Luddenham Advanced Resource Recovery Centre Environmental Impact Statement

Prepared for Coombes Property Group & KLF Holdings

July 2020

EMM
creating opportunities

COOMBES
PROPERTY GROUP

KLF GROUP
BUILDING WASTE RECYCLING

Luddenham Advanced Resource Recovery Centre

Environmental Impact Statement

Report Number

J190749 RP17

Client

Coombes Property Group and KLF Holdings Pty Ltd

Date

22 July 2020

Version

v3 Final

Prepared by	**Approved by**
	
Janet Krick Senior Environmental Planner 22 July 2020	**Dr Philip Towler** Associate Director 22 July 2020

Certification

For submission of an environmental impact statement (EIS) under Part 4, Division 4.1 of the NSW Environmental Planning and Assessment Act 1979.

EIS prepared by

Janet Krick
BDevS, GradDipNatRs
Senior Environmental Planner

EMM Consulting Pty Limited
Level 3, 175 Scott Street
Newcastle NSW 2300

Philip Towler
BSc(hons), PhD
Associate Director

EMM Consulting Pty Limited
Ground floor, 20 Chandos Street
St Leonards NSW 2065

Applicant

Coombes Property Group and KLF Holdings Pty Ltd

Description of development

Development and operation of an Advanced Resource Recovery Centre.
See Chapter 2 of the EIS for a detailed description of the proposed development.

Land to be developed

275 Adams Road Luddenham, NSW
Lot 3 in DP 623799

Certification

We certify that the contents of this EIS have been prepared in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979*, Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and the NSW Department of Planning, Industry and Environment and Planning Secretary's Environmental Assessment Requirements issued for the development. To the best of our knowledge, it contains all available information that is relevant to the environmental assessment of the development to which the statement relates. The information contained in this EIS is neither false nor misleading.

Janet Krick
Senior Environmental Planner
22 July 2020

Dr Philip Towler
Associate Director
22 July 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.

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.

Stage 1 has commenced with the applicants having submitted a separate application to modify the quarry's consent (Development Consent DA-315-7-2003), with the primary intention of changing the approved access to the subject property to allow quarry operations to recommence (Modification 5).

This report relates to a new development application for the development and operation of an Advanced Resource Recovery Centre (ARRC) relating to the delivery of Stage 2 above.

The conceptual master plan for the development of the full site as envisaged by Stage 3 is provided in Figure ES1.

Photograph ES1 Quarry void from the south-west corner (panorama format)

KEY

- Subject property
- Proposed street trees
- Proposed shrub and buffer planting
- Large shade trees for landscape amenity and to reduce urban heat effect
- Small people-friendly amenity spaces and pathway connections
- Existing vegetation

Source: EMM (2020); DFSI (2017); Indesco (2020)

0 50 100 m

GDA 1994 MGA Zone 56

N

T:\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC005 ConceptPlan 20200617 01.mxd 19/06/2020

Concept masterplan of final land use

Luddenham Advanced Resource Recovery Centre
Figure ES.1

EMM
creating opportunities

ES2 Project overview

CPG and KLF propose to develop the ARRC (the project) within the subject property to the north of the existing quarry void. The ARRC will accept and process up to 600,000 tonnes per annum (tpa) of general solid waste comprising building and demolition waste as well as selected commercial and industrial waste and tyres. No special (other than tyres), liquid, hazardous, restricted solid waste, putrescible solid waste, or odorous waste will be accepted at the ARRC.

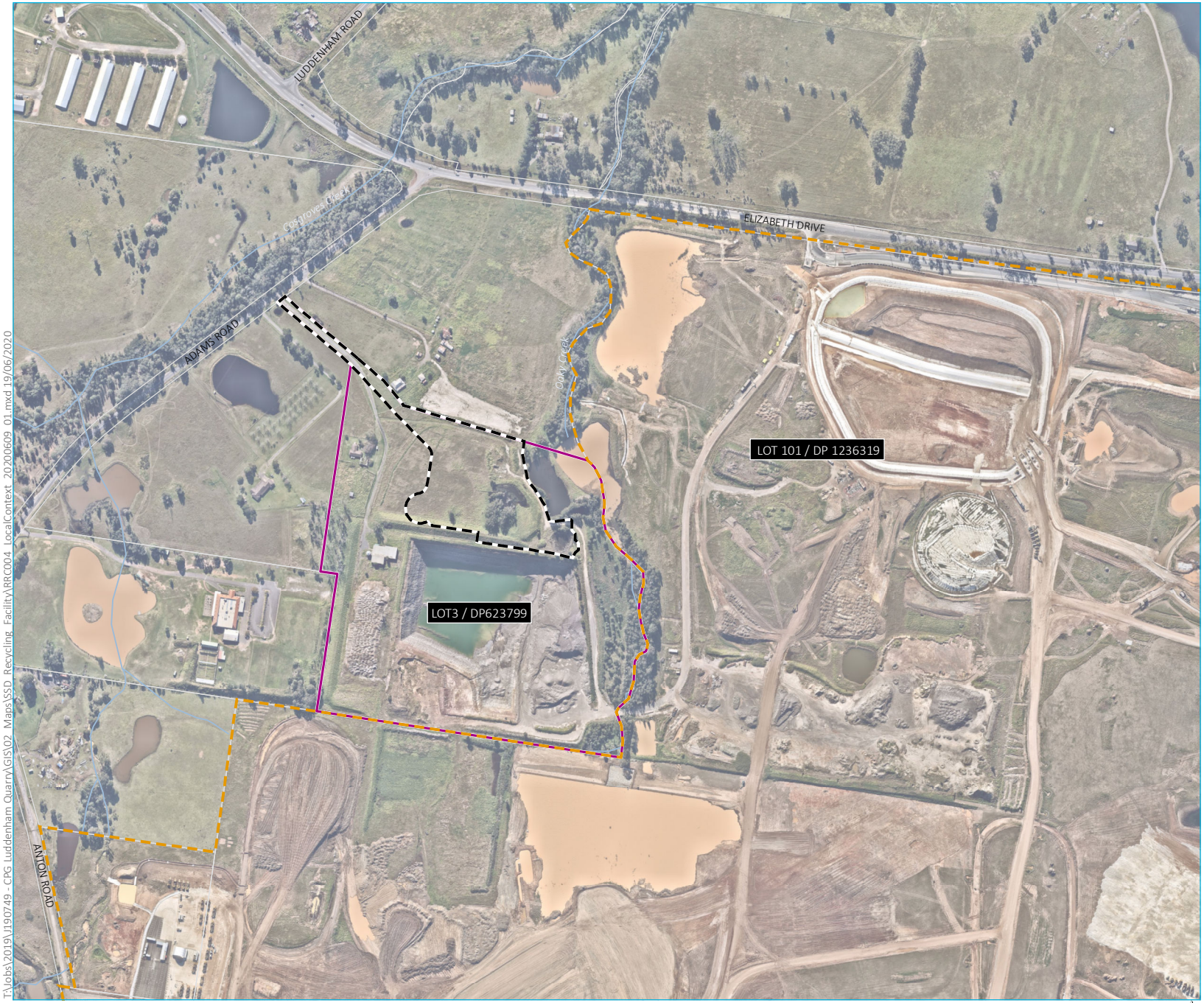
Wastes will be processed by sorting and separating, screening, crushing, blending, shredding and soil washing, with the aim of recovering up to 90% of the waste received. It is not proposed to compost any waste onsite. All waste acceptance, processing, storage and dispatch activities will occur within an enclosed warehouse (Plate ES1), which will be the central and most prominent feature of the 3 hectares (ha) ARRC site north of the existing quarry void.

Plate ES1 Perspective – ARRC offices on the left and warehouse in the background

The vast majority of materials accepted will be recovered, the remaining minor amount (10–20%) of non-recyclable residues will be disposed of at an offsite licensed landfill or to the quarry void on the site as part of rehabilitating the void following approval of quarry rehabilitation activities.

Recycled products such as metals, soils, screened fines, sorted segregated materials such as timber, paper/cardboard/film, plastics, and aggregate products will generally be dispatched by heavy vehicle for sale or processing at another resource recovery facility.

The ARRC site is west and north of the Commonwealth-owned Western Sydney Airport (WSA) site (Figure ES2). Surrounding land uses include a mix of agricultural, rural industrial and commercial, and rural residential development. However, given the site is adjacent to the WSA and is within the future Western Sydney Aerotropolis, it is anticipated that the surrounding environment will be significantly transformed in the coming decade. The ARRC will be the first of many agribusiness/industrial warehouses on the subject property and surrounding properties.



KEY

- Subject property
- ARRC site
- Western Sydney airport
- Cadastral boundary
- Watercourse

T:\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC004 LocalContext 20200609 01.mxd 19/06/2020

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

0 100 200 m

GDA 1994 MGA Zone 56

N

Local context

Luddenham Advanced Resource Recovery Centre
Figure ES.2

EMM
creating opportunities

A new State significant development (SSD) consent under Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) is required to establish and operate the ARRC. On 24 April 2020, the Secretary of the Department of Planning, Industry and Environment (DPIE) issued the Secretary's Environmental Assessment Requirements (SEARs) for the environmental impact statement (EIS) for the project. The SSD consent application number is SSD-10446.

A detailed description of the project is provided in Chapter 2 with the key components summarised as follows:

- construction and operation of an advanced construction and demolition resource recovery centre;
- all acceptance, processing, storage and dispatch of waste and recycled product will be carried out within an enclosed warehouse;
- accepting and processing up to 600,000 tonnes per annum (tpa) of waste for recycling;
- dispatch of up to approximately 540,000 tpa of recycled product;
- dispatch of approximately 60,000–120,000 tpa of non-recyclable residues either to an offsite licensed waste facility or to the adjacent quarry void (following approval of quarry rehabilitation activities);
- upgrade the access road from the subject property to Adams Road;
- use of the access road from the subject property to Adams Road; and
- the ARRC will operate up to 24 hours a day, 7 days per week.

The site layout is provided in Figure ES3. The scale of the development assists in offsetting the capital and operational costs associated with the enclosed warehouse.

The northern section of Adams Road between the site access road and Elizabeth Drive will be upgraded by the applicants to allow the current 3-tonne load limit to be lifted.

ES3 Benefits of the project

The project's manifold benefits include:

- **Addresses the need for waste and resource recovery infrastructure** – the NSW Government paper *Cleaning Up Our Act: The Future for Waste and Resource Recovery* (DPIE 2020) identifies a critical need to plan and prepare early for all types of waste and resource recovery infrastructure. Direction 3 of the paper is to 'Plan for future infrastructure' and notes the challenges in finding appropriate lands for waste and resource recovery land. The ARRC will provide:
  - an environmentally beneficial means of dealing with non-putrescible solid wastes by recycling up to 90% of the waste received, contributing to meeting of NSW government recycling targets; and
  - 20% of the required additional processing capacity required in the Sydney Metropolitan Area.
- **Strategic location** – the subject property, being located at the northern end of the future Western Sydney Airport and readily accessible from major transport links including Elizabeth Drive, M4 Motorway, M7 Motorway the Northern Road and the future M12 Motorway, is strategically located to provide recycling service to meet the projected demand associated with future development activities within the Aerotropolis and surrounding areas.

- **Shovel ready** – the ARRC will be developed as soon as all legislative requirements are met and will employ about 30 people (full-time equivalent, FTE) for about 18 months during construction and the ongoing employment of about 70 people (FTE) once at full production. Employees will be sourced from the local area where possible, to provide local job opportunities consistent with current Government objectives.

- **Economic benefits** Operations will provide a range of economic benefits for the Western Sydney economy including:

    - a total of 178 direct and indirect ongoing jobs;

    - $14 million in annual wage generation ($143 million over a 20-year period); and

    - $56 million in annual local area value added economic activity ($596 million over a 20-year period).

