Luddenham Quarry Modification Report
DA 315-7-2003 MOD5

Prepared for Coombes Property Group & KLF Holdings
August 2020

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COOMBES
PROPERTY GROUP

KLF GROUP
BUILDING WASTE RECYCLING

Luddenham Quarry

DA 315-7-2003 MOD5 Modification Report

Report Number

J190749 RP12

Client

Coombes Property Group and KLF Holdings Pty Ltd

Date

6 August 2020

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6 August 2020

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6 August 2020

Executive Summary

Executive Summary

ES1 Vision

CFT No 13 Pty Ltd, a member of Coombes Property Group (CPG), has recently acquired the property at 275 Adams Road, Luddenham New South Wales (NSW) (Lot 3 in DP 623799, 'the subject property') within the Liverpool City Council municipality. The subject property is host to an existing shale/clay quarry (the quarry site). CPG owns, develops, and manages a national portfolio of office, retail, entertainment, land, and other assets. The company's business model is to retain long-term ownership and control of all its assets. CPG has the following staged vision to the long-term development of the subject property:

- Stage 1 Quarry Reactivation: **Solving a problem**. CPG intends to responsibly avoid the sterilisation of the remaining natural resource by completing the extraction of shale which is important to the local construction industry as raw material used by brick manufacturers in Western Sydney. Following the completion of approved extraction activities, the void will be prepared for rehabilitation.

- Stage 2 Advanced Resource Recovery Centre and Quarry Rehabilitation: **A smart way to fill the void**: CPG in partnership with KLF Holdings Pty Ltd (KLF) and in collaboration between the circular economy industry and the material science research sector, intends to establish a technology-led approach to resource recovery, management, and reuse of Western Sydney's construction waste, and repurposing those materials that cannot be recovered for use to rehabilitate the void. This will provide a sustainable and economically viable method of rehabilitating the void for development.

- Stage 3 High Value Employment Generating Development: **Transform the land to deliver high value agribusiness jobs**. CPG intends to develop the rehabilitated quarry site into a sustainable and high-tech agribusiness hub supporting food production, processing, freight transport, warehousing, and distribution, whilst continuing to invest in the resource recovery research and development (R&D) initiatives. This will deliver the vision of a technology-led agribusiness precinct as part of the Aerotropolis that balances its valuable assets including proximity to the future Western Sydney Airport (WSA) and Outer Sydney Orbital.

This Modification Report relates to a modification application relating to the delivery of Stage 1 as described above.

ES2 Background

CPG in partnership with KLF (the applicants) are seeking to reactivate quarrying operations at the site, an existing clay/shale quarry in the Greater Western Sydney region of NSW.

Quarrying operations were originally approved under consent DA No. 315-7-2003 (the consent, and now classified as State significant development (SSD)) issued by the Minister for Infrastructure, Planning and Natural Resources on 23 May 2004. The existing consent has been modified three times (MOD1 to MOD3). A fourth modification (MOD4) was withdrawn. The quarry is currently approved to produce and transport up to 300,000 tonnes per annum (tpa) of clay and shale product, with quarry operations approved until 31 December 2024, although rehabilitation and some other activities may continue past this date.

CPG and KLF are seeking to reactivate quarrying operations through an approved modification (MOD5) of the consent (the proposed modification) to avoid sterilisation of a regionally significant resource that is identified in Schedule 1 of the Sydney Regional Environmental Plan No 9 – Extractive Industry (No 2 – 1995).

ES3 Overview of proposed modification

The scope of the proposed modification is described in detail in Chapter 2 of this Modification Report and is summarised as follows:

- the use of the existing site access from Adams Road by quarry vehicles;
- upgrade (including sealing) of the site access road and its intersection with Adams Road as required, and upgrades to the existing internal road network;
- new stockpiling area, weighbridge and other site infrastructure within Lot 3 DP 623799;
- the operation of some additional quarry equipment and a small increase to the daily maximum number of trucks;
- removal of references to activities on Commonwealth-owned land previously known as Lot 1 DP 838361 (now a part of Lot 101 DP 1236319) from the consent;
- update of the existing surface water management system including removal of irrigation activities;
- removal of the northern noise bund during construction of the ARRC; and
- administrative modification of some other conditions of consent to align with current government policy and/or site conditions (ie reduced development footprint).

The proposed modification does not seek to increase the quarry void footprint, production rate or hours of operation. It is not proposed to extend the quarry life beyond 2024, so the proposed quarry operations will be complete prior to the scheduled start of Western Sydney Airport operations in 2026.

The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant so that the pavement is suitable for use by heavy vehicles, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines.

The consent is proposed to be modified under Section 4.55(1A) of the EP&A Act as it will have minimal environmental impacts which are generally restricted to the proposed change in site access and minor changes to quarry operations. Landowners who will be directly impacted by the proposed modification have been consulted during the preparation of this Modification Report.

ES4 Proposed modification benefits

A recent resource appraisal estimates that approximately 2 million tonnes of shale and clay resource remains within the approved extraction footprint. This material shale is worth about $7/tonne, so the total resource has a value of about $14 million.

The resource cannot currently be extracted and dispatched from the site as the approved site access on Commonwealth land can no longer be used by the quarry. This modification application proposes that quarry vehicles use the site access from Adams Road to allow resource extraction to resume. Quarry operations will be reactivated as soon as this modification is approved, all applicable consent conditions met and all other legislative requirements are met, eg an Environment Protection Licence (EPL) and Mining Lease are granted. This will maximise the amount of clay and shale that can be recovered prior to the end of quarry operations.

Given that the quarry will be reactivated as soon as all legislative requirements are met, reactivation will provide immediate economic benefits, including:

- it will provide employment for up to 15 quarry workers and 10 to 12 truck drivers;
- it will provide clay and shale for the production of approximately 80 million standard bricks per year, worth approximately $76 million – enough to construct around 8,000 houses per year; and
- it will support the employment of around 200 brick manufacturing employees.

On a broader scale, there is a renewed demand for quarry products due to NSW Government's investment in infrastructure, building and development in the Greater Western Sydney region.

ES5 Engagement

KLF and CPG have engaged with the quarry site neighbours during the preparation of this modification report. This engagement will continue as part of the reactivation of the quarry and in relation to the further development of the site.

Similarly, KLF and CPG have engaged with a range of government agencies in regards to reactivating the quarry and the further development of the site. Much of this consultation focussed on the compatibility of the quarry with Western Sydney Airport operations and the future Aerotropolis. A key outcome from this consultation was to remove the proposal to extend quarry operations until 2029 from this modification application.

ES6 Impact assessment

Chapter 6 of this Modification Report provides a summary of detailed air quality, noise, surface water, groundwater, traffic groundwater, heritage and biodiversity technical assessments carried out to assess the potential impacts associated with the proposed modification. These assessments have been appended to this Modification Report. Chapter 6 also contains desktop assessments for assessing potential land and soil, social, visual, hazard, and waste impacts. Key findings of the impact assessment are:

- All quarry trucks will access the site from the north and travel north on leaving the site. Therefore, the most northerly 280-m long section of Adams Road will be the only additional section of road used by quarry trucks. The Elizabeth Drive/Adams Road intersection is currently operating at Level of Service (LOS) A or B with significant capacity to accommodate additional traffic. In 2024, the intersection will continue to operate at LOS A during peak periods with or without quarry traffic. Notwithstanding, it is proposed to upgrade the intersection as part of upgrading the northern section of Adams Road.
- Adams Road currently has a 3-tonne load limit, restricting its use by heavy vehicles. The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant so that the pavement is suitable for use by heavy vehicles, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines. This will allow the load limit to be lifted and the northern section of Adams Road to be used to access the site. Upgrades to the northern section of Adams Road will include upgrades to the Adams Road/site access road intersection and the Elizabeth Drive/Adams Road intersection so that it is suitable for B-doubles.
- Quarry traffic will be less than 2% of the total traffic forecast to be using Adams Road so is not expected to have a significant impact on traffic flow or safety. The proposed modification will result in a small increase in approved quarry truck movements and will have a negligible impact on traffic volumes on Elizabeth Drive.

- There are no sight distance or safety issues at the Adams Road/site access intersection for vehicles entering or exiting the site.

- Noise levels calculated for the approved quarry operations, found that estimated quarry noise levels were approximately 48 dBA at the adjacent residence to the east of the access road (R3) and at three residences west of the site (R4, R5 and R6), ie up to in 7 dB exceedance of approved criteria. Prior to rezoning of the area to Agribusiness under the proposed State Environmental Planning Policy (SEPP) Western Sydney Aerotropolis, noise exceedances between 3 and 10 dB are predicted to occur at these four residences. The predicted noise exceedances at R3 to R6 would be considered 'moderate'. If required, negotiated agreements will be considered prior to the area being rezoned. Following rezoning of the area, industrial amenity criteria will apply for isolated residences in industrial zoned land in accordance with the *Noise Policy for Industry* (EPA 2017) and operational noise will comply with the relevant amenity noise goal of 65 dBA $L_{Aeq,period}$.

- There will be no cumulative exceedances of the air quality criteria for the annual average PM_{10} concentration, annual average $PM_{2.5}$ concentration, annual average TSP concentration, annual average dust deposition level, 24-hour average PM_{10} concentration or 24-hour average $PM_{2.5}$ concentration at any assessment location.

- No significant surface water, groundwater, heritage, biodiversity, soil, social, or visual impacts were identified.

This Modification Report presents management measures to minimise impacts from the proposed modification and ongoing quarrying operations. These are summarised in Appendix D.

ES7 Conclusion

The proposed modification has been designed to avoid and minimise adverse biophysical, social and economic impacts. The proposed modification is anticipated to result in minimal environmental impacts beyond those previously assessed and approved under the consent. The residual impacts have been identified and assessed.

All aspects relating to environmental management will continue in accordance with the consent (as modified), a new Environment Protection Licence, revised site management plans, and the mitigation measures consolidated in Appendix D.

Reactivation of the quarry will create jobs and provide immediate economic benefits to the Greater Western Sydney region as well as maximising the amount of the state significant resource that can be recovered prior to the start of the operation of Western Sydney Airport.

As the potential environmental impacts can be managed and mitigated with few residual impacts and there are a range of immediate and longer-term economic benefits from reactivating the quarry through the proposed modification, we are confident that the proposed modification is in the public interest. The proposed modification allows the best use of the approved quarry and the site, and provides an economically viable pathway to the rehabilitation of the void to a final landform that can be fully developed for uses in keeping with the vision for the Aerotropolis.

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Introduction

1 Introduction

1.1 Overview

CFT No 13 Pty Ltd, a member of Coombes Property Group (CPG), has recently acquired the property at 275 Adams Road, Luddenham New South Wales (NSW) (Lot 3 in DP 623799, 'the subject property') within the Liverpool City Council municipality. The subject property is host to an existing shale/clay quarry (the quarry site). CPG owns, develops, and manages a national portfolio of office, retail, entertainment, land, and other assets. The company's business model is to retain long-term ownership and control of all its assets. CPG has the following staged vision to the long-term development of the subject property:

- Stage 1 Quarry Reactivation: **Solving a problem**. CPG intends to responsibly avoid the sterilisation of the remaining natural resource by completing the extraction of shale which is important to the local construction industry as raw material used by brick manufacturers in Western Sydney. Following the completion of approved extraction activities, the void will be prepared for rehabilitation.

- Stage 2 Advanced Resource Recovery Centre and Quarry Rehabilitation: **A smart way to fill the void**: CPG in partnership with KLF Holdings Pty Ltd (KLF) and in collaboration between the circular economy industry and the material science research sector, intends to establish a technology-led approach to resource recovery, management, and reuse of Western Sydney's construction waste, and repurposing those materials that cannot be recovered for use to rehabilitate the void. This will provide a sustainable and economically viable method of rehabilitating the void for development.

- Stage 3 High Value Employment Generating Development: **Transform the land to deliver high value agribusiness jobs**. CPG intends to develop the rehabilitated quarry site into a sustainable and high-tech agribusiness hub supporting food production, processing, freight transport, warehousing, and distribution, whilst continuing to invest in the resource recovery research and development (R&D) initiatives. This will deliver the vision of a technology-led agribusiness precinct as part of the Aerotropolis that balances its valuable assets including proximity to the future Western Sydney Airport (WSA) and Outer Sydney Orbital.

This modification report relates to a modification application relating to the delivery of Stage 1 as described above.

1.2 Background

CPG in partnership with KLF (the applicants) are seeking to reactivate quarrying operations at the site, an existing clay/shale quarry in the Greater Western Sydney region of New South Wales (NSW).

Quarrying operations were originally approved under State significant development (SSD) consent DA No. 315-7-2003 (the consent) issued by the Minister for Infrastructure, Planning and Natural Resources on 23 May 2004. The existing consent has been modified three times (MOD 1 to MOD3). A fourth modification (MOD 4) was withdrawn. The quarry is currently approved to produce and transport up to 300,000 tonnes per annum (tpa) of clay and shale product up to 31 December 2024.

The consent includes quarry components that are on Commonwealth-owned land, which was leased by the previous operator, including the site access road, quarry support facilities and stockpiling areas. These quarry components on Commonwealth-owned land, including the approved site access off Elizabeth Drive, are no longer available for use by the quarry. The quarrying operations ceased under the previous owners/operators approximately 2 years ago. CPG/KLF have no relationship to the previous site owners/operators.

CPG and KLF are seeking to reactivate quarrying operations through an approved modification (MOD5) of the consent (as modified) (the proposed modification) to avoid sterilisation of a regionally significant resource that is identified in Schedule 1 of the Sydney Regional Environmental Plan No 9 – Extractive Industry (No 2 – 1995) (SREP No 9 – Extractive Industries). Reactivation of the quarry will provide for the continued economic contribution of an approved resource extraction activity. The quarry will provide clay and shale for the production of approximately 80 million standard bricks per year, worth approximately $76 million – enough to construct around 8,000 houses per year, representing an important local source for inputs into construction materials to support the myriad of approved and proposed construction projects in the Western Sydney Aerotropolis.

In parallel to the proposed modification, the applicants are progressing a new SSD application to establish a construction and demolition waste advanced resource recovery centre (ARRC) on the site (Stage 2), with the intention of making a future application to fill the quarry void with unrecyclable materials to provide a sustainable and economically viable method of rehabilitating the void for development consistent with the vision of the Draft Western Sydney Aerotropolis Plan (the draft Aerotropolis Plan) (Western Sydney Planning Partnership 2019).

CPG's and KLF's vision is that reactivation of the quarry, through the proposed modification, will be the first of three proposed development stages for the site.

1.3 Overview of proposed modification

Quarry reactivation will require an approved modification (MOD5) to SSD DA 317-7-2003. The scope of the proposed modification is described in detail in Chapter 2 of this Modification Report and is summarised as follows:

- the use of the existing site access from Adams Road by quarry vehicles;
- upgrade (including sealing) of the site access road and its intersection with Adams Road as required and upgrades to the existing internal road network;
- new stockpiling area, weighbridge and other site infrastructure within Lot 3 DP 623799;
- the operation of some additional quarry equipment and a small increase to the daily maximum number of trucks;
- removal of references to activities on Commonwealth-owned land previously known as Lot 1 DP 838361 (now a part of Lot 101 DP 1236319) from the consent;
- update of the existing surface water management system including removal of irrigation activities;
- removal of the northern noise bund during construction of the ARRC; and
- administrative modification of some other conditions of consent to align with current government policy and/or site conditions (ie reduced development footprint).

The proposed modification does not seek to increase the approved quarry life, quarry footprint, approved production rate or approved hours of operation.

1.4 Applicants

KLF and CPG are the applicants for the proposed modification.

CPG is a private organisation that owns, develops and manages a diversified property portfolio, including retail, commercial office, hotel, entertainment and land assets. CPG's business model is to retain long-term ownership and control of all its assets. Current projects includes One Hurstville Plaza, an A-Grade 11,000-m^2 commercial office tower under construction at the heart of the Hurstville CBD, and 505 George Street, a 270-m tall mixed used landmark tower with 507 apartments, community facilities and retail podium in the Sydney CBD.

KLF is an Australian owned and operated waste management company that operates two strategically located resource recovery and recycling facilities in Sydney; one at Camellia and another at Asquith. KLF has 20 years' experience in the waste recycling and resource recovery industry. KLF facilities are licensed by the NSW Environment Protection Authority (EPA) and have full International Organisation for Standardisation (ISO) accreditation.

Table 1.1 Applicants

CPG	KLF
Level 5, 2 Grosvenor Street Bondi Junction, New South Wales 2022	16 Grand Avenue Camellia NSW 2142
https://coombespropertygroup.com.au/	https://klfholdings.com.au/

The applicants intend to develop and operate the site in perpetuity. Initially by completing resource extraction (a suitably experienced contractor will be engaged to operate and manage day to day quarrying operations), then developing the ARCC and rehabilitating the quarry void, and ultimately developing agribusiness and industrial uses on the site.

CPG and KLF are ready, willing and able to recommence quarrying activities on-site promptly after being granted the necessary consents. This will generate economic activity and jobs, which is particularly important given the recent impacts of COVID-19 on the NSW economy.

The landowner of the site is CFT No. 13 Pty Ltd, a member CPG.

1.5 Purpose of this modification report

EMM Consulting Pty Limited (EMM) has been engaged by the applicant to prepare this modification report which accompanies the modification application to the Minister for Planning and Public Spaces, NSW Department of Planning, Industry and Environment (DPIE) as the consent authority. The consent is proposed to be modified under Section 4.55(1A) within Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This modification report has been prepared in accordance with the EP&A Act, the NSW Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and the NSW Government *draft Environmental Impact Assessment Guidance Series* (June 2019) (draft EIS guidelines). It also addresses the assessment requirements provide by DPIE in a letter dated 5 May 2020 (refer Appendix B).

This modification report follows the structure laid out by the draft Modification Report guidelines and describes the site locality, historical and approved operations, the proposed modification, the strategic and statutory context, engagement to date, and the likely impacts over and above the existing impacts. The final chapter includes an evaluation of merits.

This modification report is accompanied by the following appendices and technical reports:

- Appendix A: SSD DA No. 315-7-2003 as modified;
- Appendix B: DPIE Letter dated 5 May 2020 *Luddenham Shale and Clay Quarry DA 315-7-2003 Modification 5*;
- Appendix C: Updated project description;
- Appendix D: Updated mitigation measures;
- Appendix E: Air quality impact assessment (EMM 2020a);
- Appendix F: Noise and vibration impact assessment (EMM 2020b);
- Appendix G: Surface water assessment (EMM 2020c);
- Appendix H: Qualitative groundwater assessment (EMM 2020d);
- Appendix I: Biophysical Strategic Agricultural Land (BSAL) Site Verification Report (Minesoils 2020);
- Appendix J: Traffic impact assessment (EMM 2020e);
- Appendix K: Request to waiver the requirements for a Biodiversity Development Assessment Report (BDAR) for modification of Luddenham Quarry operations dated 9 March 2020 (EMM 2020f);
- Appendix L: Final land use report (EMM 2020g); and
- Appendix M: Aboriginal heritage due diligence assessment (EMM 2020h).

1.6 MOD5 assessment requirements

On 5 May 2020, DPIE Resource Assessment issued a letter outlining assessment requirements for the proposed modification. These requirements and where they have been addressed in this report and supporting technical assessments are outlined in Table 1.2.

Table 1.2 DPIE assessment requirements (DPIE, 5 May 2020)

Requirement	Addressed
Road transport impacts were a material consideration in the original assessment of the project and remain an important consideration in relation to public safety, amenity and road network functionality.	Section 6.6 Traffic and transport
In addition, the modification would materially extend the duration of operations by a further 25% on the currently approved operational life, with associated prolonging of amenity impacts at surrounding receiver locations and impacts on road users.	The proposed modification is no longer seeking to extend the duration of operations as part of this proposed modification. The quarry would remain active up to 31 December 2024, as per the current consent.

Table 1.2 DPIE assessment requirements (DPIE, 5 May 2020)

Requirement	Addressed
While the physical disturbance footprint of the modification may be relatively small, the Department considers that the modification application falls within the scope of Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (the Act).	Consultation with DPIE following the applicants' decision to remove extension of quarrying operations beyond the current consent indicated the modification pathway could revert to Section 4.55(1A) of the EP&A Act providing the applicant provides justification that the restricted impacts associated with the proposed modification as being minor environmental impacts under 4.55(1A). This justification is outlined in Chapters 6 and 7 of this report. Chapter 4 discussed the statutory context of the proposed modification.
The Department is satisfied with the proposal to provide qualitative assessments of: • visual; • heritage; • hazards; • waste; and • social impacts of the modification.	Section 6.10 Visual Section 6.11 Heritage Section 6.13 Hazardous materials Section 6.14 Waste Section 6.12 Social
The Department notes that the regional context, site surrounds and planning considerations have changed substantially since the development was originally approved, modified and subsequently ceased operations.	Section 1.7 Site context Chapter 3 Strategic context
The proposed Modification 5 is seeking to extend the duration of quarrying by a further 5 years, which would mean that it would potentially be operating concurrently with the adjacent Western Sydney Airport. The Department considers this to be a material change in the operating environment of the quarry and requests that you consider:	The proposed modification is no longer seeking to extend the duration of operations as part of this proposed modification. The quarry would remain active up to 31 December 2024, as per the current consent.
• appropriate management and mitigation methods (eg for dust, wildlife, wind shear, lighting, etc) to ensure the ongoing quarry operations are compatible with surrounding land uses and	Section 3.3.2 Compatibility with Western Sydney Airport
• reflect consideration of relevant planning objectives under the *Draft Western Sydney Aerotropolis Plan* (as may be amended or supplemented from time to time).	Section 3.3.1 Draft Western Sydney Aerotropolis Plan
The Department requires that the Modification Report provide a robust and contemporary assessment of the predicted impacts of the modified project in the current setting and with the operation of the adjacent airport, including but not limited to:	
• air quality;	Section 6.2 Air quality Appendix E Air quality impact assessment
• noise;	Section 6.3 Noise and vibration Appendix F Noise and vibration impact assessment
• surface water;	Section 6.4 Surface water Appendix G Surface water assessment
• groundwater;	Section 6.5 Groundwater Appendix H Qualitative groundwater assessment

Table 1.2 DPIE assessment requirements (DPIE, 5 May 2020)

Requirement	Addressed
• lighting;	Section 6.10 Visual
• biodiversity;	Section 6.8 Biodiversity Appendix K Request to waiver the requirements for a BDAR for modification of Luddenham Quarry operations dated 9 March 2020
• agricultural impacts;	Section 6.6 Soil and land Appendix I BSAL Site Verification Report
• final landforms; and	Section 6.9 Rehabilitation and final land use Appendix L Final land use report
• land use compatibility.	Chapter 3 Strategic context
In addressing these matters, the Department requests that the Modification Report includes:	
A detailed Traffic Impact Assessment that includes: • the predicted impact of the modification on the capacity and safety of the Elizabeth Drive/Adams Road and Adams Road/Northern Road intersections; • road safety impacts of trucks turning into/out of the access road/Adams Road intersection; and • consideration of changes in traffic volumes and routes in the area, including cumulative traffic impacts associated with other developments such as the Western Sydney Airport.	Section 6.7 Traffic and transport Appendix J Traffic impact assessment
A detailed Air Quality Impact Assessment, that includes: • assessment of construction and operation of air quality impacts, in accordance with the *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (EPA 2016) and with a particular focus on $PM_{2.5}$ and PM_{10} emissions over the prolonged operational life, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*; • the assessment of the proposed modification's air quality emissions should consider: – current zoning and residential properties; – future zoning/land use and remnant residential properties; and – review the proposed air quality impacts and mitigation requirements;	Section 6.2 Air quality Appendix E Air Quality impact assessment
A detailed Noise Impact Assessment, that includes: • assessment of road traffic and construction noise in accordance with the *Road Noise Policy* and *Interim Construction Noise Guideline*; • the assessment of the proposed modification's operations against Project Noise Trigger Levels in accordance with the *Noise Policy for Industry* should consider: – current zoning and residential properties; – future zoning/land use and remnant residential properties; and – review the proposed noise impacts and mitigation requirements.	Section 6.3 Noise and vibration Appendix G Noise and vibration assessment

Table 1.2 DPIE assessment requirements (DPIE, 5 May 2020)

Requirement	Addressed
A detailed assessment of the proposed rehabilitation of the site including: • consideration of how the final landform and land use will meet the objectives of the Agribusiness Precinct detailed in the *Draft Western Sydney Aerotropolis Plan*; and	Section 6.9 Rehabilitation and final land use Appendix L Final land use report
• a qualitative surface and groundwater impact assessment, paying particular note to the relative impacts or approved vs modified project.	Section 6.4 Surface water Section 6.5 Groundwater Appendix I Surface water assessment Appendix K Qualitative groundwater assessment
In relation to the assessment of biodiversity impacts, the Department is satisfied that a qualitative assessment can be undertaken if the modification is proposed in such a way as to avoid any additional impacts or disturbance of native flora or potential threatened species habitat.	Section 6.8 Biodiversity Appendix K Request to waiver the requirements for a BDAR for modification of Luddenham Quarry operations dated 3 March 2020
Importantly, the Department notes that the site contains known Southern Myotis habitat and nest areas and considers that any additional impacts to biodiversity beyond those already approved would need to be considered and quantified in the Modification Report, with demonstrated application of the efforts undertaken to avoid, mitigate and if necessary offset these impacts.	Section 6.8 Biodiversity Appendix K Request to waiver the requirements for a BDAR for modification of Luddenham Quarry operations dated 3 March 2020
In relation to Biophysical Strategic Agricultural Land (BSAL), the Department is not satisfied with the level of information provided to date to support the absence of BSAL on the site, particularly given the proposed agribusiness land use detailed in the *Draft Western Sydney Aerotropolis Plan*. Consequently, in the absence of any further supporting information the Department considers that a Site Verification Certificate must be obtained prior to lodging the Modification Report.	A site verification certificate (SVC) application has been made and an SVC was granted on 5 August 2020. Section 6.9 Rehabilitation and final land use Appendix L Final land use report
The existing Development Consent requires a report to be prepared and submitted to the Department identifying the final land use of the site and method of treatment for the final void, 5 years prior to scheduled quarry closure. While the Department acknowledges that the Coombes Property Group has recently acquired the site, I wish to advise that this report is now overdue. Accordingly, the Department requests this report be prepared and submitted in conjunction with, but severable from, the Modification Report. This would mean that regardless of the outcome of the Modification 5, an appropriate closure report covering the current context, final landform and future land uses of the site that could be implemented at an appropriate time under the existing or modified consent.	Section 6.9 Rehabilitation and closure strategy. Appendix L Final land use report
I would encourage you to consult with all relevant government agencies during the preparation of your Modification Report and note that this report should be lodged through your dashboard on our new major projects website.	Chapter 5

1.7 Site context

The site is within the Liverpool local government area (LGA) in the Greater Western Sydney region of NSW, approximately 19 km north-west of the city of Liverpool, 25 kilometres (km) south-west of the city of Parramatta and approximately 43 km south-west of the city of Sydney. The regional context of the site is provided in Figure 1.1.

The site is approximately 19 hectares (ha) and is bordered to the east and south by the Commonwealth-owned WSA site. The WSA has been approved and construction, including bulk earthworks and road infrastructure upgrades, are currently underway. In addition to WSA, surrounding land uses include a mix of agricultural, rural industrial and commercial, and residential development. Oaky Creek forms the eastern boundary of the site. The site is battle-axe in shape with a thin corridor providing the access to Lot 3 DP 623799 from Adams Road, which is a local road joining Elizabeth Drive about 280 m north of the site and The Northern Road about 2.5 km south of the site.

The area surrounding the site is sparsely populated, with the closest densely-populated area being the residential area of Luddenham approximately 2.2 km to the south-west. The closest occupied residence is about 100 m west of the site. There are two unoccupied residences to the north of the site. Consultation with the property owner of these residences has confirmed one of these residences is condemned and uninhabitable. An agreement is currently being negotiated with this property owner with respect to potential noise and amenity impacts of reactivated operations. Hubertus Country Club and pistol range is immediately west of the site. The closest agricultural property is a duck farm located to the north-west, about 300 m north-west of the intersection with Adams Road (approximately 650 m from the quarry excavation). The local context of the site is shown in Figure 1.2.

Key aspects of the site are shown in Photograph 1.1 to Photograph 1.5. The site is relatively flat, sloping gently from the south-west to the north-east. Much of the site is disturbed by the quarry operations. There is a residence with agricultural sheds within the site, approximately 110 m north-west of the northern edge of the quarry void. The northern parts of the site are grassed, and there are small vegetation patches in the northern portion with more extensive vegetation along Oaky Creek on the eastern part of the site.

