

MSS proposes to construct sediment basins at the base (down-slope) of each active extraction area to capture sediment laden runoff. These sediment basins are predicted to exceed their capacity two to four times a year on average due to large storm events. However, these overflows would be directed into the base of the extraction area and left to infiltrate into the alluvium. This infiltration has the potential to impact alluvial groundwater quality. These impacts may extend to the regional groundwater source as there is uncertainty around the connectivity of these two systems.

DoI Water considered that there is potential for contamination of groundwater from reuse and seepage of sediment basin water. The infiltration process is not limited to the removal of suspended solids and the quality of the water may change from what was originally deposited. The Department notes that the likelihood of any contamination is low; however; there is no groundwater data available to further assess these potential water quality impacts to both the alluvium and regional groundwater system.

To inform predictions about the proposal's potential impacts on river water quality, MSS drew on a 2014 study undertaken by Ecoengineers for Appin Colliery Longwall 705. This study was conducted during Stage 7 operations and analysed water quality during normal flows along a 16 km stretch of the Nepean River between Douglas Park and Menangle Weir. MSS concluded that its operations were not contributing measurable nutrient concentrations to the Nepean River. However, the Department considers that this study does not appropriately represent the proposal's potential water quality impacts.

As sediment mobilisation in the river would most likely occur during flooding events, the use of normal flow samples does not adequately reflect the quarry's potential contribution to nutrient concentration in the river. Additionally, this study has a limited sampling period in relation to the site's 40-year history of extraction, and there appears to be no sampling points downstream of the Stage 7 area. Based on the information provided by MSS, there is insufficient data to analyse water quality trends over the life of the existing operations or to predict potential changes as a result of the proposal.

Nevertheless, MSS asserts that any impacts on water quality of the Nepean River would be short-lived and the river appears to have the capacity to absorb them. The Department considers there is insufficient information to assess the potential impacts of the proposal on surface water quality against the Australian and New Zealand Environment Conservation Council (ANZECC) water quality guidelines and NSW water quality objectives.

### 5.1.3 Proposed Avoidance, Mitigation and Management

*Erosion and Sediment Control*

MSS would continue to adopt its existing erosion and sediment controls currently being used at the quarry. This includes utilising the bund formed by the undisturbed river bank and swales to divert and capture surface-runoff into down-slope sediment basins (see **Figure 6**). The sediment basins would be designed in accordance with *Managing Urban Stormwater: Soils and Construction* including *Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008)* (Blue Book) to accommodate a 90$^{th}$ percentile design storm event. This would equate to a capacity of 273 m$^3$ at any one time.

The EA initially stated that water would be discharged (via pump) from the sediment basins if the total suspended solids (TSS) concentration is less than 50 mg/L. Although, due to the porous nature of the alluvium, this practice has not been necessary throughout the site's operating history. In its RTS, MSS retracted its proposal to undertake controlled water discharges and clarified that all water would be removed via infiltration into the alluvium from the pit floor or sediment basin. The EPA noted this commitment and the Department acknowledges that no discharge from the site is a desirable outcome for quarrying operations. The Department considered the potential water quality impacts of this infiltration in **Section 5.1.2** above.