- **Economically viable means to fill the Luddenham Quarry void** – without a practical and economically viable method of rehabilitating the quarry site, the void will remain. The void will prevent the realisation of the draft Aerotropolis SEPP's vision at the subject property as about half of the property would be sterilised from future land uses compatible with the WSA and the proposed agribusiness land zoning. Instead, the void will remain a liability to future generations.

- **Realisation of Aerotropolis vision** – the project is integral to achieving the intended future agribusiness/industrial land use for the subject property as the project provides a commercially viable means to fill the quarry void (following approval of quarry rehabilitation activities). This vision is aligned with the long-term vision of the draft Western Sydney Aerotropolis Plan (draft Aerotropolis Plan) (Western Sydney Planning Partnership 2019) and the proposed Western Sydney Aerotropolis State Environmental Planning Policy (draft Aerotropolis SEPP).

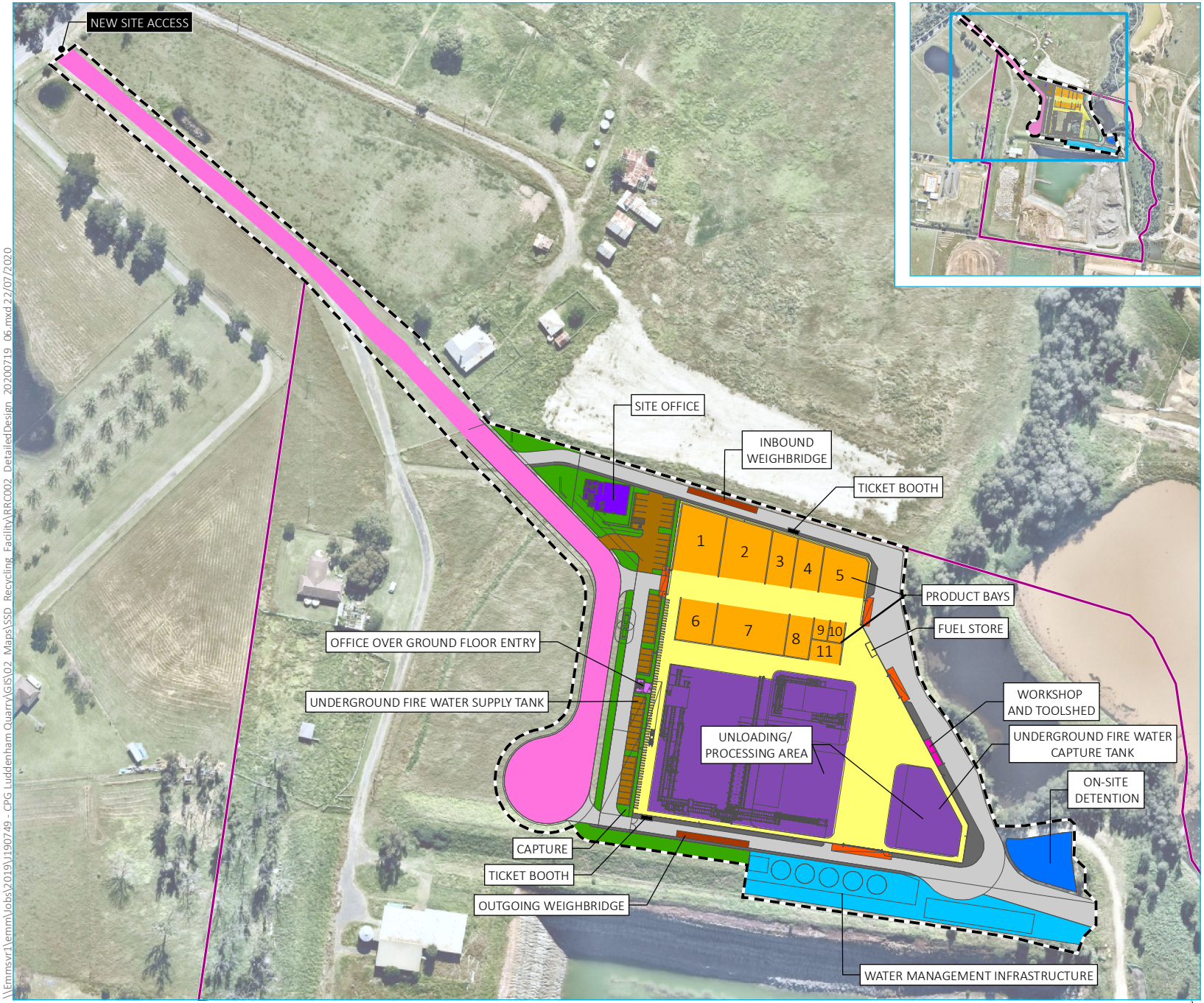
ES4 Engagement

A community and stakeholder engagement strategy was prepared for the project, with the results of the strategy outlined in the EIS.

Stakeholder engagement regarding the development of the subject property, including the ARRC, commenced in December 2019 and is ongoing. This engagement has guided the development of the project design and assessment process. While many stakeholders recognised the economic benefits of the project; Western Sydney Airport Corporation (WSA Corp), Western City & Aerotropolis Authority (Aerotropolis Authority) and Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) raised concerns regarding the compatibility of the project with WSA, particularly with regard to potential wildlife attraction and dust impacts on the operation of the airport.

Engagement with nearby landholders has not raised any objections to date with discussions continuing.

The EIS will be placed on public exhibition and the applicants will respond to any submissions received.



KEY

- Subject property
- ARRC site
- Indicative detailed layout

Proposed element

- Awning
- Carpark
- Hardstand
- ARRC access road
- Kerb/pedestrian area
- Landscaping
- Office over ground floor
- On-site detention
- ARRC warehouse
- Product bay
- Site office
- Ticketbooth
- Tool shed, workshop
- Unloading/processing
- Water management infrastructure, including treatment plant and storage
- Weighbridge

Product bays

1. Concrete/ rubble masonry
2. Clean timber
3. Rigid plastics
4. Paper/cardboard/film
5. Stumps/asphalt/metal
6. Heavy residual
7. Fines screened
8. Soil audit
9. Ferrous
10. Non-ferrous
11. Non-recyclables

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

0 50 100 m

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC002 DetailedDesign 20200719 06.mxd 22/07/2020

Project overview

Luddenham Advanced Resource Recovery Centre

Figure ES.3

EMM creating opportunities

ES5 Project design refinement

The ARRC site design takes into consideration the likely interactions between the ARCC and the existing and future site components and activities (ie Stage 1 and Stage 3 of the long-term vision for the subject property), to be compatible with surrounding future Agribusiness land uses to ensure that its operations will not impact airport operations.

During the preparation of this EIS, the design of the ARRC has been refined on the basis of stakeholder feedback and the findings of the technical assessments. Key project refinements include enclosing the ARRC with all waste and recycled product now accepted, processed, stored and dispatched within a fully enclosed warehouse, which visually will resemble any typical large-scale industrial warehouse.

The applicants' recycling experience and the scale of the ARRC will allow the applicants to procure the latest cutting-edge waste processing plant and equipment. The plant designers have been provided a design brief to "future proof" the plant design. This includes the ability to incorporate robotics and other new automation processes to the overall sorting/screening process.

It is anticipated that opportunities for research and development into new technologies and processes will arise from the applicant's collaboration with NSW Circular and University of NSW Material Sciences that will drive best practices in the waste recycling industry, drawing ideas and inspiration from innovations worldwide. An area of the warehouse has been designated for future next generation innovation to allow for the applicants' ongoing and long-term collaboration with these organisations.

ES6 Hazards and risks

Chapters 6 provides an assessment of potential hazards and risks from the ARRC, including a summary of the bushfire assessment. The environmental risk assessment found that there is generally a low risk that the ARRC will adversely impact the environment but identified air quality (during concurrent quarry operations and construction of the airport) and noise (prior to rezoning) as higher risks. The air quality risk will be reduced following the completion of quarry operations and airport construction, while noise criteria will be met following rezoning of the area so it will become a low risk.

An assessment of the project against *Applying SEPP 33* (DoP 2011a) found the ARRC is not a potentially hazardous or offensive development according to SEPP 33.

A fire suppression system will be installed in the ARRC warehouse. This will include a 2.6-ML fire water supply tank, a sprinkler system and a 2.6-ML underground fire water containment tank. A bushfire asset protection zone will be provided to the east of the ARRC site.

ES7 Impact assessment

A view of the ARRC site is provided in Photograph ES2.

Photograph ES2 Proposed ARRC site – view to the south from the subject property boundary

Detailed technical investigations for airport safeguarding, air quality, noise and vibration, surface water, traffic, economics, biodiversity, Aboriginal heritage, land and soil, contamination and infrastructure have been conducted as part of this EIS. These assessments have been appended to the EIS and are summarised in Chapter 7. This chapter also includes assessments of potential groundwater, social, urban design and visual impacts. The assessments undertaken identify the potential impacts of constructing and operating the ARRC, and appropriate mitigation measures to address these impacts. The key findings of these impact assessments are:

- The project will not impact WSA operations, as it is not predicted to produce exhaust plume, cause any hazard from sunlight reflections, increase the potential for wildlife collisions or result in airborne or deposited dust that will affect aircraft operations or WSA infrastructure. The project is not an activity that would infringe on Prescribed Airspace and require approval under the Commonwealth *Airports Act 1996*.

- All dust emissions, except for wheel generated dust on the access road, will be generated within the warehouse and subject to controls afforded by enclosure and misters at the entrances. No air quality assessment criteria are predicted to be exceeded at the airport terminal, runway, fuel farm or airport infrastructure areas. Dust criteria are predicted to be met at all other sensitive receivers, with the exception of:

    - 24-hour average PM_{10}, annual average $PM_{2.5}$, 24-hour average $PM_{2.5}$ and TSP concentrations at receptor R3 (currently unoccupied); and

    - the annual average $PM_{2.5}$ concentration at receptor R6, primarily due to the high background concentration.

- Prior to rezoning and assuming the ARRC and quarry are operating at full capacity, noise criteria will be exceeded at seven properties surrounding the ARRC site and additional noise mitigation measures will be required if the area is not rezoned. After the rezoning of the land, it is predicted that the ARRC noise levels will satisfy the applicable noise criterion at all assessment locations.
- The key intersections potentially impacted by ARRC-related traffic are:
  - Elizabeth Drive/Adams Road: the intersection will operate at LOS A or B with the even north/south distribution of ARRC-related traffic, or at LOS C if all ARRC-related heavy vehicles access the ARRC using the northern section of Adams Road prior to lifting the heavy vehicle restriction south of the subject property;
  - Elizabeth Drive/Luddenham Road: based on its current configuration, the intersection is currently operating at LOS B, but by 2029, with the locality traffic growth from the Western Sydney Aerotropolis development, the intersection will deteriorate to a LOS F, regardless of ARRC traffic (which will only contribute 4.1% of the total traffic) and an intersection upgrade will be required; and
  - The Northern Road/Adams Road: the intersection is currently being upgraded as part of the Western Sydney Aerotropolis development. Once the heavy vehicle restriction south of the subject property is lifted, the ARRC-related traffic will not deteriorate the performance of the upgraded intersection.
- ARRC-related traffic is not expected to have a significant impact on traffic flow or traffic safety on Adams Road, Elizabeth Drive, and The Northern Road.
- The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant prior to the start of ARRC operations as part of the proposed development so that the pavement is suitable for use by large trucks, up to B-doubles, and so that the lane and shoulder widths meet Ausroads Guidelines and, until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using the northern section of Adams Road.
- The road noise criteria are predicted to be met on Elizabeth Drive and on Adams Road north of the ARRC site, however road noise criteria may be exceeded on Adams Road south of the ARRC site when the load limit on this section of road is lifted and measures may need to be applied depending on the growth of project-related traffic.
- The ARRC water management system will separate clean stormwater runoff from dirty water from active ARRC areas. The dirty water will be treated and reused. No treated or untreated dirty water will be discharged. Stormwater will be harvested and used, which will reduce the volume and frequency of discharges to Oaky Creek from the onsite detention storage.
- The project is expected to have a number of socio-economic benefit including employment opportunities, providing local waste services, resource recovery for use in construction, and economic benefits to the Western Sydney economy. Dust and visual impacts have been minimised through the design of the ARRC. Following rezoning, noise levels at sensitive receivers will be high but will be below applicable criteria. However, the value of the land will also increase substantially providing financial opportunities to the residents.
- The ARRC has been designed to avoid sensitive biodiversity areas where possible. The ARRC site footprint was reduced to avoid potential impacts to the Swamp Oak Floodplain Forest Endangered Ecological Community (EEC) listed under the BC Act (PCT 1800) along the eastern boundary. A total of 0.28 ha of PCT 1800 Swamp Oak forest on riverflats of the Cumberland Plain and Hunter Valley will be unavoidably cleared. This PCT provides foraging habitat for the Southern Myotis. A total of 7 ecosystem credits and 6 species credits are required to offset the residual impacts of the project.