Photograph 1.1 Existing quarry – view to the south towards WSA development site

Photograph 1.2 **View from south-eastern corner of quarry, showing western stockpile and existing agricultural shed**

Photograph 1.3 **Sedimentation basin in north-eastern corner of the site**

Photograph 1.4 Undeveloped land within the northern part of the site

Photograph 1.5 Site access from Adams Road

KEY

- Study area
- Western Sydney Airport
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- NPWS reserve (see inset)
- State forest (see inset)

T:\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\Modification Reporting\MR001 RegionalContext 20200529 03.mxd 29/05/2020

Source: EMM (2020); DFSI (2017); ASGC (2006); Nearmap (2020)

0 0.5 1 km

GDA 1994 MGA Zone 56

Regional context

Luddenham Quarry - Modification 5
Modification Report
Figure 1.1

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KEY

- Study area
- Western Sydney airport
- Former lot Lot 1/DP838361
- Cadastral boundary
- Watercourse

T:\jobs\2019\119074 9 - CPG Luddenham Quarry\GIS\02_Maps\Modification_Reporting\MR002_LocalContext_20200303_01.mxd 29/05/2020

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

0 100 200 m

GDA 1994 MGA Zone 56

Local context

Luddenham Quarry - Modification 5
Modification Report
Figure 1.2

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1.8 Approved operations

Information relating to approved site operations was obtained using the following documentation:

- Luddenham Quarry Development Consent DA No. 315-7-2003 (the consent) issued by the Minister for Infrastructure, Planning and Natural Resources to Badger Mining Company Pty Limited on 23 May 2004 as modified 13 May 2015 (MOD3);
- Douglas Nicolaisen & Associates Pty Ltd, 2003, *Environmental Impact Statement – Proposed Clay/Shale Extraction Operation – Lot 3 - 272 Adams Road Luddenham NSW*, prepared for Badger Mining Company Pty Limited 275 Adams Road Luddenham NSW;
- Douglas Nicolaisen & Associates Pty Ltd, 2003, *Environmental Impact Statement – Proposed Clay/Shale Extraction Operation – Lot 3 - 272 Adams Road Luddenham NSW*, prepared for Badger Mining Company Pty Limited 275 Adams Road Luddenham NSW;
- *Environmental Assessment Report (EA) for the Luddenham Clay & Shale Quarry*, 245 Adams Road, Luddenham NSW, dated 25 August 2016 (Epic Mining Pty Ltd) prepared for MOD 4 which was withdrawn;
- *Environmental Assessment Report for Epic Mining Pty Ltd*, *275 Adams Road*, *Luddenham*, *NSW*, dated November 2014 (Benbow Environmental) prepared for MOD 3;
- *Assessment Report for Adams Road Quarry*, *Luddenham*, *Section 96(1A) Modification (MOD 2)*, dated 28 January 2010 (NSW Department of Planning 2010) prepared for MOD 2; and
- *Assessment Report for Adams Road Quarry*, *Luddenham* (NSW Department of Planning 2006) prepared for MOD 1.

The quarry is currently approved to produce and transport up to 300,000 tpa of clay and shale product up to 31 December 2024. The approved layout of the quarry is shown in Figure 1.3.

The consent includes quarry components that are on Commonwealth-owned land, which was leased by the previous operator, including the site access road, quarry support facilities and stockpiling areas.

Approved operations of the quarry originally involved the extraction of shale and clay, followed by direct dispatching of product off-site via the Elizabeth Drive access road, for the purpose of brick making. Stockpiling within the quarry footprint, the western stockpile footprint within Lot 3 DP 623799 and within the leased portions of the Commonwealth land (Lot 1 DP 838361,) was approved as part of MOD 3.

The approved quarrying method involves extraction and stockpiling using a bulldozer, excavators, dump trucks and loading materials onto road trucks with a front-end loader.

The approved water management system on the site includes a quarry sump to dewater the quarry void two sedimentation ponds. Water collected in the surface water management system is used for dust suppression, irrigation or discharged into Oaky Creek. Clean water is diverted around the site.

The consent also includes approval for bunded fuel storage, plant nursery, weighbridge, bridge, conveyor and hoppers.

The approved site layout includes earth bunds along the northern and western sides of the quarry footprint. These bunds fulfil a dual purpose of noise attenuation and visually screening extraction and stockpiling operations within Lot 3 DP 623799. A lower and narrower bund wall is approved along the quarry void's eastern edge.

Small-scale composting activities were approved under MOD3 for the implementation of onsite rehabilitation, vegetation and landscaping plans. Composting activities were carried out exclusively on Commonwealth-owned leased land (Figure 1.3).

Source: DA No. 315-7-2003 (the consent) as modified 13 May 2015 (MOD3)

Figure 1.3 Approved quarry layout

CHAPTER 2

Proposed modification

2 Proposed modification

2.1 Overview

Luddenham Quarry reactivation will require an approved modification (MOD 5) to SSD DA 317-7-2003 that includes:

- the use of the existing site access from Adams Road by quarry vehicles;
- upgrade (including sealing) of the site access road and its intersection with Adams Road as required and upgrades to the existing internal road network;
- new stockpiling area, weighbridge and other site infrastructure within Lot 3 DP 623799;
- the operation of some additional quarry equipment and a small increase to the daily maximum number of trucks;
- removal of references to activities on Commonwealth-owned land previously known as Lot 1 DP 838361 (now a part of Lot 101 DP 1236319) from the consent;
- update of the existing surface water management system including removal of irrigation activities;
- removal of the northern noise bund during construction of the ARRC; and
- administrative modification of some other conditions of consent to align with current government policy and/or site conditions (ie reduced development footprint) (refer Section 2.7).

The proposed modification does not seek to increase the approved quarry footprint, approved production rate or approved hours of operation.

The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant so that the pavement is suitable for use by heavy vehicles, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines.

An overview of the proposed modification is shown in Figure 2.1. A comparison of the proposed modification compared to currently approved operations is detailed in Table 2.1.

KEY

- Study area
- Cadastral boundary

Proposed site modifications

- Approved extraction footprint
- Existing noise bunds
- Existing stockpiling area
- Extended stockpiling area
- Internal road
- Site entry infrastructure (incl. offices, amenities, weighbridge)
- Equipment laydown area

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

0 50 100 m

GDA 1994 MGA Zone 56

Proposed modification

Luddenham Quarry - Modification 5
Modification Report
Figure 2.1

EMM
creating opportunities

Table 2.1 Proposed modification compared to approved project (as modified)

Element	Approved project (as modified)	Proposed modification
Quarry life	31 December 2024	No change
Production rate	300,000 tpa	No change
Approved site layout	As per consent Appendix A	Relocate access road, weighbridge, stockpiles and other site infrastructure onto Lot 3 DP 623799 as per Figure 2.1 and remove Commonwealth land (Lot 1 DP 838361) from the consent.
Maximum extraction depth	30 m	No change
Quarry footprint	As per consent Appendix A	No change
Hours of operation	Operations 7 am to 6 pm Monday to Friday. No haulage vehicles to enter the site between 6 pm and 7 am Monday to Friday. Maintenance 7 am and 1 pm Saturday.	No change
Stockpiles	Onsite: 6 ha western stockpile area plus stockpiling within approved extraction footprint. Maximum volume of clay and shale to be stockpiled on site: 100,000 m^3 Lot 1 DP 838361: 14 ha stockpile Maximum volume to be stored on Lot 1 DP 838361: 190,000 m^3.	Extend existing western stockpile area to the north. Continue stockpiling within extraction footprint. Increase the maximum volume of clay and shale stockpiled on site to 250,000 m^3. Remove Lot 1 DP 838361 from approved footprint.
Site access	Site access on Elizabeth Rd through Lot 1 DP 838361. All site roads are currently unsealed and the site speed limit is currently 20 kph.	Access via existing property access on Adams Road. All heavy vehicle movements will access the site via Elizabeth Drive/Adams Rd intersection. It is proposed to amend Condition 13 of Schedule 4 to allow vehicles to travel at 40 kph on the sealed access road.
Vehicle movements	Approximately 80 product movements	Up to 100 product movements per day.
Quarrying equipment	Excavators, bulldozer, dump trucks and front-end loaders.	As per approved project (excluding conveyor) with the inclusion of a crusher and screen.
Noise bunds	A western and an eastern noise bund are included in the approved project.	No change to the western noise bund. The northern noise bund will be removed during construction of the ARRC.
Blasting	No blasting	No change
Waste	No disposal, storage, processing of waste unless permitted by an environment protection licence (EPL).	No change
Rehabilitation	Condition 35 of Schedule 4 requires annual audits to be carried out by a qualified rehabilitation consultant.	The proposed modification proposes to remove Condition 35 of Schedule 4 noting final rehabilitation of the site is subject to separate development consent application.
Employees	Around 12 employees during normal operating conditions with a maximum of 15 during peak operating times	No change.

Table 2.1 Proposed modification compared to approved project (as modified)

Element	Approved project (as modified)	Proposed modification
Surface water management system	The existing water management system is shown in Appendix 1 of the consent. Conditions 23 to 28 of Schedule 4 relate to surface water management.	Update surface water system to accommodate future development of the site (subject to separate approval). Remove Condition 28 from the consent as revised surface water management system removes irrigation.
Community consultative committee (CCC)	Condition 8 of Schedule 5 of the consent requires that a CCC be established and operating by September 2015.	Remove requirement for a CCC.

2.2 Site access

The currently approved access for the quarrying operations is from Elizabeth Drive, across the formally leased Commonwealth land. This access is no longer available for use by the quarry. Therefore, approval is required for quarry vehicles to use the existing site access road from Adams Road, to allow for the reactivation and continuation of approved quarrying operations. This will avoid sterilising an important resource approved for extraction.

All heavy vehicles associated with the haulage of quarry product will access and leave the site via Adams Road and the Elizabeth Drive/Adams Road intersection. No heavy vehicles associated with the haulage of quarry product will travel on Adams Road south of the site.

The proposed modification seeks approval for vehicles up to 26-metres (m) long, including B doubles, to access the site. Swept path analysis carried out as part of this the traffic impact assessment (Appendix I), indicate that the current Adams Road/site access road intersection is suitable for 19-m long vehicles but that intersection improvements will be required prior to longer vehicles regularly accessing the site. These are proposed to be undertaken by the applicants.

The site access road will be sealed between Adams Road and the weighbridge. The existing internal roads will be upgraded to accommodate heavy vehicles accessing the relocated weighbridge and access road.

Following approval of the ARRC, the internal roads may be realigned and will continued to be used by quarry vehicles to accommodate the site access arrangements for the ARRC. Any road realignment will avoid areas of native vegetation on the site.

2.3 Stockpiling

The approved western stockpiling area covers approximately 8,000 m^2. It is proposed to extend this area to the north, within the existing noise bunds, to provide an additional 3,000 m^2 for stockpiles. In addition, material would continue to be stockpiled within the extraction footprint (the extraction footprint is approximately 7.1 ha). Due to the extent of approved extraction carried out to date, the extraction footprint, has a significantly larger capacity to accommodate stockpiling activities compared to earlier stages on the quarry's development.

The currently approved operations allow for 100,000 t of clay/shale to be stockpiled within the site and 190,000 t of clay/shale within Lot 1 (the Commonwealth land). It is proposed that a maximum of 250,000 t of clay/shale would be stockpiled within the site at any one time. This equates to a reduction of 40,000 m^3 in overall stockpiling capacity of the approved quarry.

Initial quarry activities planning has determined that the extended stockpile area, in combination with stockpiling within the quarry void, will provide sufficient stockpiling area for continued quarrying operations.

2.4 New site infrastructure

2.4.1 Equipment laydown area

A new equipment laydown area will be established to the north of the extended western stockpile (refer Figure 2.1). The area will contain a demountable shed with a maximum height of 2.5 m. A small amount of fuel and chemicals required for site operations (including petrol, grease and flocculant) will be stored in a dedicated area within the site shed in accordance with the relevant Australian Standards. Maintenance of mobile plant will occur offsite. The quarry equipment fleet will be refuelled by a mobile refuelling vehicle.

An existing disused farm shed within this footprint will be demolished to accommodate the equipment laydown area and demountable site shed.

2.4.2 Site entry infrastructure

Site entry infrastructure will include an above ground weighbridge, wheel wash, site office, site shed, amenities and staff and visitor carparking area. The site office, site shed and amenities will be demountable structures with a maximum height of 2.5 m and minimal ground disturbance required for installation.

Given that the site access road will be sealed it is proposed to increase the speed limit to 40 kph on the sealed road, while maintaining the current speed limit of 20 kph on unsealed roads.

Following the approval and subsequent construction of the ARRC, quarrying operations may use ARRC site components.

2.5 Surface water management system

The approved water management system includes a quarry sump to dewater the quarry void to two sedimentation dams. Water collected in the surface water management system is used for dust suppression or irrigation or is discharged to Oaky Creek.

One of the sedimentation dams (the smaller of the sedimentation dams on site and previously referred to as Sediment Dam 1), has not been actively maintained for at least 2 years while the quarry has been inactive and is overgrown with vegetation, impeding the capacity of the dam. This dam is planned to be decommissioned in preparation for the future development at the site (yet to be approved) and as such will not form part of the proposed water management system for reactivated quarrying operations.

The area to the north of the existing quarry footprint was previously irrigated as part of the approved Irrigation Management Plan (Epic Mining 2015). This area will no longer be irrigated to accommodate the future development of the ARRC.

2.6 Northern noise bund

As outlined in Section 1.2, the applicants are progressing a new SSD application to develop an ARRC on the site to the north of the quarry void. The development footprint of the proposed ARRC will impact on the northern noise bund to accommodate a water treatment plant for the ARRC and an ARRC access road.

The design of the ARRC incorporates a fully enclosed facility. The southern wall of the ARRC warehouse will run parallel, directly adjacent to the northern noise bund and will be 138 m long and constructed to a minimum height of 10 m and maximum height of 16 m, effectively negating the need for a noise bund in this location.

It is proposed to maintain the northern noise bund until erection of the ARRC building and then to remove the bund to accommodate the ARRC access road and water treatment plant.

2.7 Product traffic movements

The original EIS outlined up to 40 trucks a day (80 movements) would access the quarry (Douglas Nicolaisen & Associates 2003). Whereas the Environmental Assessment report (Benbow Environmental 2014) prepared to support MOD3, outlined approximately (rather than up to) 40 trucks a day are approved to access the site. According to Condition 2 of the consent, the applicant is to carry out operations generally in accordance with the EIS and the subsequent environmental assessments supporting the respective proposed modification applications. Condition 3 of the consent notes if there is any inconsistency between the original EIS and subsequent environmental assessments, the most recent document shall prevail to the extent of the inconsistency. Therefore, it is considered that approximately 40 trucks (80 movements) are currently approved.

Traffic generation associated with quarrying operations is generally sporadic in nature with dispatch of product driven by weather conditions as well as product sales. The traffic impact assessment prepared to support MOD4 (withdrawn) reviewed weighbridge data from the quarry between September 2016 and February 2017 (Stanbury Traffic Planning 2017). This review found that over this six month period average traffic generation was generally below the approved average of 80 movements a day however the maximum daily movements were significantly higher being up to 132 movements (66 trucks) per day (Stanbury Traffic Planning 2017).

The proposed modification proposes to increase the approved maximum product truck movements a day to a maximum of 100 movements a day to formalise maximum traffic movements and not overly restrain operations in times of peak demand. The traffic impact assessment (summarised in Section 6.7 and contained in Appendix J) assesses the proposed increase to a maximum of 100 traffic movements per day on Adams Road, the Elizabeth Drive/Adams Road intersection and the Elizabeth Drive/Luddenham Road intersection.

2.8 Administrative modifications

Administrative modifications of some conditions of consent are required to align with current government policy and/or site conditions (ie reduced development footprint). These are detailed in Table 2.2.

Table 2.2 Administrative modifications

Condition[1]	Matter	Proposed modification
Appendix 1	Approved site layout	Site layout to be replaced by the site layout presented in Figure 2.1.
Schedule 1, Land, Proposed Development Schedule 3, Condition 13 Schedule 4, Condition 12 Notes: (a) Schedule 4, Condition 29 Schedule 4, Condition 40 and 41	Activities on the Commonwealth land (Lot 1 DP 838361)	Removal of references to activities, potential impacts and required management measures on the Commonwealth land.
Schedule 4, Condition 12	Noise impact assessment criteria	Revise this condition in accordance with the predicted noise levels determined in accordance with the Noise Policy for Industry (NPfI) (EPA 2017) (refer Section 6.3 and Appendix F).
Schedule 4, Condition 7	Air quality monitoring	Revision of the wording of this condition to reflect change in sensitive receptors due to removal of activities on Commonwealth land.

Table 2.2 Administrative modifications

Condition[1]	Matter	Proposed modification
Condition 35 of Schedule 4	Annual rehabilitation audits	Removal of this condition requiring annual rehabilitation audits by a qualified rehabilitation consultant due to the limited rehabilitation activities that are proposed during reactivation and ongoing quarrying operations. Final rehabilitation of the quarry will be subject to a separate application (refer Section 6.9 and Appendix L).
Schedule 5 Condition 8	Community Consultative Committee	Removal of the requirement for a CCC as the previous quarry operator was unable to establish a CCC due to lack of interest from the community (NICS 2016).

1. DA No. 315-7-2003 (the consent) as modified 13 May 2015 (MOD3).

2.9 Construction of proposed new site components

2.9.1 Construction of new site components

The proposed modification comprises construction of the following site components in order to reopen the quarry, which are shown in Figure 2.1:

- upgrading/sealing the proposed access road from the weighbridge to Adams Road;
- upgrading the site access road/Adams Road intersection prior to use by product transport vehicles that are more than 19-m long;
- upgrading the internal site roads;
- removal of existing agricultural shed to accommodate the equipment laydown area;
- topsoil stripping in new stockpiling area to the north of the existing western stockpiling area; and
- installing site entry infrastructure including a weighbridge, wheel wash, site office, site shed and amenities.

The proposed modification also involves the removal of activities on Commonwealth-owned land, previously known as Lot 1 DP 838361 (now a part of Lot 101 DP 1236319) and modification of current surface water management system.

2.9.2 Construction hours

Construction work will occur during standard construction hours for approximately four to six weeks, which are:

- Monday to Friday 7:00 am to 6:00 pm;
- Saturday 8:00 am to 1:00 pm; and
- no construction work will take place on Sunday or public holidays.

2.9.3 Construction management and mitigation measures

Existing tracks and the new proposed internal road will be used during the construction of the site.

Plant and equipment laydown areas, waste, fuel and chemical storage locations will be confirmed as the design is finalised. They will be placed to minimise potential environmental impacts. Fuel and chemical containers will be in stored in vehicles or on bunded surfaces to prevent any leaks of hydrocarbons entering the environment.

There will be minimal temporary construction impacts. Any short-term impacts will be mitigated by the implementation of the management and mitigation measures outlined in Chapter 6 and consolidated in Appendix D.

There are two native trees that are within the approved disturbance footprint. These may need to be cleared. No other clearing of native vegetation is required (see Section 6.8).

The proposed modification does not include activities within, or impact, the vegetation along Oaky Creek.

2.10 Do nothing alternative

In its current state, the existing dormant quarry is neither compatible with the proposed Agribusiness zone nor the WSA. The approved access road to the quarry from the public road network through the Commonwealth land is no longer available. Without an approved alternative, no quarrying or major rehabilitation activities can occur on site.

Without approval of the proposed modification, the quarry will remain dormant and the void will remain unfilled, preventing the realisation of a number of key benefits, including:

- avoiding the sterilisation of a regionally significant resource as identified in the SREP No. 9 – Extractive Industry (No 2);
- fulfilling local and regional demand for quarry products as outlined in Section 3.7;
- eliminating the operational and visual incompatibility with the WSA, including concerns associated with water bodies, bird life and other wildlife which would potentially conflict with airport operations;
- providing the means to infill the quarry void and achieve a final, safe, stable landform to enable proposed agribusiness/industrial land use(s) in line with the long-term vision contemplated by the Aerotropolis SEPP (otherwise more than 50% of the site would be sterilised from potential future development and employment opportunities); and
- creating direct and indirect benefits to the local and regional economy, including:
    - providing employment for up to 15 quarry workers and 10 to 12 truck drivers;
    - providing clay and shale for the production of approximately 80 million standard bricks per year, worth approximately $76 million – enough to construct around 8,000 houses per year; and
    - supporting the jobs of around 200 brick manufacturing employees.

CHAPTER 3

Strategic context

3 Strategic context

3.1 Greater Sydney Region Plan: A Metropolis of Three Cities

The Greater Sydney Region Plan, *A Metropolis of Three Cities*, ('the GSR Plan') is built on a vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities and services. To meet the needs of a growing and changing population, the vision seeks to transform Greater Sydney into a metropolis of three cities:

- the Western Parkland City;
- the Central River City; and
- the Eastern Harbour City.

The WSA Aerotropolis is identified in the GSR Plan as connecting established centres and potentially connecting the Western Parkland City and the Central River City.

Objective 23 of the GSR Plan is particularly relevant – that industrial and urban services land is planned, retained and managed. 'Urban services' describes a range of industries that enable cities to develop and operate, such as waste management, landfill, concrete batching plants and utilities. These are recognised in the Plan as high value, not because they are major employers, but because they are essential to the economic functioning of the cities they serve.

The Plan importantly notes that the locational needs of urban services are often constrained. There are clear physical limits to where, for example, quarries and landfill sites can be located. These are not 'footloose' industries.

The GSR Plan states (p.133) that:

> All existing industrial and urban services land should be safeguarded from competing pressures, especially residential and mixed-use zones. This approach retains this land for economic activities required for Greater Sydney's operation, such as urban services. Specifically, these industrial lands are required for economic and employment purposes. Therefore, the number of jobs should not be the primary objective – rather a mix of economic outcomes that support the city and population.

The Western Parkland City will include expansive industrial and urban services lands to the north and east of the WSA. Supported by a freight link, these lands will provide for Greater Sydney's long-term freight and logistics and industrial needs.

The site, being located at the northern end of the future WSA is in close proximity to the main transport corridor of Elizabeth Drive via a 280-m long section of Adams Road. The currently approved land use of the site will support brick manufacturing and future development in the area.

In the bigger picture, and subject to a separate development application, the proposed ARRC on the site will provide a recycling service to the foreseeable demand associated with future development activities within the Aerotropolis and will provides a commercially-viable option to fill the quarry void, with appropriate engineering controls, to allow the use of the quarry area for commercial and/or industrial uses.

3.2 Western City District Plan

The Western City District Plan ('the WCD Plan') provides a 20-year plan to manage growth and achieve the 40-year vision, while enhancing Greater Sydney's liveability, productivity and sustainability into the future.

Planning priorities outlined in the WCD Plan relevant to the site's current and desirable future land uses are:

- Planning Priority W8 – Leveraging industry opportunities from the Western Sydney Airport and Badgerys Creek Aerotropolis; and
- Planning Priority W10 – Maximising freight and logistics opportunities and planning and managing industrial and urban services land.

3.2.1 Planning Priority W8

The WCD Plan includes Planning Priority W8 – Leveraging industry opportunities from the Western Sydney Airport and Badgerys Creek Aerotropolis. This is the mechanism by which the overarching objectives of the GSR Plan are to be implemented.

The WCD Plan notes that the Western District contains State and regionally significant mineral and energy resources, such as construction material resources, such as the clay and shale that it is proposed to continue to extract from the quarry.

The WCD Plan describes how to best to protect resource extraction locations such that the production of raw materials is able to continue as a driver of economic development. The WCD Plan states [underlining added]:

> These resources have potential to drive regional economic development by generating employment and supporting infrastructure, housing, jobs creation and other development needed for a growing population. Land use planning can respond to the life cycle of the mineral resources by adopting a multiple or sequential approach to the location of compatible activities on or near mineral resources land. Land uses will need to be carefully considered to ensure a balanced approach to managing growth and development in this region, including economic, social and environmental considerations.

The provisions in the WCD Plan align with the proposed continuation of quarrying activities on the site.

3.2.2 Planning Priority W10

The WCD Plan notes that existing industrial and urban services sites face pressure to be rezoned, and that it is therefore important to retain the existing sites. Safeguarding the sites can facilitate essential services such as waste management and recycling. Specifically, the WCD states:

> All existing industrial and urban services land should be safeguarded from competing pressures, especially residential and mixed-use zones. This approach retains this land for economic activities required for Greater Sydney's operation, such as urban services. Specifically, these industrial lands are required for economic and employment purposes. Therefore, the number of jobs should not be the primary objective – rather a mix of economic outcomes that support the city and population.

3.3 Aerotropolis-specific strategic context

3.3.1 Draft Western Sydney Aerotropolis Plan

The Draft Western Sydney Aerotropolis Plan (the draft Aerotropolis Plan) establishes a vision, objectives and principles for the development of the Aerotropolis, a metropolitan area with infrastructure, land uses and the economy centred on Western Sydney Airport. The draft Aerotropolis Plan sets precinct boundaries around the Aerotropolis and identifies land use zoning and permissible land use under each precinct.

The Aerotropolis-shaping objectives relevant to reactivated quarrying operations and the long-term final use of the site following infilling of the quarry void (subject to further approval) include:

- Objective 2: High-value jobs growth is enabled, and existing employment enhanced;
- Objective 5: A sustainable, low carbon Aerotropolis that embeds the circular economy; and
- Objective 6: A resilient and adaptable Aerotropolis.

As described in Section 2.4 of the draft Aerotropolis Plan, land uses and urban forms will evolve as the Aerotropolis changes. This will require flexibility given the uncertain nature of future land uses, especially in non-residential areas. Land uses, buildings and structures will change from short- to medium-term uses to longer-term advanced and creative industry uses. The draft Aerotropolis Plan acknowledges that new enabling industries such as building materials production, to facilitate construction of the Aerotropolis, may be permitted subject to interface mitigation treatments and an ability for the site to transition to higher order uses compatible with airport operations over time.

The continued operation of the quarry represents an existing “enabling” industry providing an economic basis on which the site can be developed to provide innovative resource recovery solutions in the medium- to long-term, and long-term commercial/industrial uses. As outlined in Section 6.8, infilling the quarry void, after the extraction of the significant resource, will achieve a stable non-polluting landform that will be developed for commercial or light industrial uses that will achieve the objectives of the draft Aerotropolis Plan to transition land use to a high-value job-creating uses that are compatible with future airport operations.

3.3.2 Compatibility with Western Sydney Airport

The letter from DPIE’s Resource Assessment team issued on 5 May 2020 outlined that the proposed modification needs to consider appropriate management and mitigation methods to ensure the ongoing quarry operations are compatible with the WSA. The applicant is not currently seeking to extend quarrying operations beyond the existing quarry life of December 2024. Given that the WSA is scheduled to open in 2026 (two years following the anticipated end of extraction activities), the compatibility of the proposed modification with WSA operations does not need to be taken into consideration as part of this modification report. The cumulative environmental impact of construction of the WSA and reactivation of quarrying operations has been assessed in the air quality and traffic impact assessments for the proposed modification (refer Appendix E and Appendix J). These assessments found the reactivation of quarrying operations would not result in a measurable impact on the construction of the WSA considering the nature of the proposed modification and scale of construction activities currently occurring on the WSA site.

3.3.3 Compatibility with Agribusiness zone

The draft Aerotropolis Plan defines the purpose of the Agribusiness zone is "to support high-tech agribusiness uses, including freight, logistics and horticulture in the Agribusiness Precinct". Key considerations and strategic outcomes of the zone (ie objectives) as outlined in the draft Aerotropolis Plan, are provided in Table 3.1. The table is followed by consideration of the outlined objectives and how reactivation of the quarry and subsequent infilling of the quarry void to achieve a stable developable landform aligns with these.

Table 3.1 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
Key considerations		
1	Aircraft noise	The quarry and the WSA will not be operating concurrently.
2	Safeguarding for Airport operations	This modification report has been prepared in consultation with DPIE and government agencies responsible for safeguarding WSA construction and operations (refer Chapter 5). In addition, this report takes into consideration all statutory requirements relevant to development adjacent to airports (refer Section 4.2.2). Given that the quarry and the Western Sydney Airport will not be operating concurrently, no further assessments were warranted.
3	Supporting existing rural industry to minimise land use conflicts	The quarry has operated for many years in the vicinity of rural land use and rural industries with no land use conflicts. As outlined in the Final land use report (Appendix L and summarised in Section 6 9), infilling the quarry void will achieve a stable non-polluting landform, which will be developed for commercial or light industrial uses compatible with the Agribusiness zoning and other permissible uses in the Agribusiness zone.
4	Incorporating existing rural landscape, sustainability and biodiversity values	The proposed modification will not change the character of the current land use on site. The existing noise and visual bunds effectively shield quarrying operations from rural receivers and the proposed equipment laydown area has been sited within these bunds. The biodiversity values of the Oaky Creek riparian corridor will not be impacted by the proposed modification. Biodiversity values are discussed in Section 6.8 of this report. Refer also to response for strategic outcome #15. Principles of ecologically sustainable development (ESD) are considered in Chapter 7.
5	Recognition of existing communities, such as Luddenham	Social impacts have been considered in Section 6.11.
6	Wildlife attraction	Wildlife that may occur within the Oaky Creek corridor will not be disturbed or obstructed by quarry operations. Recommencement of quarrying operations will deter use of the quarry void by birds and other wildlife.
7	Biosecurity	The environmental management plan (EMP) for the proposed modification will include weed management protocols, such as measures for identification, management and ongoing monitoring of weeds within the site.