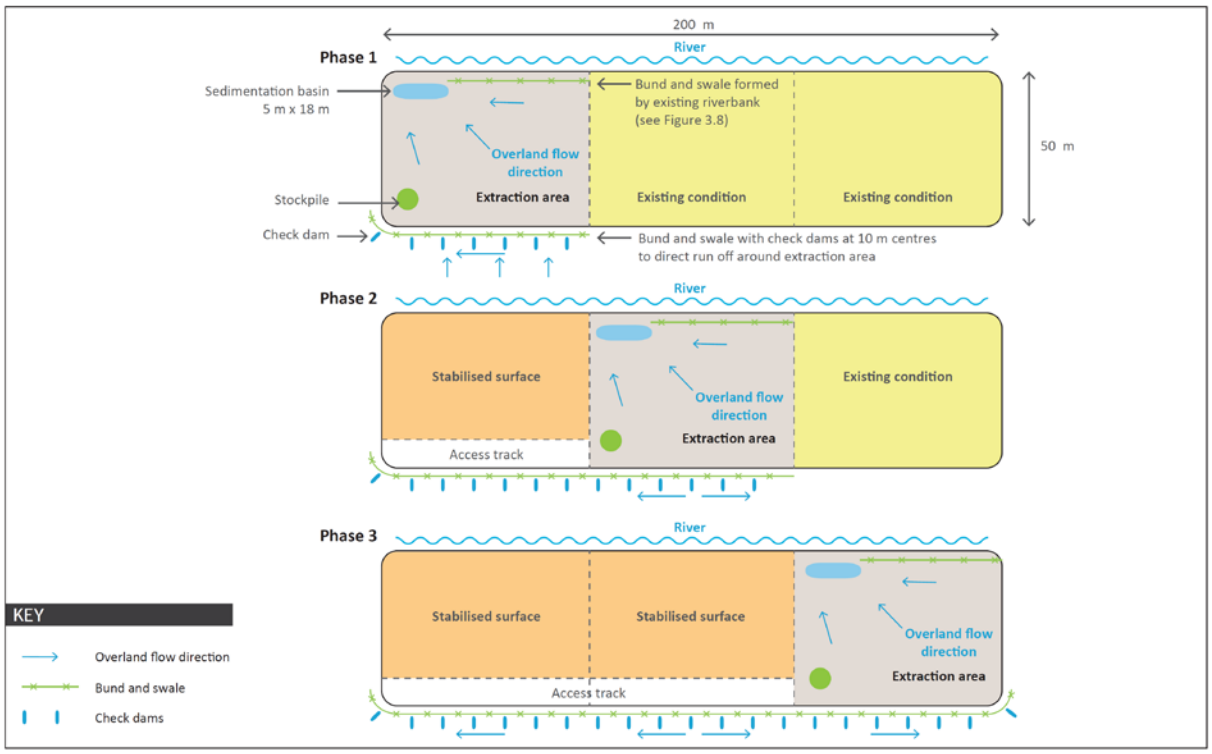


**Figure 6** | Erosion and sediment control diagram

*Surface Water Monitoring*

MSS has committed to monitor surface water quality of the Nepean River for at least 12 months prior to the commencement of extraction activities in the Stage 8 area. Monitoring would be undertaken quarterly, and samples would be collected upstream and downstream of the active extraction area. Samples would also be taken from the sediment basins to determine if there are any contaminants in the sediment basins that could infiltrate to the underlying alluvium or the Nepean River.

However, the Department is not satisfied that this monitoring would provide a sufficient amount of data to predict water quality impacts from extraction in the Stage 8 area. The sampling period would be unlikely to represent a variety of flow events and is less than the ANZECC Guidelines baseline data collection period of two years. In the absence of sufficient baseline monitoring data, the Department and DoI Water cannot be satisfied that the proposal would have minimal impacts on water quality.

*Flood and High Flow Management*

MSS would temporarily cease extraction activities when the alluvial water table rises into the pit during flood or high flow events. MSS has committed to preparing a Flood Response Plan which would be implemented based on flood alerts. The responses would initiate the movement of personnel and equipment to higher ground prior to flood levels flowing into the active working area. Flood water would be left to naturally infiltrate back into the alluvium before works recommence. No dewatering or discharges would be required. Flood waters generally take a few days to subside before works can recommence. The Department is satisfied that flooding would not significantly affect MSS' operations or the safety of personnel with these measures in place.

Due to the location of the resource, MSS has no control over the flood waters entering and leaving the site. However, to respond to concerns of increased water velocity during floods, MSS committed to reordering its extraction sub-stages to advance from downstream to upstream so that the face of the extraction area always faces downstream (see **Figure 3**). This would allow upstream vegetation to slow water velocities during flooding before reaching the exposed extraction and rehabilitation areas, reducing the potential for scour and erosion. It is unclear how much this reordered scenario would reduce water velocities during flooding, and the Department and DoI Water are not satisfied that this measure would alleviate the moderate to high risk of scour initiation.

*1 ha Sub-Stages*

The RFG notes that variable risk of fluvial scour is inevitable due to normal topographical variations in the floodplain. This is a consequence of the location of the resource along the river bank. To reduce this risk, MSS proposes to minimise the area of disturbance at any one time through progressive clearing and rehabilitation. As such, extraction would be undertaken in 13 sub-stages, and a maximum of 1 ha would be cleared at any time. The Department agrees that reducing the area of exposed soil would reduce the risk of scour.

*10 m Setback from Nepean River*

As with the previous extraction areas, the proposed extraction area would be setback a minimum of 10 m from the 64 m AHD height contour, which is approximately 3 m above the Nepean River and alluvial water table. This setback has been applied in previous extraction areas at the quarry. MSS assert that this setback retains a sufficient amount of vegetation on the bank to protect it from erosion and maintain bank stability. MSS also assert that by leaving the low bank in situ, the 'normal flow' of the river would be unaffected by the proposal.

The Department understands that the 64 m AHD elevation was chosen based on the 99 percentile flow of the Nepean River (a water level of 63.4 m AHD plus 0.6 m freeboard). However, the Department considers that the proposed setback should also consider factors of bank stability and scour protection, not just freeboard. On this basis, the Department and DoI Water are not satisfied that the proposed setback would provide adequate protection from erosion and bank slump failure.