- The scenic quality of the site and surrounds is mostly low to moderate. The ARRC warehouse will be the most prominent and visible feature from the sensitive receivers and viewpoints assessed surrounding the site. Initially, the ARRC site will cause a significant impact in the surrounding landscape. However, it will be in keeping with the WSA and Aerotropolis development, which will occur regardless of development of the ARRC site. Thus, the project is considered well suited to the future land uses surrounding the site. It will contribute to the Agribusiness precinct objectives, and to the overall character of the subject property, WSA, Aerotropolis and surrounds.

- The subject property has been subject to a high level of disturbance. An AHIMS site within the subject property (#45-5-2280) is outside the ARRC site and is currently protected by fencing. The archaeological character and actual level of disturbance of the ARRC site could not be established through desktop study and survey alone and unknown artefacts may occur in highly disturbed areas. There is moderate archaeological potential for subsurface deposits. Given this current ambiguity and strong support for a test excavation programme by the RAPs, a test excavation program will be completed. The results of this program will be used to inform appropriate management measures in consultation with RAPs and will be provided so that DPIE and Heritage NSW can consider any new information prior to project approval.

- The greatest erosion risk will occur during construction of the ARRC will expose potentially dispersive subsoils. A combination of amelioration of dispersive soils, source control of erosion and the use of Type D sediment basins will mitigate potential offsite impacts of this risk. There is very low erosion risk during the operational phase of the project with the majority of the ARRC site covered by sealed hardstands, buildings or landscaped areas.

- There is a low potential for contamination to be present which would prevent the future development of the site for the purposes of a resource recovery facility.

- Services augmentations, lead-ins and service connections to the site will be required to support the ARRC. Some temporary services for water and wastewater are proposed until appropriate connections are available in the future. Applications have been made to Sydney Water for sewer and potable water connections, and to Endeavour Energy for electrical connections.

With effective management and incorporation of mitigation and management measures in Chapter 6 and 7, consolidated and appended in Appendix C, impacts from the project can be managed to minimise residual impacts.

ES8 Conclusion

The ARRC has been designed to be compatible with surrounding future Agribusiness land use with a focus on preventing impacts to WSA's operations. The ARRC has also been designed to minimise environmental impacts.

The ARRC is a 'stand-alone' development that will provide a range of direct and indirect socio-economic benefits including contributing an estimated $141 million in annual direct and indirect output or business turnover to the Western Sydney economy and 70 direct and 108 indirect jobs and will provide environmental benefits through the recycling of up to 540,000 tpa of waste supporting NSW Government strategies to meet waste reduction targets and increase the recovery and reuse of material.

The NSW government's vision is that the Western Sydney Aerotropolis will be Australia's third-largest economy by 2036 and will be one of the country's fastest growing regions. The development projects required to meet this vision will generate large volumes of waste during their construction and operation. The ARRC is in an ideal strategic location to recycle this rapid growth in waste generated in the Aerotropolis and the South West Growth Area.

In addition to its benefits as a stand-alone project, development of the ARRC is integral to achieving the intended future Agribusiness/industrial land use of the subject property as the project provides a commercially viable means to fill the quarry void (subject to separate development consent). This will support the Western Sydney Airport and ongoing development of the Western Sydney Aerotropolis.

This EIS finds that ARRC could be developed without any significant impacts on the local environment within the context of the Aerotropolis.

For all of these reasons, the proposed ARRC is considered to be in the public interest.

Table of Contents

Appendices

Tables

Figures

CHAPTER 1

Introduction

1 Introduction

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 for 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 report relates to a new development application for the development and operation of an Advanced Resource Recovery Centre (ARRC) relating to the delivery of Stage 2 above.

CPG and KLF propose to develop the ARRC (the project) within the subject property to the north of the existing quarry void.

The NSW Government paper *Cleaning Up Our Act: The Future for Waste and Resource Recovery* (DPIE 2020) identifies a critical need to plan and prepare early for all types of waste and resource recovery infrastructure. Direction 3 of the paper is to 'Plan for future infrastructure' and notes the challenges in finding appropriate lands for waste and resource recovery land. The ARRC will provide an environmentally beneficial means of dealing with non-putrescible solid wastes by recycling up to 90% of the waste received, contributing to meeting of NSW government recycling targets.

The subject property, being located at the northern end of the future Western Sydney Airport and readily accessible from major transport links including Elizabeth Drive, M4 Motorway, M7 Motorway the Northern Road and the future M12 Motorway, is strategically located to provide recycling service to meet the projected demand associated with future development activities within the Aerotropolis and surrounding areas.

The ARRC would only provide 20% of the required additional processing capacity required in the Sydney Metropolitan Area (Appendix E).

In addition to the 'stand-alone' benefits that the ARRC would provide, the development of the ARRC is integral in achieving the intended future agribusiness/industrial land use for the subject property as the project provides a commercially viable means to fill the quarry void (subject to separate development consent). This will support the Western Sydney Airport and ongoing development of the Western Sydney Aerotropolis. Without a practical and economically viable method of rehabilitating the quarry site, the void will remain. The void will prevent the realisation of the draft Aerotropolis SEPP's vision at the subject property as about half of the property would be sterilised from future land uses compatible with the WSA and the proposed agribusiness land zoning. Instead, the void will remain a liability to future generations.

1.1 Project overview

A new State significant development (SSD) consent under Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) is required to establish and operate the ARRC. On 24 April 2020, the Secretary of the Department of Planning, Industry and Environment (DPIE) issued Secretary's Environmental Assessment Requirements (SEARs) for the environmental impact statement (EIS) for the project. The SSD consent application number is SSD-10446.

A detailed description of the project is provided in Chapter 2 with the key components summarised as follows:

- construction and operation of an advanced construction and demolition resource recovery centre;
- all acceptance, processing, storage and dispatch of waste and recycled product will be carried out within an enclosed warehouse;
- accepting and processing up to 600,000 tonnes per annum (tpa) of waste for recycling;
- dispatch of up to approximately 540,000 tpa of recycled product;
- dispatch of approximately 60,000–120,000 tpa of non-recyclable residues either to an offsite licensed waste facility or to the adjacent quarry void (following approval of quarry rehabilitation activities);
- upgrade the access road from the subject property to Adams Road;
- use of the access road from the subject property to Adams Road; and
- ARRC operations up to 24 hours a day, 7 days per week.

The ARRC will accept general solid waste comprising building and demolition waste as well as selected commercial and industrial waste. No special, liquid, hazardous, restricted solid water, putrescible solid waste, or odorous waste, that could potentially pose a risk to the adjacent Western Sydney Airport (WSA), currently under construction, will be accepted at the ARRC.

The northern section of Adams Road between the site access road and Elizabeth Drive will be upgraded by the applicants to allow the current 3-tonne load limit to be lifted.

The vast majority of materials accepted will be recovered, the remaining minor amount (10–20%) of non-recyclable residues will be disposed of at an offsite licensed landfill or to the quarry void on the site as part of rehabilitating the void.

1.2 The applicants

The project applicants are CPG and KLF.

CPG is an experienced Australian-owned private property company that owns, develops and manages a diversified property portfolio, including retail, commercial office, hotel, entertainment and land assets. Since 1978, CPG's business model has been to retain long-term ownership and control of all its assets. Recently completed development projects include 413 George St, an A-Grade 16, 700 metres squared (m^2) commercial office building in the Sydney central business district (CBD); 2 Grosvenor Street, a boutique A-Grade 4,800 m^2 commercial office building in Bondi Junction; and Gateway Shopping Centre, a 37,000 m^2 regional shopping centre in Palmerston, Northern Territory. CPG's current projects includes One Hurstville Plaza, an A-Grade 11,000 m^2 commercial office tower under construction in Hurstville; and 505 George Street, an 80-level 270-metre tall mixed-used landmark tower with 507 apartments, community facilities and retail podium in the Sydney CBD. CPG takes great pride in its extensive track record of collaborating with local and State government and agencies to deliver transformative and iconic projects.

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 Project applicants

Coombes Property Group (CPG)	**KLF Holdings Pty Ltd**
Level 5, 2 Grosvenor Street Bondi Junction, NSW 2022	16 Grand Avenue Camellia NSW 2142 7–9 Brennan Close Asquith NSW 2077
https://coombespropertygroup.com.au/	https://klfholdings.com.au/

The applicants intend to develop and operate the subject property, including the ARRC in perpetuity as outlined in Section 1.1.

CPG and KLF are ready, willing and able to commence construction and operation of the ARRC promptly after being granted the necessary consents. This will increase local area value-added economic activity generation in the order of $56 million per annum for ongoing operations and $11 million per annum during construction (Appendix M) which is particularly important given the impacts of COVID-19 on the NSW economy.

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

1.3 ARRC site context

1.3.1 Regional and local context

The subject property is within the Liverpool local government area (LGA) in the Greater Western Sydney region of NSW and is approximately 19 kilometres (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 (Figure 1.1).

The subject property is approximately 19 hectares (ha) and bordered to the east and south by the Commonwealth-owned WSA site (Figure 1.2). The construction of WSA is currently underway, including bulk earthworks and road infrastructure upgrades. Other surrounding land uses include a mix of agricultural, rural industrial and commercial, and rural residential development. Oaky Creek forms the eastern boundary of the subject property. The subject property is battle-axe in shape with a thin corridor providing the access from Adams Road, which is a local road joining Elizabeth Drive about 500 metres (m) north of the site and The Northern Road about 2.5 km south of the site.

1.3.2 Subject property

The subject property is generally flat with the exception of the quarry void. The property slopes gently from the south-west to the north-east flat (approximately 60 to 75 metres Australian Height Datum (mAHD)). Key aspects of the subject property are shown in Photograph 1.1 to Photograph 1.4.

Much of the subject property 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 subject property 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. Other notable features include earthen noise bunds to the west and north of the quarry void (3–5 m tall) and two existing sedimentation dams and a water storage on Oaky Creek.

It is proposed to develop the ARRC to the north of the quarry void. The ARRC site is approximately 3 ha in area and currently grassed with small patches of native vegetation. The noise bund to the north of the quarry intersects the southern portion of the ARRC site.

The subject property is zoned RU1 Primary Production under the Liverpool Local Environmental Pan 2008 (Liverpool LEP). The subject property is proposed to be zoned “Agribusiness” under the draft Western Sydney Aerotropolis State Environmental Planning Policy (Aerotropolis SEPP). Land along the eastern boundary of the subject property, associated with the Oaky Creek riparian zone is proposed to be zoned Environment and Recreation zoning under the draft Aerotropolis SEPP.