Table 3.1 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
Strategic outcomes		
1	Provide a world-class agriculture and agribusiness precinct that will deliver fresh and value-added Australian food production from farm gate to global market.	The proposed modification will not interfere with strategic outcomes relevant to agriculture and the agribusiness precinct, for the following reasons: the quarry is located on an existing quarry site (ie there are no land use conflicts with agricultural land uses); the quarry site does not share an access road, facilities or site boundaries with any of the surrounding agricultural or agribusiness entities; and the surrounding road network and key intersections have sufficient capacity to accommodate the level of traffic that will result from quarry operations (Section 6.7).
2	Provide an integrated intensive production hub and state of the art integrated logistics hub to deliver a multi-modal supply chain solution for agricultural products to Greater Sydney, NSW and Australia.	N/A
3	Enable smart city and digital integration into research, education and logistics.	N/A
4	Protect the character and history of the Luddenham Village.	The proposed modification will not impact the character and history of the Luddenham Village.
5	Accommodate agricultural value-added industries and freight and logistics facilities that benefit from access to the proposed Outer Sydney Orbital and air-side access to the Airport.	As outlined in the Final Land Use Report (refer Appendix L and summarised in Section 6.9), infilling of the quarry void will achieve a stable non-polluting landform, which can be developed for commercial or light industrial uses. This is consistent with the draft Aerotropolis Plan of transitioning to a high value job creating commercial land use and is compatible with future Western Sydney Airport operations.
6	Integrate sustainable energy, waste and water as well as circular economy design principles into development and operations.	The proposed modification will utilise an existing quarry site, which already has an open quarry void, a water management system and some infrastructure required to reopen the quarry. Some of the site components will change as result of the proposed modification, however the use of an existing site (rather than seeking to operate a quarry in another location) demonstrates the principles of a circular economy design. This modification report provides a summary of the technical assessments (refer Chapter 6) undertaken to inform the detailed design of site elements, such as the water management system. All technical assessments take into consideration the various potential environmental impacts, and thus the proposed modification has been designed with consideration of sustainable outcomes.
7	Support and add value to the effective ongoing agricultural industry operations and viability across the Western Parkland City and beyond (across NSW).	Refer to response for strategic outcomes #1 and #5.

Table 3.1 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
8	Provide for the movement and storage of agricultural commodities that should be connected to the commercial entrance of the Airport.	Refer to response for strategic outcomes #1.
9	Allow for the development of integrated food supply chain related industries particularly those that rely on the skills of and proximity to a growing population in the Western Parkland City.	Refer to response for strategic outcomes #1 and #5.
10	Facilitate education, research and development and high technology land uses associated with food production and processing.	N/A
11	Capitalise on the increasing domestic and international demand for high-quality fresh food and value-added pre-prepared meals.	N/A
12	Enable a road layout and subdivision pattern that supports the movement, storage and processing of agricultural goods and produce into an out of the Western Parkland City.	Refer to response for strategic outcomes #1 and #5.
13	Allow for limited residential development that is ancillary to Agricultural and Agribusiness operations outside of the ANEC/ANEF 20 and above contours.	N/A
14	Address any potential for land use conflict between adjoining land uses as a result of future development, including airport operations.	As noted previously, the site has an existing quarry void and is therefore unsuitable for any other land uses at present. The proposed modification is not in conflict with the activities on Western Sydney Airport land (currently consisting of bulk earthworks and construction). The quarry is currently more compatible with the adjacent construction works than other land uses would be (eg residential). The future vision of the site (ie as outlined in the Final land use report in Appendix L and Section 6.9) will enable other land uses (commercial and light industrial), which will be more aligned with the strategic objectives of the draft Aerotropolis Plan.
15	Deliver an urban tree canopy along important corridors to contribute to the amenity of the area.	The proposed modification will not impact on the riparian corridor of Oaky Creek.
16	Enable innovative approaches to sustainability outcomes including water sensitive design, resource and liquid and solid waste management and adaptable and durable credentials as a key driver for the design and function of the precinct.	The applicants have engaged a number of technical specialists (Chapter 6) and consulted with relevant government agencies (Chapter 5) in order to enable sustainable outcomes for the design of the proposed modification. For example, the site water management system has been revised to maximise efficiency and improve water quality management and release into the Oaky Creek water catchment. In addition, refer to response provided for strategic outcomes #6.
17	Allow for sustainable and holistic development of agritourism product and experiences within the precinct	Refer to response for strategic outcomes #1 and #5.

Table 3.1 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
18	Early protection of transport corridors to minimise possible land use conflict with adjacent areas and ensure the orderly and timely provision of infrastructure.	Refer to response for strategic outcomes #1 and #5. In addition, the proposed modification will operate in accordance with all relevant statutory requirements and mitigation measures outlined in this modification report, which will minimise impact to/and protect any surrounding developments.

3.4 Western Sydney development, building and infrastructure projects

In the last few decades, Western Sydney has emerged as a major driver of Australia's economic growth (Deloitte 2015). With the growth in population, many Australian businesses and government departments have moved their headquarters to the suburbs of Western Sydney. These trends have spurred a development, building and infrastructure boom in Western Sydney. In 2015, the NSW Government announced the following investment plans for Western Sydney, outlined in NSW Government's *Shaping Future Cities: Designing Western Sydney – A blueprint for the economic transformation of Western Sydne*y (Deloitte 2015):

- $35 million total infrastructure pipeline;
- $1.68 billion redevelopment of Westmead, Blacktown and Mr Druitt hospitals;
- $5.3 investment for Western Sydney Airport (dual runway option);
- $3.6 billion investment into Western Sydney planned roads infrastructure; and
- 664,000 new homes needed by 2031.

The proposed modification site falls within the Western Sydney Priority Growth Area (WSP Growth Area) which is bordered by the Western Sydney Employment Area to the north and South West Priority Growth Area (SWP Growth Area) to the south (NSW Government n.d.). These growth regions are illustrated in Figure 3.1.

The WSP Growth Area is going to be transformed into a thriving economic hub delivering new jobs, homes, infrastructure and services. Likewise, the NSW Government is working with local councils and communities in the SWP Growth Area to assist with the provision of new homes that are close to jobs, parks, schools and amenities.

Furthermore, the NSW Government established the Western Sydney Employment Area (also referred to as the Western Economic Corridor) to provide businesses in the region, which will provide people living in Western Sydney with the opportunity to work locally and spend less time commuting and more time with their families.

The Northern Gateway Precinct is located to the north of Elizabeth Drive and encompasses the Western Sydney Employment Area. The land around the central employment hub will offer a mix of residential commercial and light industrial uses. Residential development will be permitted within walking distance of public transport (DPE 2018).

This shows the NSW Government's commitment to revitalising Western Sydney and investing in residential, commercial and industrial development and infrastructure. The proposed modification will align with the increase in resource demand in these areas, particularly related to development reliant on quarry products.

NSW Government's commitment to revitalising Western Sydney stems from the identification that Western Sydney's biggest challenge was the job deficit within the region (Deloitte 2015). Historically, the region had more workers than jobs with some 300,000 leaving the area each morning for work (Deloitte 2015). Given the predicted doubling of Sydney's population, it is expected that the Sydney's West would absorb much of the increase with the job imbalance set to become more pronounced (Deloitte 2015). Over its life, the operation and rehabilitation of the quarry will contribute to permanent and contractor jobs, thereby aligning with State goals. In addition, the final land use of the site (commercial and light industrial) will contribute to the development of other businesses and further employment opportunities.

3.5 Connected Liverpool 2050 Local Strategic Planning Statement – A Land Use Vision to 2050

The Liverpool Council's Local Strategic Planning Statement, *Connected Liverpool 2050* (the 'LSPS') was developed to set Liverpool City Council's strategic planning vision for the next 30 years. The LSPS will inform what type of growth occurs in the Liverpool LGA, where and when it occurs, as well as the actions to deliver on planning priorities in order to meet the community's future vision for Liverpool. The LSPS has been created in accordance with the EP&A Act.

The proposed modification aligns with two of the Council's planning priorities considered below.

3.5.1 Planning Priority 12 – Industrial and employment lands meet Liverpool's future needs

One of the main challenges within the Liverpool LGA has been the city economy. While the Liverpool LGA has experienced rapid population growth, a significant challenge remains in ensuring that local employment growth keeps pace with the increase in population. The LSPS notes that close to 70% of the population within the Liverpool LGA works outside of the area, which reflects a long-standing imbalance of jobs between Western and Eastern Sydney.

The LSPS notes that the Council has identified:

> … a future lack of zoned and serviced industrial land, requiring Council to investigate suitable areas in the LGA. New industrial land around the Western Sydney International Airport will contribute to meeting demand in the medium-long term for larger industrial uses. However, there is a projected shortage of land zoned for local service-related industrial uses after 2026. We will develop an Industrial and Employment Lands Strategy to ensure there is enough serviced employment land to sustain projected population growth, and which is also flexible enough to support the needs of future businesses including knowledge based and advanced manufacturing activities.

The proposed modification, as the first step in CPG's vision (refer Section 1.1) is in line with Planning Priority 12 as it would provide employment opportunities within the Liverpool LGA, stimulate the local economy and provide a pathway for a viable future industrial/commercial land use that could accommodate future businesses and advanced manufacturing activities in line with this planning priority.

3.5.2 Planning Priority 14 – Bushland and waterways are celebrated, connected, protected and enhanced

The proposed modification, as part of CPG's overall vision for the site, aligns with the Council's Planning Priority 14 – Bushland and waterways are celebrated, connected, protected and enhanced. The proposed modification and intended future land use of the site, including the proposed ARRC, avoid direct impacts on the Oaky Creek Riparian Corridor.

The surface water management system for the quarry has been revised as part of the proposed modification (refer to Section 6.4 and Appendix G) and will include an oil and water and sediment trap immediately upstream of the Water Management Dam.

The vegetation management plan required under the existing quarry consent will also be revised prior to the recommencement of operations and include measures to maintain the Oaky Creek Riparian corridor.

3.6 Product demand

It is estimated that approximately 600,000 tonnes per week of quarry products are currently flowing into or within the Greater Sydney Region to build dwellings, non-residential buildings, roads and infrastructure and that demand for construction materials in the Greater Sydney Region has increased by 50% over the past five years (Quarry Magazine March 2019). The article notes "As the population of the GSR [Greater Sydney Region] continues to grow, the accessibility and availability of construction materials has become critical for providing affordable housing, buildings, roads and other infrastructure" (Quarry Magazine March 2019).

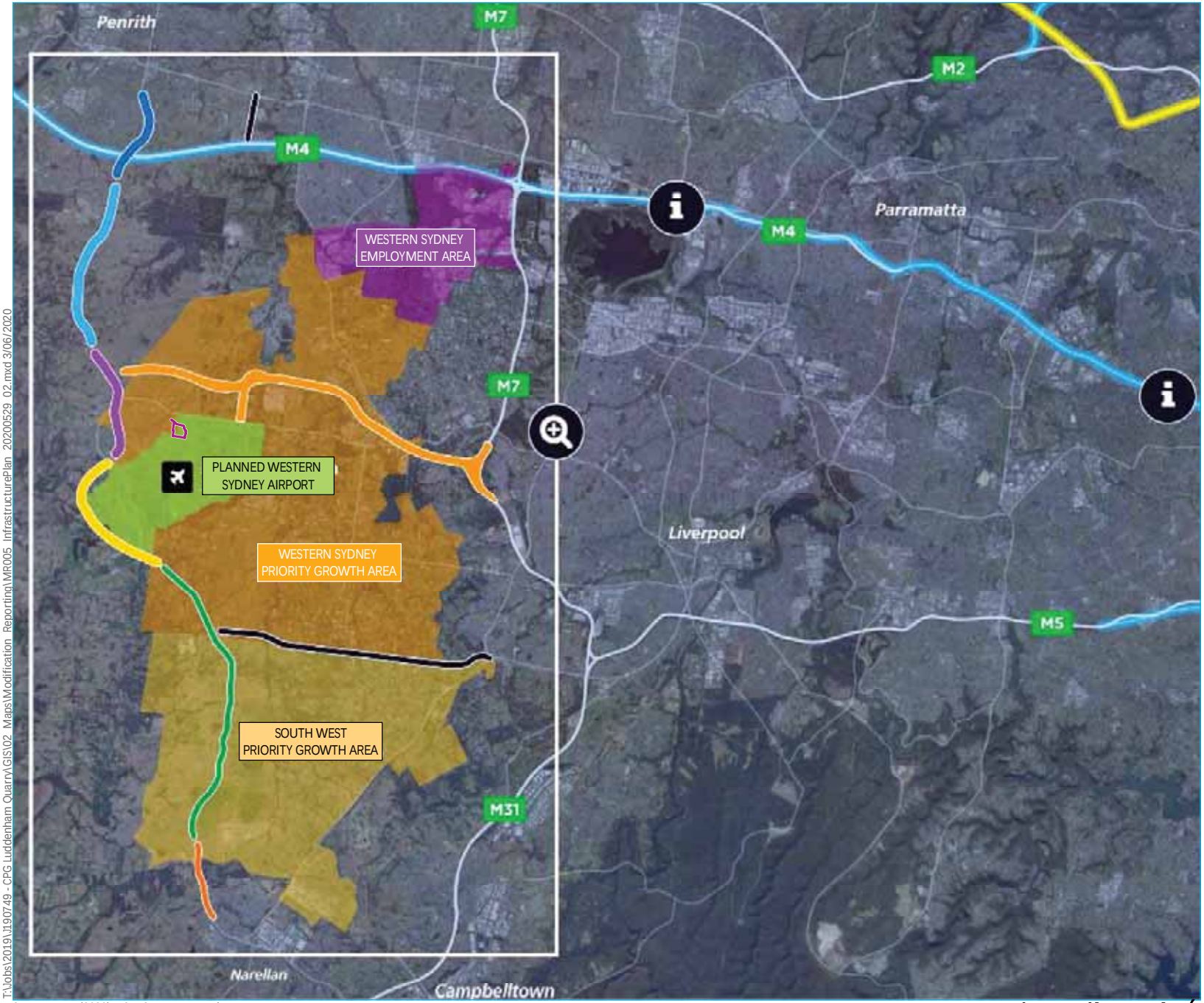
The reactivation of the quarry in the short term will avoid the sterilisation of a regionally significant resource as identified in the SREP No. 9 – Extractive Industry. Most Australian cities are facing the problem that local extractive resources are being depleted or sterilised due to competing land uses (Quarry Magazine March 2019). This is causing a reliance on more distant extractive resources beyond the boundaries of cities.

An estimated 2 million tonnes of clay/shale resource remains within the approved extraction footprint. At the approved extraction rate this would provide the clay/shale for the manufacture of bricks to build approximately 8000 house per annum with the value of the bricks produced from the clay/shale being around $76 million per annum.

3.7 Quarry location

The size and location of the quarry is a significant advantage because:

- it is readily accessible from major transport links including The Northern Road (A9), M4 Motorway, M7 Motorway and the Great Western Highway (A44); and
- the site has sufficient area to allow external manoeuvring of vehicles and also the handling and storage of materials.



KEY

- Study area
- Major road project
- Major rail project
- Bringelly Road upgrade
- M12 Motorway

The Northern Road upgrades

- Glenmore Parkway to Jamison Road
- Littlefields Road to Glenmore Parkway
- Eaton Road to Littlefields Road
- Mersey Road to Eaton Road
- Peter Brock Drive to Mersey Road
- The Old Northern Road to Peter Brock Drive

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Source: EMM (2020); NSW Government n.d.

0 2.5 5 km

GDA 1994 MGA Zone 56

The site in the context of the Western Sydney Infrastructure Plan and Greater Sydney growth regions

Luddenham Quarry - Modification 5
Modification Report
Figure 3.1

EMM creating opportunities

CHAPTER 4

Statutory context

4 Statutory context

4.1 General

This chapter describes the planning framework under which the proposed modification will be assessed and relevant provisions of Commonwealth and State legislation and policy.

4.2 Commonwealth legislation

4.2.1 Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a controlled action and requires approval from the Commonwealth Minister of Energy and Environment, or the Minister's delegate.

The EPBC Act also requires the Minister for Energy and Environment's approval for any action by "any person outside of Commonwealth land that is likely to have a significant impact on the environment on Commonwealth land."

This modification report seeks to remove the Commonwealth land specified in the consent (previously known as Lot 1 DP 838361). The impact assessments (see Chapter 6) considered potential impacts on the environment surrounding the site including the adjacent Commonwealth-owned land. The assessments found that there will be no impacts to this land as a result of the proposed modification.

The airport is scheduled to start operations in 2026. It is not proposed to extend quarrying operations beyond December 2024 as part of this modification. Therefore, quarry operations will not impact airport operations.

4.2.2 Commonwealth approvals relating to airspace operations

i Commonwealth Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996

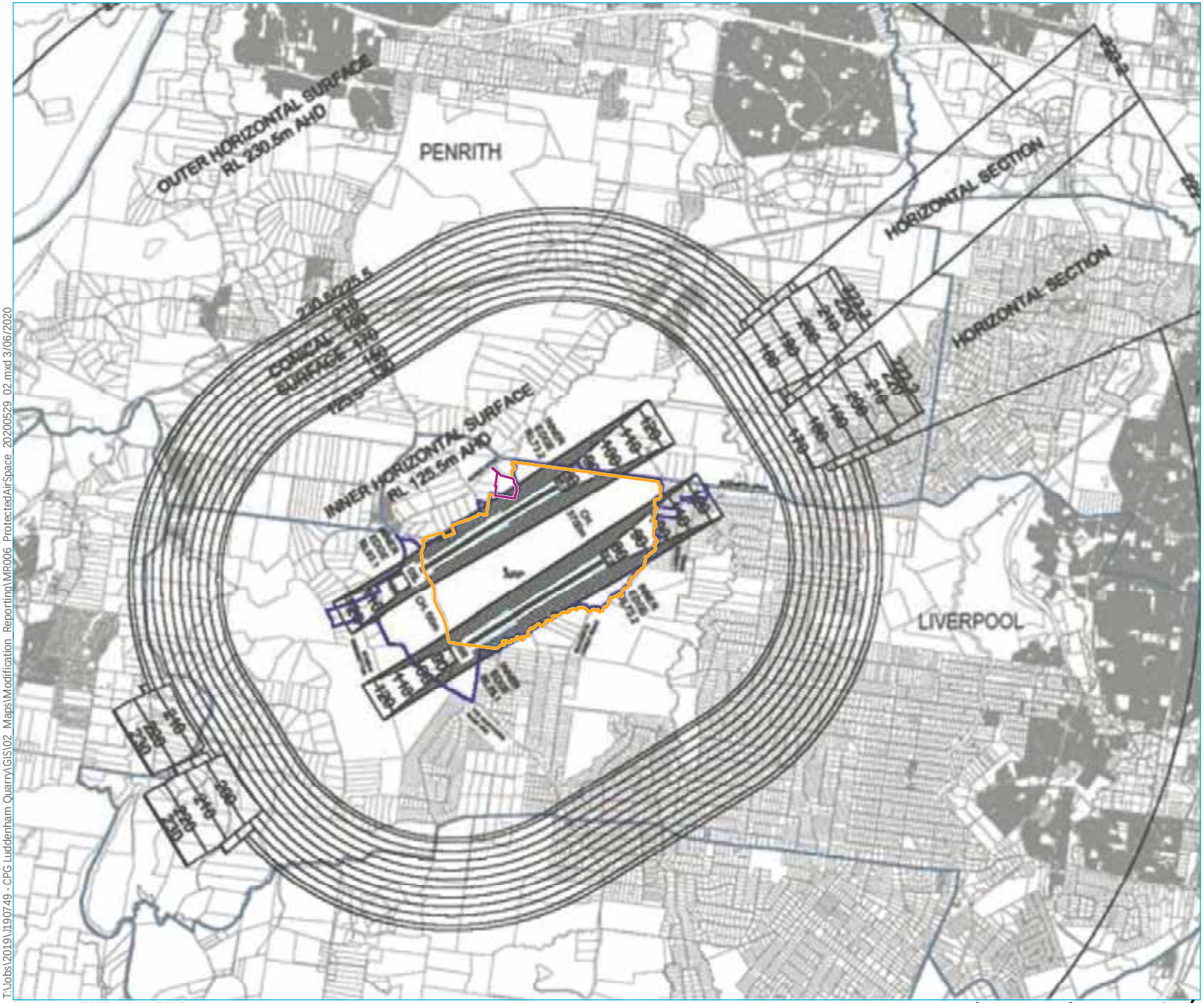
Planning and building control within and surrounding any Commonwealth airports in Australia are subject to the Commonwealth *Airports Act 1996* (Airports Act). Clause 6, Part 1 of the Airports Act states:

> For the purpose of this Act, Sydney West Airport is taken to be an airport at a particular time even if, at that time, it is:
>
> a) merely intended to be developed for use as an airport; or
>
> b) being developed for use as an airport.

Clause 7, Part 1 of the Airports Act lists Western Sydney Airport as a 'core regulated airport'.

Given that the site is located adjacent to the airport, the modification report has addressed the Obstacle Limitation Surface (OLS) for the Western Sydney Airport which has been declared under the provisions of the Airports Act and Airports (Protection of Airspace) Regulations 1996 (Airports Regulations).

Airspace in the vicinity of the Western Sydney Airport is protected under the Airports Act and Airports regulations. The OLS extends outward and upward from ground level from the runway location (WSA Co n.d.). The site is within the 'inner horizontal surface RL 125.5 m AHD [Australian Height Datum]' as shown in Figure 4.1.



KEY

- Study area
- Western Sydney Airport

Source: EMM (2020); WSACO (2020)

0 2 4 km

GDA 1994 MGA Zone 56

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Western Sydney Airport OLS

Luddenham Quarry - Modification 5
Modification Report
Figure 4.1

EMM
creating opportunities

This area extends 4 km from the proposed runway at an altitude of 125.5 m AHD or 45 m above the Aerodrome Reference Point (ARP). The south-western portion of the site extends into the approach and take-off clearance surfaces extending from the threshold of each runway, where the OLS is 120–90 m AHD (WSA Co n.d.).

Development that infringes on the airport's protected airspace is referred to as a 'controlled activity' and can include, but is not limited to:

- permanent structures such as buildings;
- temporary structures such as cranes; or
- activities that can cause intrusions into the protected airspace such as artificial light, smoke, dust or other particles.

If the proposed activity is in the OLS, approval is not required where that proposed activity:

- involves buildings, structures or things that penetrate the protected airspace but are no taller than 10 m above ground level;
- relates to temporary activities that penetrate the protected airspace, but do not continue for more than 12 months and will not result in a permanent airspace intrusion; or
- is authorised by the Western Sydney Airport Plan.

Site entry infrastructure including a weighbridge, wheel wash, site office and amenities and a demountable site shed will be installed as part of the modification. These will be less than 3 m tall. The installation of new infrastructure and quarry operations will not be concurrent with airport operations.

The proposed modification will not impact on the WSA OLS or protected airspace and is therefore not a controlled activity within the airport's protected airspace and will not require approval from the airport operator, WSA Co.

4.3 NSW approval framework

4.3.1 Environmental Planning and Assessment Act 1979

i Proposed approval pathway

As specified in DA 315-7-2003, the quarry is classified as SSD. The consent is proposed to be modified under Section 4.55(1A) of the EP&A Act as it will have minimal environmental impacts which are generally restricted to the proposed change in site access and minor changes to quarry operations. Landowners who will be directly impacted by the proposed modification have been consulted throughout the preparation of this Modification Report (refer Chapter 5).

ii Matters for consideration

In accordance with Section 4.55(3) of the EP&A Act, the consent authority must take into consideration matters referred in Section 4.15(1) of the Act when determining a modification application. The Section 4.15(1) matters and where they are addressed in this modification report are detailed in Table 4.1.

Table 4.1 EP&A Act Section 4.15(1) matters for consideration

Matter		Where addressed
(a)	The provisions of:	
(i)	any environmental planning instrument, and	Section 4.3.9.
(ii)	any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved); and	Draft State Environmental Planning Policy (Western Sydney Aerotropolis) 2019 (Draft WSA SEPP) is addressed in Section 4.3.10.
(iii)	any development control plan, and	Liverpool City Council's Development Control Plan (DCP) has been considered in the design of the new site components. Draft Aerotropolis Development Control Plan 2019 Phase 1 (Draft Aerotropolis DCP Phase 1) has also been considered. The Draft Aerotropolis DCP Phase 1 sets out the vision of the agribusiness precinct. The Phase 2 DCP (still being developed) will set out the objectives, performance outcomes and acceptable solutions for desirable development types.
	(iiia) any planning agreement that has been entered into under section 7.4 or any draft planning agreement that a developer has offered to enter into under section 7.4, and	Not applicable to the proposed modification.
(iv)	the regulations (to the extent that they prescribe mattes for the purposes of this paragraph);	The requirements of the EP&A regulation are addressed in Section 4.3.1iii.
(v)	(Repealed)	
That apply to the land to which the development application relates,		
(b)	the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	Chapter 6.
(c)	the suitability of the site for the development,	As addressed in Chapter 3, the site has historically been used for extracting clay and shale. Land use zoning is discussed in Section 3.3 and Section 4.3.9.
(d)	any submissions made in accordance with this Act or the regulations,	The local community and relevant government agencies will be invited to make submissions on the proposed modification during the public exhibition of the modification report.
(e)	the public interest.	Chapter 1.

iii Environmental Planning and Assessment Regulation 2000

As described in Section 4.2.1, the quarry is defined as a 'mine' under the NSW *Mining Act 1992* (Mining Act). Clause 50A of the Environment Planning and Assessment Regulation 2000 (EP&A Regulation) outlines special provisions relating to development applications relating to mining or petroleum development on strategic agricultural land. As the project involves a mining development within the meaning of Part 4AA of the Mining SEPP, clause 50A of the EP&A Regulation requires that the development application be accompanied by either:

- a Gateway Certificate, where the development occurs on land which meets the definition of Biophysical Strategic Agricultural Land (BSAL); or
- a Site Verification Certificate that certifies that the land on which the proposed development is to be carried out is not BSAL.

A BSAL Verification Assessment was completed by Minesoils (Appendix I) in accordance with the *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (OEH and DPI-OASFS 2013 (The Interim Protocol). The assessment found that the SVC Application Area is Non-BSAL. An SVC was issued by the Secretary of DPIE on 5 August 2020.

4.3.2 Protection of the Environment Operations Act 1997

The quarry is a scheduled premise and was formally covered by EPL 12863 issued on 14 December 2000. The licence was suspended on the 9 August 2019 as the previous site owners had not paid the annual licence fees. The applicants have recently been notified that the current EPL was revoked on the 29 May 2020. The scheduled activity in the EPL was 'land-based extractive activities', with the approved scale being 100,000 - 500,000 tpa.

Consultation with EPA had commenced to determine whether reactivation and subsequent variation of the EPL or application for a new EPL was appropriate. Following the revocation of the previous EPL, the applicant will apply for a new EPL. Under section 5.24 of the EP&A Act, an EPL cannot be refused if it is necessary for carrying out approved SSD and is to be substantially consistent with the consent.

4.3.3 NSW Roads Act 1993

Road works will be required on Adams Road as part of sealing the access road, widening the access road intersection with Adams Road, and to upgrade the northern section of Adams Road so that it is suitable for use by heavy vehicles. Consent will be required under Section 138 of the *NSW Roads Act 1993* for work on Adams Road. Under section 5.24 of the EP&A Act, this consent cannot be refused if it is necessary for carrying out approved SSD and is to be substantially consistent with the consent.

4.3.4 NSW Mining Act 1992

The objects of the Mining Act are to encourage and facilitate the discovery and development of mineral resources in NSW, while encouraging ecologically sustainable development.

As clay and shale are classified as "minerals" under the Mining Act, the quarry is classified as a mine requiring a mining lease. Under section 5.24 of the EP&A Act, a mining lease cannot be refused if it is necessary for carrying out approved SSD and is to be substantially consistent with the consent.

It is also anticipated that a Mining Operations Plan (MOP) will need to be prepared and approved.

4.3.5 Biodiversity Conservation Act 2016

Under *Biodiversity Conservation Act 2016* (BC Act), impacts to biodiversity are assessed and, if required, offset in accordance with the clearing thresholds prescribed by the Biodiversity Conservation Regulation 2017.

The biodiversity assessment (see Section 7 and Appendix K) found that the proposed modification will not impact on native vegetation or threatened species habitat outside the previously existing approved impacts. The proposed modification avoids impacts on threatened species movement by using existing site roads and siting proposed new site components away from areas of biodiversity on the site. Given that the modification will have a negligible impact on biodiversity values, a request was submitted to DPIE to waive the requirements to lodge a biodiversity development assessment report (BDAR) as per Section 7.9 of the BC Act. DPIE confirmed in their letter outlining assessment requirements for the proposed modification (DPIE May 2020) that a qualitative assessment could be carried out for the proposed modification.

4.3.6 Water Act 1912 and Water Management Act 2000

The NSW *Water Act 1912* (Water Act) and *Water Management Act 2000* (WM Act) regulate the use and interference with surface water (streams, creeks, rivers, etc) and groundwater in NSW. The licencing provisions of the WM Act are applicable to the plan area.

A water access licences (WALs) will be required to dewater the quarry void. The WSPs relevant to the site are:

- Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011 – the Upper South Creek Management Zone within the Hawkesbury and Lower Nepean Rivers Water Source applies to the surface water in the vicinity of the site; and

- Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011 – the Sydney Basin Central Groundwater Source applies to groundwater in the vicinity of the site.

Groundwater intercepted by the quarry pit was estimated to be 5 m^3/day (Douglas Nicolaisen & Associates 2003). The project may require a water access licence for 1.8 ML/year from the Sydney Basin Central Groundwater Source regulated by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources. If required, CPG/KLF plan to purchase sufficient entitlement on the open market.

As the quarry is an approved SSD, in accordance with Section 4.41 of the EP&A Act, there is no requirement to obtain a water supply work or use approval. Works within 40 m of Oaky Creek will be limited to a minor upgrade of the existing internal road. These works are not expected to impact Oaky Creek, as a suitable buffer will be maintained and appropriate sediment and erosion controls will be implemented in accordance with the updated site water management plan and relevant subplans including erosion and sediment control plan required under Condition 24 of the consent.

4.3.7 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) contains provisions for the conservation of fish stocks, key fish habitat, biodiversity, threatened species, populations and ecological communities.