DoI Water identified that the proposed setback was inconsistent with the CA Guidelines. These guidelines recommend that controlled activities be undertaken at a minimum of 40 m back from the top of the highest bank of the river. DoI Water noted that MSS is currently permitted to extract within this buffer under their existing CAA. However, this approval relates only to the existing consent and predates consideration under the WM Act and associated guidelines. DoI Water advised that these prior approvals do not set a precedence that future CAAs should also be approved and that proposals within this 40 m buffer are assessed on their merits and should demonstrate that there would be no more than minimal harm to waterfront land. In its latest correspondence to the Department, DoI Water advised that MSS had not demonstrated that adequate arrangements are in place to ensure no more than minimal harm will occur to waterfront land, particularly in relation to river bank stability and maintaining geomorphic integrity. On this basis DoI Water advised that it would be unable to issue a CAA for the proposed extraction.

The Department and DoI Water are not satisfied that MSS has adequately addressed the risk of bank instability associated with proposal, nor proposed any ongoing monitoring or management measures to minimise bank instability.

*Groundwater Avoidance*

To validate predictions in the EA, MSS has committed to install three validation bores and collect 12 months of groundwater data prior to the commencement of extraction activities in the Stage 8 area. This monitoring would include continuous recording of water levels and quarterly water quality sampling. The Department supports the installation of these bores but considers they should have been installed years prior to provide site-specific baseline data for this EA.

MSS has also committed to installing groundwater monitoring bores progressively in each extraction area to monitor the fluctuating alluvial water table to ensure operations remain at least 1 m above the 'normal alluvial water table' at all times. The Department understands that this buffer is primarily proposed to avoid operational, safety and equipment impacts, and to a lesser extent, to avoid groundwater impacts.

Due to the fluctuating nature of the alluvial water table, the Department would generally require extraction to either remain at least 1 m above the 'maximum predicted groundwater table' unless an assessment under the AIP demonstrates that closer extraction is acceptable. The former is unfeasible for MSS as there is no data available to predict this level and even then, it would likely rule out a majority of the resource. Further, MSS has not undertaken a comprehensive assessment to satisfy the latter.

### 5.1.4 Consideration

The Department has carefully considered the potential water related impacts of the proposed modification, including the concerns raised by DoI Water and MSS' additional studies and responses. Despite the additional information provided by MSS, the Department holds a number of residual concerns regarding the location of the proposed extraction area and its potential impacts on flood behaviour, erosion, bank stability, groundwater and surface water resources.

The location of the Stage 8 area is such that the susceptibility to flooding and the risk of erosion and scour are potentially substantial, and there are limited opportunities to mitigate these impacts. Whilst the Department acknowledges that there is risk of scour during flooding events without the proposal, the proposal would increase this risk of scour initiation, particularly in areas with exposed soil. As these reaches of the Nepean River have been subject to bank slump failure, the Department considers that increased risk of scour could compromise the geomorphic integrity of the bank of the Nepean River. The Department agrees with DoI Water that there is insufficient assessment of potential impacts on the geomorphic stability of the Nepean River to demonstrate that no more than minimal harm would occur to waterfront land as a result of the proposal, particularly during intermediate and rare flood events.

MSS has not demonstrated that the potential groundwater and surface water impacts are acceptable. The Department accepts DoI Water's advice that the proposal would constitute an aquifer interference activity and the groundwater assessment has not been carried out in accordance with the AIP. The assessment lacks site-specific baseline data and associated modelling to validate conclusions that there would be minimal impact on groundwater resources. Additionally, the surface water assessment lacks historic data to validate assertions that there have been no adverse downstream impacts from existing operations. MSS has committed to validate surface and groundwater predictions made in the EA by collecting 12 months-worth of data prior to the commencement of extraction. Whilst this data collection may provide sufficient information to undertake a comprehensive AIP assessment, the results of this assessment are unknown, and the Department considers that it would be inappropriate to defer this assessment and conditionally approve the modification because of its location within a sensitive riparian environment. The Department also considers that 12 months of surface water monitoring may not provide adequate baseline data to inform if impacts are occurring.

DoI Water has expressed a high level of concern with the proposal and considers it to be inconsistent with the WM Act and the CA guidelines that are in place to protect the sensitive riparian corridor as:

- the proposed extraction, within proximity to the Nepean River, does not attempt to minimise the proposed extent of disturbances to soil and vegetation within the waterfront land;
- sufficient information has not been provided to justify how the proposal maintains or mimics the existing or natural hydraulic, hydrologic, geomorphic and ecological functions of the watercourse; and
- the proposed development does not seek to prevent increased scour and erosion of the watercourse bed or banks in flood events.

On this basis, DoI Water considered that it has not been demonstrated that no more than minimal harm would occur to waterfront land and advised that it would be unable to issue a CAA for the proposal.

Current government policy seeks to avoid, minimise and mitigate impacts on the bed and banks of the Nepean River, with the aim of maintaining or improving environmental values of this watercourse and surrounding riparian corridor. DA 85/2865 was granted prior to these planning provisions; however, this modification must be assessed in accordance with contemporary regulations. The Department considers that the potential water impacts of this modification make it inconsistent with current policy including, Objects 1.3 (a), (b) and (e) of the EP&A Act and clauses 7.3 and 7.4 of the Wollondilly LEP 2011.