1.3.3 Surrounding land use

The area 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 200 m west of the AARC site (130 m from the boundary of the subject property). There are two unoccupied residences on the property to the north of the site. Consultation with the property owner of these residences has confirmed that one of these residences is condemned and uninhabitable. Agreements are currently being discussed with the property owners of the western and northern residences with respect to potential noise and amenity impacts of reactivated quarrying operations and the development of the ARRC.

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 site access on Adams Road.

The WSA is quickly becoming a dominant land use in the area (Figure 1.1).

KEY

- Subject property
- ARRC site
- Western Sydney Airport
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- NPWS reserve (see inset)
- State forest (see inset)

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

\\Emmsvr1\emm\Jobs\2019\190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC003 RegionalContext 20200609 02.mxd 17/06/2020

Regional context

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 1.1

EMM
creating opportunities

KEY

- Subject property
- ARRC site
- Western Sydney airport
- Cadastral boundary
- Watercourse

\\Emmsvr1\emm\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC004 LocalContext 20200609 01.mxd 17/06/2020

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

0 100 200 m

GDA 1994 MGA Zone 56

N

Local context

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 1.2

EMM
creating opportunities

Photograph 1.1 **Proposed ARRC site – view to the south from the subject property boundary**

Photograph 1.2 **Quarry void – view to the south towards the Western Sydney Airport site**

Photograph 1.3 Internal access road to Adams Road

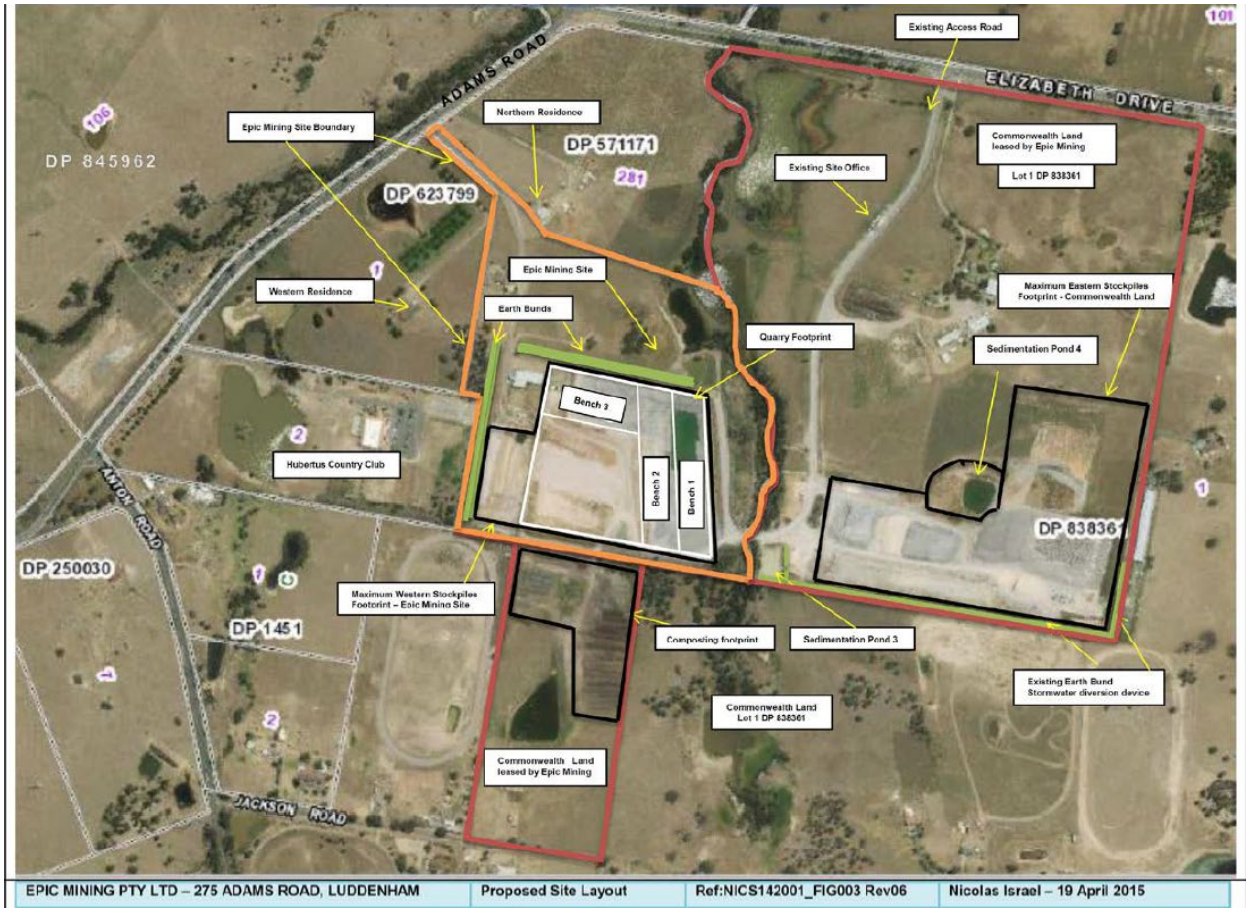
Photograph 1.4 Subject property access from Adams Road – looking north

1.3.4 Existing development consents

There is an existing clay and shale quarry on the subject property approved under Development Consent DA-315-7-2003, as modified. 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 quarry is currently inactive. 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 approved site access road off Elizabeth Drive. These quarry components on Commonwealth-owned land, including the approved site access off Elizabeth Drive, are no longer available for use by the applicants due to the development of the WSA. The quarry is approved to operate 7 am to 6 pm Monday to Friday. No haulage vehicles are to enter the site between 6 pm and 7 am Monday to Friday and maintenance is permitted 7 am and 1 pm Saturday.

The applicants have submitted an application to modify the quarry's consent to allow quarry operations to recommence (Modification 5, also referred to as MOD5), with the primary intention of changing the approved access to the subject property to allow quarry operations and to remove components of the consent located on Commonwealth owned land.

The approved layout of the quarry is shown in Figure 1.3 whereas the layout of Modification 5 currently being assessed by DPIE is shown in Figure 1.4.



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

Figure 1.3 Approved quarry layout

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

\\Emmsvr1\emm\Jobs\2019\190749 - CPG Luddenham Quarry\GIS\02 Maps\Modification Reporting\MR004 ProposedModification 20200529 03.mxd 17/06/2020

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

0 50 100 m

GDA 1994 MGA Zone 56

N

Modification 5 to SSD
DA 317-7-2003 proposed layout

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 1.4

EMM
creating opportunities

1.3.5 Staging of site development

Indicative timeframes for the development of the subject property and surrounding areas are:

- Gazetting of Aerotropolis SEPP:
  - second half of 2020.
- Stage 1 Quarry extraction (subject to a separate application):
  - reactivate the quarry as soon as approval is received, pre-quarrying consent conditions are met, and the northern Section of Adams Road is upgraded (targeting late 2020); and
  - complete quarry operations by 31 December 2024.
- Stage 2 ARRC:
  - commence construction in mid-2021;
  - commence operations in 2022 – with 24-hours operations commencing as soon as commercially viable;
  - connect to mains water: 2022 (expected); and
  - connect to truck sewer: 2026 (expected).
- Stage 2 Quarry rehabilitation/void in-fill (subject to a separate application):
  - commence quarry rehabilitation in about 2025; and
  - about 15 years to complete quarry rehabilitation.
- Stage 3 Commercial/light industrial development:
  - commence additional commercial/light industrial development on the northern part of the site in about 2024; and
  - commence construction on the southern part of the site following the completion of the void rehabilitation.
- Western Sydney Airport:
  - construction commenced and ongoing; and
  - commence operations: 2026.

The reactivated quarry operations (assuming that Modification 5 is approved) will occur on different parts of the subject property to the ARRC construction and operations. The site access road and public roads will be the only areas used by both developments.

This EIS conservatively assesses the cumulative impacts of both the ARRC and quarry operating at full capacity (600,000 tpa and 300,000 tpa respectively). However, this is unlikely to occur as ARRC operations are expected to commence in 2022 and to ramp up over several years, while the quarry operations will cease in 2024. Rehabilitation activity will start in 2025 and will be less intense that the assessed quarry operations. The construction of the ARRC is expected to be completed before airport operations commence in 2026. It is noted that the draft *Western Sydney Aerotropolis Plan* (draft Aerotropolis Plan) (WSPP 2019) envisages construction in the area to continue for many years after the start of airport operations.

1.4 Future land use vision and alternatives

1.4.1 Future land use vision

As outlined in sections 1.1 and 1.3.5, the applicants have a staged vision for the long-term development of the subject property. This vision is aligned with the long-term vision contemplated by the draft Aerotropolis Plan (WSPP 2019) and the proposed Aerotropolis SEPP. Development of the subject property will realise the objectives of the proposed agribusiness zoning and will not impact WSA aviation operations.

The ARRC is integral in achieving the intended future agribusiness/industrial land use for the subject property as the project provides an environmentally sustainable and economically viable means to infill and rehabilitate the quarry void (following the approval of rehabilitation of the quarry) to allow for development compatible with the WSA and the vision of a technology-led agribusiness precinct as part of the Aerotropolis. The applicants will seek approval to engineer the quarry void into a lined landfill complete with leachate collection and treatment systems following the extraction of the shale and clay resource from the quarry. This will allow for the landfilling of non-recyclable residues (eg plastics, cardboard and treated timber) from the ARRC as well as the direct landfilling of excavated natural material (ENM) and virgin excavated natural material (VENM).

The infilled and rehabilitated quarry will provide a stable and developable landform allowing for the long-term agribusiness/industrial use of the subject property; providing additional developable land for long-term employment and business opportunities in the immediate vicinity of the WSA in alignment with the draft Aerotropolis Plan. 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 initiatives. This will deliver the vision of a technology-led agribusiness precinct as part of the evolving Aerotropolis. The ARRC would continue operations as part of the commercial estate, providing ongoing waste and recycling services to developing urban areas within the Aerotropolis. A concept masterplan for the rehabilitated subject property is provided in Figure 1.5.

While development of the ARRC is integral in achieving the intended future commercial/industrial land use of the subject property as the project provides a commercially viable means to fill the quarry void (subject to separate development consent), the ARRC can be developed and operated independently of the other proposed developments on the site. This EIS describes all of the components and activities required for the development and operation of the ARRC and assesses the associated potential impacts. No other planning approvals will be required.

The applications associated with the reactivation and rehabilitation of the quarry do not need to be approved for the ARRC development to proceed. Of note, this EIS assesses the impacts of all non-recyclable residues being transported off-site for disposal at a licenced landfill. This will occur before and after rehabilitation of the quarry void or if filling of the void is not approved. This ARRC application seeks approval to transfer non-recyclable residues to the void. It does not seek approval for the placement of this material, which will be subject to a separate approval.

As described in Chapter 8, the ARRC will provide a range of societal benefits regardless of its benefits in providing an economically feasible method to rehabilitate the quarry void on the subject property. In summary, the ARRC can be assessed as a 'stand-alone' development that will provide a range of economic benefits, including 178 direct and indirect jobs at full operations, and environmental benefits through the processing of up to 600,000 tpa of waste to produce up to 540,000 tpa of recycled products. Subject to the approval of other developments on the subject site, the ARRC will deliver further benefits by enabling the filling of the void and subsequent commercial/industrial land uses.