The proposed surface water management system is described in Section 6.3 and Appendix G. Discharges to Oaky Creek are predicted to occur eight days per year with a total volume of 4.4 ML per year under median rainfall conditions. The discharges are not expected to materially change or degrade the water quality of Oaky Creek, as they are expected to have similar characteristics to the water quality within the Oaky Creek upstream of the site. The quarry is expected to remain above the limit of flooding along Oaky Creek in all events up to and including the probable maximum flood (PMF) event. The proposed modification will not impact any threatened aquatic species, populations, communities, habitats and key fish habitats.

4.3.8 National Parks and Wildlife Act 1974

Aboriginal objects and places are protected in NSW under Part 6 of the NSW *National Parks and Wildlife Act 1974* (NPW Act). The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (due diligence guidelines) (DECCW 2010) is adopted by the NSW (National Parks and Wildlife Regulation 2009) NPW Regulation.

The Aboriginal heritage due diligence assessment (see Section 6.11 and Appendix M) found that there is one registered Aboriginal site within the site, a medium density artefact scatter identified in 1991. Aboriginal objects are unlikely to be harmed by the proposed modification. Further investigation beyond the scope of a due diligence assessment is not warranted for the proposed modification.

4.3.9 Environmental planning instruments

i Applicable environmental planning instruments

Environmental planning instruments (EPIs) including State Environmental Planning Policies (SEPPs), Sydney Regional Environmental Plans (SREPs) and the LEP relevant to the proposed modification are listed in Table 4.2.

Table 4.2 Environmental planning instruments relevant to the proposed modification

EPIs	Addressed
SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)	The Mining SEPP provides for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of NSW. It establishes appropriate planning controls to encourage ecological sustainable development. This modification report considers the matters relevant to the Mining SEPP, including: existing uses and approved uses of land in the vicinity of the development, and potential impacts and compatibility; impacts on water resources and threatened species and biodiversity, and consideration in regard to the transportation of product on public roads. The proposed modification is consistent with the aims of this policy.
SEPP Sydney Regional Growth Centres 2006	This SEPP provides for the coordinated release of land for residential, employment and other urban developments in the North West and South West Growth Centres of Sydney Region. The proposed modification will provide quarry product for these developing areas, employment opportunities and the means to achieve other urban developments.
SEPP (Koala Habitat Protection) 2019	The State Environmental Planning Policy (SEPP) Koala Habitat Protection replaces SEPP 44. This SEPP defines 'core koala habitat'. This SEPP does not apply to SSD projects. Notwithstanding, the proposed modification will not impact on core koala habitat. Refer to Section 6.8 for further details on biodiversity impacts.
SEPP No. 55 – Remediation of land	*State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55) requires a consent authority to consider potential contamination at a site when a change of land use is proposed. No change of use is proposed so a contamination investigation is not required.
Sydney Regional Environmental Plan No. 9 – Extractive Industries (No2) (SREP Extractive Industries)	Refer to Section 4.3.9ii

Table 4.2 Environmental planning instruments relevant to the proposed modification

EPIs	Addressed
Proposed State Environmental Planning Policy (Western Sydney Aerotropolis) (Proposed Aerotropolis SEPP)	Refer to Section 4.3.10
Liverpool LEP	Refer to Section 4.3.9ii

ii Sydney Regional Environmental Plan No 9 – Extractive Industry (No 2 – 1995)

The proposed modification aligns with the aims and objectives SREP No 9 – Extractive Industries. Clause 2 of SREP No 9 – Extractive Industries outlines the main aims of the plan, which are:

a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance, and

b) to permit, with the consent of the council, development for the purpose of extractive industries on land described in Schedule 1 or 2, and

c) to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential, and

d) to promote the carrying out of development for the purpose of extractive industries in an environmentally acceptable manner; and

e) to prohibit development for the purpose of extractive industry on the land described in Schedule 3 in the Macdonald, Colo, Hawkesbury and Nepean Rivers, being land which is environmentally sensitive.

Under Division 1 of Schedule 1 of SREP No 9 – Extractive Industries, the site is identified as being a clay/shale extraction area of regional significance.

The proposed modification will facilitate the continued extractive resource operations in proximity to the population of Sydney Metropolitan Area, on land that has been identified to contain extractive material of regional significance and thereby avoiding sterilisation of this significant resource.

iii Liverpool Local Environmental Plan 2008

Under the Liverpool Local Environmental Plan (LEP) the site is zoned RU1 – Primary Production. Extractive industries are permitted within the RU1 – Primary Production zone with consent. As noted above the site is identified as being a clay/shale extraction area of regional significance under SREP No 9 – Extractive Industries. Thus, consideration was already given to the objectives of land use within the site through the SREP.

4.3.10 Proposed State Environmental Planning Policy (Western Sydney Aerotropolis)

The site is intended to be zoned predominantly Agribusiness under the proposed State Environmental Planning Policy (Western Sydney Aerotropolis) (Aerotropolis SEPP), the objectives of which are:

- To encourage sustainable and high technology Agribusiness and Agricultural production with links to food production and processing.
- To encourage diversity in Agricultural and Agribusiness enterprises and systems appreciate for the area.
- To encourage the development of integrated food and supply chain related industries.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To maintain and enhance natural rural character, biodiversity and sustainability of the area.
- To allow for non-agricultural land uses that will not restrict the use of other land in the locality for agricultural purposes.
- To allow for the sustainable and holistic development of agritourism product and experiences.
- To protect the operations of the Airport, including 24-hour operations, and provide appropriate protections for the community.
- Ensure there are no sensitive land uses (such as residential, aged care, early education and childcare, educational establishments and hospitals among other uses) located within the Australian Noise Exposure Concept (ANEC 20) and above contours.
- Ensure that land uses up to the ANEC 20 contour are subject to appropriate design and construction standards to reduce and potential for airport noise impacts.

These objectives align with the key considerations and strategic outcomes identified in the Draft Aerotropolis Plan. The proposed modifications accordance with which is outlined in Section 3.3.3.

A small part of the site along the eastern boundary, associated with the Oaky Creek riparian zone, is intended to be zoned Environment and Recreation under the proposed SEPP. A small area of the proposed Environment and Recreation zoning overlaps the existing approved quarry footprint and has previously been disturbed by quarrying operations. Apart from this operational area, the remaining portion of the site with this proposed zoning will be maintained in accordance with the proposed objectives of the Environment and Conservation zone through the implementation of the revised vegetation management plan for the site.

CHAPTER 5

Engagement

5 Engagement

5.1 Overview

This chapter provides details of the community and stakeholders engagement undertaken and/or planned during the preparation of this modification report and the assessment process.

5.2 Consultation with neighbours

KLF representatives have personally contacted the private landholders/occupiers bordering and in near vicinity to the quarry site via telephone and in person:

- Workers Hubertus Country Club;
- 225 Adams Road, Luddenham;
- 285 Adams Road, Luddenham;
- 5 Anton Road, Luddenham; and
- 185 Adams Road, Luddenham.

These landowners/occupiers were briefed by telephone or face to face about the plans to reactivate the quarry as part of the overall plans for the future development of the site. Some face to face briefings were not possible during this time due to the COVID-19 pandemic. No specific concerns have been raised in relation to the proposed modification and reactivation of the quarry.

The landowner of 285 Adams Road noted that while there is a residential dwelling that is leased from time to time (currently unoccupied) on the property, the owner plans to develop the property for commercial purpose. CPG and KLF are currently discussing entering into a negotiated agreement with landowner such that the property is not considered to be a sensitive receptor for the purposes of the environmental assessments. As this discussion is in progress, this property has been included as a sensitive receptor (R3) for the purposes of the environmental assessments.

A face to face meeting with the landowner of 225 Adams Road discussed the proposed modification and the overall development vision of the site. The landowner did not raise major concerns but was pleased to be advised that the internal access road would be sealed to the weighbridge.

The landowners/occupiers of 5 Anton Road and 185 Adams Road do not raise any concerns regarding the reactivation of quarry operations.

High level discussions with the Workers Hubertus Country Club have been conducted however a detailed project briefing has not been possible due to the COVID-19 restrictions. The Club has agreed to meet with the applicant in the near future.

As the modification does not include any substantial change to the quarry which would impact the broader community, further consultation regarding this proposed modification is not considered warranted. However, consultation has commenced with a wider section of the community in relation to the further development of the site, including the proposed ARRC.

Consultation with WSA corporation is detailed in the following section.

5.3 Government agency consultation

Agencies consulted during the preparation of this Modification Report are outlined in Table 5.1.

Table 5.1 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
Western Sydney Aerotropolis Authority (Aerotropolis Authority)	CPG, KLF and EMM met with the Western Sydney Aerotropolis Authority (Aerotropolis Authority) on 19 December 2019.	The Aerotropolis Authority was, in principle, not opposed to continued quarrying in the short-term. It is noted the agency advice received for the ARRC identified concern with the operation of the quarry past the start of WSA operations.	As a result of this feedback, the proposal to extend the quarry life has been removed from the proposed modification so quarrying operations would cease in December 2024 while airport operations are proposed to commence in 2026. Any requirement to extend the quarry life will be reviewed once the quarry has been reactivated and further environmental monitoring data are available.
Western Sydney Planning Partnership (WSPP)	CPG, KLF and EMM met with the WSPP at Mulgoa Hall on 4 February 2020 and subsequently in a combined meeting with Western Sydney Airport, DPIE and Liverpool City Council on 18 February 2020.	During both meetings, the WSPP expressed that it is desirable to eventually fill the quarry void to allow its development to meet the land use objectives of the draft Aerotropolis Plan. It is noted the agency advice received for the ARRC identified concern with the operation of the quarry past the start of WSA operations.	In is proposed to fill the void as part of quarry rehabilitation (refer to Appendix L) to allow the site to be developed to be used for high tech logistics, warehousing, distribution, and freight as part of the Aerotropolis. The potential impacts of the ARRC will be assessed in the EIS prepared to support a separate development application.
Western Sydney Airport Corporation	CPG, KLF and EMM met with WSA Corp at the combined meeting with PPO, DPIE and Liverpool City Council on 18 February 2020.	Western Sydney Airport raised concerns regarding dust generation from the quarry impacting airport operations.	As a result of this feedback, the proposal to extend the quarry life has been removed from the proposed modification. The rehabilitation of the quarry will be considered in a separate application.
Liverpool City Council	CPG, KLF and EMM met with Western Sydney Airport, DPIE, PPO and Liverpool City Council at the Council offices on 18 February 2020.	As well as the matters outlined above, the Council noted that a range of other impacts, such as transport- and noise- related impacts, will need to be addressed.	Transport- and noise-related impacts have been assessed in Section 6.6/Appendix J and Section 6.2/Appendix F respectively.
DPIE	CPG, KLF and EMM met with DPIE at the combined meeting on 18 February 2020 and subsequently at a project scoping in Parramatta on 21 February 2020. DPIE issued assessment requirements on 5 May 2020. A meeting with the DPIE Resource Assessments team was held on 8 May following the provision of the MOD5 assessment requirements.	Topics discussed included the planning pathway for the proposed modification, the requirement for a SVC, and the assessment of potential environmental impacts. DPIE requested that a scoping report be prepared. The DPIE assessment requirements, and how they have been addressed, are summarised in Table 1.2.	A scoping report for the proposed modification was prepared and submitted in March 2020. DPIE discussed process of SVC application and expectations regarding submission of Final Land Use Plan (as required by Condition 36).

Table 5.1 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
EPA	CPG, KLF and EMM met with EPA on a teleconference on 3 April 2020.	Topics discussed included an introduction to the staged development of the site, with a focus of the RCC, and the potential transfer of EPL 12863.	Discussions regarding the transfer of EPL 12863 are ongoing.
TfNSW	CPG, KLF and EMM met with Transport for NSW (TfNSW) on the 4 February 2020. The draft traffic impact assessment has been reviewed by TfNSW.	The objective of this meeting was to confirm the assessment scope for the traffic impact assessment in consideration of the broader changes in terms of project increased traffic volumes and road upgrade projects associated with the developing Aerotropolis.	The traffic impacts assessment (refer J and Section 6.7) has been prepared in consultation with TfNSW. TfNSW comments on the draft report have been considered in the final assessment.
Resources Regulator	Ongoing consultation via email regarding the existing mining lease application.	A mining lease application was lodged by a previous site operator. This mining lease application had not been granted. The applicant is in the process of transferring the existing application into the applicants' name.	NA

5.4 Ongoing consultation

The proposed modification is to allow the reactivation of the quarry as the first stage of the long-term development of the site. As such, the community and stakeholder engagement undertaken to date is the start of a wider ongoing engagement program. As a minimum, this program will include engaging the government agencies listed in the Secretary's Environmental Assessment Requirements (SEARs) issued for the ARRC application. Other agencies will be consulted as required.

An information sheet regarding the development of the site will be distributed locally and selected community stakeholders, generally potentially impacted neighbours and residences along the local transport routes, will be consulted in-depth one-on-one.

The aims of the community engagement program will be to:

- build relationships;
- to describe the ongoing development of the site;
- listen to community and stakeholder's concerns; and
- revise project design and management measures to address concerns where possible and reasonable.

CHAPTER 6

Assessment of impacts

6 Assessment of impacts

6.1 Overview

The potential environmental impacts of the proposed modification are identified in the *Luddenham Quarry Scoping Report MOD5* (EMM 2020) and accompanying Scoping Worksheet. The assessment approach for each environmental aspect was determined based on the potential environmental impacts and DPIE's advice of 5 May 2020 regarding the assessment of the proposed modification. The environmental aspects for which a stand-alone technical report was prepared are summarised in Table 6.1. The findings of each technical report are summarised in this chapter. The potential impacts of the proposed modification on visual amenity and social values, are assessed in this chapter alone.

Table 6.1 Environmental assessments

Environmental aspect	Technical assessment	Proposed modification report section
Air quality	Appendix E	Section 6.2
Noise and vibration	Appendix F	Section 6.3
Surface water	Appendix G	Section 6.4
Groundwater	Appendix H	Section 6.5
Biophysical strategic agricultural land	Appendix I	Section 6.6
Traffic and transport	Appendix J	Section 6.7
Biodiversity	Appendix K	Section 6.8
Final land use	Appendix L	Section 6.9
Visual	-	Section 6.10
Heritage	Appendix M	Section 6.11
Social	-	Section 6.12

6.2 Air quality

6.2.1 Introduction

An air quality impact assessment (AQIA) for the proposed modification was prepared by EMM (Appendix E).

6.2.2 Assessment approach

The AQIA was prepared in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods for Modelling) (EPA 2016).

The AQIA included:

- collating meteorological data required for modelling;
- assessing the existing air quality environment;
- estimating emissions for all relevant site activities relevant to quarry operations;
- using a computer-based regulatory dispersion model (AERMOD) to predict total suspended particles (TSP), PM_{10}, $PM_{2.5}$ and dust concentrations at the nearest sensitive receivers; and
- comparing predicted concentrations at representative sensitive with air quality criteria.

The AQIA presents predicted incremental changes to air quality (ie changes from the project alone) and predicted cumulative changes to air quality (ie changes to the overall air quality, incremental plus background). The cumulative predictions are based on the project increment plus assumed background concentrations which conservatively include the contribution from the construction phase of WSA, as the background concentrations will decrease following the completion of the airport.

Emissions of other pollutants (including oxides of nitrogen, carbon monoxide and sulphur dioxide) associated with diesel fuel combustion are likely to be minor relative to particulate matter emissions and were not assessed.

6.2.3 Assessment criteria

The EPA's impact assessment criteria for particulate matter are presented in Table 6.2.

Table 6.2 Impact assessment criteria for particulate matter

PM metric	Averaging period	Impact assessment criteria
TSP	Annual	90 µg/m^3
PM_{10}	24-hour	50 µg/m^3
	Annual	25 µg/m^3
$PM_{2.5}$	24-hour	25 µg/m^3
	Annual	8 µg/m^3
Dust deposition	Annual	2 g/m^2/month (project increment only)
		4 g/m^2/month (cumulative)

6.2.4 Background air quality

Baseline and background air quality were characterised based on monitoring data collected at the closest publicly available monitoring site, the DPIE site at Bringelly located approximately 6 km south-east of the site.

The summary statistics for background concentrations of PM_{10} and $PM_{2.5}$ for 2015 to 2019 are presented in the AQIA. These show that 2019 is not a representative of background air quality due to the extensive bushfires in November and December. Therefore, background air quality for 2017 was used for the assessment of cumulative impacts. The results of dust deposition monitoring conducted at the quarry between 2015 to 2018 were also used in the assessment.

6.2.5 Assessment locations

The representative sensitive receivers (also referred to as assessment locations) assessed are listed in Table 6.3 and their locations shown in Figure 6.1.

Table 6.3 Air quality and noise assessment locations

ID	Address	Classification
R1	2161–2177 Elizabeth Drive, Luddenham	Residential
R2	2111–2141 Elizabeth Drive, Luddenham	Residential
R3	285 Adams Road, Luddenham	Residential
R4	5 Anton Road, Luddenham	Residential
R5	185 Adams Road, Luddenham	Residential
R6	225 Adams Road, Luddenham	Residential
R7	161 Adams Road, Luddenham	Residential
R8	2510–2550 Elizabeth Drive, Luddenham	Residential
C1	Hubertus Club – restaurant including outdoor facilities	Commercial
AR1	Hubertus Country Club – outdoor firing range	Active recreation

KEY

- Study area
- Cadastral boundary

Assessment location

- Active recreation
- Commercial
- Residential

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

0 100 200 m

GDA 1994 MGA Zone 56

Assessment locations

Luddenham Quarry - Modification 5
Modification Report
Figure 6.1

EMM
creating opportunities

6.2.6 Existing environment

The local air quality is expected to be primarily influenced by traffic, commercial activity, seasonal emissions from household wood-heaters and episodic emissions from bushfires.

Daily 24-hour PM_{10} and $PM_{2.5}$ concentrations for the modelling year (2017) were predominantly below the impact assessment criteria (Table 6.2). The *NSW Air Quality Statement 2017* (OEH 2017) reported that three PM_{10} exceedances and two $PM_{2.5}$ exceedances due to exceptional events (bushfires, hazard reduction burns and dust storms). There were three PM_{10} exceedances and no $PM_{2.5}$ exceedances due to non-exceptional events.

Total suspend particulate concentrations are not measured at Bringelly, however background annual average TSP concentrations are predicted to range from 0.4 to 0.5 µg/m^3 (ie PM_{10} is typically 40% to 50% of TSP).

The annual average dust deposition ranged from 0.7 to 3.7 g/m^2/month, with an average across all monitoring sites of 1.5 g/m^2/month.

6.2.7 Dust emissions

Potential sources of dust emissions from the quarry are:

- extraction of material within the pit using excavator or scraper;
- dozer pushing material in the pit;
- handling of material (loading to trucks and unloading to stockpiles);
- crushing/screening of material within the approved quarry footprint;
- movement of vehicles across paved and unpaved roads and surfaces within the site;
- rehandle of material to product stockpiles;
- loading of product to truck for dispatch;
- diesel fuel combustion by on-site plant and equipment; and
- wind erosion associated with material stockpiles and exposed ground.

A single emission scenario was modelled based on the maximum approved extraction rate of 300,000 tpa.

6.2.8 Impact assessment

The predicted incremental and cumulative airborne dust concentrations and deposited dust levels are presented in Table 6.4. Contour air quality plots are provided in Figures C1 to C6 of the AQIA (Appendix E).

Table 6.4 Incremental and cumulative concentration and deposit results

Assessment location	Incremental concentrations/deposition due to the quarry						Cumulative concertation/deposition due to the quarry and background air quality					
	TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust deposition	TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust deposition
	Annual average	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average TSP	24-hour average Cumulative with WSA[1]	Annual average PM_{10}	Annual average $PM_{2.5}$	24-hour average	Annual average
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	g/m²/month	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	g/m²/month
Criteria	**90**	**50**	**25**	**25**	**8**	**2**	**90**	**50**	**25**	**8**	**25**	**4**
R1	0.4	1.0	0.1	0.2	<0.1	<0.1	50.1	47.6	19.6	7.5	24.1	1.8
R2	0.7	2.2	0.2	0.5	0.1	0.1	50.4	47.7	19.7	7.6	24.0	1.9
R3	6.1	10.2	1.8	1.9	0.4	0.7	55.8	49.9	21.7	8.0	24.5	2.5
R4	0.9	3.2	0.3	0.7	0.1	0.1	50.6	48.3	20.2	7.7	24.1	1.9
R5	0.7	2.6	0.2	0.7	0.1	0.1	50.4	48.2	20.1	7.7	24.1	1.9
R6	3.8	5.5	1.3	1.4	0.3	0.4	53.5	50.0	21.2	7.9	24.4	2.2
R7	0.3	1.4	0.1	0.4	<0.1	<0.1	50.0	47.9	20.0	7.6	24.1	1.8
R8	0.2	1.2	0.1	0.3	<0.1	<0.1	49.9	47.5	19.6	7.5	23.9	1.8
C1	4.1	8.0	1.4	1.6	0.3	0.5	53.8	49.8	21.3	7.9	24.3	2.3
AR1	3.4	8.6	1.2	1.6	0.3	0.4	53.1	49.6	21.1	7.9	24.2	2.2

1. WSA – Western Sydney Airport

It is predicted that there will be no cumulative exceedances of air quality criteria at any assessment location for annual average PM_{10} concentrations, annual average $PM_{2.5}$ concentrations, annual average TSP concentrations and annual average dust deposition levels. It is noted that the predicted annual average $PM_{2.5}$ concentration at R3 is predicted to be equal to impact assessment criterion of 8 µg/m³ and the cumulative 24-hour PM_{10} concentration at R6 is predicted to be equal to the impact assessment criterion of 50 µg/m³.

When the predicted 24-hour average PM_{10} and $PM_{2.5}$ concentrations project increments are paired with the respective background concentrations, no additional cumulative exceedances of the impact assessment criteria at any assessment location are predicted.

There were six exceedances of the 24-hour average PM_{10} criterion in the 2017 background dataset. With the airborne dust contribution from the construction of WSA, an additional four exceedances of the 24-hour average PM_{10} criterion are predicted. Therefore, the 11th highest cumulative concentrations are presented for 24-hour average PM_{10}. There are two existing exceedances of the daily $PM_{2.5}$ criterion in the 2017 background dataset. Therefore, the third highest cumulative concentrations are presented for 24-hour average $PM_{2.5}$.

No cumulative exceedances of TSP or dust deposition criteria are predicted for any assessment location.

The AQIA considered the potential impacts on the existing residences on the lots surrounding the quarry. The same air quality criteria apply at commercial and industrial premises. Therefore, it is predicted that air quality criteria would continue to be met at the properties surrounding the site if they were developed for commercial/industrial uses prior to the completion of quarry operations.

6.2.9 Mitigation measures

The following measures will be implemented to minimise potential air quality impacts of the proposed modification:

- a water cart will operate on the internal unsealed haulage routes as required;
- the access road between Adams Road and the weighbridge will be sealed;
- drop heights will be minimised when loading trucks;
- water will be applied to the crushing plant as required to minimised dust emissions;
- double handling of material will be avoided where possible;
- site-wide vehicle speed limits will be applied (40 km/h limit on sealed and 20 km/h limit on unsealed roads);
- disturbance of stabilised ground cover will be avoided where possible;
- meteorological forecasts will be used to predict when the risk of dust emissions are likely to be high (due to adverse wind conditions) and preparatory measures will be implemented that may include:
    - watering surfaces so they are moist prior to hot and windy conditions;
    - planning additional water spraying during the day;
    - ceasing some activities or reducing activity levels; and
    - re-scheduling product dispatch.

Theses dust controls will be formally documented in the air quality management plan, prepared following approval for the reactivation of the quarry.

6.2.10 Conclusion

It is predicted that there will be no cumulative exceedances of the air quality criteria for the annual average PM_{10} concentration, annual average $PM_{2.5}$ concentration, annual average TSP concentration, annual average dust deposition level, 24-hour average PM_{10} concentration or 24-hour average $PM_{2.5}$ concentration at any assessment location.

6.3 Noise and vibration

6.3.1 Introduction

A noise and vibration impact assessment (NVIA) was prepared by EMM for the proposed modification (Appendix F).

6.3.2 Assessment approach

The NVIA was prepared in accordance with the *Noise Policy for Industry* (NPfI) (EPA 2017), *Interim Construction Noise Guideline* (ICNG) (DECC 2009) and *NSW Road Noise Policy* (RNP) (EPA 2011). The NVIA considers operational and construction noise and vibration emissions from the quarry operations and related traffic impacts.

The NVIA also considers the future changes to land use zoning and the area, with the development of the Western Sydney Aerotropolis and noise exposure as outlined in the Western Sydney Airport EIS, Assessment of Ground-Based Operational Noise (Wilkinson Murray 2015).

6.3.3 Existing environment

i Ambient noise

Unattended noise monitoring was undertaken from 25 February to 5 March 2020 by EMM at three locations surrounding the site (Figure 6.2):

- NM1 – 2111 Elizabeth Street, Luddenham;
- NM2 – 275 Adams Road, Luddenham; and
- NM3 – 225 Adams Road, Luddenham.

ii Assessment locations

The same noise sensitive receivers (also referred to assessment locations) were used in the AQIA and NVIA (listed in Table 6.3 and shown in Figure 6.2).

Road traffic noise levels from the proposed modification were assessed at the representative residential assessment locations as it is not proposed to modify the transport route along Elizabeth Drive.

KEY

- Study area
- Cadastral boundary
- Noise measurement location

Assessment location

- Active recreation
- Commercial
- Residential

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

0 100 200 m

GDA 1994 MGA Zone 56

Noise monitoring and assessment locations

Luddenham Quarry - Modification 5
Modification Report
Figure 6.2

EMM creating opportunities

6.3.4 Assessment criteria

i Operational noise

As discussed in Section 4.3.10, the site and surrounding area is part of the area included covered by the draft Aerotropolis SEPP. It is anticipated that the land zoning will change from a RU1 – Primary Production zone to in Agribusiness zone with the gazettal of the Aerotropolis SEPP in mid-2020. The NVIA (Appendix F) assesses the potential noise impacts of the proposed modification against the criteria that we believe apply before and after the rezoning.

Operational noise limits that are applicable prior to rezoning were established using the NPfI methods for determining project specific intrusiveness and amenity levels. The NPfI intrusiveness noise triggers require that $L_{Aeq,15min}$ noise levels (energy average noise level over a 15-minute period) from the site do not exceed the rated background level (RBL) by more than 5 dB during the relevant operational periods. The intrusiveness noise levels are only applicable at residential assessment locations. For residential land-uses, the project noise trigger level (PNTL) is the lower of the calculated intrusiveness or amenity noise level.

Permitted uses listed in the draft Aerotropolis SEPP for this zone include earthworks, freight and transport facility, electricity generating works, intensive agriculture, light industry, rural industry, service station, warehouse or distribution centre and other similar uses. These land uses are consistent with uses adopted for industrial development as defined in the NPfI.

The NPfI (Table 2.2 notes) states:

> For isolated residences within an industrial zone, the industrial amenity level is usually applied.

Consistent with the application of the NPfI, the project amenity criteria of 65 dB(A) $L_{eq,period}$ has been applied to existing isolated residential properties following rezoning of the area.

Predicted compliance with the PTNLs currently applicable to the site and predicted compliance with the amenity criteria for the rezoned land following commencement of the Aerotropolis SEPP are summarised in Section 6.3.6.

ii Road traffic noise

The principal guidance to assess the impact of the road traffic noise on assessment locations is the *NSW Road Noise Policy* (RNP) (EPA 2011). The RNP states that where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to an increase of up to 2 dB.

The relevant RNP criteria are presented in Table 6.7.

iii Construction noise

Noise management levels (NMLs) during construction were established using the method provided in the DECC's *Interim Construction Noise Guideline* (ICNG) (July 2009) and are presented in Table 6.8.

iv Construction vibration

Safe working distances for typical items of vibration intensive plant are listed in Table 6.5Table 6.5. The safe working distances for typical items of vibration intensive plant for both "Cosmetic Damage" (refer to British Standard BS 7385) and "Human Comfort" (refer to British Standard BS 6472-1). The safe working distances presented are indicative and will vary depending on the item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions.

Table 6.5 Recommended safe working distances for vibration intensive plant

Plant Item	Rating/description	Safe working distance	
		Cosmetic damage (BS 7385)	Human comfort (BS 6472)
Vibratory Rollers	<50 kN (typically 1–2 tonnes)	5 m	15 to 20 m
	<100 kN (typically 2–4 tonnes)	6 m	20 m
	<200 kN (typically 4–6 tonnes)	12 m	40 m

6.3.5 Methods

i Construction and operational noise

Operational and construction noise levels at assessment locations were predicted using DGMR Software proprietary modelling software, iNoise. Plant and equipment representing the range of proposed construction and operation scenarios were modelled at locations representing the worst-case noise levels throughout the construction and operational scenarios. The modelled noise levels assume all plant and equipment are operating, and all noise emitting activities are occurring, concurrently.

Construction noise levels were predicted for standard and out of hours (OOH) day periods although it is proposed that all construction occurs during standard hours.

ii Vibration

iii Road traffic noise

Road traffic noise levels from the project were assessed by calculating existing and existing plus project traffic at representative residential assessment locations.

The US EPA Federal Highways (FHWA) road traffic noise calculation procedure was used to assess road traffic noise from the proposed modification as the low traffic flows (<200 vehicles per hour) will continue. The FHWA procedure is more sensitive for low traffic volumes compared to the Calculation of Road Traffic Noise (CoRTN) methodology.