The Department does not consider that conditions could be drafted to ensure that impacts on significant water resources, including surface and groundwater resources, could be avoided, or minimised to the greatest extent practicable (clause 14(1)(a) of the Mining SEPP). The Department therefore considers that the proposal's potential impacts on water resources are unacceptable.

## 5.2 Biodiversity

The EA included a Terrestrial Ecology Assessment, prepared by EMM, to assess the potential biodiversity impacts of the proposed modification. The assessment consisted of an initial desktop study to assist with identifying threatened species, populations and communities that may be present on the site, followed by field surveys including targeted threatened fauna surveys and the development of an offset strategy to compensate for the associated loss in native vegetation and destruction of habitat from the proposed 13 ha of Stage 8 extraction area.

### 5.2.1 Riparian Setting

The Stage 8 area is located within the vegetated riparian corridor on the banks of the Nepean River. Riparian corridors are important ecological areas because they host nutrient rich sediments, support diverse and unique vegetation, help maintain bank stability, provide soil conservation, support healthy waterways, provide vital fauna

habitat and protect aquatic ecosystems. Riparian corridors are also vulnerable and easily degraded from activities such as land clearing, stock or recreational overuse and weed invasion.

The importance of riparian corridors is increasingly being recognised and planning controls continue to be developed to protect these areas from future development. Vegetation mapping and classification assists with identifying these zones, their biodiversity value, vulnerability and susceptibility to impacts. The section below focuses on potential biodiversity-related impacts of the proposed modification on the riparian corridor.

### 5.2.2 Predicted Impacts

The Stage 8 extraction area contains native riparian forest, coupled with large areas of exotic weed-dominated understory. The results of the surveys categorised the area as:

- 10.65 ha of Bangalay x Sydney Blue Gum Tall Riparian Forest which represents *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-East Corner Bioregions*, a listed Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1999* (now *Biodiversity Conservation Act 2016*) of which 2.79 ha is in moderate to good condition and 7.86 ha is in poor condition; and
- 2.35 ha of cleared exotic grassland.

The Department understands that the River Flat Eucalypt Forest is listed as threatened due to competing agricultural practices, high nutrient run-off, sediment erosion and weed competition that has resulted in stands of fragmented and low quality remnant vegetation.

Importantly, the proposed modification has been designed to avoid direct impacts on critical EEC such as the *Shale/Sandstone Transition Forest in the Sydney Basin Bioregion* and *Cumberland Plan Woodland in the Sydney Basin Bioregion*, which are also potential habitat for the Hooded Robin and Koala.

No threatened flora species were identified on the site during the field surveys, despite the Brown Pommaderris, Bargo Geebung and Matted Bush Pea having a moderate potential for occurrence. One threatened fauna species, the Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), and one migratory species, the Black faced Monarch (*Monarcha melanopsis*) were recorded during the survey. The Stage 8 area also provides potential habitat for a range of threatened fauna species.

### 5.2.3 Proposed Avoidance, Mitigation and Management

MSS proposes an 'avoid, minimise, mitigate, offset' principle in terms of environmental management of the Stage 8 area. The extraction area has been designed to avoid critical EEC, and the proposed 1 ha sub-stages of extraction and progressive rehabilitation have been designed around minimising impacts on flora, fauna and their habitat. To mitigate impacts to fauna habitat and connectivity, MSS also proposes to salvage hollow bearing trees, where possible, or replace them with nest boxes in the restoration areas.

Rehabilitation of the site is currently undertaken in accordance with a Vegetation Management Plan prepared by Ecohort in 2013 to support the CAA for Stage 7. This plan details specific measures to protect high quality remnant vegetation and promote successful reconstruction/regeneration of riparian vegetation. The detailed regeneration programs include primary weeding, erosion control, revegetation, rubbish removal and disposal, fencing, seed collection, fauna habitat considerations, management and maintenance and monitoring and assessment, which is undertaken to enable successful reconstruction of riparian vegetation post extraction.

MSS advised that previous rehabilitation efforts on the site have been successful in restoring a high quality vegetation community, including River Flat Eucalypt Forest. MSS therefore proposes to adopt these similar practices in the Stage 8 area to return the land to a high quality riparian ecosystem in the long-term. MSS

considered that if the proposal were not to proceed, the opportunity to restore weed-infested areas along the river bank would be foregone.