KEY

- Subject property
- Proposed street trees
- Proposed shrub and buffer planting
- Large shade trees for landscape amenity and to reduce urban heat effect
- Small people-friendly amenity spaces and pathway connections
- Existing vegetation

\\emmsvr1\EMM\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC005 ConceptPlan 20200617 01.mxd 18/06/2020

Source: EMM (2020); DFSI (2017); Indesco (2020)

0 50 100 m

GDA 1994 MGA Zone 56

N

Concept masterplan of final land use

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 1.5

EMM creating opportunities

1.4.2 Do nothing option

The 'do nothing option' would forgo the estimated $56 million in annual local area value added economic activity and $14 million in annual wage generation, as well as the 178 direct and indirect ongoing jobs created by the project (Appendix M). The economic benefits of the project are discussed further in Section 7.7 and Chapter 8.

While the ARRC can be developed as a stand-alone project, it is proposed as part of the wider development of the subject property.

In its current state, the site contains a substantial, largely unrehabilitated quarry and is incompatible with the new WSA, for both operational and visual reasons. The existing quarry consent (DA 315-7-2003) does not require refilling the void which is essential for productive reuse of the subject property and compatibility with WSA. The original EIS for the quarry identified that filling the void with inert waste was proposed to rehabilitate the quarry, but as the timing of rehabilitation was then many years away, it indicated this would be the subject of a separate application. The 'do nothing option' would be to forego the only commercially-viable means of rehabilitating the subject property and would conflict with the original long-term development intention for the subject property.

Without a practical and economically viable method of rehabilitating the quarry site, the void will remain.

The void will prevent the realisation of the draft Aerotropolis SEPP's long-term vision for the subject property as over 50% of the property (the quarry void and stockpile areas) would be sterilised from future land uses compatible with the WSA and proposed agribusiness land zoning.

The proposed developments will see the subject property initially occupied for extractive/industrial purposes and then for commercial/industrial purposes. Occupation of the site will result in the implementation of site management practices, such as management of the waterbodies present on the property, dewatering of the void, management exotic vegetation and the prevention of illegal dumping. In the absence of development, the property is likely to remain vacant, particularly given the constraints that the void places on commercial development of the property. In this case, adequate management of the property is unlikely to occur and risks to the operation of the airport from the subject property will be increased.

1.4.3 Alternative ARRC design

The original design for the ARRC presented in the Scoping Report (EMM 2020a) comprised a smaller warehouse for waste acceptance and processing (approximately 6,000 m^2 enclosed) with recycled products stored in outdoor product bays. The design included a perimeter wall around the ARRC site which incorporated a potable water misting system for dust suppression.

Following consultation with the Environment Protection Authority (EPA), Western Sydney Airport and the receipt of the agency requirements appended to SEARs, the applicants have redesigned the ARRC to a fully enclosed facility in response to concerns raised from some agencies regarding the outdoor storage of recycled product.

A further alternative would be for the ARRC to accept a wider range of wastes than proposed, such as putrescibles, organic wastes, liquid wastes and/or hazardous wastes. For example, previous an application, DA 315-7-2003 Modification 4, was made for the site to accept organic waste for composting. It is not proposed to accept any of these wastes. In particular, no putrescibles or organic wastes that could attract birds will be accepted at the ARRC, given the potential for birdstrike impacting WSA operations.

1.5 The purpose of this report

This EIS accompanies a development application (DA) under Part 4.1 of the EP&A Act. The consent authority is the Minister for Planning and Public Spaces or delegate, and the determining authority is anticipated to be the Secretary of the Department of Planning, Industry and Environment (DPIE) or the Independent Planning Commission (IPC) as delegated by the Minister for Planning and Public Spaces.

This EIS has been prepared in accordance with the NSW EP&A Act, the NSW Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and has considered the draft *Preparing an Environmental Impact Statement: Guidance for State Significant Projects* guidelines (DPE 2019) (draft EIS guidelines). This EIS addresses the SEARs, as required under Section 4.12 of the EP&A Act, and addresses the requirements of the relevant government agencies as attached to the SEARs issued on 24 April 2020 (Ref: SSD-10446).

The SEARs and where they are addressed in this EIS are summarised in Appendix A.

CHAPTER 2

Project description

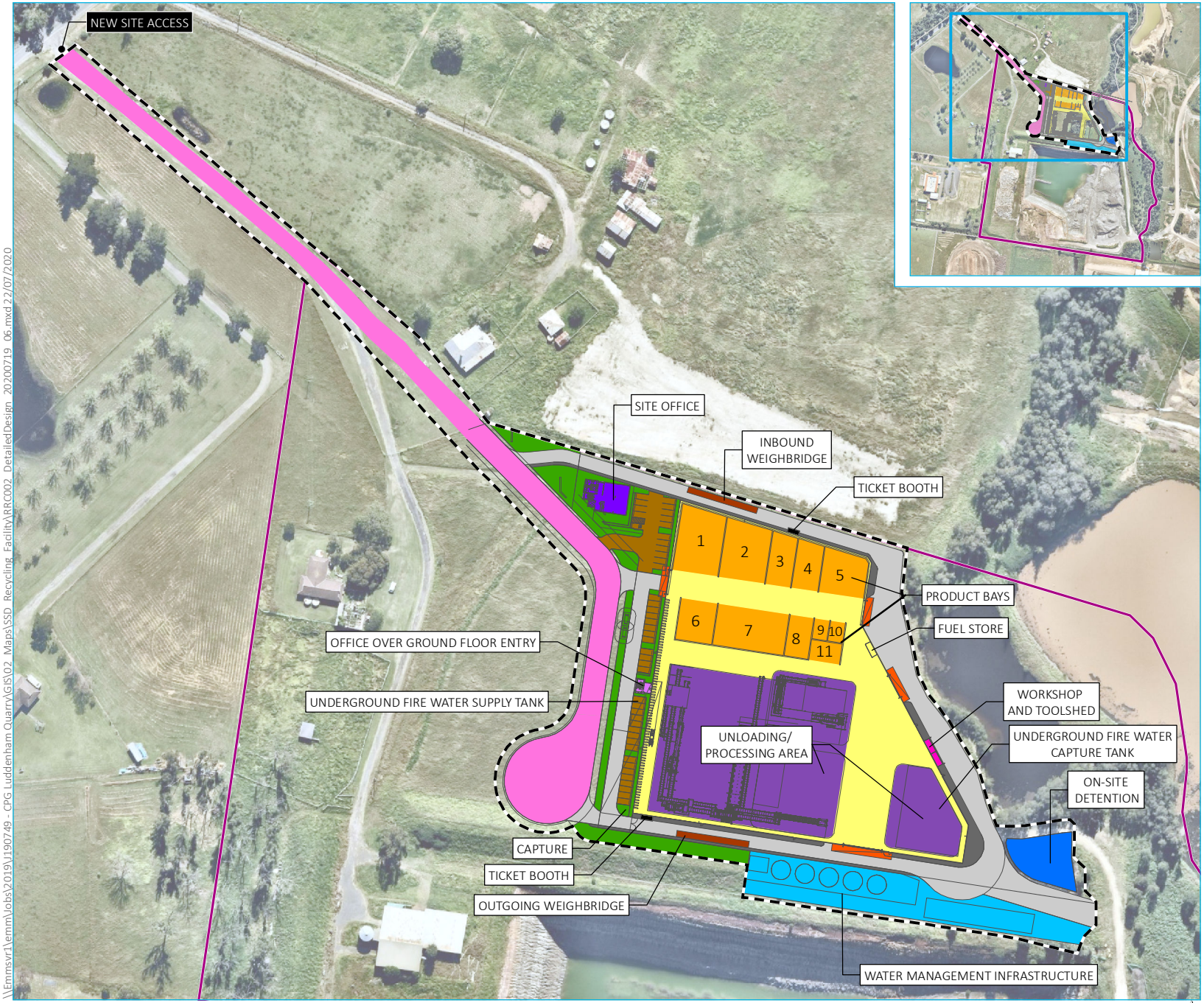
2 Project description

CPG and KLF are seeking a State Significant Development consent under Division 4.1 of Part 4 of the EP&A Act to construct and operate an ARRC within the subject property to the north of the existing quarry void. The ARRC will predominately accept construction and demolition waste, with some commercial and industrial waste, including tyres. No special, liquid, hazardous, restricted solid waste or general solid waste (putrescible), as defined in the *NSW Protection of the Environment Operations Act 1997* (POEO Act) and the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014a), will be accepted by the ARRC with the exception of tyres meeting the recovered tyres order (EPA 2014c).

The ARRC has been designed to comply with local, State and Federal environmental and planning legislation and guidelines (refer Chapter 4). The design takes into consideration the likely interactions between the ARRC and the existing and future site components and activities (ie Stage 1 and Stage 3 of the long-term vision for the subject property outlined in Section 1.1). The ARRC has been designed to be compatible with surrounding future Agribusiness land uses and its operations will not impact airport operations.

During the preparation of the EIS, the design of the ARRC has been refined in response to stakeholder feedback and the findings of the technical assessments. A key project refinement since the scoping phase of the project has been the decision to fully enclose the ARRC with all waste and recycled product now to be accepted, processed, stored and dispatched within a fully enclosed warehouse.

The ARRC layout is shown in Figure 2.1 and the AARC components summarised in Table 2.1. Detailed descriptions of the ARRC site components, proposed operations and proposed environmental controls to manage and mitigate potential environmental impacts are outlined for the respective site components as relevant. Interactions between the project and existing and future developments on the subject property are described in Section 2.7. Concept design drawings of the ARRC are contained in Appendix B. The ARRC site includes the site access road from Adams Road and the new internal road which borders the western boundary of the ARRC.



KEY

- Subject property
- ARRC site
- Indicative detailed layout

Proposed element

- Awning
- Carpark
- Hardstand
- ARRC access road
- Kerb/pedestrian area
- Landscaping
- Office over ground floor
- On-site detention
- ARRC warehouse
- Product bay
- Site office
- Ticketbooth
- Tool shed, workshop
- Unloading/processing
- Water management infrastructure, including treatment plant and storage
- Weighbridge

Product bays

1. Concrete/ rubble masonry
2. Clean timber
3. Rigid plastics
4. Paper/cardboard/film
5. Stumps/asphalt/metal
6. Heavy residual
7. Fines screened
8. Soil audit
9. Ferrous
10. Non-ferrous
11. Non-recyclables

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

0 50 100 m

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC002 DetailedDesign 20200719 06.mxd 22/07/2020

Project overview

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 2.1

EMM
creating opportunities

Table 2.1 Project overview

Aspect	Description
Site component	
Project application area	The project application area is the 'ARRC site' shown in Figure 1.1. Approximately 3 ha.
Access	The ARRC warehouse will be accessed from Adams Road. The site access road will be upgraded during construction of the ARRC if it has not previously been upgraded as part of re-activating the quarry.
ARRC site layout	The ARRC layout is shown in Figure 1.1.
ARRC warehouse	The ARRC warehouse will be approximately 13,230 m^2 in area and 16-m above ground level (AGL). All waste will be accepted, processed, stockpiled and dispatched within this enclosed warehouse. The warehouse will be metal-clad in a colour that will minimise reflectivity (see Appendix B).
Hardstand areas	All areas of the ARRC site external to the ARRC warehouse will be hardstand with the exception of small landscaped areas near the ARRC site office and along the site access road (see Appendix T). Hardstand areas will accommodate internal access roads, parking and required bushfire asset protection zones (APZs).
Weighbridges and wheelwash	There will be inbound and outbound weighbridges. A wheel wash will be installed in the vicinity of the outgoing weighbridge.
Site offices and amenities	There will be two offices, including amenities and lunchroom.
Water	Runoff from the warehouse roof will be collected in rainwater tanks for reuse for dust suppression, product processing and amenities. Stormwater from other external areas and overflow from rainwater tanks will drain to the onsite detention (OSD) in the south-eastern corner of the ARRC site. This OSD will be netted or have lines for flags across it to deter birds from utilising it. Runoff from within the ARRC warehouse will drain away from entry points and be transferred to the water treatment system for treatment and subsequent reuse on site. A pump-out septic system will be installed to manage wastewater from amenities prior to connection to wastewater services. Potable water will be transported by road to the site until the site is connected to mains water and then a combination of rainwater and mains water will be used.
Fire management	A fire suppression system will be installed in the ARRC warehouse. This will include a 2.6-ML fire water supply tank, a sprinkler system and a 2.6-ML underground fire water containment tank.
Utilities	Power supply: 1,000-kVA pad-mount kiosk substation with a high-voltage connection to the existing Endeavour Energy network.
Diesel	A 35,000 L self-bunded diesel tank will be located on the eastern side of the ARRC warehouse.
Lighting	Site lights will be installed that prevent light spill above the horizontal.
ARRC operations	
Annual waste acceptance	Up to 600,000 tpa.
Dispatch of recycled products	Up to approximately 540,000 tpa.
Non-recyclable residues	Non-recyclable residues will be dispatched to an offsite licensed waste facility or transferred to the quarry void (following approval of quarry rehabilitation activities).