6.3.6 Impact assessment

i Operational noise levels

Predicted noise levels at the assessment locations during quarry operations are presented in Table 6.6. This provides the predicted noise levels from the proposed modified quarry operations. As the proposed modification includes additional quarry equipment, 'calculated existing' noise levels are also provided. These were modelled in the same way as for the proposed modification but are based on the equipment inventory in the Noise Management Plan (NMP), Clay/Shale Quarry, Adams Road, Luddenham (Golder Associates 2009) (Report No. 087623124 001 Rev 1).

Table 6.6 Predicted operational noise levels

Assessment location	Classification	Period	PNTL[1]	Industrial amenity criterion ($L_{Aeq,period}$) [2]	Site noise level[3], $L_{Aeq,15min}$ Predicted future [calculated existing]
			dB	dB	dB
R1	Residential	Day	51	65	41 [36]
R2	Residential	Day	51	65	43 [38]
R3	Residential	Day	44	65	**53 [48]**
R4	Residential	Day	42	65	**46** [41]
R5	Residential	Day	42	65	**45** [40]
R6	Residential	Day	42	65	**52 [47]**
R7	Residential	Day	42	65	41 [36]
R8	Residential	Day	51	65	41 [36]
AR1	Active recreation	When is use	53	65	49 [44]
C1	Commercial	When is use	63	65	51 [46]

1. Criteria applicable prior to rezoning.
2. Criteria applicable following rezoning.
3. Exceedances of the PTNL prior to rezoning are shown in bold.

Noise modelling predicts that the PNTLs will be satisfied at R1, R2, R7 and R8 residential assessment locations under standard ISO9613 noise enhancing conditions (explained in NVIA Section 4.2.4). The modelling predicts that the applicable noise criteria will be satisfied at the commercial (C1) and active recreation (AR1) components of the Hubertus Club.

Prior to the rezoning of the land, noise exceedances are predicted for a number of residential assessment locations under standard ISO9613 noise enhancing conditions:

- 285 Adams Road (R3): 9 dB exceedance;
- 5 Anton Road (R4): 4 dB exceedance;
- 185 Adams Road (R5): 3 dB exceedance; and
- 225 Adams Road (R6): 10 dB exceedance.

Prior to the rezoning of the land, it is predicted that the noise levels will satisfy the day amenity level (53 dBA) at all assessment locations.

Noise levels calculated for the approved quarry operations, found that estimated quarry noise levels were approximately 48 dBA at R3 and R6, ie up to in 7 dB exceedance of approved criteria. There is limited opportunity to reduce noise levels from the site operations with the schedule of plant and equipment already reduced as compared to previously approved operations and presence of existing bund walls.

Following rezoning of the site land to Agribusiness zone, it is predicted that the amenity noise goal of 65 dBA $L_{Aeq,period}$ will be met at all assessment locations.

ii Road traffic noise

Quarry vehicles will access the site from Adams Road (from the north only) and will use Elizabeth Drive. The NVIA assessed the potential for project-related traffic to impact residential properties on these road segments. The assessment considered exiting traffic volumes and projected vehicle movements associated with the operational activities. The road traffic noise level predictions were based on 100 daily truck movements.

Traffic movements from construction would be significantly lower than operational movements. Note that noise emissions from vehicles on the site access road are treated as part of on-site noise in accordance with the NPfI.

Adams Road is classified as a sub-arterial road and Elizabeth Drive is classified as an arterial road in accordance with the RNP. The calculated existing and future road traffic noise levels are presented in Table 6.7.

Table 6.7 Operations road traffic noise calculations, daytime (7 am to 10 pm)

Road segment	Approximate distance of residential façade from nearest carriageway	Existing movements[1]	Existing plus project movements	RNP Criteria[3] L_{Aeq}	Noise level increase due to the Project, $L_{Aeq,15hr}$
		Calculated level, $L_{Aeq,15hr}$	Predicted level, $L_{Aeq,15hr}$		
Adams Road (north)	195 m	45.0	47.7	60	2.7
Elizabeth Drive[3]	45 m	65.5	65.7	60	0.2

1. Adams Road is a sub-arterial road
2. Elizabeth Drive is an arterial road
3. Noise measurements at 2111 Elizabeth Drive were reviewed in conjunction with the classified traffic counts and FHWA predictions and confirmed levels within 1 dB.

It is predicted that noise levels for Adams Road (north) will comply with the baseline RNP daytime goal of $L_{Aeq,15hr}$ 60 dBA, with a noise level increase of 2.7 dB. There is one residence 195 m from the north section of Adams Road. Existing for daytime traffic noise levels on Elizabeth Drive exceed the baseline RNP criteria of $L_{Aeq,15hr}$ 60 dBA. It is predicted that noise levels for Elizabeth Drive will comply with the <2 dB increase criterion.

iii Construction noise levels

Predicted noise levels for standard and out of hours (OOH) day periods for Stage 1 construction works (ie road works that will have the highest total sound power level and longest duration of all construction works, about 4 weeks), are provided in Table 6.8. It is not currently proposed to undertake outside of standard hours.

Table 6.8 Predicted construction noise levels (Stage 1 – Road works)

Assessment location	Classification	Period[1,2]	Noise affected NML, dB	Highly noise affected NML, dB	Predicted construction noise level, dB $L_{Aeq,15min}$	Level above NML[3]
R1	Residential	Standard	56	75	50	-
		OOH	51	n/a		
R2	Residential	Standard	56	75	51	-
		OOH	51	n/a		
R3	Residential	Standard	49	75	65	+16
		OOH	44	n/a		
R4	Residential	Standard	47	75	51	+4
		OOH	42	n/a		
R5	Residential	Standard	47	75	49	+2
		OOH	42	n/a		
R6	Residential	Standard	47	75	62	+15
		OOH	42	n/a		
R7	Residential	Standard	47	75	45	-
		OOH	42	n/a		
R8	Residential	Standard	56	75	48	-
		OOH	51	n/a		
AR1	Active recreation	Any period	65	n/a	55	-
C1	Commercial	Any period	70	n/a	57	-

1. Standard hours (7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sunday or public holidays.
2. OOH – out of hours (Day – 1pm to 6pm Saturday, Sunday and public holidays).
3. Level above NML for Standard hours only.

It is predicted that the NML will be exceeded at the closest residential assessment locations (R3, R4, R5 and R6). Noise levels do not exceed the highly noise affected NML at any residence. It is not uncommon for construction projects to exceed NMLs. For this reason, they are not considered as noise criteria, but as a trigger to consider all feasible and reasonable noise mitigation and management measures, once exceeded.

Construction noise levels will be managed where exceedances of NMLs are predicted to occur (see Section 6.3.7).

iv Construction vibration

Safe working distances for typical items of vibration intensive plant are listed in Table 6.5. The safe working distances relate to continuous vibration and apply to residential assessment locations. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels occurring over shorter periods of time are allowed (as discussed in British Standards 6472-1).

The nearest residence (R3) is located approximately 40 m from the closest proposed construction activities. This assessment location is beyond the safe working distances for human response. Vibration impacts at residences from construction are therefore highly unlikely.

6.3.7 Mitigation measures

i Operations noise management plan

The quarry will be operated generally in accordance with the quarry as previously assessed and approved including:

- hours of operation;
- traffic movements (with a small increase); and
- existing noise bunds.

Following approval of the proposed modification, the quarry's noise management plan will be reviewed and updated if necessary.

The *Voluntary Land Acquisition and Mitigation Policy* (VLAMP) (DPE 2018) addresses voluntary mitigation and land acquisition actions from State significant mining, petroleum and extractive industry developments.

Prior to the area being rezoned, the application of the procedures of VLAMP, for assessment locations R3 to R6 with 'moderate' noise impacts potential treatment adopted would be as follows:

- provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity; and
- upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.

It is anticipated that the VLAMP will not need to be applied once the area has been rezoned as noise levels are predicted to comply with NPfI amenity levels at all surrounding properties.

ii Construction

There is limited opportunity to meet all NMLs as some residences are close to construction activities and the local topography does not provide significant noise mitigation. The construction works are short (4–6 weeks), with the noisiest works (construction of the access road) occurring over about four weeks.

Construction will be limited to standard day hours.

Noise monitoring during the initial stages of construction will be undertaken to determine if actual construction noise levels are above NMLs. Construction noise levels will be managed where exceedances of NMLs may occur as detailed in a construction noise management plan. This will address the following ICNG recommendations:

- application of feasible and reasonable work practices to minimise noise;
- inform potentially impacted residents of the nature of the works to be carried out, expected noise levels and duration and relevant contact details; and
- negotiation with the neighbours where noise from work outside standard hours is predicted to exceed the relevant NML by more than 5 dB.

Work practice methods will include:

- regular reinforcement of the need to minimise noise and vibration, such as through toolbox talks;
- reviewing and implementing feasible and reasonable mitigation measures that reduce construction noise levels;
- avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents;
- developing routes for the delivery of materials and parking of vehicles to minimise noise impacts;
- avoiding the use of equipment that generates impulsive noise where possible; and
- notifying residents prior to the commencement of noise intensive works.

Measures for the management of noise emissions from plant and equipment will include:

- where possible, choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks;
- operating plant and equipment in the quietest and most efficient manner; and
- regularly inspecting and maintaining plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively.

The safe working distances for cosmetic damage from vibrations will be monitored throughout the construction process. If safe working distances need to be encroached, real time vibration monitoring with audible and visual alarms will be installed at vibration sensitive structures so actual vibration levels can be monitored and managed appropriately in real-time.

6.3.8 Conclusion

Noise levels calculated for the approved quarry operations, found that estimated quarry noise levels were approximately 48 dBA at R3 and R6, ie up to in 7 dB exceedance of approved criteria.

Prior to rezoning of the area, noise exceedances between 3 and 10 dB are predicted to occur at four residences (R3, R4, R5 and R6). The predicted noise exceedances at R3 to R6 would be considered ‘moderate’. If required, negotiated agreements will be considered prior to the area being rezoned.

Following rezoning of the area, industrial amenity criteria will apply for isolated residences in industrial zoned land in accordance with the NPfI. Operational noise will comply with the relevant amenity noise goal of 65 dBA.

Road traffic noise levels are predicted to satisfy RNP criteria.

Construction noise levels from the project are predicted to exceed NMLs at the closest assessment locations, with exceedances greater than 10 dB above NML at R3 and R6 closest to the site. Accordingly, residents will be notified prior to works commencing and management measures applied.

The nearest residence to construction activity is assessment location R3 which is approximately 40 m away from closest construction activities. The assessment location is outside of the safe working distances required to maintain acceptable human response and structural vibration levels. Vibration impacts from construction at residential assessment locations are therefore highly unlikely.

6.4 Surface water

6.4.1 Introduction

A surface water assessment was prepared by EMM (Appendix G).

6.4.2 Assessment approach

The surface water assessment reviews the existing surface water environment at the site, describes the proposed water management system (including the supporting water balance and water quality modelling), and assesses flooding and water licensing requirements.

Guidance documents for water resource management and assessment in NSW considered in the surface water assessment included:

- Erosion and sediment control guidelines:
  - *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom 2004); and
  - *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (DECC 2008).
- NSW water quality and river flow objectives:
  - *NSW Water Quality and River Flow Objectives* (DECCW 2006); and
  - *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018).
- Relevant studies:
  - *Updated South Creek Flood Study* (WorleyParsons 2015); and
  - *Western Sydney Airport: Surface Water Hydrology and Geomorphology* (GHD 2016).

6.4.3 Existing environment

i Topography and geology

The topography of the site is largely flat other than the void. The site slopes gently from the south-west to the north-east, with elevation ranging between 60 m to 75 m AHD. The riparian corridor along the Oaky Creek is the lowest point on the site at 60 m AHD.

The Luddenham area is within the central part of the Sydney Basin, which is primarily comprised of sedimentary strata including extensive Hawkesbury Sandstone. The regional depression of the basin allowed the formation of shaly and silty strata (Wianamatta group) which includes the Ashfield and Bringelly Shales, which are several hundred metres thick. These form the quarry's mineral resource.

ii Rainfall

Rainfall and evaporation for the Badgerys Creek McMasters station, 1 km north-east of the site, is presented in Table 6.9. Monthly rainfall is lowest between July and September, and highest from January to March.

Table 6.9 Rainfall and evaporation statistics (1889–2019)

Annual statistic	Rainfall	Evaporation
	mm/year	mm/year
Average	756	1,470
Minimum	330	1,169
5th percentile	424	1,340
10th percentile	477	1,400
Median	737	1,472
90th percentile	1,044	1,522
95th percentile	1,164	1,581
Maximum	1,695	1,746

iii Catchment hydrology

The site is located within the Hawkesbury-Nepean catchment, and more specifically within the Oaky Creek catchment. Oaky Creek forms the eastern boundary of the site and has a total contributing catchment area of approximately 382 ha. The creek rises approximately 2 km south of the site (within the WSA site) and flows generally in a northerly direction. The creek continues downstream of the site for approximately 0.9 km before joining Cosgrove Creek.

The flow regimes of Oaky Creek and downstream watercourses have been extensively modified by land clearing, agriculture, extractive activities and urban and industrial development in the catchment. The creek has been significantly modified by the construction of the WSA upstream of the quarry (see Figure 1.2).

iv Site and surround hydrology

The site and immediate surrounds comprised of four main sub-catchments:

- A well vegetated grassed paddock (approximately 2.8 ha) to the north of the quarry void that drains to a depression in the north-east of the site which includes Sediment Dam 1 and the Water Management Dam (formally referred to as Sediment Dam 2). Sediment Dam 1 is located to the south of the Water Management Dam. Sediment Dam 1 has not been actively maintained for around 2 years while the quarry has been inactive and is overgrown with vegetation, impeding the capacity of the dam. It is proposed to decommission this dam.

- A portion of the unsealed internal road along the northern boundary of the site adjacent that drains to the Water Management Dam (approximately 0.8 ha).

- The north-eastern corner of the site where Oaky Creek drains to an online dammed storage, assumed to be built approximately 50 to 70 years ago. Although partially within the site boundary, this online storage is not part of the site's water management system.

- The remaining site areas, including the existing and proposed stockpiling areas, and laydown area, site entry infrastructure and remaining internal roads, extraction footprint and a minor portion of a neighbouring properties grassed area all drain to the quarry void. These areas are predominantly disturbed catchment, totalling approximately 12.9 ha.

v Water quality

Water quality monitoring at the site has historically been undertaken at the following locations (Figure 6.3):

- Oaky Creek upstream of the site;
- Oaky Creek downstream of the site;
- water stored within the quarry pit; and
- water stored within water management dams (the dams previously referred to as Sediment Dam 1 and Sediment Dam 2).

Monitoring results during quarry operations are available for 2010 to 2018. A summary of the median water quality results is presented in Table 3.2 of the Surface Water Assessment in Appendix G. Key results are summarised below.

- Salinity (as indicated by electrical conductivity) was elevated in the site's water management system and in Oaky Creek upstream of the quarry compared to ANZG (2018) default guideline values (DGVs). This is common in watercourses surrounded by agricultural land use.
- The pH of the water stored within the quarry pit and water management dams was elevated compared to Oaky Creek. The pH within Oaky Creek, both upstream and downstream of the quarry, was within the DGV range.
- Total suspended solids (TSS) concentrations were generally low (typically below 50 milligrams per litre (mg/L)), however elevated TSS concentrations were recorded following significant rainfall events, particularly in the water management dams and at the Oaky Creek upstream site.
- Nutrient concentrations were generally low within the water management system and in Oaky Creek, with the exception of phosphorous concentrations at the Oaky Creek upstream site that exceeded the DGVs. This is common in watercourses surrounded by agricultural land use.
- Metal concentrations were generally below DGVs for all sites, with slight exceedances of the DGVs for dissolved iron at the Oaky Creek upstream site; dissolved nickel and zinc within the quarry void; and copper and zinc within the water management dams.

In summary, water quality in the quarry's water management system during operations was similar to water quality within Oaky Creek.

KEY

- Study area
- Cadastral boundary
- Watercourse
- Water quality monitoring location

Water quality monitoring locations

Luddenham Quarry - Modification 5
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Figure 6.3

Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006); Nearmap (2020)

0 100 200 m

GDA 1994 MGA Zone 56

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6.4.4 Flooding

The impacts on surface water hydrology, flooding and geomorphology were assessed as part of the EIS for the WSA (GHD 2016). The WSA development was broken into two stages, the Stage 1 development and the long-term development of the airport. Construction of Stage 1 commenced in late 2018. This involves major earthworks to level the central and northern portions of the airport site (known as the construction impact zone) for the runway and related Stage 1 infrastructure (see Figure 6.3). The construction impact zone is across the Oaky Creek headwaters.

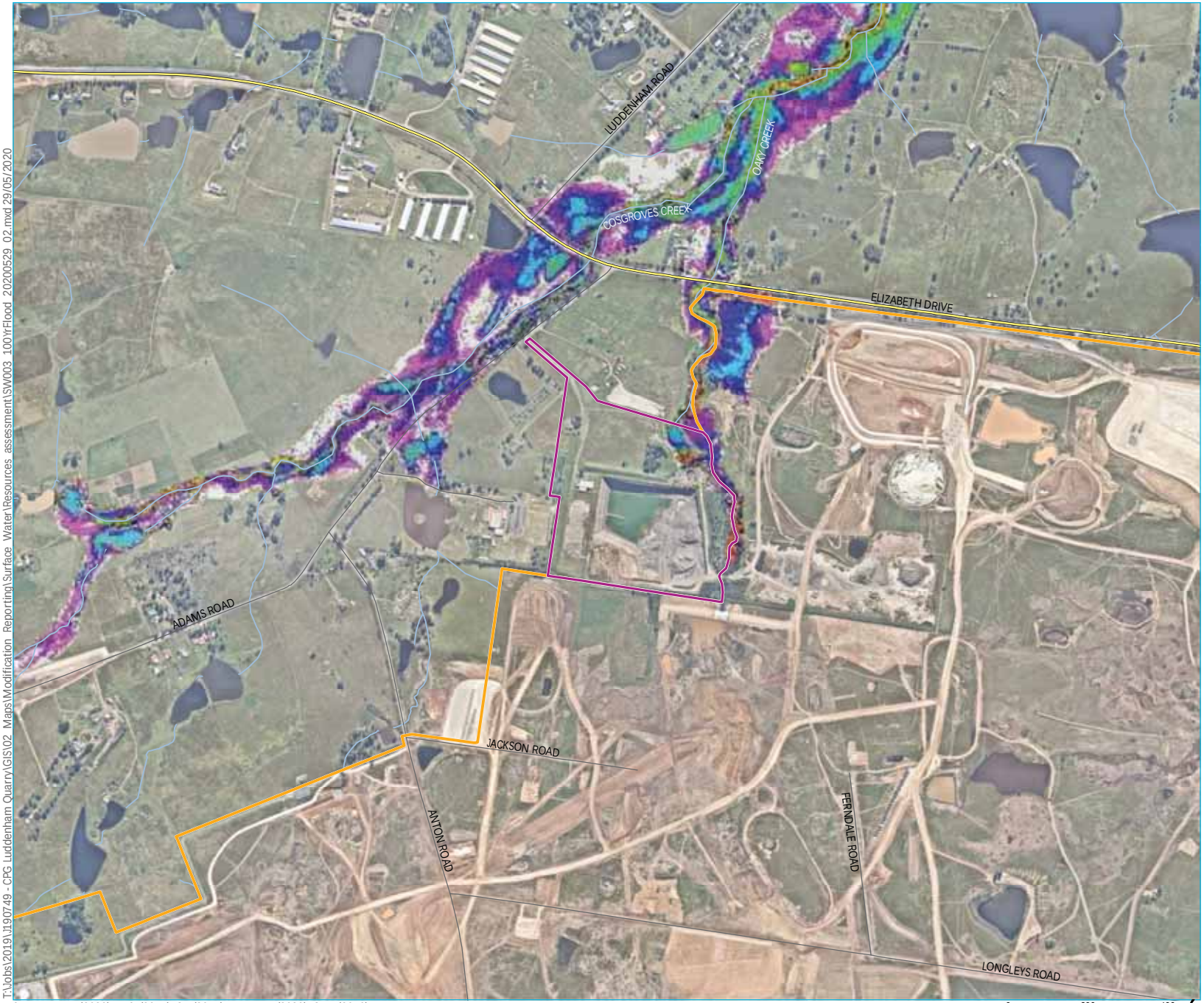
Upon completion, WSA Stage 1 is expected to service demand for annual passenger movements up until 2030. Therefore, the Stage 1 development flood results (GHD 2016) are considered to provide a reasonable estimate of flooding conditions likely to be experienced along Oaky Creek for the remaining life of the quarry.

Areas of the Oaky Creek headwaters within the WSA site are being regraded to drain in a north-east direction, away from the quarry site, and to provide a level surface for the WSA runway and associated infrastructure. As a result, the catchment area draining to Oaky Creek upstream of the site will be reduced by 75 ha. The increase in the impervious surface area associated with the airport runway will be offset by the reduction in the catchment area. It is predicted that Stage 1 will reduce pre-development peak flows in Oaky Creek at the quarry site by approximately 4.5 m^3/s during a 1-year average recurrence interval (ARI) event and 22 m^3/s during a 100-year ARI event (GHD 2016).

The 100-year ARI peak flow at the quarry site is expected to be approximately 13 m^3/s for the Stage 1 airport development. The probable maximum flood (PMF) event is predicted to be approximately 40 m^3/s adjacent the site and approximately 200 m^3/s downstream of the site at Elizabeth Drive (GHD 2016).

The disturbed areas of the site are expected to remain above the limit of flooding along Oaky Creek in all events including the PMF event for the Stage 1 development conditions. The Water Management Dam is predicted to be periodically inundated by flows from Oaky Creek, in events as frequent as a 1-year ARI.

Flood depths within Oaky Creek are estimated to be around 0.4 m to 0.6 m for a 100-year ARI event and 0.6 m to 0.8 m for the PMF event, as shown in Figure 6.4 and Figure 6.5 respectively.



KEY

- Study area
- Western Sydney Airport

Flood depth (m)

- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- 3 - 4
- > 4

Flooding Data Source:GHD (2016a) Western Sydney Airport: Surface Water Hydrology and Geomorphology, prepared by GHD Pty Ltd for Commonwealth Department of Infrastructure and Regional Development.

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Source: EMM (2020); DFSI (2017); GA (2011); Nearmap (2020); GHD (2016)

0 200 400 m

GDA 1994 MGA Zone 56

100-year average recurrence interval flood depth

Luddenham Quarry - Modification 5
Modification Report
Figure 6.4

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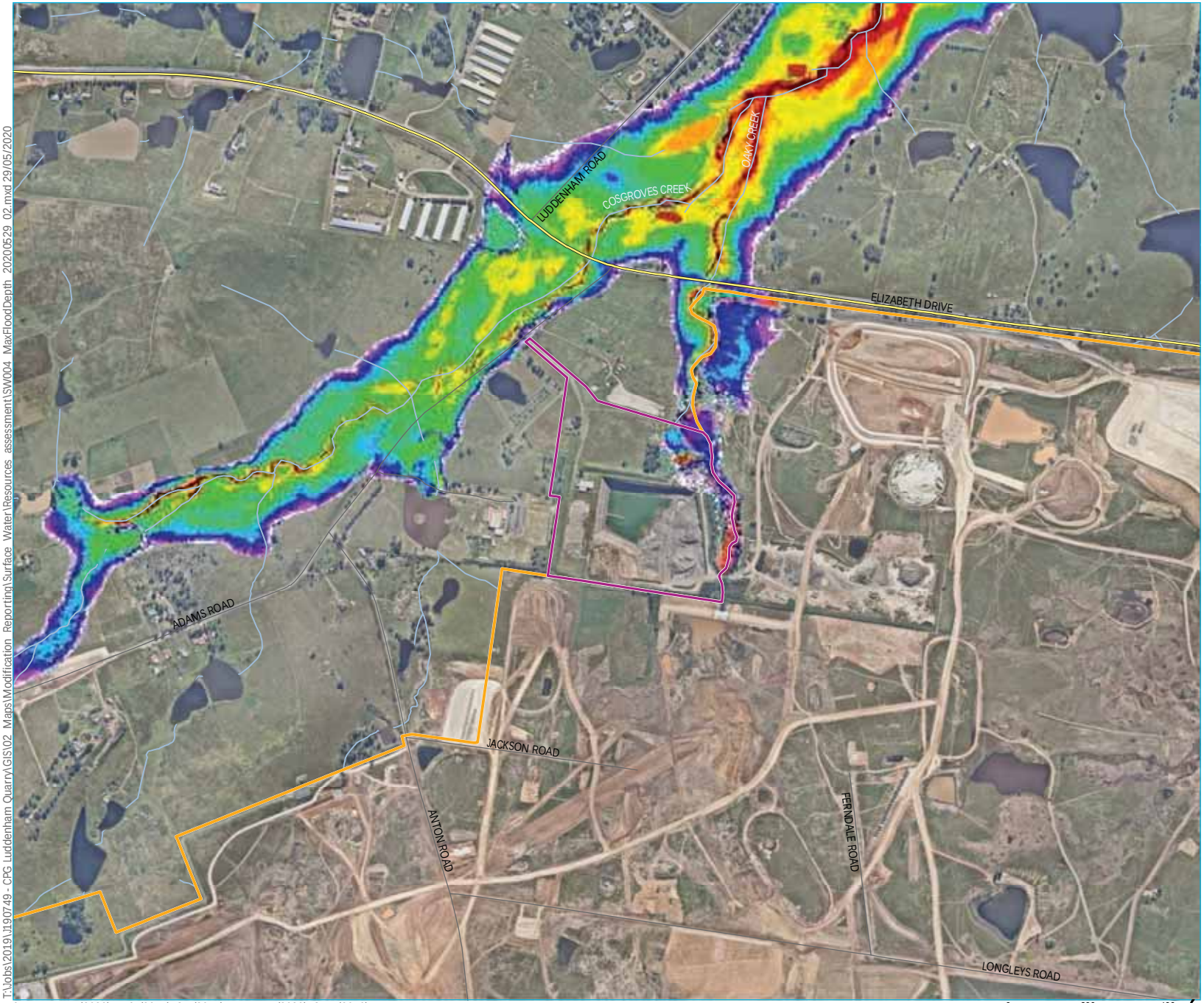

KEY

- Study area
- Western Sydney Airport

Flood depth (m)

- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- 3 - 4
- > 4

Flooding Data Source:GHD (2016a) Western Sydney Airport: Surface Water Hydrology and Geomorphology, prepared by GHD Pty Ltd for Commonwealth Department of Infrastructure and Regional Development.

T:\lobs\2019\119749 - CPG Luddenham Quarry\GIS\02 Maps\Modification Reporting\Surface Water\Resources assessment\SW004 MaxFloodDepth 20200529 02.mxd 29/05/2020

Source: EMM (2020); DFSI (2017); GA (2011); Nearmap (2020); GHD (2016)

0 200 400 m

GDA 1994 MGA Zone 56

Probable maximum flood depth

Luddenham Quarry - Modification 5
Modification Report
Figure 6.5

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6.4.5 Proposed water management strategy

The site's current water management system will be upgraded as part of the proposed modification to meet the water management objectives in Table 6.10.

Table 6.10 Water management objectives and approach

	Water management objective	Approach
1	Minimise the use of potable water from the public supply for purposes where non-potable water is acceptable and available.	• Water captured in the quarry pit and Water Management Dam will be used preferentially to potable water for dust suppression.
2	Maximise the separation of clean and dirty (sediment-laden) water.	• Diversion channels and drains will divert clean water around disturbed areas on site as far as reasonable and feasible. • All sediment-laden runoff will be directed into the internal water management system.
3	Minimise the risk of discharges from the site.	• Erosion and sediment control structures will be sized and maintained generally in accordance with Landcom (2004) and DECC (2008). • Water captured in the quarry pit and Water Management Dam will be used for dust suppression on site. • An oil and water separator and sediment trap will be installed immediately upstream of the Water Management Dam.
4	Minimise the potential for water quality impacts associated with chemical and hydrocarbon spills.	• Chemical and hydrocarbon products will be stored in bunded areas in accordance with Australian Standard AS1940:2004 – The Storage and Handling of Flammable and Combustible Liquids.

The upgraded water management system for the site is presented in Figure 6.6.

EPL 12863 included a licenced discharge point (LDP). This EPL was revoked in May 2020. A new LDP, at the outflow point of the Water Management Dam into Oaky Creek (refer to Figure 6.6), will be proposed in the application for a new EPL for the site.

The following existing diversion structures will be maintained to divert clear runoff around disturbed areas and direct sediment-laden runoff to the water management storages:

- bunds placed around the southern and western quarry boundaries which incorporate a diversion drain to divert clean water around the site;
- quarry walls which act as diversion drains to direct runoff into the quarry void;
- the bund on the eastern side of the quarry which incorporates a diversion drain to divert runoff from this area into the quarry void; and
- the drains on the northern and eastern sides of the quarry void to prevent runoff from the disturbed areas leaving the extraction area.

Sediment Dam 1 has not been actively maintained for at around two years, while the quarry has been inactive, and is overgrown with vegetation, reducing the capacity of the dam. It is proposed to decommission this dam and it will not be part of the upgraded water management system.