### 5.2.4 Offset Strategy

As outlined in **Section 2**, as part of this modification application, MSS proposes to relinquish (ie not develop) the currently approved Stage 3 area in return for the Stage 8 extraction area. The Stage 3 area contains 5.68 ha of River Flat Eucalypt Forest EEC in poor condition, and therefore MSS is proposing a 'like for like' swap of these areas followed by offsetting of the residual impacts. After deducting the Stage 3 area, the remaining areas and credits required under the BBCC calculation are tabulated in **Table 5.**

**Table 5:** Credits required

| Biometric vegetation type | Area cleared (ha) | Ecosystem credits required |
|---|---|---|
| HN526 River Flat Eucalypt Forest) (Low quality) | 2.18 | 73 |
| HN526 River Flat Eucalypt Forest) (Moderate to good quality) | 2.79 | 58 |
| **Total** | **4.97** | **131** |

To offset these residual impacts, MSS propose to restore three discrete areas (northern, central and southern) to west of the Stage 8 extraction area, referred to collectively as the 'Stage 8 restoration area'. Restoration would largely entail clearing of understorey and invasive weeds.

The Stage 8 restoration area covers 13.28 ha and would generate approximately 142 ecosystem credits, enough to satisfy the above requirements (see **Table 6** and **Figure 7**).

**Table 6:** Credits generated from Stage 8 restoration areas

| Biometric vegetation type | Area (ha) | Ecosystem credits generated |
|---|---|---|
| HN526 River Flat Eucalypt Forest) (Low quality) | 9.66 | 110 |
| HN526 River Flat Eucalypt Forest) (Moderate to good quality) | 2.99 | 32 |
| **Total** | **12.65** | **142** |

MSS has committed to securing the Stage 8 restoration areas under a legally binding protection mechanism endorsed by OEH, within 12 months of the approval of this modification. As discussed in **Section 4**, OEH raised concerns that the nominated areas may not be suitable Biobanking (now Stewardship) sites because of their fragmentation and size. If Biobanking applications were not accepted by OEH, MSS would have to pursue alternate offsetting requirements by way of identifying and establishing other land-based offsets, buying credits or paying into the new Biodiversity Conservation Fund. If approved, conditions would need to be imposed to ensure that the credits are retired prior to commencement of the Stage 8 area.

MSS also originally committed to securing the relinquished Stage 3 area under a legally binding protection mechanism; however, this was later retracted following discussions with DPI and EMAI who do not want this land conserved in perpetuity.

### 5.2.5 Consideration

The Department considers that the proposed 13 ha of disturbance would have significant short-term impacts on biodiversity due to the direct clearing of River Flat Eucalypt Forest EEC and indirect habit fragmentation. However, MSS has committed to undertaking progressive rehabilitation combined with establishing compensatory restoration areas and habitat features to offset these impacts. The remaining uncertainty around the suitability of

the restoration areas as Biobanking sites could be resolved through conditions, if approved, to ensure that appropriate offsets are secured prior to commencement.

The Department also acknowledges that MSS' previous rehabilitation efforts were verified by Ecohort and completed to the satisfaction of Council. Nevertheless, the Department does not consider that this demonstrates successful environmental management more broadly. Successful final rehabilitation of previous extraction areas gives little indication of what other environmental impacts may or may not have occurred during past operations.