Table 2.1 Project overview

Aspect	Description
Wastes accepted	Construction and demolition, and commercial and industrial, waste classified as general solid waste (non-putrescible) under the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014a) and tyres.
Wastes not accepted	The following wastes will not be accepted by the ARRC: • special waste (including clinical and related waste, asbestos waste, or anything classified as special waste under an EPA gazettal notice) as defined in EPA (2014a), with the exception of tyres, Step 1; • liquid waste as defined in EPA (2014a) Step 2; • general solid waste (putrescible) as defined in EPA (2014a) Step 3; • waste processing hazards as defined in EPA (2014a) Step 4; or • waste that requires chemical assessment to determine its classification as defined in EPA (2014a) Step 5.
Waste processing	Waste processing will include: • sorting of co-mingled waste; • concrete/masonry crushing; • timber and tyre shredding; and • soil washing. A future designated area is provided to allow for next generation innovation through collaboration with NSW Circular and the University of NSW (UNSW) Materials Sciences.
Waste/recycled product/non-recyclable residues storage	Waste recycled product and will be stored in designated product bays in the northern portion of the ARRC warehouse. Waste and recycled product will be stockpiled to a maximum height of 10 m. A total of up to 34,515 t of waste, recycled product non-recyclable residues will be stored onsite at any one time.
Operating hours	Up to 24 hours a day, 7 days per week.
Workforce	On-site (daytime): up to approximately 42 full time equivalent (FTE) employees. On-site (night-time): up to approximately 22 FTE employees. Off-site (sales): up to approximately 6 FTE employees. Transport: up to approximately 15–20 contractors will drive trucks dispatching recycled product/non-recyclable residues.
ARRC construction	
Construction duration	Approximately 18 months.
Construction hours	Construction of the ARRC will generally be carried out during standard construction hours as per the *Interim Construction Noise Guideline* (ICNG) (DECC 2009): • Monday to Friday: 7:00 am to 6:00 pm; • Saturday: 8:00 am to 1:00 pm; and • no work on Sundays or public holidays. Outside of these hours, some works will be carried as required (such as limited construction activities, environmental management such as dust control and delivery of oversized equipment). In these circumstances, works will be undertaken in accordance with the noise criteria for outside of recommended standard hours in the ICNG.
Construction workforce	Approximately 30 people will be employed during construction.

2.1 Site components

The project will involve the development of a fully enclosed waste acceptance, processing and storage warehouse and supporting ancillary facilities consisting of the following:

- Construction of:
  - sealed site access via Adams Road;
  - internal sealed roads;
  - hard surfacing for the warehouse floor and external areas;
  - a 13,230 m^2 metal clad warehouse, with a maximum elevation of 16 m
  - two site offices with the larger office (400 m^2) located in the outside parking area and the smaller office (140 m^2) located over the car parking area on the western side of the ARRC warehouse; and
  - surface water drainage system.
- Installing:
  - marked traffic and pedestrian areas;
  - approximately 47 parking spaces for staff and customers located to the west and north-west of the ARRC warehouse;
  - two weighbridges: an inbound and an outbound weighbridge;
  - two ticket booths, one for incoming and one for outgoing vehicles;
  - a wheel wash for outbound vehicles;
  - awnings attached to the warehouse at each warehouse entry/exit point;
  - separate underground tanks for firewater supply and containment, and a fire suppression system;
  - a stormwater management system including rainwater tanks and an onsite detention basin;
  - an on-site surface water management system consisting of a water treatment plant, onsite leachate and water detention areas;
  - an on-site wastewater management system comprising of a septic tank;
  - connection to services;
  - fencing and signage at the front of the site; and
  - landscaping.

The construction phase outlined above is expected to take around 18 months. Site components within the warehouse are described in further detail in Section 2.1.2.

2.1.1 Site access arrangements

All heavy and light vehicles associated with the ARRC will access and leave the site via Adams Road.

The subject property has a narrow frontage on Adams Road with a fenced access road connecting the bulk of the property to Adams Road (Photograph 1.3). This existing access road is unsealed. The applicants are seeking to upgrade the existing site access as part of the modification application to reactivate quarry operations. This includes minor widening (splaying) of the site access intersection and sealing of the access road to the quarry infrastructure area (refer Figure 1.4). In the event the approval or subsequent reactivation of quarry operations are delayed, the ARRC application seeks approval to carry out these upgrades along with the construction of an internal sealed road including stormwater drainage structures along the western side of the ARRC (Figure 2.1).

2.1.2 ARRC warehouse

All waste acceptance, processing, storage and dispatch will occur within the ARRC warehouse. The warehouse will have an area of 13,230 m^2 and an elevation maximum of 16 m above ground level (AGL) or up to approximately 80 mAHD. The ARRC warehouse will be enclosed on all sides with four doors providing vehicle access points. These access points will be fitted with awnings to shield light emissions from the ARRC and with misters to minimise dust emissions from the shed. Architectural renders of the warehouse are shown in Plate 2.1 and Plate 2.2. The ARRC warehouse will be separated into three main areas: receival; sorting; and storage/dispatch. The southern portion of the warehouse will accommodate the waste receival and sorting areas and will included a truck tipping and inspection area, and screening and sorting plant enabling sorting of material by hand and equipment. Waste acceptance and sorting procedures are discussed further in Section 2.2.4.

The northern portion of the ARRC warehouse will be used for storage and dispatch of recycled product and non-recyclable waste. The storage area will consist of 11 product bays for specific product/waste types. Further details of the stockpiles are provided in Table 2.7. Waste and product dispatch is discussed further in Section 2.2.4.

A skip bin storage area will be accommodated in the south-eastern corner of the processing shed. An adjoining area is also designated for future next generation innovation to allow for the applicants' collaboration with NSW Circular and the University of NSW (UNSW) Materials Sciences.

Details of how vehicles will access the shed and measures to minimise vehicle conflict are provided in Section 2.3.

Construction of the warehouse will require temporary crane construction activity to a maximum height of 100 mAHD. It is expected that construction of the ARRC will be completed prior to the start of the airport operations. Regardless, cranes used during construction will not infringe on the obstacle limitation surface (OLS) of the WSA. Airport safe-guarding is discussed in detail in Section 7.2.

Plate 2.1 **Indicative 3D render of ARRC view towards the east**

Plate 2.2 **Indicative 3D render of ARRC view to the north**

2.1.3 Hardstand and parking areas

All areas of the ARRC site, including all internal roads external to the ARRC warehouse will be hardstand, with the exception of small landscaped areas (refer to Section 2.1.6). Hardstand areas will accommodate internal access roads, parking and required bushfire asset protection zones (APZs).

Approximately 47 car spaces, including 1 disabled car space, to accommodate the predicted workforce and visitors for the ARRC will be accommodated around the site office and along the western edge of the ARRC shed. Parking has been designed to separate employee/visitor traffic from operational delivery/dispatch traffic with a separate light vehicle entry to the car parking areas to the south of the main entry to the ARRC.

2.1.4 Weighbridges, ticket booths and wheel wash

Two new weighbridges and ticket booths will be installed at the ARRC (Figure 2.1). An in-bound weighbridge and ticket booth will be situated to the north of the warehouse. An out-bound weighbridge and ticket booth will be situated to the south of the warehouse. Weighbridges will be monitored via video and loads will also be inspected by weighbridge personnel.

All internal roads and surfaces leading to and surrounding the weighbridges will be sealed. The exit weighbridge will be fitted with a self-contained wheel wash that will wash sediment from the wheels of outgoing vehicles prior to leaving the site. Sediment retained in the wheel wash will be removed as required and will be disposed at an appropriately licensed facility.

2.1.5 Site offices and amenity areas

The larger of the two offices will be constructed to the north-west of the ARRC warehouse. This will be the main office and amenity area and will include:

- reception area;
- site manager's office;
- video surveillance monitoring;
- break room; and
- site toilets.

A second smaller office with further site amenities will be located above the car parking area on the western side of the ARRC warehouse. Architectural renders of the site offices are shown in Plate 2.3 and Plate 2.4.

Plate 2.3 **Indicative 3D render ARRC office in foreground and ARRC warehouse**

Plate 2.4 **Indicative 3D render ARRC office on western side of ARRC warehouse**

2.1.6 Landscaping

The ARRC site will include approximately 1,000 m^2 of landscaping surrounding the main office to the north-west of the ARRC warehouse, between the parking area to the west of the ARRC warehouse and internal road and surrounding the water management system to the south-east of the warehouse. A landscape plan is provided in Appendix T. Landscaping detailed design will be in accordance with the Liverpool City Council Development Control Plan (Liverpool DCP), Draft Western Sydney Aerotropolis (draft Aerotropolis DCP) and in consultation with the WSA to ensure appropriate landscaping design which incorporates green space while minimising the potential to attract wildlife and birds (refer to Appendix T).

2.1.7 Water management

i Operational water management system

The water management system will be separated into two major water management areas:

- the warehouse area, containing all site activities where waste material is stockpiled, processed and handled and water has the potential to come into contact with waste (or recycled products/non-recyclable residue) or on hardstand that is used to store waste (or recycled products/non-recyclable residue); and
- the stormwater management area, comprising the balance of the ARRC site, including runoff from the warehouse roof.

The on-site water management system will consist of the following components:

- drains to capture all water from operational areas;
- water treatment plant and reuse water tanks located to the south of the ARRC warehouse;
- rainwater tanks; and
- stormwater onsite detention storage in the south-eastern part of the ARRC site.

The stormwater system has been designed for a 100-year average recurrence interval (ARI) event.

The ARRC will use rainfall runoff from the warehouse roof for dust suppression and product processing as far as possible.

ii Wastewater management

A trunk sewer servicing the subject property is expected to be installed by Sydney Water in about 2026 (refer to Appendix S). The ARRC will be connected to this sewer.

A sewage treatment plant (STP), with a pump out septic tank, will be installed in the vicinity of the site office for use by the ARRC prior to the connection of the property to the truck sewer (Appendix S).

2.1.8 Fire management

The ARRC fire protection system will include:

- a ring main of attack hydrants along the access road that surrounds the building;
- a high-hazard sprinkler system will be throughout the ARRC warehouse;
- fire hydrants;
- fire extinguishers;
- fire hose reels;
- a water deluge system in the diesel storage area;
- a 2.6-ML underground firefighting water supply tank;
- the ability to use mains water (once connected) and water from the onsite firefighting water supply tank;
- a dedicated pump room with diesel and electric duty/standby pumps;
- a booster assembly adjacent to the vehicle turning area to provide more than adequate hardstand space for fire-fighting appliances and additional equipment as required;
- a kerb around the base of the warehouse to contain fire water;
- a 2.6-ML underground fire water containment tank;
- smoke alarms; and
- fire blankets.