KEY

- Study area
- Cadastral boundary
- Watercourse
- Proposed transfer point
- P Licensed discharge point

Proposed road alignment

- Sealed
- Unsealed

On-site drainage lines

- Clean water diversion
- Piped drainage
- Water management
- Water storages

Sub-catchments

- Clean water catchment
- Pit catchment
- Water Management Dam catchment

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Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006); Nearmap (2020)

0 50 100 m

GDA 1994 MGA Zone 56

Proposed water management system layout

Luddenham Quarry - Modification 5
Modification Report
Figure 6.6

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6.4.6 Water balance

Catchment runoff captured by the quarry void and the Water Management Dam will be either used for dust suppression of unsealed haul roads or discharged to Oaky Creek. Water take from the Water Management Dam is excluded works under Schedule1, item 3 of the Water Management (General) Regulation 2018 (dams solely for the capture, containment or recirculation of drainage). Dams used for the containment and reuse of catchment runoff are consistent with industry best practice to prevent the contamination of a watercourse is also excluded from harvestable rights calculations. Accordingly, the proposed modification is not expected to have any requirements for licensing of surface water take.

Site water balances are presented in Appendix G for dry, average and wet rainfall years. In summary, the water balances indicate that:

- Approximately 81% of the demand for dust suppression is supplied by harvest catchment runoff, under average rainfall conditions. The use of water captured in the quarry void and Water Management Dam to supply dust suppression activities minimises the demand from potable water supply and reduces the volume and frequency of discharges to Oaky Creek.

- For the average rainfall year, discharges to Oaky Creek from the Water Management Dam were predicted to occur over eight days in the year with total volume of 4.4 ML/year.

Potable water for the offices and amenities will be sourced from the Sydney Water potable water supply network. Prior to the site being connected to mains water, potable water will be supplied by tanker if required.

Potable water will also be used for dust suppression activities when demand exceeds the supply from water stored within the Water Management Dam.

Wastewater generated by on-site amenities will be discharged to a septic holding tank, which will be pumped out by an approved licensed contractor when required.

6.4.7 Impact assessment

i Water quality

Discharges through the licenced discharge point will occur due to overflows from the Water Management Dam into Oaky Creek. The dam will receive runoff from a minor catchment as well as pumped transfers from the quarry void, which will capture the majority of the catchment runoff. Reuse of stored runoff for dust suppression and unsealed roads will reduce the volume and frequency of discharges.

Water quality monitoring results indicate that water within the water management dams during the previous operation of the quarry had similar characteristics to Oaky Creek upstream of the site (see Section 6.4.4). Therefore, occasional discharges from the Water Management Dam are not expected to materially change or degrade the water quality of Oaky Creek.

During high flows, Oaky Creek is predicted to flow into the Water Management Dam, further diluting discharges. There is potential for entrainment of sediment particles from the Water Management Dam when this occurs. However, the water quality of Oaky Creek under flood conditions is expected to be similar with a high sediment load.

ii NSW water quality and river flow objectives

An assessment of the proposed water management system against the typical water quality and river flow objectives for controlled streams in NSW is provided in Table 6.1 of the Surface Water Assessment. The assessment concludes that:

- no impacts to aquatic ecosystems are expected as the water quality of discharges is expected to be similar to the water quality of Oaky Creek upstream of the site;
- no impacts to the visual amenity of Oaky Creek are expected as the water quality of discharges is expected to be similar to the water quality of Oaky Creek upstream of the site. In particular, discharges are not expected to have elevated concentrations of oils, petrochemicals or floating debris or nuisance organisms such as algae;
- no impacts to primary or secondary contact recreation activities are expected as the water quality of discharges is expected to be similar to the water quality of Oaky Creek upstream of the site. In particular, discharges are not expected to have elevated concentrations of faecal coliforms, enterococci or protozoans as there is no source of these pollutants within the water management system;
- no impacts to downstream users for agricultural purposes are expected as the water quality of discharges is expected to be similar to the water quality of Oaky Creek upstream of the site;
- it is unlikely that downstream users extract water from Oaky Creek or downstream watercourses for homestead water supply. Therefore, impacts to homestead water supply have not been assessed;
- no water is extracted from downstream of the quarry for town water supply. Therefore, impacts to drinking water supply have not been assessed;
- no extraction of surface water from Oaky Creek is proposed as part of the proposed modification;
- occasional discharges from the Water Management Dam to Oaky Creek will occur when the water stored on site exceeds the demand of dust suppression activities. The water balance model predicted a total discharge of 4.4 ML/year for the typical median (50th percentile) rainfall events; and
- no instream structures are proposed.

iii Flood impacts

Quarry operations are above the limit of flooding along Oaky Creek for all events up to and including the PMF event (refer to Section 6.4.5). As a result, there is no potential for adverse flood impacts.

6.4.8 Mitigation measures

i Water management plan

Following approval of the proposed modification, the water management plan for the site will be updated to include the new water management strategy for the quarry. The updated water management plan will address any specific development consent or licence conditions and will include:

- baseline monitoring data results;
- objectives and performance criteria including trigger levels for investigating any potentially adverse impacts associated with water management;
- details of the monitoring, inspection and maintenance programs;
- reporting procedures for the results of the monitoring program; and
- plans to respond to any exceedances of the performance criteria.

ii Monitoring

Water quality monitoring will continue within Oaky Creek, upstream and downstream of the site, and within the quarry pit and Water Management Dam. The monitoring will be used to identify any water quality impacts associated with dam overflows. If water quality impacts are identified, the following contingency measures will be implemented:

- application of coagulating and/or flocculating agents, such as gypsum, polyacrylamides and alum, to enhance sediment removal prior to discharge; and/or
- dewatering of the Water Management Dam into the quarry pit via pumped transfer to minimise discharge volumes, if sufficient capacity exists.

All monitoring will be undertaken in accordance with Approved Methods for Sampling and Analysis of Water Pollutants in New South Wales (DEC 2004).

iii Inspection and maintenance program

Inspections of the water management system will be undertaken informally on a regular basis and formally on a quarterly basis. The water management structures will be visually inspected for capacity, structural integrity and effectiveness. Maintenance, such as the removal of excessive sediment accumulation or macrophyte growth from the Water Management Dam and drainage lines, will be implemented as required.

6.4.9 Conclusion

The proposed water management system is expected to achieve the following outcomes:

- captured catchment runoff was predicted by the water balance model to provide 81% of the demand for dust suppression under median rainfall conditions, reducing the demand from potable water supply and the volume and frequency of discharges off-site to Oaky Creek;
- discharges to Oaky Creek from the Water Management Dam are predicted to occur over eight days per year with total volume of 4.4 ML/year under median (50th percentile) rainfall conditions;
- the Water Management Dam is expected to be periodically inundated by flows when Oaky Creek is in flood. This is likely to coincide with the predicted discharges from the Water Management Dam, further diluting flows;
- the water quality of discharges is expected to have similar characteristics to the water quality within Oaky Creek upstream of the site, with discharges not expected to materially change or degrade the water quality of Oaky Creek; and
- the quarry's disturbance footprint is expected to remain above the limit of flooding along Oaky Creek in all events up to and including the PMF event.

6.5 Groundwater

6.5.1 Introduction

A qualitative groundwater assessment was prepared by EMM (Appendix H).

6.5.2 Assessment approach

The Groundwater Assessment describes the existing groundwater environment, assesses potential impacts to groundwater and provides management and mitigation measures. The Groundwater Assessment considers the requirements of the *NSW Aquifer Interference Policy* (2012).

6.5.3 Existing environment

The quarry targets the Bringelly Shale of the Wianamatta Group. There is Quaternary alluvium (sand, silt and clay) to the north and west of the site, consistent with the alignment of Cosgroves Creek to the west and the northern reaches of Oaky Creek.

A groundwater monitoring network was installed in January 2009 prior to quarrying to understand the hydrogeology at the site and to monitor for potential impacts. Three monitoring bores were installed to a depth of approximately 30 m into the Bringelly Shale.

The most recent groundwater standing water levels (SWLs) measured in the bores were in May 2017 (Figure 6.7). These ranged from 58.36 m AHD (bore BSM1) in the south-west to 46.83 m AHD to the north-east (bore BSM3), with the inferred groundwater flow direction to the north-east mirroring the prevailing topography. Quarrying activities have disrupted natural groundwater flow, with some local groundwater flows likely to be towards the pit. Groundwater quality measured at this time indicated that groundwater was near neutral, saline (total dissolved solids (TDS) of approximately 18,000 mg/L), and with elevated total nitrogen concentrations. Relatively low concentrations of metals were also reported for the bores sampled, less than the relevant guideline values.

The Bringelly Shale has low hydraulic conductivity associated with the fine-grained shale and claystone so the rate of groundwater inflow to the quarry pit will be low.

High-potential terrestrial groundwater dependent ecosystems (GDE) (ecosystems that rely on the subsurface presence of groundwater) were inferred at the eastern boundary of the site and south-east of the site associated with Oaky Creek, and to the north-west of the site consistent with the alignment of Cosgroves Creek. It is unlikely groundwater provides baseflow to Oaky Creek or that baseflow in the creek supports GDEs at the site boundary due to the depth of groundwater and the low permeability of the aquifer.

As a consequence of the composition and fine grain size of the Bringelly Shale, low to very low permeability and the known poor quality of the groundwater, there are no known registered bores that extract groundwater from the Bringelly Shale within a 1 km radius of the quarry.

KEY

- Study area
- Cadastral boundary
- High potential terrestrial GDE (based on BOM 2020)
- A Groundwater monitoring
- A In-pit sump

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

0 50 100 m

GDA 1994 MGA Zone 56

Groundwater features

Luddenham Quarry - Modification 5
Modification Report
Figure 6.7

EMM creating opportunities

6.5.4 Impact assessment

The proposed modification will not significantly impact on the local groundwater system, any neighbouring bores, or GDEs and will meet the minimal impact considerations under the *NSW Aquifer Interference Policy*. Further, ongoing groundwater monitoring would be undertaken during quarry operations to identify any changes to the local groundwater system that may occur.

6.5.5 Mitigation measures

No additional groundwater mitigation measures are required as a result of the proposed modification. As described in Section 6.4.8i, the quarry's water management plan will be updated to include the new water management strategy for the site and to address any specific development consent or licence conditions.

6.5.6 Conclusion

The proposed modification is not expected to result in an additional impact on groundwater as there are primarily surface modifications, with no changes proposed to the pit depth or extent.

It has been assessed that the approved project and proposed modification poses a low risk to the local groundwater system, neighbouring bores and groundwater levels and quality associated with groundwater dependent ecosystems.

6.6 Land and soil

6.6.1 Introduction

Soils were tested and described in the Biophysical Strategic Agricultural Land (BSAL) Site Verification Report prepared by Minesoils (Appendix I).

6.6.2 Assessment approach

The BSAL assessment included a desktop review of regional mapping, review of BSAL criteria, agricultural impacts risk ranking and field sampling and testing of soils from the site and considered the following government policies, standards and guidelines:

- SEPP (Mining, Petroleum Production and Extractive Industries) 2007;
- *NSW Strategic Regional Land Use Policy – Guideline for Agricultural Impact Statement (AIS) at the Exploration Stage* (DPIE 2015);
- *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (OEH 2013); and
- Australian Soil Classification System (Isabell 1996).

6.6.3 Existing environment

i Land use, geology and topography

Land uses surround the site are described in Section 1.7. Prior to initial quarrying the site was assessed as degraded agricultural land being predominantly grass covered and bare earth due to overgrazing and stock trampling, with small stands of remnant vegetation along Oaky Creek (Douglas Nicolaisen & Associates 2003).

ii Soils

The soil landscape unit mapped for the site and proposed modification area is the Blacktown soil landscape and Second Ponds Creek soil landscape.

The soils on site can be generally characterised as:

- slightly to strongly acidic;
- often hard setting with low permeability and water holding capacity;
- localised saline, sodic subsoils prone to erosion and with low chemical fertility and elevated aluminium; and
- generally low fertility.

The Australian Soil Resource Information System (ASRIS) mapping indicates that two soil types are present in the greater site area, Kurosols and Sodosols. Both are considered to have very low agricultural potential due to low chemical fertility and poor soil structure (Gray and Murphy 2002). The ASC soil map for the site is presented in Appendix I.

There are no acid sulphate soils (ASS) in the site.

iii Land and soil capability (agricultural value)

Land and soil capability is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources (OEH 2012). The land and soil capability class gives an indication of the land management practices that can be applied to a parcel of land without causing degradation to the land and soil.

The site is mapped in the OEH eSPADE database (OEH 2016; OEH 2017a) as Class 4 to Class 6 (Table 6.11). These classes represent land with 'moderate to severe limitations' for cropping and with agricultural land uses restricted to grazing, forestry and natural conservation. Limited options exist to improve the agricultural viability of the land without causing degradation.

Table 6.11 Land and soil classifications mapped for the site

Land and soil capability class (per OEH 2012)	Description
Class 4 – Moderate Capability Land	• Land has moderate to high limitations for high-impact land uses. • Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. • These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
Class 5 – Moderate–low capability land	• Land has high limitations for high-impact land uses. • Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. • The limitations need to be carefully managed to prevent long-term degradation.
Class 6 – Low capability land	• Land has very high limitations for high-impact land uses. • Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. • Careful management of limitations is required to prevent severe land and environmental degradation

iv Contaminated land

A search of the EPA's contaminated land public record of notice and list of sites notified to the EPA under Section 60 of the NSW *Contaminated Land Management Act 1997* (CLM Act) did not return any information on reported contamination or any regulatory notices issued for the land within the site (EPA 2020).

A search of the contaminated land record of notices did not reveal any sites within Luddenham that have been issued with any notices.

6.6.4 Impact assessment

i Biophysical strategic agricultural land

The BSAL assessment carried out to support the SVC application determined that the existing quarry disturbance and proposed modification, inclusive of a 100 m buffer, are not BSAL (Appendix I).

ii Strategic agricultural land

The site is not identified as strategic agricultural land (SAL) or high-value agricultural land in the Greater Sydney Regional Plan or Western Sydney District Plan. The site is unlikely to be considered SAL in the future for these reasons:

- the site is considered degraded agricultural land;
- the land and soil capability classes for the site are mapped as having 'moderate to very severe limitations' for cropping (ie they cannot support high-value agricultural land uses); and
- current and future quarry operations are complimentary to the strategic economic and industrial planning objectives for the region.

6.6.5 Mitigation measures

Existing management plans (including the site water management plan and relevant subplans including erosion and sediment control plan required under Condition 24 of the consent will also be updated to account for the proposed modification.

6.6.6 Conclusion

In addition to the quarry reactivation, CPG and KLF are currently preparing a separate development application for a new, advanced resource recovery centre facility to be co-located on site. Core to this application is the proposal to:

- Utilise non-hazardous unrecyclable *'General solid waste (non-putrescible)'* (EPA 2014) generated by the facility, that cannot be sold or beneficially reused, to backfill the quarry void.
- Use existing overburden resources (stockpiled subsoils and topsoils) and other imported media as necessary to cap and cover the fill material.
- Produce a safe, stable and non-polluting final landform suitable for commercial/industrial final land use.

The above proposal is generally consistent with the original 2003 EIS commitments for the site (Douglas Nicolaisen & Associates 2003), with the exception of the changed final land use for the site (other than Oaky Creek) from pastoral/rural (RU1 Primary Production) to commercial/industrial.

The changed final land use acknowledges that the pre-quarrying land use (pasture for cattle grazing and horse agistment) is no longer appropriate on account of:

- the unfavourable land and soil capability (LSC) class of the site, reflected in its original degraded condition (EMM 2020; MineSoils 2020; Douglas Nicolaisen & Associates 2003); and
- that commercial/industrial land use better compliments the proposed Western Sydney Airport and strategic objectives of the draft Western Sydney Aerotropolis Plan.

There will be no change to the biodiversity land use for the Oaky Creek riparian zone as prescribed in Condition 34 of the existing consent.

6.7 Traffic and transport

6.7.1 Introduction

A traffic impact assessment (TIA) for the proposed modification has been prepared by EMM (Appendix J).

6.7.2 Assessment approach

The TIA assesses:

- the existing site access from Adams Road capacity to accommodate approved traffic movements;
- the capacity and safety of Adams Road and the Elizabeth Drive/Adams Road intersection to accommodate approved traffic movements and of the site access intersection; and
- the adequacy of the revised internal road network to accommodate site traffic.

The TIA also assesses the proposed increase to a maximum of 100 traffic movements per day on Adams Road and the Elizabeth Drive/Adams Road intersection and the Elizabeth Drive/Luddenham Road intersection.

It was prepared in accordance with:

- RTA's *Guide to Traffic Generating Developments* (RTA 2002);
- *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* (Austroads 2016); and
- the requirements outlined at the consultation meetings with TfNSW on 4 February 2020 and Liverpool City Council on 18 February 2020. Meeting minutes are appended in Appendix A of the TIA (Appendix J).

All quarry trucks will access the site via Elizabeth Drive and the northern end of Adams Road. Therefore, the only major road intersection that will be affected as a result of change of access to the site is the Elizabeth Drive/Adams Road intersection. No quarry trucks will use The Northern Road/Adams Road intersection so this intersection was not assessed.

The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant as part of the proposed development so that the pavement is suitable for use by larger trucks, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines.

Other potential impacts that may result in the use of other routes, such as employee traffic, will be minor. These movements are already approved and have not been further assessed.

6.7.3 Approved operations

Traffic generation associated with quarrying operations is generally sporadic in nature with dispatch of product driven by weather conditions as well as product sales. The traffic impact assessment prepared to support MOD4 (withdrawn) reviewed weighbridge data from the quarry between September 2016 and February 2017 (Stanbury Traffic Planning 2017). This review found that over this six month period average traffic generation was generally below the approved average of 80 movements a day however the maximum daily movements were significantly higher being up to 132 movements (66 trucks) per day (Stanbury Traffic Planning 2017).

The original EIS outlined up to 40 trucks a day (80 movements) would access the quarry (Douglas Nicolaisen & Associates 2003). Whereas the Environmental Assessment report (Benbow Environmental 2014) prepared to support MOD3, outlined approximately (rather than up to) 40 trucks a day are approved to access the site. According to Condition 2 of the consent, the applicant is to carry out operations generally in accordance with the EIS and the subsequent environmental assessments supporting the respective proposed modification applications. Condition 3 of the consent notes if there is any inconsistency between the original EIS and subsequent environmental assessments, the most recent document shall prevail to the extent of the inconsistency. Therefore, it is considered that approximately 40 trucks (80 movements) are currently approved.

6.7.4 Existing and future environment

i Local road and transportation network

The site has a narrow frontage on Adams Road with a narrow strip connecting the bulk of the site to Adams Road. Adams Road is a local road that intersects with Elizabeth Drive about 280 m north of the site and The Northern Road about 2.5 km south of the site. Elizabeth Drive and The Northern Road are the closest state roads to the site. The proposed access road is unsealed and there is no constructed intersection on Adams Road as shown in Photograph 6.1.

Adams Road currently has a 3-tonne load limit, restricting its use by heavy vehicles. The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant so that the pavement is suitable for use by heavy vehicles, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines. This will allow the load limit to be lifted and the northern section of Adams Road to be used to access the site.

There are currently no public transport services accessible to the site. Pedestrian and cycling infrastructure in the area is currently limited, reflecting the current rural character of the area.

Between 2014 and 2018, there were five crashes on Adams Road and at its intersections with Elizabeth Drive and The Northern Road.

Photograph 6.1 Existing driveway off Adams Road

An overview of Adams Road and Elizabeth Drive is provided in Table 6.12. A full profile of these roads is provided in Section 2.2 of the TIA (Appendix J).

Table 6.12 Local road specifications

	Adams Road	Elizabeth Drive
Road classification	Local road (managed by Liverpool City Council)	State road (TfNSW managed)
Connectivity	Between Elizabeth Drive (north-east) and The Northern Road (south-west)	Between the Northern Road (west) and Hume Highway (east)
Number of lanes	One lane each way	Travel lane various, however, close to Luddenham it has one lane each way
Heavy vehicle access	Prohibited for vehicles over 3 tonnes. This restriction will need to be lifted to allow heavy vehicle site access	TfNSW approved 25/26 m B-double route between The Northern Road and Hume Highway
Traffic function	Predominantly carries local traffic at present	Provides east-west arterial connection

ii Future road improvements

The *Western Sydney Infrastructure Plan* (DITRDC 2019) outlines the upcoming infrastructure upgrade works to accommodate traffic generated from the Western Sydney Airport. The following upgrades are relevant to the locality of Adams Road:

- The Northern Road upgrade – the realigned The Northern Road will intersect with Adams Road at a location closer to the site and will have a four-way intersection instead of the current T-intersection.
- M12 Motorway – the new motorway will provide a direct access from the M7 Motorway to the Western Sydney Airport as well as The Northern Road. As a result, Elizabeth Drive will be partly relieved from regional traffic.

Adams Road between Elizabeth Drive and The Northern Road will retain its existing speed limit of 70 km/h.

In the longer term, Adams Road will be realigned at its northern end to connect directly into Luddenham Road at a new four-way intersection which will replace the existing Elizabeth Drive/Adams Road intersection.

iii Existing and future traffic volumes

An intersection survey was undertaken between 6:00 am and 9:00 am as well as between 3:00 pm to 6:00 pm on 27 November 2019 at the Elizabeth Drive/Adams Road intersection, as presented in Section 2.4.1 of the TIA in Appendix J. The survey results indicate that the network peak hours are as follows:

- AM peak hour: 6:30 am to 7:30 am; and
- PM peak hour: 4:15 pm to 5:15 pm.

The future traffic volumes in the locality incorporating the traffic generation associated with the Western Sydney Airport have been provided by TfNSW based on the Strategic Travel Forecasting Model (STFM). The STFM includes historical traffic levels (ie including existing land uses such as the approved quarry) and the traffic levels forecast generated by the staged Western Sydney Airport and Aerotropolis development.

The existing baseline and anticipated future traffic volumes are presented in Table 6.13.

Table 6.13 Existing and future traffic volume

Road	Traffic flow direction	Existing traffic volumes (2020 baseline traffic volume)				Future traffic volumes (2024 baseline traffic volume)			
		AM peak hour traffic		PM peak hour traffic		AM peak hour traffic		PM peak hour traffic	
		LV	HV	LV	HV	LV	HV	LV	HV
Elizabeth Drive (west of Adams Road)	Eastbound	558	67	452	17	663	91	580	23
	Westbound	416	54	771	40	544	49	680	31
Elizabeth Drive (east of Adams Road)	Eastbound	584	67	479	17	766	91	670	23
	Westbound	342	54	710	39	249	49	475	28
Adams Road (south of Elizabeth Drive)	Northbound	100	0	88	1	398	0	295	3
	Southbound	82	2	146	2	89	3	170	2

Note: LV – light vehicle, HV – heavy vehicle.

6.7.5 Proposed modification

i Site layout impacts

It is proposed to use the existing site access road from Adams Road to access the quarry and to upgrade the internal road network on site, including sealing of the site access road between Adams Road and the proposed weighbridge.

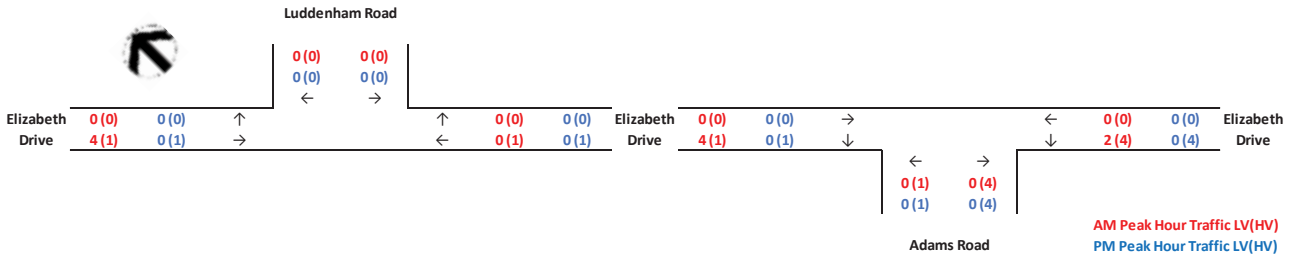
ii Traffic generation

The TIA considers 100 daily truck movements between 7.00 am to 6.00 pm. It assumes that peak hour traffic represents 10% of the daily traffic, which equates to 10 movements in the peak hours. These trucks will be accessing and exiting the site via the northern section of Adams Road between the site access road and Elizabeth Drive.

There will be a maximum of 15 staff members on site at any given time. Some staff arrivals may align with the AM network peak hour.

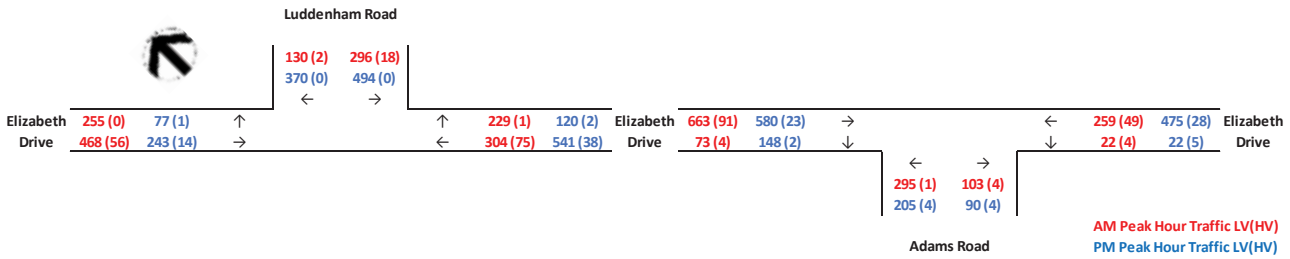
iii Traffic distribution

All quarry trucks will travel to and from site via Elizabeth Drive with traffic projected to be 80% east and 20% west along Elizabeth Drive. No quarry trucks will access (or leave) the site from Adams Road south of the quarry. It is assumed future staff car trips will follow the turn movement proportions of the existing road network. The calculated existing and future site car and truck traffic movements on Elizabeth Drive are presented in Table 6.13. The calculated traffic movements at the Elizabeth Drive/Adams Road intersection in 2020 are presented in Figure 6.8 and for 2024 are presented in Figure 6.9.



Light vehicle movements unbracketed and heavy vehicle bracketed

Figure 6.8 Quarry-related traffic volume



Light vehicle movements unbracketed and heavy vehicle bracketed

Figure 6.9 2024 cumulative traffic volume

iv Car parking

Car and truck parking demand will be met within the site entry infrastructure area (Figure 2.1).

v Proposed road upgrades

A swept path assessment was undertaken as part of the TIA to ensure the adequacy of the proposed internal road network and the relevant intersections (Elizabeth Drive/Adams Road intersection and Adams Road/site access intersection). The Elizabeth Drive/Adams Road and The Northern Road/Adams Road intersections can currently accommodate 19-m long truck and dog turning movements. Upgrades to the northern section of Adams Road will include upgrades to this intersection so that it is suitable for B-doubles.

The swept path assessment indicates that minor splaying at the site access is required to accommodate the left turn of a 19-m long truck and dog into the site. This will be within the existing access road corridor and will be upgraded prior to B-doubles accessing the site.

6.7.6 Impact assessment

i Traffic volumes

The current baseline traffic volumes (from the recent tube count) and forecast future baseline traffic volumes (extracted from data provided by TfNSW) on Adams road are provided in Table 6.14. The forecast future baseline traffic volumes have considered the cumulative traffic growth associated with Western Sydney Airport and other associated infrastructure. In 2024, the additional development traffic from the quarry (10 movements in the peak hours) will represent approximately 2% of the future total forecast traffic volume using Adams Road and is not expected to have a significant impact in terms of either traffic flow or traffic safety along Adams Road.

Table 6.14 Peak hour traffic volume on Adams Road

Peak Hour	2020 (tube count)	2024 (interpolation from 2020 survey and 2026 STFM outputs)
AM	171	490
PM	218	470

The impact of the quarry traffic on Adams Road will be minimal, particularly when considered in the context of the broader changes to the traffic volumes associated with the Aerotropolis. The load limit (up to 3 tonnes) on Adams Road will need to be removed by the National Heavy Vehicle Regulator prior to quarry trucks using Adams Road.

The STFM traffic volumes provided by TfNSW (see Section 6.7.4iii) consider the traffic from the approved quarry and the upcoming Western Sydney Airport. The proposed modification will only result is a small approved increase in approved quarry truck movements and will have a negligible impact on traffic volumes on Elizabeth Drive.

ii Intersection performance

The predicted intersection performance for the Elizabeth Drive/Adams Road intersection for 2020 and 2024 are presented in Table 6.15. The table presents the maximum average delay of any particular movement for a priority-controlled intersection (usually the longest delay occurs for the right turning movement from the minor road) and the average delay over all movements.

Table 6.15 Elizabeth Drive/Adams Road intersection performance

Peak hour	DOS		LOS		DEL (seconds)		Q95 (metres)	
	Baseline	Proposed modification	Baseline	Proposed modification	Baseline	Proposed modification	Baseline	Proposed modification
2020								
AM	0.389	0.392	A	A	9.3	9.9	6.2	6.7
PM	0.422	0.425	A	A	10.6	11.5	16.6	17.2
2024								
AM	0.469	0.471	A	A	10.2	10.6	8.3	9.0
PM	0.436	0.439	A	A	10.4	10.8	17.2	17.7

DOS: Degree of saturation – the total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (eg 0.8 = 80% saturation).
DEL: Average delay – the average delay in seconds encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
LOS: Level of service – this is a categorization of average delay, intended for simple reference.
Q95: 95% queue lengths – is defined to be the queue length in metres that has only a 5% probability of being exceeded during the analysed time period. It transforms the average delay into measurable distance units.