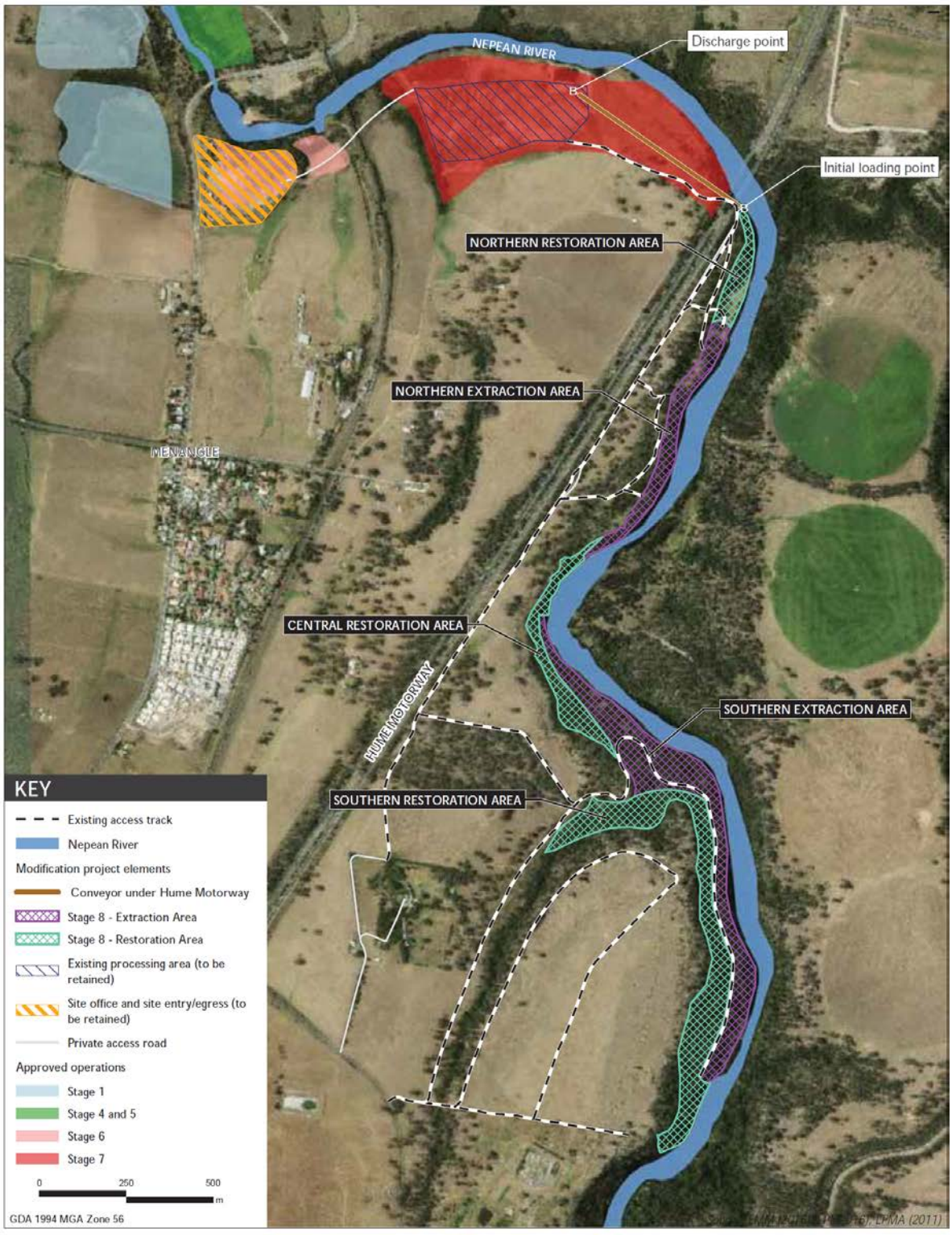


**Figure 7** | Proposed Stage 8 restoration areas

Rehabilitation of the bank post extraction and establishment of offset restoration areas would provide a beneficial biodiversity outcome in the long-term, but the Department considers this a necessary compensatory obligation for undertaking the development.

The Department also disagrees with MSS' assertion that the condition of the riparian corridor would continue to decline if the proposed modification were not approved because weeds (including both noxious and environmental weeds) would continue to invade the land. As the landowner, MSS has obligations to manage its land in accordance with the *Biosecurity Act 2015* and the *Greater Sydney Regional Strategic Weed Management Plan 2017-2022*, regardless of whether or not this modification is approved.

## 5.3 Other Issues

Other potential impacts are discussed in **Table 7**, below.

**Table 7** | Summary of other issues raised

| Issue | Findings |
|---|---|
| Air Quality | • Air quality monitoring is not currently undertaken at the site; however, MSS does use water sprays to suppress road and processing dust.<br>• The proposed modification would result in continued generation of dust from excavation, on-site transport, material processing and from wind-erosion of exposed surfaces.<br>• Other sources of cumulative emissions include the nearby Hi-Quality Menangle Park Quarry and Camden Gas Plant and gas wells, nearby agricultural activities and vehicle exhaust and road dust from Menangle Road and the Hume Highway.<br>• As the proposed modification includes a new extraction area in a different topographic setting, it is likely that the quarry's air impacts would change compared to the current approved development.<br>• The EA included an Air Quality and Greenhouse Gas Assessment for the proposed modification, prepared by Ramboll Environ in accordance with the EPA's 2005 *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods).<br>• As part of this assessment, Ramboll undertook new modelling of both the current approved operations and the proposed modification using updated emissions inventories, nearby ambient air quality monitoring data, meteorological data and contemporary dispersion modelling techniques.<br>• Predictions at 12 nearby sensitive receivers, indicate that the continued implementation of dust controls, MSS would comply with the assessment criteria in the 2005 Approved Methods and the 2016 Approved Methods which includes lower annual PM10 criterion and new PM2.5 criteria.<br>• Water supply for dust suppression and processing would continue to be supplied from either the Nepean River under the Water Use Approval or reused from the sediment basin.<br>• The Department is satisfied with the findings of this assessment and considers that the potential air quality impacts of the proposed modification are not substantially different than those already approved. |
| Noise | • As the proposed modification includes a new extraction area in a different topographic/noise setting and the addition of a conveyor belt, it is likely that the quarry's noise impacts would change compared to the current approved development.<br>• The EA included a Noise Impact Assessment for the proposed modification, prepared by EMM in accordance with the *NSW Industrial Noise Policy* (INP).<br>• As part of the assessment, background noise monitoring was undertaken to assist with establishing project specific noise levels (PSNLs) and sleep disturbance criteria for the 12 surrounding sensitive receivers. |