A conceptual fire services site plan is provided in Appendix D of the Site Servicing Strategy (Appendix S). Fire safety design will be finalised as part of the detailed design process in accordance with National Construction Code provisions, *Planning for Bushfire Protection* (PBP) (NSW RFS 2006 and 2018) and *FRNSW's Fire Safety Guideline – Fire Safety in Waste Facilities* (FRNSW 2020). This will include the preparation of an emergency and evacuation plan.

The fire hydrant system and minimum water supply capabilities will be designed to meet the ARRC's largest stockpile fire load (see Section 2.2.3).

There will be 7–12 m-wide APZs maintained between the riparian corridor of Oaky Creek and the eastern wall of the ARRC warehouse (refer to Section 6.4.1).

Fire and Rescue NSW will be consulted further during the detailed design of the fire protection strategy and complete the design accordingly.

2.1.9 Utilities

i Potable water

A water main servicing the subject property is expected to be installed by Sydney Water in about 2022 (Appendix S). The ARRC will be connected to the water main when it is available (refer to Section 7.13.2).

Prior to connection of the site to mains water, potable water will be trucked to the ARRC site. This will require the site's 100-kL potable water tank to be refilled weekly (refer to Section 7.13.2).

ii Power supply

There is existing aerial high-voltage and low-voltage cabling along Adams Road. The subject property is currently supplied from the aerial low-voltage network via a pole mounted transformer. For the ARRC, a new 1,000-kVa pad-mount kiosk substation will be required to be connected to the existing high-voltage feed along Adams Road (refer to Section 7.13.3).

Existing energy provisions to the site and required upgrades are outlined in the Servicing Strategy Report (refer Appendix S).

Endeavour Energy has currently have plans for two new zone substations in the area, one adjacent to the airport and another approximately 2 km away along Elizabeth Drive.

2.1.10 Diesel tank and hazardous goods storage

A 35,000-L diesel tank will be installed on the eastern wall of the ARRC warehouse. The tank will be contained within a bund with a capacity of 10% more than the tank's capacity. Plant and vehicles will be filled from a bowser located next to the diesel tank. When refuelling, vehicles will be parked within a bunded area drained to a sump with a trap. The refuelling area will have a diesel spill kit handy. Diesel spill kits will also be stored at other key locations within the ARRC warehouse for emergency spill response. Any used absorbent material will be disposed of at an appropriately licensed waste facility and fresh material replaced in the spill kit.

Small quantities of hazardous goods, generally fuels, oils and grease for onsite plant, will be stored in a designated bunded area in accordance with the relevant Australian Standards(refer to Section 6.3).

2.2 ARRC operations

2.2.1 Waste materials accepted

The materials accepted by waste facilities are restricted to the specified waste types approved by the development consent for the facility and by the site's EPL.

The ARRC will accept general solid waste (non-putrescible) as defined in the *NSW Protection of the Environment Operations Act 1997* (POAO Act) and the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014a) summarised below (further details of specific waste types are provided in Table 2.2 and Table 2.3):

- mixed waste (recyclable) – including building and demolition waste, soils, excavated materials, fines and construction spoils;
- mixed waste (non-recyclable) – including a mixture of general solid waste;
- building and demolition waste – including bricks, concrete, paper, plastics, glass, metal and treated and untreated timber;

- vegetation waste – including garden waste, wood waste and non-putrescible vegetative waste;
- timber and wood waste – including wood associated with manufacturing of timbers and timber products, both treated and untreated, and timbers emanating from building and demolition waste;
- metals – including metals from building and demolition waste;
- cardboard – including paper and cardboard;
- asphalts – including asphalt resulting from road construction and water proofing works; and
- excavated natural materials.

The waste types that will be accepted to the ARRC site are generally pre-classified according to the *Waste Classification Guidelines Part 1: Classifying waste* (EPA 2014a) (the guidelines) as provided in Table 2.3.

Table 2.2 Pre-classified 'General solid waste (non-putrescible)' as defined by the guidelines

General solid waste (non-putrescible)
The following wastes (other than special waste, liquid waste, hazardous waste, restricted solid waste or general solid waste (putrescible) are pre-classified as 'general solid waste (non-putrescible)':
glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal;
paper or cardboard;
household waste from municipal clean-up that does not contain food waste;
waste collected by, or on behalf of, local councils from street sweepings;
grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids;
grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids;
garden waste;
wood waste;
waste contaminated with lead (including lead paint waste) from residential premises or educational or childcare institutions;
containers, previously containing dangerous goods, from which residues have been removed by washing [the cleaning method must be as good as or better than the triple-rinsed method outlined in Appendix 2 of EPA (2014b)] or vacuuming;
drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids;
drained motor oil containers that do not contain free liquids;
non-putrescible vegetative waste from agriculture, silviculture or horticulture;
building cavity dust waste removed from residential premises or education or childcare institutions, being waste that is packaged securely to prevent dust emissions and direct contact;
synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste;
building and demolition waste;
asphalt waste (including asphalt resulting from road construction and waterproofing works);
cured and uncured concrete waste from a batch plant;

Table 2.2 Pre-classified 'General solid waste (non-putrescible)' as defined by the guidelines

General solid waste (non-putrescible)
fully cured and dried residues of resins, glues, paints, coating and links; and
any mixtures of the wastes referred to above.
In assessing whether waste has been pre-classified as general solid waste (non-putrescible, the following definitions apply:
Building and demolition waste
This is the unsegregated material (other than material containing asbestos waste or liquid waste) that results from:
the demolition, erection, construction, refurbishment or alteration of buildings other than:
- chemical works;
- mineral processing works;
- container reconditioning works; and
- waste treatment facilities;
the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports;
And includes material such as:
bricks, concrete, paper, plastics, glass and metal; and
timber, including unsegregated timber that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP);
but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).
Garden waste
Garden waste includes waste that consists of branches, grass, leaves, plants, loppings, tree trunks, tree stumps and similar materials, and includes any mixture of those materials.
Wood waste
Wood waste includes sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials but does not include wood treated with chemicals such as CCA, HTC, PEC and LOSP.
Virgin excavated natural material
Virgin excavated natural material means natural material (such as clay, gravel, sand, soil or rock fines):
that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities;
that does not contain sulfidic ores or soils, or any other waste; and
includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

Definitions of waste types that are to be accepted at the ARRC but are not pre-classified according to the guidelines are provided in Table 2.3.

Table 2.3 Waste types not pre-classified by the guidelines

Waste types	Note
Asphalt waste	Asphalt waste is not specifically included in the building and demolition waste type, but it is a pre-classified waste. It is very likely to form parts of loads from infrastructure construction and/or demolition projects. Inclusion will also allow acceptance of minor quantities of asphalt likely to be included in sweepings or other tertiary sources.
Cement fibre (no asbestos)	Cement fibre is a type of reinforced cement sheeting used commonly in internal and external applications. No asbestos containing materials will be accepted. Cement fibre is likely to be included in buildings and demolition waste. It may also be accepted from individuals and businesses that are undertaking minor clean-up works not associated with buildings and demolition.
Concrete waste from a batch plant	Cured or hardened concrete is concrete that is generally 'left over' from a concrete pour or otherwise unused at a concrete batching plant. It is useful for crushing as a form of aggregate. As with all waste on site, it will be handled and stored within the enclosed building and not exposed to rainfall. Concrete wash water and liquid wash-out will not be accepted by the ARRC.
Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal	This is a pre-classified waste type. With the exception of rubber, plasterboard and ceramics, these are explicitly permitted in the building and demolition waste type. We understand that the building and demolition waste type permits acceptance of these common types of waste associated with demolition of buildings (eg tiles, plasterboards and fittings). Inclusion allows for uniform handling and acceptance of comingled building and demolition and non-building and demolition loads.
Rail ballast	Rail ballast is a common material sourced from infrastructure projects and may be re-used for rail or road infrastructure.
Soils that meet the CT1 thresholds as per the Waste Guidelines	Building and demolition projects are very likely to include soils from around the building or demolition site, through the building and demolition waste type specifically excludes excavated soils. The guideline's CT1 thresholds identify the requirements for 'general solid waste' and measure contaminants in the order of milligram per kilogram of material and are commonly referred to in EPLs to aid in the definition of waste type. Given the need to be able to accept soils at the ARRC, CT1 thresholds are a reasonable standard for defining the waste type.
Treated and untreated timber	The pre-classified waste 'wood waste' does not allow for the acceptance of wood treated with chemicals. The building and demolition waste definition for timber includes timber treated with chemicals associated with preserving outdoor wood applications, such as outdoor tables. Inclusions of this as a separate line item will allow for simpler handling and acceptance of waste and allow for non-building and demolition deliveries to be treated the same as building and demolition deliveries.
Waste tyres	Waste tyres (including casings, seconds, shredded tyres or tyre pieces) are classed as a "special waste" under the Waste Classification Guidelines (EPA 2014a). However, the EPA has issued a resource exemption (EPA 2014b) to allow for tyres to be applied to land for use in civil engineering structures and road making activities. Waste tyres accepted at the ARRC will meet all chemical and other material requirements for recovered tyres as required under the recovered tyres order (EPA 2014c).

2.2.2 Waste materials that will not be accepted

The following waste will not be accepted:

- special waste (including clinical and related waste, asbestos waste, or anything classified as special waste under an EPA gazettal notice), with the exception of waste tyres meeting the recovered tyres order (EPA 2014b), as defined in EPA (2014a) Step 1;
- liquid waste as defined in EPA (2014a) Step 2;
- general solid waste (putrescible) as defined in EPA (2014a) Step 3;
- waste processing hazards as defined in EPA (2014a) Step 4; or
- waste that requires chemical assessment to determine its classification as defined in EPA (2014a) Step 5.

No odorous waste will be accepted by the ARRC. Vegetation waste will not be allowed to compost on site.

All incoming loads will be inspected at the incoming weighbridge and again at the unloading and processing area within the warehouse, as per the *Standards for Managing Construction Waste in NSW* (EPA 2019) and best practices. Any deliveries suspected of including waste that cannot be accepted by the ARRC (including asbestos containing material (ACM)) will be rejected, reloaded (if the waste has been tipped) and the load sent off the site. If despite these precautions, any suspected ACM (eg a small fragment of asbestos sheeting) that is found will be bagged appropriately and placed in a covered bin clearly labelled 'asbestos'. These materials will be removed from the site by a contractor licensed to transport these materials as soon as there is sufficient material to make up a small load.

The careful and appropriate handling of ACM is a part of the applicants' workplace health and safety (WHS) responsibilities. All ACM will be handled and stored in accordance with WHS procedures. The waste inspection measures employed therefore protect the employees as well as the surrounding environment.

It is also in the applicants' commercial interest that no contaminated waste is accepted onto the site given the high rates charged for it to be removed and disposed in a facility licensed to accept contaminated material.

2.2.3 Waste quantities

The ARRC will accept a mixture of general solid waste (non-putrescible) (see Section 2.2.1). This will be generally comingled loads but some segregated loads are expected, particularly of excavated materials.

It is anticipated that waste will be sourced from:

- bulk waste transfer from other facilities within the KLF group and other recycling facilities that do not have the ability to recycle to level that will be achieved by the ARRC (about 150,000–200,000 tpa);
- waste from construction, industrial and commercial sites logistically close to the facility as described in Section 3.6 (about 100,000–200,000 tpa); and
- bulk general solid waste/excavated materials from projects logistically close to the facility (about 100,000–200,000 tpa).

The average and estimated maximum amount of waste that will be accepted and processed by the ARRC is provided in Table 2.4.