With the forecast TfNSW locality growth by 2024, in the AM peak hour, the Elizabeth Drive/Adams Road intersection will continue to operate at LOS A, with or without the quarry traffic. The average delay for the right turning vehicles would be approximately 11 seconds which is considered acceptable. The maximum queuing will be about two to three vehicles.

iii Car and truck parking provisions

There will be maximum 15 staff members on site at any given time and there may be up to two visitors. Therefore, 17 marked parking spaces will be provided within the proposed site entry infrastructure area. The car parking spaces will be designed in accordance with relevant Australian Standard (AS 2890.1:2004) and there will be at least one will be an accessible parking space.

iv Site access road intersection

The proposed site is located on a straight section of Adams Road, hence there are no sight distance or safety issues for vehicles entering or exiting the site. Based on the sight distance analysis, the sight distances to the left and right meets the minimum sight line requirement (151 m) stipulated in *Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections)* (Austroads, 2017), for a 70 km/h road.

v Impact on public transport, pedestrians and cyclists

Any future pedestrian or cycling infrastructure along Adams Road is supported as it would encourage site staff members to consider using active transport modes, rather than driving.

vi Adams Road load limit restriction

Adams Road is a council controlled local road. There is an existing load limit restriction (up to 3 tonnes) on Adams Road. This load limit needs to be lifted to allow heavy vehicles to access the site. Discussions are being held with Liverpool City Council regard upgrading the northern section of Adams Road and lifting the load limit.

The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant so that the pavement is suitable for use by heavy vehicles, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines.

The applicants have commissioned road surveys and will prepare an upgraded road design. The upgrade design will be agreed with Council prior to an application being lodged to National Heavy Vehicle Regulator (NHVR) to lift the load limit.

6.7.7 Mitigation measures

The access road will be sealed between Adams Road and the weighbridge and there will be minor splaying at the access road/Adams Road intersection.

Quarry trucks will only travel on the section of Adams Road between Elizabeth Drive and the site access road. This section of Adams Road will be upgraded by the applicant.

No quarry trucks will travel on Adams Road south of the quarry access road.

The Road Transport Protocol, required by Schedule 4, Condition 42 of the consent, will be revised to reflect site access changes and new infrastructure layout.

6.7.8 Conclusion

Use of Adams Road by heavy vehicles is currently restricted by a 3-tonne load limit. As part of the approval process, the current heavy vehicle restriction on Adams Road will need to be lifted by the National Heavy Vehicle Regulator (NHVR). The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant as part of the proposed development so that the pavement is suitable for use by larger trucks, up to B-doubles, and so that the lane and shoulder widths meet Austroads Guidelines. There are no sight distance or safety issues at the Adams Road/site access intersection for vehicles entering or exiting the site.

The Elizabeth Drive/Adams Road intersection is currently operating at LOS A or B with significant capacity to accommodate additional traffic. Quarry traffic will not deteriorate the operation of the intersection. In 2024, the intersection will continue to operate at LOS A during peak periods with or without the quarry traffic.

Quarry traffic will be less than 2% of the total traffic forecast to be using Adams Road so is not expected to have a significant impact on traffic flow or safety. The proposed modification will only result in a small increase in approved quarry truck movements and will have a negligible impact on traffic volumes on Elizabeth Drive.

6.8 Biodiversity

6.8.1 Introduction

A BDAR waiver application was lodged with the Scoping Report (EMM 2020) as the proposed modification is unlikely to have any significant impact on biodiversity values. The BDAR waiver application is attached to this modification report (Appendix K).

6.8.2 Assessment approach

The biodiversity assessment included desktop reviews, and field surveys on 30 January, 24 February and 27 February 2020 that included targeted searches, vegetation mapping, Biodiversity Assessment Method (BAM) plots, and targeted nocturnal surveys. The biodiversity assessment was completed in accordance with the EPBC Act, BC Act, Biodiversity Conservation Regulations 2017 (BC Regulations), and the *Biodiversity Assessment Method* (OEH 2017).

6.8.3 Existing environment

Site vegetation and its location in relation to the proposed modification footprint is shown in Figure 6.10.

i Plant community types

There are two Plant community types (PCTs) on the site:

- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley; and
- Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.

These PCTs, are either 'Moderate-Good' or 'Low' condition.

Any vegetation not mapped is exotic. The exotic vegetation does not comprise habitat for threatened species.

ii Composition, structure and function of vegetation on site

The existing vegetation integrity at the site is limited to the riparian corridor along Oaky Creek, and a patch of woodland in the north-east corner of the site (Figure 6.10). The vegetation integrity in the surrounding area is also degraded, and largely limited to isolated pockets of woodland, or corridors of riparian vegetation along meandering drainage creeks within a wider agricultural landscape.

The site provides minimal ecological connectivity. Oaky Creek has some ecological value as a drainage line and riparian corridor. The southern extent of this riparian corridor is the southern boundary of site as the corridor to the south has been removed as part of WSA bulk earthworks (Figure 6.10). The proposed modification does not include activities within, or impact, Oaky Creek vegetation.

Prior to being used as a quarry, the site was used as stockyard for horses and a turf farm. The majority of the property was covered by grass or bare earth, with remnant trees mostly located in or near Oaky Creek (Douglas Nicolaisen & Associates 2003).

iii Threatened species and ecological communities

The desktop review of the site identified 36 threatened species and 4 threatened ecological communities (TECs) occurring in the vicinity of the site. No threatened species recorded on the site in the 2003 EIS (Douglas Nicolaisen & Associates 2003). The desktop assessment identified fifteen migratory birds that are predicted to occur within the vicinity of the site.

The field surveys identified two TECs and one threatened species on site, the microchiropteran bat, Southern Myotis, *Myotis Macropus.* The two TECs on site comprise:

- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC listed); and
- Cumberland Plain Woodland in the Sydney Basin Bioregion (BC listed).

These TECs are both very poor quality, comprising an exotic ground-layer and no midstorey.

KEY

- Study area
- Proposed road layout
- Waterbody
- Cadastral boundary

Proposed disturbance

- Approved under DA315/7/2003 (as modified)
- Proposed new disturbance MOD5

Threatened ecological community (TEC)

- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin, South East Corner bioregions
- Cumberland Plain Woodland in the Sydney Basin Bioregion

Plant community type (PCT)

1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley

- Poor (disturbed)
- Poor
- Medium

849 - Grey Box Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion

- Poor

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

0 50 100 m

GDA 1994 MGA Zone 56

Biodiversity features

Luddenham Quarry - Modification 5
Modification Report
Figure 6.10

EMM creating opportunities

iv Other site features

No rocks were identified on the site that may provide habitat to threatened species, such as the Pink-tailed Worm Lizard. If any rocks are present but were not found, it is unlikely that any threatened species would utilise them due to the degraded nature of the site (ie exotic groundlayer, absent midstorey, sparse tree structure, modified landscape).

6.8.4 Impact assessment

i Impacts to vegetation on site

The proposed modification avoids impacts to habitat as no disturbance is proposed to native vegetation apart from that currently approved.

The extension to the existing stockpiling area and equipment laydown area have been sited to avoid impacts on native vegetation. All other proposed infrastructure will occur inside the existing approved footprint, and no additional clearing (or any other direct impacts to existing vegetation) will occur. Existing site roads will be used and operations are not proposed to extend past current approval boundaries. Site roads will be upgraded but will not encroach on areas of native vegetation.

ii Impacts to threatened species including migratory and fish species

Introducing quarry vehicles to the access road will result in additional traffic increasing the risk of vehicles strike in the along the road (and remove it from the previous site access road). The modified access route will be shorter than the approved access route and will not cross through the riparian corridor along Oaky Creek. With the implementation of the proposed mitigation measures, no threatened species (including Southern Myotis) are likely to be impacted by vehicle strike.

The farm shed on the site proposed to be demolished is not suitable microchiropteran bat habitat. Therefore, it is unlikely that any future demolition activities would significantly impact Southern Myotis.

The modification avoids impacts to habitat as no additional disturbance is proposed to native vegetation apart from that currently approved.

It is unlikely that any threatened species using the water in, or near the site, will be impacted.

6.8.5 Mitigation measures

Existing quarry roads will be used. These tracks may receive improvements but will not encroach on areas of native vegetation. The proposed extension to the existing stockpiling area and proposed equipment laydown area have been sited to avoid impacts on native vegetation.

The proposed mitigation measures to mitigate indirect impacts to the biodiversity values on site will include:

- operations will be carried out in accordance with the vegetation management plan which will be revised prior to the restart of quarrying operations;
- a speed limit of 40 kilometres per hour (km/h) will apply on the sealed site access road and 20 km/h on unsealed internal roads; and
- roads will be regularly be maintained by managing vegetation on the shoulder to main visibility to prevent vehicle strike.

6.8.6 Conclusion

The proposed modification is not likely to have any significant impact on biodiversity values. Specifically, it is not likely to impact Southern Myotis**.**

The vegetation management plan will be revised and the management and mitigation measures implemented to mitigate any impacts to the biodiversity on the site.

6.9 Rehabilitation and final land use

6.9.1 Introduction

Rehabilitation of the quarry considers the progressive rehabilitation during quarry operations, and the long-term rehabilitation of the void to enable the whole site to be developed for agribusiness/industrial purposes.

Existing post quarrying land use objectives and statutory obligations pertaining to the site are contained with three principal documents:

- *Environmental Impact Statement (EIS): Proposed Clay/Shale Extraction Operation. Lot 3 – 275 Adams Rd, Luddenham NSW* (Douglas Nicolaisen and Associates 2003);
- *Site Rehabilitation Plan: Clay/Shale Quarry, Adams Road Luddenham* (Connacher Environmental Group 2009); and
- *Vegetation Management Plan for a Clay Shale Quarry, Adams Road, Luddenham* (UBM Ecological Consultants 2009).

A final land use report for the quarry has been prepared by EMM (Appendix L). The report describes the treatment and alternative (non-agricultural or pastoral) final land uses for all site components, including the final void. It was prepared to meet Schedule 4, Condition 36 of the development consent (DA No. 315-7-2003) which requires that the Applicant submit a report to the Department of Planning, Industry and Environment (DPIE) identifying the final land use of the site and method of treatment for the final void.

6.9.2 Rehabilitation commitments

Key quarry components requiring either progressive or long-term rehabilitation include the quarry void, stockpile areas and existing vegetation on site.

The applicants are committed to fulfilling Schedule 4, Conditions 33–36, related to rehabilitation and vegetation management as summarised in Table 6.16.

Table 6.16 Conditions of consent relevant to rehabilitation on site

Condition no[1].	Condition description	How it will be addressed
33	Prior to carrying out of any development on the site, the Applicant shall prepare a Site Rehabilitation Plan in accordance with the rehabilitation guidelines in the document titles "Sydney Regional Environmental Plan No. 9 – Extractive Industry (No. 2) – Planning Report", to the satisfaction of the Secretary. The Site	A Site Rehabilitation Plan (Connacher Environmental Group 2009) has been prepared. The previous operators carried out rehabilitation of the noise bunds as well as restoration activities in the Oaky Creek riparian corridor.

Table 6.16 Conditions of consent relevant to rehabilitation on site

Condition no[1].	Condition description	How it will be addressed
	Rehabilitation Plan shall include a Vegetation Management Plan.	The Site Rehabilitation Plan will be updated to include the changes relevant to the proposed modification.
34	The Vegetation Management Plan shall include: (a) revegetation of the riparian zone of Oaky Creek; (b) protection, establishment and maintenance of the riparian zone; (c) protection of remnant native vegetation; (d) restoration of any areas within the riparian zone disturbed by the development; and (e) a program to vegetate the noise attenuation bund.	A Vegetation Management Plan (UBM Ecological Consultants 2009) has been prepared. The previous operators carried out restoration activities in the Oaky Creek riparian corridor. The Vegetation Management Plan will be updated to include the changes relevant to the proposed modification.
35	The Applicant shall provide audits of the performance of the rehabilitation undertaken on the site to include in the Annual Review. The audit shall be conducted by a qualified rehabilitation consultant, approved by the Secretary.	It is proposed to remove this condition as further progressive rehabilitation opportunities are limited until infilling of the quarry void commences (subject to separate approval) (see Section 2.8).
36	Prior to 5 years of the estimated completion of extractive activities at the site, the Applicant shall submit a report to the Department identifying the final land use of the site and method of treatment for the final void.	The final land use report is provided in Appendix L.

1. DA No. 315-7-2003, Schedule 4.

6.9.3 Final land use

i Overview

The quarry void will be filled and rehabilitated once the available resource has been extracted. Any plant and equipment not required during rehabilitation of the quarry, will be decommissioned and removed from the site at the end of quarry operations.

In addition to the quarry reactivation, CPG and KLF are currently preparing a separate development application for an advanced new resource recovery centre facility to be co-located on site. Core to this application is the proposal to:

- utilise non-hazardous unrecyclable 'General solid waste (non-putrescible)' (EPA 2014) generated by the facility, that cannot be sold or beneficially reused, to backfill the quarry void;
- use existing overburden resources (stockpiled subsoils and topsoils) and other imported media as necessary to cap and cover the fill material; and
- produce a safe, stable and non-polluting final landform suitable for commercial/industrial final land use.

This is generally consistent with the original 2003 EIS (Douglas Nicolaisen & Associates 2003) commitments for the site, with the exception of the changed final land use for the site (other than Oaky Creek) from pastoral/rural uses to commercial/industrial uses.

No change to the biodiversity land use of the Oaky Creek riparian zone as prescribed in Schedule 4, Condition 34 of the consent is proposed.

ii Fill material and sources

The original EIS (Douglas Nicolaisen & Associates 2003) stated that only materials that satisfied the criteria for 'Class 2 inert waste' in accordance with the criteria in the *NSW EPA Environmental Guideline: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* 1996 (EPA 1996) would be used to backfill the void.

The EIS also stated that rehabilitation (backfill) material will be inert waste sourced from existing industrial demolition work conducted by the owners (ie construction and demolition waste), and virgin excavated natural material (VENM) sourced from various government or private civil construction works such as road tunnels, rail excavations and the like. Noting that "some building excavation sites may also yield suitable material that complies with EPA criteria".

'Inert waste' is defined as waste which does not undergo environmentally significant physical, chemical, or biological transformations and has no potentially hazardous content once landfilled. Examples include building and demolition waste including bricks, concrete, glass, plastics, metal and timber (*Environmental Guidelines: Solid Waste Landfills* (EPA 1996a)). Class 2 inert wastes include all inert wastes except stabilised asbestos cement or physically, chemically, or biologically fixed, treated or processed waste (EPA 1996a).

NSW wastes are now classified in accordance with *Waste Classification Guidelines Part 1: Classifying Waste* NSW (EPA 2014). The former Class 2 inert wastes now fall under the category of 'General solid waste (non-putrescible)'.

The fill material is proposed to be sourced from the advanced resource recovery centre, which is subject to a separate development application. The fill material would be the unrecyclable non-hazardous material left over from screening, sorting, and recycling that cannot be sold or otherwise beneficially reused.

iii Placement method

The void would be dewatered to the existing Water Management Dam and designed and operated in accordance with the *Environmental Guidelines Solid Waste Landfills* (EPA 2016). Material will be placed in the void and then spread and compacted using a landfill compactor or other appropriate surface mobile equipment. Geotechnical advice will be sought on the maximum depth of waste that can be placed in the void and the void will be filled to that level in successive compacted layers.

Filling may be undertaken in completed areas of the void concurrently with quarrying operations.

At the completion of backfilling activities, it may be necessary for the compacted fill to be allowed to consolidate for a period to account for any differential settlement that may impact the proposed final landform or proposed final land use. The final grading of the fill will include a slight gradient such the surface of the fill drains to a collection sump so that any accumulated water can be pumped to the Water Management Dam.

During backfilling, the surface of the fill material will be stabilised with temporary grasses, soil stabilizing polymer or some other appropriate means to minimise water ingress into the fill or dust generation.

iv Final capping materials and method

The completed fill will be capped with a suitable material layer to provide sufficient sub-grade geotechnical stability to support the proposed commercial/industrial final land use. This is expected to the sourced from subsoil in the existing noise/safety bunds and if necessary, imported material.

6.9.4 Landform design

i Elevation

The void will be back-filled to be generally consistent with the original landform contours which existed prior to the commencement of quarry operations.

ii Slope

Prior to quarrying, the site had gentle cross drainage from the south-west to north-east of approximately 3 to 4% The finished landform will have a generally similar gradient although it will include levelling and terracing to enable the delivery of the proposed agribusiness/industrial final land-use.

iii Drainage

During filling operations, a gentle gradient will be maintained for drainage toward a sump or low point to facilitate dewatering. Once the fill has been capped and the elevation is level with the natural landform and can free drain, sheet flow drainage conditions will be maintained to minimise erosion of the cap. Temporary drainage will be installed to divert any potential turbid runoff to sediment basin(s).

The surface will be stabilised with soil stabilising polymers, temporary vegetation, or some other suitable means until the site is developed in accordance with the planned commercial/industrial land use.

6.9.5 Progressive rehabilitation

Rehabilitation activities will include:

- regular monthly inspections to monitor growth of previous revegetation within the Oakey Creek riparian corridor and presence of weeds and pests within the revegetated areas;
- management works on a quarterly basis, involving removal of environmental or noxious weeds growing in the revegetated areas;
- controlling pests affecting the revegetated area using appropriate pest control techniques;
- controlled mowing/slashing to manage grassed areas of the site; and
- quarterly reporting for management program based on monthly monitoring inspections; as well as annual reporting to be incorporated into the Annual Review.

The Site Rehabilitation Plan (Connacher Environmental Group 2009) will be updated to include the changes relevant to the proposed modification.

6.10 Visual

6.10.1 Introduction

The following section provides a description of the existing landscape and environment of the site and surrounding areas and assesses the visual impact of the proposed modification. It considers the landscape values, the visual sensitivity of the location and the potential visual changes as a result of the proposed modification.

Visual impact assessments were undertaken as part of the original EIS and proposed modification applications for MOD1 to MOD3. This section considers the potential visual impacts of the currently proposed modification.

6.10.2 Existing environment

i Landform

The topography of the site is largely flat other than the void. The site slopes gently from the south-west to the north-east, with elevation ranging between 60 m to 75 m AHD. The riparian corridor along the Oaky Creek is the lowest point on the site at 60 m AHD.

ii Vegetation

The existing vegetation integrity at the site is limited to the riparian corridor and a patch of woodland in the north-east corner of the site. Vegetation in the surrounding landscape is also degraded and largely limited to isolated pockets of woodland, and corridors of riparian vegetation along meandering drainage creeks within a wider agricultural landscape.

iii Key site components

Much of the site is disturbed by the quarry void and stockpiles (Figure 2.1). As previously noted, there is a residence and agricultural sheds within the site. There are noise bunds to the west and north of the quarry void. There are three surface water storages within the north-east part of the site. The site access road is unsealed and there is no constructed intersection on Adams Road.

iv Surrounding land uses

The character of the surrounding land is predominantly rural to the west and north which corresponds with the site's and surrounding current zoning, RU1 – Primary production, with the closest occupied residence about 70 m east of the site access road (and north of the majority of the site and the quarry void) (Photograph 6.2). The Hubertus Country Club and pistol range is located immediately west of the quarry and is visible from the top of the quarry stockpiles located in the east of the site (Photograph 6.3).

Currently, the land to the east and south is dominated by the bulk earthworks for the WSA (Figure 1.2).

No listed scenic or significant vistas near the quarry footprint have been identified.

Photograph 6.2 View from northern portion of site to offsite condemned uninhabited residence (on left) and smaller unoccupied residence on right

Photograph 6.3 Hubertus Country Club – view from the top of existing stockpiles with a noise bund in the foreground

v Scenic quality

The visual quality of the site of the landscape is rated in Table 6.17. This table provides a landscape visual quality rating for landscape characteristics when viewed from the areas adjacent to the site.

Each visual characteristic has a series of criteria to define an appropriate rating for scenic quality. Higher scenic quality is generally associated with variety, uniqueness, prominence and naturalness of landform, vegetation and water form, and cultural values. Lower scenic quality is generally associated with urban and industrial land uses.

The quality ratings for the proposed modification are shaded in Table 6.17. This indicates that the visual quality of the site is variable (ie low to high depending on the features addressed).

There are no visible cultural landmarks, such as heritage buildings and other structures, on or in the vicinity of site. The one archaeological site on the banks of a dam within the site is not visible, even at close range (refer to Section 6.11.3).

Table 6.17 Scenic quality rating

Visual characteristic	Low	Moderate	High
Relief	Flat terrain dominant	Undulating terrain dominant	High hills in foreground and middle ground
Vegetation	One or two vegetation types in foreground	Three or four vegetation types in foreground Few emergent trees	High degree of patterning in vegetation Four or more distinct vegetation types
Naturalness	Dominance of development	Some evidence of development but not dominant	Absence of development or minimal dominance
Water	Little or no view of water Water in background	Moderate extent of water	Dominance of water in foreground and middle ground
Development	Commercial and industrial structures Large scale development Newer residential development prominent	Established residential development Small scale industrial development in middle ground	Rural structures, heritage buildings and other structures apparent Isolated domestic structures
Cultural	Area free of cultural landmarks Presence of new development	Established, well landscaped development, especially in middle ground and background	Established, maintained landscapes, old towns and buildings, etc.

vi Sensitive receivers and visual sensitivity

Residential and commercial properties in the landscape surrounding the site taken that are considered in this visual assessment are:

- residential dwelling at 285 Adams Road, Luddenham;
- residential dwelling at 225 Adams Road, Luddenham;
- residential dwelling at 5 Anton Road, Luddenham;
- residential dwelling at 185 Adams Road, Luddenham;

- Hubertus Club outdoor pistol range (classified as an active recreation premise);
- Hubertus Club restaurant including outdoor facilities (classified as a commercial premise); and
- Western Sydney Airport, which is currently under construction.

Visual sensitivity is a measure of the level of concern attached by a user-group to a change in the existing landscape. It is largely determined by visibility and the distance form viewing areas, but it is also influenced by the disposition of the viewer to the nature of development/operations present on site.

The scenic quality of the site currently is consistent with the pre-existing land use of the site. Surrounding residential and commercial land holders will be accustomed to the quarry and its activities. The WSA is the only approved new neighbouring land use surrounding the site. However, commercial/industrial uses of the rezoned area around the quarry will develop over time.

6.10.3 Impact assessment

i Proposed visual changes

Minor visual changes to the site will occur as a result of construction and operation of the proposed modification. The establishment and operation of the following site components will change the current landscape:

- the use of the existing site access from Adams Road by quarry vehicles;
- the establishment of the site access infrastructure area (including demountable site office, amenities and weighbridge); and
- new stockpiling area and equipment laydown area.

The new stockpiling area and equipment laydown area have been sited within the northern and western noise bunds and will be predominately screened from offsite viewpoints to the north, east and west of the site.

ii Impact of proposed visual changes

External views to the site and potential visual impacts are described below.

- Views from the north:
    - The upgraded site access road and associated use of this road by quarry vehicles, along with the structures and parking in the site access infrastructure area will be visible (refer to Figure 2.1). These new site components will be visible from the residence at 285 Adams Road, Luddenham.
    - Quarry vehicles using the site access road and the demountable office/parking in the site entry infrastructure area will be partially visible from Adams Road (to the north of the site) and Elizabeth Drive. However, they are expected to be obstructed from the majority of Elizabeth Drive by the topography and generally in keeping with the size of existing structures.
    - The view of the quarry and majority of quarrying activities, including the proposed equipment laydown and extended stockpile area to the west of the quarry pit, will continue to be predominately obstructed by the topography and the northern noise bund.

- Views from the west:
    - The upgraded site access road and associated use of this road by quarry vehicles, along with the structures and parking in the site access infrastructure area will be visible (refer to Figure 2.1). These new site components will be visible from the residence at 225 Adams Road, Luddenham. However existing landscape plantings around this residential dwelling and along the site access road (to the south of the site property boundary), will assist in screening views of these components.
    - Quarry vehicles using the site access road and the demountable office/parking in the site entry infrastructure area will be partially visible from Adams Road (to the south-west of the site). These will be mostly obscured from vehicles travelling in both directions due the rise then fall in topography between the road and the site entry infrastructure area.
    - Employees and patrons of the Hubertus Country Club and pistol range are unlikely to view the site infrastructure as they look north-easterly from the Club due to the combined screening provided by the western noise bund that extends north of the Hubertus Country Club property and the native vegetations on the western boundary of the site.
    - The view of the proposed extended stockpile area, new laydown area from Adams Road and the Hubertus Country Club and pistol range will continue to be obstructed by the noise bund to the west of the quarry void.
- Views from the south:
    - The proposed extended stockpiling area and equipment laydown area are likely to be visible from some southern viewpoints within the WSA site. Considering the magnitude of visual change associated with the construction of the WSA currently underway, the minor visual changes associated with the proposed modification of the existing quarry are not expected to result in significant visual impacts on the WSA site.
    - Quarry vehicles using the site access road and the demountable office/parking in the new site entry infrastructure area will be partially visible from Adams Road (to the north of the site) The removal of activities on the adjacent Commonwealth-owned land will reduce the visual aspect of site activities to the east (mostly related to stockpiling). These activities have now been replaced by the construction and bulk earthworks related to construction of the Western Sydney Airport.
    - There is limited visibility into the site from the Commonwealth land that is now part of the WSA site to the east due to the presence of the heavily vegetated riparian corridor of Oaky Creek. Limited views of the site access infrastructure area may be visible across the water bodies in the north-eastern corner of the site.
    - Once constructed, the airport passenger terminal will be approximately 1 km south of the site. Aeroplane gates, taxiways, the runway and the airport fuel farm will all be on the distant view line between the passenger terminal and the quarry. In addition, the approved quarry operations will cease before passenger terminal is operational.

- Views from the air:
    - The proposed modification will not increase the approved footprint of the quarry void so will not increase the visual impact of the quarry from the air. The proposed modification will not extend quarry operations beyond December 2024. Operations at WSA are scheduled to start on 2026. The quarry void will not be filled prior to 2026. The quarry void will be visible from aeroplanes prior to its complete rehabilitation.

Construction activities will be temporary (about six weeks) and will be visible from the two residential dwellings close to the site (225 and 285 Adams Road, Luddenham) and Hubertus Country Club and pistol range.

iii Scale and dominance and visual sensitivity

The site is located adjacent to the WSA, which is currently under construction. The scale of the proposed modification is minor in relation to the surrounding construction works and in keeping with existing site components. The tallest proposed site component will be the extended stockpiling area where clay and shale would be stockpiled up to 5 m in height consistent with currently approved stockpiling heights. The demountable office in the site access infrastructure area will be single story.

The proposed heights are in accordance with the Airports Act and Airports Regulations as addressed in Section 4.2.2.

The scenic quality of the site and surrounding area is variable (mostly low to moderate) and the proposed modification will not transform the visual character of the landscape. The proposed modification will not result in a significant change to the local perception of the surrounding land use and area.

6.10.4 Mitigation measures

The site vegetation management plan will be updated prior the restart of quarrying operations. This update will consider opportunities for further vegetation screening.

6.10.5 Conclusion

The scenic quality of the site is mostly low to moderate and the proposed modification will not transform the visual character of the existing quarry and will not result in a significant change to the local perception of the surrounding land use and area.

6.11 Heritage

6.11.1 Introduction

An Aboriginal heritage due diligence (AHDD) assessment for the proposed modification was prepared by EMM (Appendix M).

6.11.2 Assessment approach

The site has previously been assessed for Aboriginal heritage as part of the application for the original consent. As there is a potential for the proposed modification to disturb areas that are not currently disturbed by quarry activities, an AHDD was undertaken to determine if Aboriginal objects will be harmed by the proposed modification and determine if further Aboriginal heritage investigations are required.

Potential impacts on Aboriginal heritage from the proposed modification were assessed in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (due diligence guidelines) (DECCW 2010). The AHDD consists of:

- consideration of the environmental context of the site and surrounds to assess the likelihood of Aboriginal objects or places being present;
- consideration of existing regional and local Aboriginal cultural heritage studies;
- a search of Aboriginal Heritage Information System (AHIMS) database to identify whether registered Aboriginal sites are present within the site;
- a site inspection by an EMM archaeologist to identify if any Aboriginal objects or areas of potential archaeological deposit (PAD) are present or likely to occur within the site; and
- determination of whether further heritage investigation and impact assessment are required.

6.11.3 Existing environment

i Land use history

Early European land use in the area of consisted of forestry and grazing in the wood and scrubland of the Cumberland Plain. Settlement expansion and the search for suitable agricultural land soon led to the establishment of Parramatta and Liverpool townships, driving the development of Sydney's west as a key area for pastoral and agricultural exploitation.

In the last few decades, the site has been used as a dairy farm, trotting track and rubbish dump, and more recently as a quarry. The rubbish dump was in the same location as the present quarry void. The northern part of the site was a turf farm in the early 1990s, which means that repeated topsoil stripping is likely to have removed any potential archaeological deposit from the A1 soil horizon.