| Issue | Findings |
|---|---|
| | • The updated noise modelling predicted that noise levels at all 12 receivers would comply with the PSNLs with the exception of two receivers that could experience negligible exceedances when the timber mill is running in adverse meteorological conditions. Due to the campaign nature of milling these exceedances would be rare and avoidable.<br>• MSS would continue to implement good practice noise management measures to minimise noise emissions from the site.<br>• The Department is satisfied with the findings of this assessment and considers that the potential noise impacts of the proposed modification are not substantially different than those already approved. |
| Aboriginal Cultural Heritage | • The EA included an Aboriginal Cultural Heritage Assessment, prepared in consultation with seven Registered Aboriginal Parties (RAPs).<br>• An initial desktop study identified 120 recorded sites within a 5 km radius of the Stage 8 area including rock shelters, art and artefacts; however, no recorded sites were situated within the proposed Stage 8 area.<br>• A site investigation and two test excavation pits also did not identify any Aboriginal objects within the Stage 8 area.<br>• Five rock shelters were identified on the scarp immediately to the west of the Stage 8 area and were assessed as being moderate to low significance; however, they would not be impacted by the proposal.<br>• The potential for uncovering any archaeological deposits within the proposed Stage 8 area is low.<br>• Nevertheless, MSS committed to undertaking pre-clearance surveys to confirm that Aboriginal objects are not present prior to disturbance.<br>• Any newly identified Aboriginal objects or sites would be assessed by an experienced archaeologist and recorded on the State's Aboriginal Heritage Information Management System.<br>• The assessment demonstrates that the proposed Stage 8 area is of low Aboriginal archaeological significance and the extraction of sand and soil would have negligible impacts on Aboriginal cultural heritage.<br>• The Department is satisfied with the findings of this assessment and considers that the proposal would be unlikely to impact Aboriginal cultural heritage. |
| Historic Heritage | • The EA included a Historic Heritage Statement of Heritage Impact which was based on a desktop study and a field assessment of the area.<br>• The initial desktop study revealed that listed heritage items under the Wollondilly LEP and Stage Heritage Register are located nearby but not within or in close proximity to the Stage 8 area.<br>• During the site investigation, EMM archaeologists located a storage container on stilts in the Stage 8 extraction area, which is thought to have been associated with Menangle Sand Company's operations in the 1920s and 1930s. The container is not a listed heritage item, nevertheless it may have some local value to people who have an association with the former Menangle Sand Company.<br>• MSS proposes to avoid the storage container, if possible. If not possible, local historical societies would be consulted regarding potential relocation to ensure the item is preserved and accessible for later research on its provenance, physical context and history. |

| Issue | Findings |
|---|---|
| | • Additional industrial equipment was also found on the west bank of the Nepean River, within the proposed Stage 8 restoration area, during one of the Aboriginal cultural heritage test excavations. The equipment was considered to not have any significant heritage association, but would still be avoided and could remain in situ.<br>• The assessment demonstrates that the proposed modification would have negligible impacts on historic heritage.<br>• The Department is satisfied with the findings of this assessment and considers that the proposal would be unlikely to impact historic heritage. |
| Traffic and Transport | • All quarry products are currently transported via road.<br>• Heavy vehicles enter and exit via Menangle Road, an arterial road that connects to Narellan Road to the north and then the Hume Highway.<br>• Prior to dispatch, laden heavy vehicles pass over a wheel wash and weighbridge.<br>• The consent allows for 84 light vehicle movements and 248 heavy vehicle movements per weekday.<br>• MSS are not proposing to change these limits and has confirmed that all heavy vehicles (recycled material and quarry products) would be counted towards this quota.<br>• A 2014 survey confirmed that the intersection of the quarry access road and Menangle Road is functional and in good condition.<br>• As such, there would be no change to previously approved traffic, transport or road safety impacts. |
| Visual Amenity | • Most of the Stage 8 extraction area is not visible from public viewpoints due to its location in the incised Nepean River valley.<br>• Vehicles travelling south along the Hume Highway would have fleeting views; however, retained trees within the Stage 8 restoration area would screen these views.<br>• The proposed restoration areas would also provide a vegetative buffer for the neighbouring Ellel Christian Ministries.<br>• It is concluded that there would be no impacts to visual amenity as a result of the proposed modification.<br>• The Department is satisfied with the findings of this assessment and considers that the proposal would be unlikely to impact visual amenity. |
| Socio-economic | • The EA included an analysis of the socio-economic benefits of the proposed modification.<br>• The benefits would include the continued employment of 16 full-time employees.<br>• The proposal would also provide continued use of local and regionally based contractors (largely trucking).<br>• The proposal would continue to supply construction and landscaping materials to the growing Sydney market.<br>• The Department is satisfied with the findings of this assessment and considers that the proposal could provide socio-economic benefits through ongoing employment and supply of sand and soil to local and regional markets. |