More recently, the quarry was established after its approval in 2003. Quarry disturbance has been extensive in the southern half of the site, including the void, stockpiles, bunds and internal access roads.

ii Desktop assessment

Relevant archaeological assessments are summarised in the AHDD (refer Appendix M). One archaeological site (#45-5-2280) has been found on the site (Dean-Jones 1991). It was identified on the banks of a dam, within an area that would originally have been on the edge of the floodplain of Oaky Creek. The site comprises a surface scatter of 22 flaked stone artefacts of indurated fine sandstone and mudstone. The assessment determined that the artefacts were not in situ but were scattered around the shoreline of a small pond created by fill and dam construction. Dean-Jones (1991) concluded that the site #45-5-2280 had low scientific, educational and cultural significance because of the disturbed landscape context. The area around #45-5-2280 has been fenced to prevent vehicle access, and stormwater or other discharges being directed across the site.

Dean-Jones (1991) predicted a low probability of other sites being present within the site.

Aboriginal consultation and a three-week long fieldwork programme of test excavation was undertaken at the WSA site in 2016 (Navin Officer Heritage Consultants 2016). The report identified Oaky Creek as an area with moderate to high archaeological potential in the WSA EIS. Artefacts recovered from the test excavations within the WSA site predominantly comprised unretouched flakes. The investigation found that alluvial flats and valley floors contained more artefacts than other landform categories such as ridgelines, valley floors, mid and upper slopes, where artefacts were more sparsely distributed. Proximity to water was the major factor influencing the areal density of artefacts.

iii Aboriginal Heritage Information Services (AHIMS)

A search of the AHIMS database on 20 January 2020 found 110 sites within a 10 x 5 km search area centred on the study area (Appendix J). Apart from an axe grinding groove site, two culturally modified trees and four areas of potential archaeological deposit (PAD), all the sites identified in the search area were artefactual sites (n=103). Culturally modified trees are rare in the local area owing to the high level of land clearance. A summary of the site types recorded on AHIMS is provided in Table 6.18 and shown on Figure 6.11.

Table 6.18 AHIMS results

Site type	Counts
Axe grinding groove	1
Culturally modified tree	1
Culturally modified tree, undefined artefactual site	1
Artefact sites	103
– Isolated Find	17
– Low density artefactual site (<10)	16
– Low density artefactual site (10–20)	1
– Undefined artefactual site	67
Potential archaeological deposit	4
TOTAL	**110**

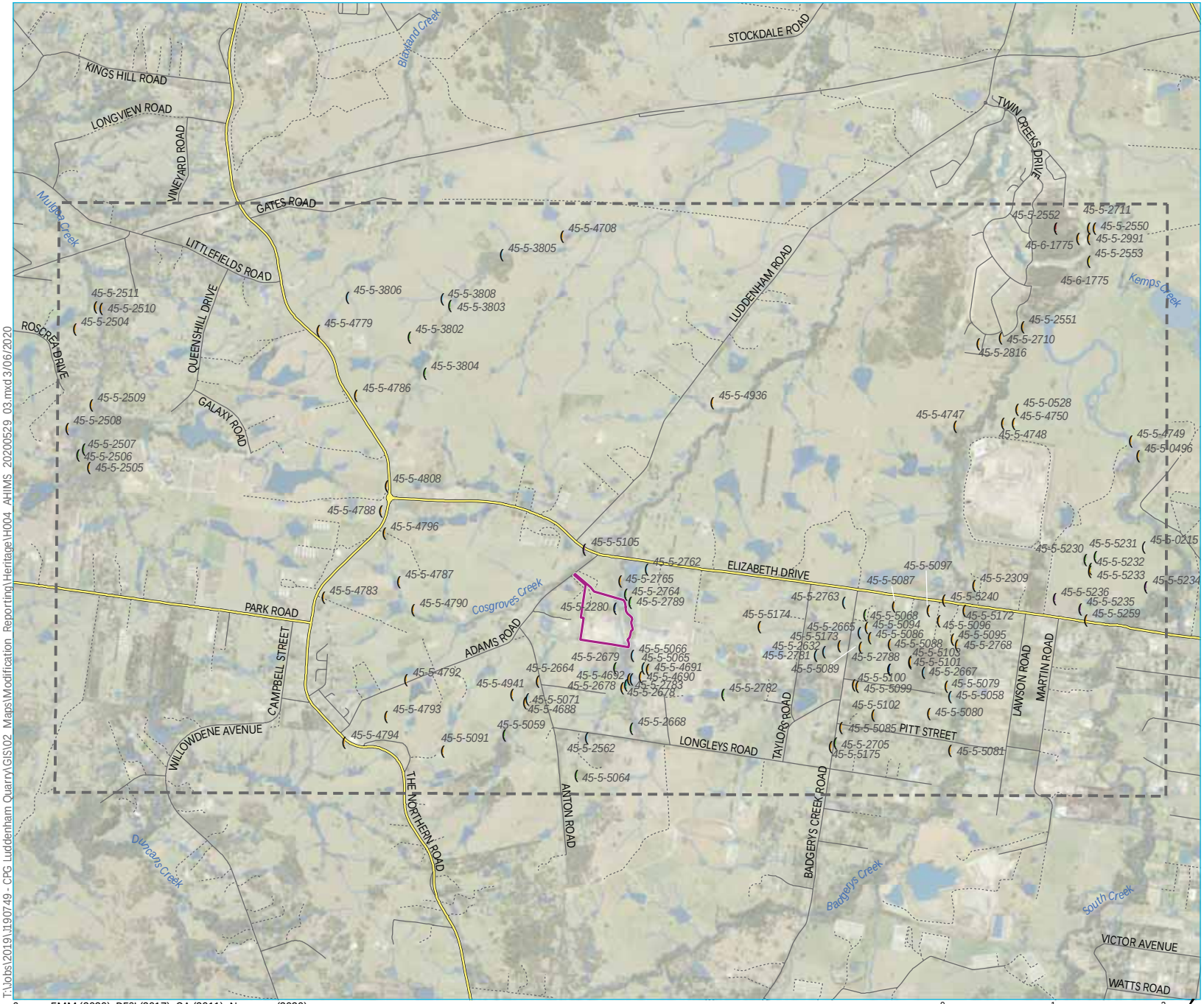
The only registered AHIMS site within the site was Oaky Creek 1 (#45-5-2880) as described above.

iv Site inspection

The site was inspected on 30 January 2020 to validate the desktop analysis results. This involved walking over the accessible areas of the site and recording landscape information, as well as targeting ground exposures for the presence of Aboriginal objects. Overall, the field investigation indicated that the site has a range of moderate and heavy ground disturbance as a result of modern activities.

The location of the Oaky Creek 1 (#45-2-2280) site was ground-truthed and the correct location established.

The only area of moderate archaeological potential is the corridor, approximately 50 m wide, along the section of Oaky Creek to the south of the Water Management Dam. This is outside the proposed modification disturbance footprint.



KEY

- Study area
- AHIMS search area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line

AHIMS site types

- Axe grinding groove
- Culturally modified tree
- Culturally modified tree, undefined artefactual site
- Isolated find
- Low density artefactual site (10-20)
- Low density artefactual site (<10)
- Medium density artefact site
- Potential archaeological deposit
- Undefined artefactual site

T:\jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\Modification Reporting\Heritage\H004 AHIMS 20200529 03.mxd 3/06/2020

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

0 1 2 km

GDA 1994 MGA Zone 56

Aboriginal Heritage Information System results

Luddenham Quarry - Modification 5
Modification Report
Figure 6.11

EMM creating opportunities

6.11.4 Impact assessment

The site has already been subject to a high level of disturbance and it is unlikely for Aboriginal objects to occur apart from the corridor along Oaky Creek. The AHIMS site (#45-5-2280) is outside the area that will be impacted by the proposed modification and is currently protected by fencing.

The new site access entry infrastructure area has been disturbed by previous clearance and agricultural activities. Although it is possible for artefacts to occur anywhere in the landscape, they would be rare on this floodplain landform that is more than 200 m from water.

The proposed extended stockpiling area to the immediate north of the existing stockpile area and the equipment laydown area are within areas already disturbed by quarrying and/or agricultural activities. The internal roads will follow their alignments created with introduced fill and levelling.

Apart from the internal roads which will follow existing road alignments, all proposed new activities will be at least 200 m from Oaky Creek and at least 200 m from Cosgroves Creek.

The proposed modification is unlikely to harm Aboriginal objects.

6.11.5 Mitigation measures

Based on the site context, combined with the existing and proposed disturbance footprints, the AHDD concludes that Aboriginal objects are unlikely to be harmed by the proposed modification and further investigation beyond the scope of a AHDD is not warranted for the proposed modification.

Further investigation in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) is unlikely to build upon the findings of the AHDD, unless test excavation is undertaken. However, the proposed modification footprint would not meet the pre-conditions warranting test excavation because a PAD has not been identified in the 2020 or previous investigations. As such, further investigation is not warranted as Aboriginal objects are unlikely to be harmed by the proposed modification.

The following mitigation measures will be applied:

- AHIMS site #45-5-2280 will continue to be avoided and protected by fencing.
- The corrected coordinates for AHIMS site #45-5-2280 will be entered in the AHIMS database.
- The riparian corridor along the western bank of Oaky Creek will continue to be avoided by quarrying activities.
- The work will proceed with caution and the following actions will be taken in accordance with the AHDD recommendations:
    - In the event that unexpected Aboriginal objects, sites or places are discovered, DPIE will be notified as soon as practicable after they are first identified.
    - In the event that known or suspected human skeletal remains are encountered, the following procedure will be followed:
        - the immediate vicinity will be secured to protect the find and the find will be immediately reported to the work supervisor who will immediately advise the site supervisor or other nominated senior staff member;

- the environmental manager or other nominated senior staff member will notify the police and the state coroner on the same day of the find (as required for all human remains discoveries);
- the environmental manager or other nominated senior staff member will contact DPIE for advice on identification of the skeletal material as Aboriginal and if so, management of the material;
- if it is determined that the skeletal material is ancestral Aboriginal remains, the Aboriginal community will be contacted, and consultative arrangements will be made to discuss ongoing care of the remains;
- the site will be recorded in accordance with the NPW Act and DPIE guidelines; and
- if the remains are historical and not of Aboriginal origin, the Heritage Division of DPIE will be notified for further instruction.

6.11.6 Conclusion

The results of the desktop assessment and site inspection identified one known Aboriginal object (#45-5-2280) within the site. However, the site has a range of moderate and heavy ground disturbance as a result of modern activities in most locations. This is especially the case in the southern half of the study area, where quarrying and related activities have altered the landscape significantly. The proposed modification is unlikely to harm Aboriginal objects.

In accordance with Step 4 of the due diligence guidelines (DECCW 2010), this assessment concludes that no further Aboriginal heritage investigations are required for the proposed modification.

6.12 Social

6.12.1 Introduction

The potential social impacts of the proposed modification have been assessed with a focus on the following potential impacts associated with the proposed modification:

- construction and operational air quality;
- construction and operational noise;
- traffic, with a focus on the use of Adams Road north of the site access by quarrying vehicles;
- biodiversity;
- Aboriginal cultural heritage;
- visual amenity; and
- economic impacts.

6.12.2 Existing environment

i Local context

Luddenham is a suburb of 1,828 residents in the Liverpool LGA, situated in the Greater Western Sydney region about 19 km north-west of the City of Liverpool, 25 km south-west of the city of Parramatta and approximately 43 km south-west of the city of Sydney (ABS 2016).

The area surrounding the site is sparsely populated. However, the construction of the WSA and NSW Government's investment into this region is expected to completely change the character of this rural setting over the coming years.

ii Sensitive receivers

The technical assessments undertaken as part of this proposed modification report, identified the nearest sensitive receivers for potential air quality, noise and visual impacts. Sensitive receivers include eight residential properties and the Hubertus Country Club (refer to Table 6.3).

iii Liveability and economic context

There are a range of NSW Government initiatives to enhance infrastructure, housing, employment and liveability in the Greater Western Sydney region (refer to Chapter 3). The NSW Government is working with local councils and communities in to assist with the provision of new homes that are close to jobs, parks, schools and amenities.

NSW Government's commitment to revitalising Western Sydney stems from the identification that Western Sydney's biggest challenge has been work deficit within the region (Deloitte 2015). Historically, the region had more workers than jobs, with about 300,000 people leaving the area each morning for work (Deloitte 2015). Given the predicted doubling of Sydney's population, it is expected that the Sydney's West will house much of the population increase with the potential for job imbalance to become more pronounced (Deloitte 2015).

Construction of the associated dwellings and community infrastructure will require construction materials, such as bricks made from clay and shale, and services such as construction and demolition waste recycling.

6.12.3 Impact assessment

i Social impacts

The key aspects of the proposed modification that could impact surrounding land holdings are summarised in Table 6.19 along with the proposed management measures.

The applicants have engaged with government stakeholders and neighbouring residential landholders and the Hubertus Country Club. The outcomes of the engagement process have been taken into account in the design of the proposed modification, and will continue to inform detailed design, mitigation measures and management of construction and operation of the quarry.

Table 6.19 Impacts to surrounding land holdings

Aspect	Potential impact	Management and mitigation measures	Section addressed
Dust generated by construction of new quarry components and operation of the quarry	Potential air quality impacts were assessed at all sensitive receiver locations. The results indicate that there are no cumulative exceedances of the impact assessment criteria at any assessment locations.	Management and mitigation measures will be implemented to minimise dust generation during construction works, and operation of the quarry.	Section 7.2
Noise and vibration from operation of the quarry	Prior to the rezoning of the area, NPfI PNTL noise exceedances from quarry operations are predicted at four of residential assessment locations: R3–R6. Following rezoning of the area, new noise criteria will apply and it is predicted that these will be met at all residential assessment locations.	The quarry has approved noise bunds. Management and mitigation measures will be implemented to minimise noise generation during construction works, and operation of the quarry. This will include consulting potentially affected neighbours.	Section 6.3
Increased traffic on the surrounding road network	There will be only minor changes to quarry traffic on Elizabeth Drive. Quarry traffic will not deteriorate the operations of the Elizabeth Drive/Adams Road intersection. Quarry traffic will be less than 2% of the total traffic forecast to be using Adams Road so is not expected to have a significant impact on traffic flow or safety. Light and heavy vehicle traffic will be visible all along the proposed internal road. The traffic will mostly impact the two closest sensitive receivers (225 and 285 Adams Road, Luddenham), and to a lesser extent the Hubertus Country Club and pistol range.	Quarry trucks will only travel on the section of Adams Road between Elizabeth Drive and the site access road. No quarry trucks will travel on Adams Road south of the quarry access road. The Road Transport Protocol will be revised to reflect site access changes and new infrastructure layout.	Section 6.7
Visual impacts from amended infrastructure location (ie amended stockpile, weighbridge and associated infrastructure)	The of proposed modification will not transform the scenic quality of the site.	The quarry bunds will continue to screen some quarry components. The site vegetation plan will consider opportunities for further vegetation screening.	Section 6.10
Construction work	Construction work will be short (4–6 weeks) but may impact receivers to the west and the north of site, 225 and 285 Adams Road, Luddenham, and the Hubertus Country Club. Construction noise levels from the project are predicted to exceed NMLs at the closest assessment locations, with exceedances greater than 10 dB above NML at R3 and R6 closest to the site. Construction works will be minor compared to the bulk earthworks and construction currently taking place on the adjacent WSA site.	Construction will be limited to standard day hours. Construction noise levels will be managed where exceedances of NMLs may occur as detailed in a construction noise management plan.	Section 6.3

ii Liveability and economic impacts

- supplying clay and shale for brick making, an essential building material required for the Western Sydney Priority Growth Area and South West Growth Area including the Western Sydney Aerotropolis;
- close proximity to brick manufacturers lowers quarry truck travel times;
- the quarry is in line with previous land use on site and will make full use of the state significant resource; and
- the construction and operation of the quarry will create employment for a number of permanent and contractor jobs, aligning with NSW Government objectives for Greater Sydney.

6.12.4 Conclusion

Four residential properties and the Hubertus Country Club are expected to experience some impacts from the proposed modification. However, the proposed modification is to reactivate the currently approved, and until recently operating, quarry. Construction and operational impacts will be managed via the mitigation measures that are outlined in Chapter 6 and consolidated in Appendix D.

The proposed modification is expected to have a number of social and economic benefits, such as product supply, site accessibility to customers, making use of an existing resource and ongoing employment opportunities.

6.13 Hazardous materials

6.13.1 Introduction

Small quantities of hazardous materials, such as oils and lubricants, will be continued to be used at the quarry to maintain site plant and equipment.

6.13.2 Mitigation measures

Oils and lubricants and any other hazardous materials (eg cleaning products) will be stored in designated bunded areas in accordance with the following Australian Standards:

- Australian Standard 1940: 2004 The Storage and Handling of Flammable and Combustible Liquids; and
- Australian Standard 1596: 2008 The Storage and Handling of LP Gas.

Site management processes will periodically review conformance with these controls and standards.

It is proposed to install an oil and grease separator upstream of the Water Management Dam to treat of water dewatered from the void (noting that the equipment laydown area will drain into the void prior to dewatering to the Water Management Dam).

6.14 Waste

6.14.1 Overview

The quarry will produce minor quantities of construction waste during construction of new site components and minor quantities of waste during continued quarry operations. Waste streams likely to be generated include:

- cardboard packaging, plastic wrapping, plastic ties, wood pallets and other timber offcuts;
- general waste, including putrescible waste such as minimal food scraps;
- comingled recycling (from office activities and site employees);
- oily rags, filters and drums;
- waste batteries;
- confidential documents; and
- building and construction waste generated by construction.

6.14.2 Mitigation measures

To encourage the efficient use of resources and reduce potential environmental impacts from the quarry, all waste will be managed in accordance with the waste hierarchy:

- reduce waste production;
- recover resources; and
- dispose of waste appropriately.

General waste management measures on site will include:

- working with suppliers to reduce overall packaging as much as possible;
- storing cardboard packaging and recyclable containers until collection by a licensed recycling contractor, or dispatch to an appropriately licensed facility; and
- storing general waste in vermin proof bins until a scheduled collection from a licensed contractor.

6.15 Updated statement of commitments

The updated management and mitigation measures relevant to the quarry are consolidated in Appendix D.

CHAPTER 7

Evaluation of merits

7 Evaluation of merits

7.1 Introduction

A description of the need and justification for the proposed modification is provided below with regard to biophysical, social and economic factors; the principles of ecologically sustainable development (ESD); and the consistency of the proposed modification with the objects of the EP&A Act.

7.2 Proposed modification impacts

This modification report assesses the potential impacts that may result from the proposed modification. The assessment of environmental issues has been multi-disciplinary and involved consultation with DPIE and key stakeholders as outlined in Chapter 1 of this report.

The proposed modification will not result in significant biophysical, social or economic impacts and the proposed modification report has identified that any residual impacts can be appropriately managed.

7.3 Proposed modification benefits

A recent resource appraisal estimates that approximately 2 million tonnes of shale and clay resource remains within the approved extraction footprint. This material shale is worth about $7/tonne, so the total resource has a value of about $14 million.

The resource cannot currently be extracted as the approved site access on Commonwealth land can no longer be used by the quarry. This modification application proposes that quarry vehicles use the site access from Adams Road to allow resource extraction to resume. Quarry operations will be reactivated as soon as this modification is approved, all applicable consent conditions met and all other legislative requirements are met, eg an EPL and Mining Lease are granted. This will maximise the amount of clay and shale that can be recovered prior to the end of quarry operations.

If quarry operations are reactivated in October 2020, extraction for 3.25 years at the approved rate of 300,000 tpa, would extract about half of the total remaining resource prior to the end of the currently approved quarry operations period (until 31 December 2024). A substantial portion of the regionally significant resource, as identified in the SREP No. 9 – Extractive Industry (No. 2), will be recovered without significantly impacting surrounding land uses, including the WSA.

Given that the quarry will be reactivated as soon as all legislative requirements are met, reactivation will provide immediate economic benefits, including:

- it will provide employment for up to 15 quarry workers and 10 to 12 truck drivers;
- it will provide clay and shale for the production of approximately 80 million standard bricks per year, worth approximately $76 million – enough to construct around 8,000 houses per year; and
- it will support the employment of around 200 brick manufacturing employees.

On a broader scale, there is a renewed demand for quarry products due to NSW Government's investment in infrastructure, building and development in the Greater Western Sydney region:

- the quarry will supply clay and shale for brick making, an essential building material required in the Western Sydney Priority Growth Area and South West Growth Area including the Western Sydney Aerotropolis;

- the quarry is ideally located to supply clay and shale to brick manufacturers in Western Sydney, minimising quarry truck travel times and transport impacts on the road network compared to more distantly located resources;

- reactivation of the quarry is aligned with the *Greater Sydney Region Plan* and the *Western City District Plan* which both include provisions to safeguard the continued economic contribution made by resource extraction; and

- the jobs created by the reactivation of the quarry will be in Western Sydney minimising commuting distances for employees living locally (importantly, the applicants are ready, willing and able to recommence quarrying activities on-site promptly after being granted the necessary consents).

Reactivation of the quarry is the first stage of the long-term development of the site (refer to Section 6.9):

- Stage 1 Quarry Reactivation: this proposed modification – the first step in preparing the quarry site for rehabilitation.

- Stage 2 Advanced Resource Recovery Centre and Quarry Rehabilitation: development of an advanced recourse recovery centre as a sustainable and economically viable method of rehabilitating the void for development.

- Stage 3 High Value Employment Generating Development: transform the land to deliver high value agribusiness jobs to deliver the vision of a technology-led agribusiness precinct as part of the Aerotropolis that balances its valuable assets including proximity to the future Western Sydney Airport (WSA) and Outer Sydney Orbital.

As such, the proposed modification is integral to realising the full potential of the site within the Aerotropolis.

7.4 Ecologically sustainable development

7.4.1 Overview of ESD

The overall objectives of ESD are to use, conserve and enhance natural resources. This ensures that ecological processes are maintained facilitating improved quality of life, now and into the future. The applicants are committed to the principles of ESD and understand that biophysical, social and economic objectives are interdependent. The applicants acknowledge that well-designed and effectively managed operation will avoid significant and/or costly environmental impacts or degradation. With 20 years' experience, two resource recovery and recycling facilities in operations, up to date EPA licensing and full ISO accreditation, KLF understands the importance of maintaining ESD objectives on site. Similarly, CPG has extensive experience implementing ESD principles in all its development projects and assets.

The principles of ESD, for the purposes of the EP&A Act, are provided in Clause 7(A) of Schedule 2 of the EP&A Regulation. The four principles of ESD are:

- precautionary principle – the precautionary principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- inter-generational equity – the principle of inter-generational equity is that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- conservation of biological diversity and maintenance of ecological integrity – the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
- improved valuation and pricing of environmental resources – improved valuation, pricing and incentive mechanisms should be promoted.

The proposed modification has been designed to reduce impacts to a level which is as low as is reasonably practicable and which are generally in accordance with the impacts of the approved quarry. Each of the four principles of ESD are considered further below.

7.4.2 Precautionary principle

This modification report has assessed the potential biophysical, social and economic impacts of the proposed modification, including detailed technical assessments of the key potential issues. The assessments have found that the proposed modification will not result in any new significant biophysical, social or economic impacts and the residual impacts can continue to be managed in accordance with the modified consent, updated mitigation measures (Appendix D) and management plans which will be revised as part of this proposed modification.

The applicants will continue environmental monitoring and to confirm that the impacts of the proposed modification are in accordance with the predicted impacts. Environmental management measures will be reviewed and, where required, updated if any impacts are greater than assessed.

7.4.3 Inter-generational equity

Environmental management measures will be implemented to ensure that the health, diversity and productivity of the environment is maintained or enhanced for future generations.

It is not proposed to continue quarry operations beyond December 2024. As described above, the proposed modification is the first stage in rehabilitating the quarry void and developing the site for the sustainable economic use of the site by future generations.

An economically viable method of filling the void in the absence of the proposed modification has not been identified. Therefore, in the absence of the proposed modification, it is likely that the void would remain unfilled and a liability to future generations.

7.4.4 Conservation of biological diversity and maintenance of ecological integrity

The potential environmental impacts of the proposed modification are detailed in this modification report. The proposed modification is not expected to cause any impacts to threatened species or endangered ecological communities. A BDAR waiver has been submitted to DPIE, summarised in Section 6.8 and attached in Appendix K.

7.4.5 Improved valuation and pricing of environmental resources

The proposed modification will support the ongoing, efficient operation and supply of clay and shale product and provide an economically viable pathway for the rehabilitation of the quarry void.

7.5 Conclusion

The proposed modification has been designed to avoid and minimise adverse biophysical, social and economic impacts. The proposed modification is anticipated to result in minimal environmental impacts beyond those previously assessed and approved under the consent. The residual impacts have been identified and assessed.

All aspects relating to environmental management will continue in accordance with the consent (as modified), EPL, revised site management plans, and the mitigation measures consolidated in Appendix D.

The proposed modification and ongoing operation of the quarry will provide immediate and long-term benefits to the local community, region and State.

As the potential environmental impacts can be managed and mitigated with few residual impacts and there are a range of immediate and longer-term economic benefits from reactivating the quarry through the proposed modification, we are confident that the proposed modification is in the public interest. The proposed modification allows the best use of the approved quarry and the site, and provides an economically viable pathway to the rehabilitation of the void to a final landform that can be fully developed for uses in keeping with the vision for the Aerotropolis.

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Abbreviations

ARRC	Advanced Resource Recovery Centre
ACHA	Aboriginal cultural heritage assessment
ACHAR	Aboriginal cultural heritage assessment report
Aerotropolis Authority	Western Sydney Aerotropolis Authority
AGL	Above ground level
AHD	Metres Australian Height Datum
AIA	Aeronautical impact assessment
ANEC	Australian Noise Exposure Concept Contour
ANEF	Australian Noise Exposure Forecast Contour
APZs	Asset protection zones
AQIA	Air quality impact assessment
ARI	Average recurrence interval
ASS	Acid sulphate soils
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BDAR	Biodiversity development assessment report
BMP	Best management practice
BOD	Biological oxygen demand
BRA	Building restricted areas
BSAL	Biophysical strategic agricultural land
BTEX	Ethylbenzene and zylenes
CBD	Central business district
CEMP	Construction environmental management plan
CNS	Communication navigation and surveillance
CoPC	Contaminants of potential concern
CPG	Coombes Property Group
CSM	Conceptual site model
DA	Development application
DBYD	Dial Before You Dig
DCP	Development control plan
DEL	Average delay
DGVs	Default guideline values

DITRDC	Commonwealth Department of Infrastructure, Transport, Regional Development and Communications
DOEE	Commonwealth Department of the Environment and Energy
DOS	Degree of saturation
DPIE	Department of Planning, Industry and Environment
EEC	Endangered ecological community
EES	DPIE Environment, Energy and Sciences
EIMP	Emergency and incident management plan
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
ENM	Excavated natural material
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPL	Environment protection licence
ESD	Ecologically sustainable development
FRNSW	Fire and Rescue NSW
FTE	Full time equivalent
g/m^2/month	Grams per square metre per month
GBAS	Ground based augmentation system
GHG	Greenhouse gas
GIS	Geographic information system
ha	Hectares
HTC	High temperature creosote
HV	High voltage
ICNG	Interim Construction Noise Guideline
IFR	Instrument flight rules
ILS	Instrument landing systems
IPC	Independent Planning Commission
ISO	International Organisation for Standardisation
KLF	KLF Holdings Pty Ltd
km	Kilometres
kVA	Kilo-volt-amperes
L	Litres
LGA	Local government area
LOS	Level of service

LOSP	Light organic solvent preservative
LSP	Local strategic planning statement
LV	Low voltage
m	Metres squared
m^2	Metres squared
mg/L	Milligrams per litre
MOD5	Modification 5
MRA	MRA Consulting group
NASF	National Airports Safeguarding Framework
NMLs	Noise management levels
NPfI	Noise Policy for Industry
NSW	New South Wales
NVIA	Noise and vibration impact assessment
OEH	Office of Environment and Heritage
OEMP	Operational environmental management plan
OLS	Obstacle limitation surface
OSD	Onsite detention
PAHs	Total polycyclic hydrocarbons
PANS OPS	Procedures for Air Navigation Services - Aircraft Operations
PBP	Planning for bushfire protection
PCBs	Polychlorinated biphenyls
PCT	Plant community type
PEC	Pigmented emulsified creosote
PESCPs	Primary erosion and sediment control plans
PIRMP	Pollution incident response management plan
PMF	Probable maximum flood
PNTL	Project noise trigger level
POEO Act	Protection of the Environment Operations Act 1997
PSI	Preliminary site investigation
Q95	95 percent queue lengths
R&D	Research and development
RAP	Registered Aboriginal party
RBL	Rating background level
RMS	Roads and Maritime Services
RNP	NSW Road Noise Policy

Roads Act	NSW Roads Act 1993
RRE	Resource recovery exemption
RTS	Response to submissions
RWS	Runway strips
SAL	Strategic agricultural land
SEAR	Secretary's Environmental Assessment Requirements
SEPP	State environmental planning policy
SID	Standard instrument departures
SSD	State significant development
STFM	Strategic Travel Forecasting Model
STP	Sewer treatment plant
SWMP	Soil and water management plan
t	Tonnes
t/day	Tonnes per day
TECs	Threatened ecological communities
TfNSW	Transport for NSW
TIA	Traffic impact assessment
TIA	Traffic impact assessment
tpa	Tonnes per annum
TRH	Total recoverable hydrocarbons
TSS	Total suspended solids
VENM	Virgin excavated natural material
WHS	Work health and safety
WSA	Western Sydney Airport
WSA Corp	Western Sydney Airport Corporation
WSP Growth Area	Western Sydney Priority Growth Area
WSPP	Western Sydney Planning Partnership
WTP	Wastewater treatment plant
µg/m^3	Micrograms per cubic metre

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