| Issue | Findings |
|---|---|
| Rehabilitation | • Rehabilitation is currently undertaken progressively with weed-infested topsoil and scalps buried in the pit void, the landform resurfaced to ensure it is free draining, followed by temporary fencing and hydroseeding.<br>• As discussed in Section 1, MSS has completed extraction and rehabilitation of five former stages (Stage 1, 3, 4, 5 and 6).<br>• Rehabilitation measures are detailed in the *Blueprint for Post-Extractive Rehabilitation at Menangle* (Fraser, 1995) and further stage-specific Vegetation Management Plans which aim to return the land to high quality vegetation communities, including River Flat Eucalypt Forest.<br>• MSS proposes to undertake similar rehabilitation in the Stage 8 area with rehabilitation undertaken progressively to promptly restore native vegetation and minimise impacts related to fragmentation and habitat destruction.<br>• Extensive weed removal would also be undertaken in the upper terraces (west of the extraction area) to ensure the rehabilitation is protected from future weed establishment.<br>• As discussed in **Section 5.2**, MSS proposes to restore 13.28 ha of degraded native vegetation as an offset, by way of removing understorey weeds and seedbank.<br>• Restoration aims to halt the spread of invasive species that dominate the banks and terraces of the Nepean River and promote growth of high quality native vegetation.<br>• The Department is satisfied with the proposed rehabilitation program. |
| Waste | • Recycled material is imported as blending material.<br>• MSS currently receives, stores and blends wastes in accordance with its EPL.<br>• EPL 3991 permits the use of excavated natural material, wood waste, sawdust, mature compost, mature composted poultry and duck manure, fly ash, virgin excavated natural material, building and demolition waste.<br>• MSS is not proposing to the change the type or amount of waste handled on the site. |

# 6. Evaluation

The Department has completed its assessment of the proposed modification and considers that the environmental impacts outweigh its benefits, and that the site is unsuitable for extractive industries as proposed by MSS for the reasons outlined in this report.

Based on the information provided by MSS and advice from DoI Water, the Department considers that the potential water related impacts of the proposal are unacceptable. The nature and location of the resource is such that the susceptibility to flooding and the risk of erosion and scour are potentially substantial. There are limited opportunities to mitigate these impacts and it has not been appropriately demonstrated that the geomorphic integrity of the river bank could be maintained, particularly during intermediate to rare flooding events. As a result, the proposal poses an unacceptable risk of detrimental impacts to the riverine ecosystem.

Additionally, it has not been sufficiently demonstrated that the potential groundwater and surface water impacts are acceptable. There is a lack of historic and baseline data to validate conclusions that there would be minimal impact on surface water and groundwater resources, and there is little evidence to substantiate MSS' claims of its successful environmental management track record.

DoI Water has expressed a high level of concern for the proposal as it is inconsistent with WM Act principles and the CA guidelines that are in place to protect the sensitive riparian corridor. Importantly, DoI Water advised the Department that, based on the information provided, it would be unable to issue a CAA for the proposal as it has not been demonstrated that no more than minimal harm would occur to waterfront land.

Whilst, the proposal would provide socio-economic benefits, including providing an important supply of sand and soil products to NSW, the Department does not consider that these benefits outweigh the potential impacts to the riverine ecosystem.

The Department considers that the environmental risks posed by the proposal make it inconsistent with Objects 1.3 (a), (b) and (e) of the EP&A Act. Further, the proposal cannot be carried out in a manner that is consistent with the aims, objectives and provisions of relevant EPI's, including the Wollondilly LEP 2011 and the Mining SEPP. The Department is not satisfied that adverse impacts on water resources can be avoided, minimised or mitigated, or that this could be achieved through conditions of consent.

On balance, the benefits of the proposal do not outweigh the adverse impacts and consequently, the Department considers that the proposed modification is not in the public interest and would not be an appropriate planning outcome, and **should not be approved.**

# 7. Recommendation

It is recommended that the Executive Director, Resource Assessments and Compliance, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **determines** that the application falls within the scope of section 75W of the EP&A Act;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to refuse the application;
- **refuses** the modification; and
- **signs** the attached instrument of refusal (**Appendix F**).

Recommended by:

24/10/18

**Megan Dawson**
Team Leader
Resource Assessments

Recommended by:

25/10/18

**Jessie Evans**
A/Director
Resource Assessments

# 8. Determination

The recommendation is: **Adopted by:**

25/10/18

**Oliver Holm**
Executive Director
Resource Assessments and Compliance

# 9. Appendices

## Appendix A – Environmental Assessment

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

## Appendix B – Submissions

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

## Appendix C – Response to Submissions (RTS)

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

## Appendix D – Agency Comments on RTS

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

## Appendix E – Additional Information

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531

## Appendix F – Notice of Refusal

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8531