Table 2.4 Facility throughput

Period	Facility throughput (tonnes)	
	Average	Maximum
Annual	<600,000	<600,000
Weekly	11,540	16,660
Daily	1,650	2,380

The proportions of each waste type received will be variable according to the source of the waste. Estimated incoming waste types are provided in Table 2.5.

Table 2.5 Estimated incoming waste types

Waste type	Primary general solid waste (non-putrescibles) waste classification types	Estimated maximum tonnes per day (t)	Estimated % of overall waste
Mixed waste (recyclable)	Building and demolition waste, soils, excavated materials, fines and construction spoils	1,071	45
Mixed waste (non-recyclable)	A mixture of general solid waste	357	15
Building and demolition waste	Including bricks, concrete, paper, plastics, glass, metal and treated and untreated timber	357	15
Vegetation waste	Including Garden waste, wood waste and non-putrescible vegetative waste	48	2
Timber and wood waste	Including Wood associated with manufacturing of timbers and timber products, both treated and untreated, and timbers emanating from building and demolition waste	95	4
Metals	Including metals from building and demolition waste	48	2
Cardboard	Including paper and cardboard	24	1
Asphalts	Including asphalt resulting from road construction and water proofing works	24	1
Excavated natural materials	Excavated natural materials	357	15

2.2.4 Waste recycling steps

The waste flowchart provided in Figure 2.2 outlines the processes that occur at the ARRC site through the following operational stages described in the following sections:

- delivery;
- waste acceptance/rejection;
- sorting/stockpiling;
- processing;
- stockpiling in product bays; and
- dispatch.

i Waste delivery, acceptance and rejection

The ARRC will accept waste from councils, contractors, businesses and the general public. Accordingly, waste will be delivered to site by a variety of vehicles including:

- light vehicles such as cars with box trailers and utilities;
- single, dual and triple axle 'rigid' heavy vehicles such as skip-bin trucks; and
- multiple axle combination heavy vehicles, including truck and dog and B-doubles.

Vehicle movements associated with the ARRC are described in Section 2.3 and the traffic impact assessment (TIA) provided in Appendix L. A swept path analysis for a 26-m articulated truck (the largest vehicle to be permitted on site) demonstrating internal manoeuvrability is provided in Appendix D of the TIA.

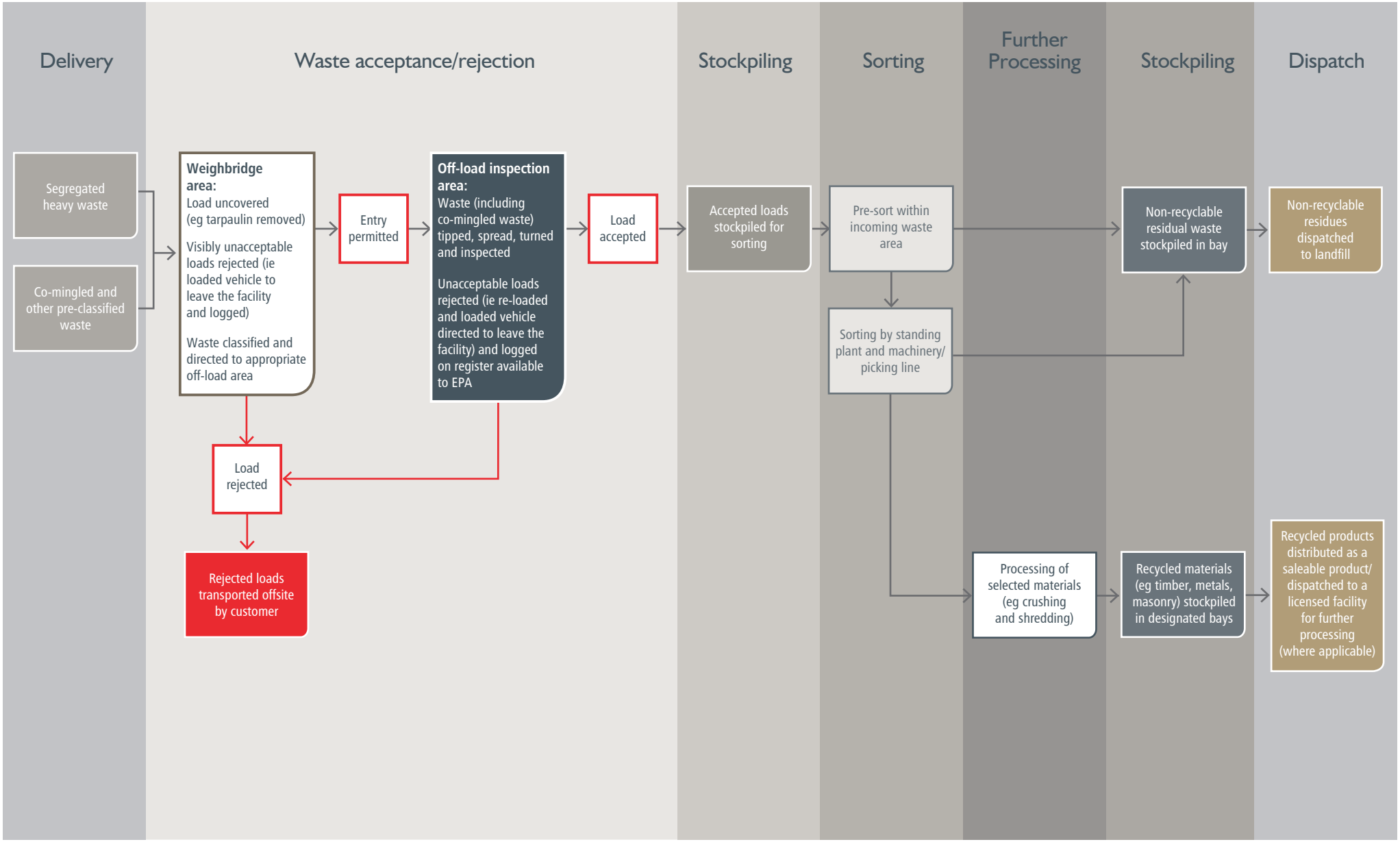
Vehicles delivering waste will be directed to the incoming weighbridge where the load will be inspected for potential contaminants via video and in person in accordance with the incoming waste management plan (see below). Loads will be issued a ticket at the ticket booth and the driver will be instructed where to deliver the waste within the warehouse. The driver will then deliver the waste to the appropriate area where it will be tipped, spread, turned over, and inspected for a second time prior to the waste being formally accepted and the empty vehicle being directed to the exit.

Heavy vehicles with comingled waste will be directed to the unloading/processing area, with segregated loads directed to the appropriate stockpile area. Light vehicles will be directed to the designated hand unloading area.

The unloading/processing area will be segregated into light vehicle hand unloading area and heavy vehicle tipping area which will be managed by a traffic controller. The total unloading area is about 25 m by 40 m, leaving ample room for this segregation. The areas will be clearly marked.

Access and safety arrangements for the unloading/processing area will be formalised in a traffic management plan.

Any incoming waste loads that are suspected to contain contaminants (ie loads that contain wastes that are not listed in Table 2.2 and Table 2.3) will be rejected, reloaded (if it has been tipped off) and the customer will be required to take the contaminated load out of the ARRC immediately.



EMM
creating opportunities

Waste flowchart
Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 2.2

a Incoming waste plan

An incoming waste plan will be prepared in accordance with the EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019) once approval for the proposed ARRC development is granted. The incoming waste plan will be part of the environmental management plan prepared following ARRC approval.

Incoming waste will be inspected in two stages:

1. a preliminary inspection of the incoming waste on the vehicle at the weighbridge; and
2. an inspection of the incoming waste after it is unloaded, spread, and turned over but before it is added to the appropriate feed stockpile. The customer will be required to wait until the waste load has passed the inspection.

As previously noted, any incoming waste loads that are suspected to contain contaminants will be rejected and the customer will be required to take the contaminated load out of the ARRC immediately. Among other details (see below), vehicle number plates will be recorded in a 'rejected load' register.

All other construction waste will not be dispatched from the ARRC unless it has been inspected, sorted, and stored in accordance with the EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019), and the load of waste to be transported consists of a listed waste type or waste that meets the requirements of a resource recovery order of the recovered fines specifications.

The incoming waste quality plan will include:

- prevention actions such as:
  - 'no asbestos' clause in supplier contracts, advising suppliers that ACM will not be accepted;
  - installing warning signage;
  - employees will be required to have successfully completed an accredited asbestos awareness course;
  - prior to beginning work, employees will undertake training on:
    - the requirements of the POEO Act and its regulations applicable to the ARRC;
    - the requirements of the EPL for the ARRC, with reference to the waste conditions and wastes permitted to be received by the facility; and
    - the requirements of the EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019).
  - education programs at material source locations to minimise the risk of ACM entering the supply chain and being imported onto the premises.
- contingency actions if suspected ACMs are identified, including a rejected load register and reporting to the EPA; and
- empowering waste inspectors to reject loads considered 'suspect' or odorous.

Information on rejected loads (date, time, vehicle registration number and customer name) will be entered into the loads register will be available for EPA inspection.

The ARRC will charge a re-loading fee to customers that tip waste that is found to contain any materials that the facility is not licensed to accept (eg putrescibles, hazardous, liquid and odorous waste).

The incoming waste quality plan will also include the requirement of employees to carry out regular inspections, including:

- inspections of waste storage labelling;
- inspection of waste stockpiles to ensure the waste is labelled correctly, and that it is not contaminated with any other type of waste; and
- recording observations, such as incidents of waste stored in the wrong area, and including the date, time, and the name and role of the trained personnel carrying out the inspection.

A review of the proposed incoming waste plan compared to the EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019) is provided in Table 2.5.

Table 2.6 EPA's Standards for Managing Construction Waste in NSW

Requirement	AARC operations – incoming waste plan and proposed waste recycling steps
Standard 1: Inspection requirements	
1.1 Inspection point 1 – verified weighbridge inspection	A preliminary inspection of the incoming waste on the vehicle at the weighbridge (refer Section 2.2.4i).
1.2 Inspection point 2 – tip and spread inspection area	An inspection of the incoming waste after it is unloaded, spread, and turned over but before it is added to the appropriate feed stockpile (refer Section 2.2.4i). The customer will be required to wait until the waste load has passed the inspection.
1.3 Training requirements for personnel	Prior to beginning work, employees will be required to successfully completed an accredited asbestos awareness course and demonstrate an understanding of: • the requirements of the POEO Act and its regulations applicable to the ARRC; • the requirements of the EPL for the ARRC, with reference to the waste conditions and wastes permitted to be received by the facility; and • the requirements of the EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019). Waste inspectors will be empowered to reject loads suspected of containing waste that cannot be accepted by the site (eg asbestos containing material) or that is odorous.
1.4 Rejected loads register	Any incoming waste loads that are suspected to contain contaminants will be rejected and the customer will be required to take the contaminated load out of the ARRC immediately. Among other details, vehicle number plates will be recorded in a 'rejected load' register (refer Section 2.2.4i).
Standard 2: Sorting requirements	
2.1 Sorting	Co-mingled and other pre-classified waste will be directed to the unloading and processing area within the warehouse so that the materials can be spread, inspected, and manually unloaded safely in an area away from trucks, heavy machinery and mobile plant (refer Section 2.2.4ii). Segregated loads will be directed to the appropriate dedicated product bay area.

Table 2.6 EPA's Standards for Managing Construction Waste in NSW

Requirement	AARC operations – incoming waste plan and proposed waste recycling steps
Standard 3: No mixing of waste	
3.1 No mixing of inspected and sorted construction waste with waste that has not been inspected and sorted	Waste requiring sorting will be sorted by screen and/or hand-picking line. Inspected or sorted construction waste will not be mixed with waste that has not yet been inspected or sorted. Screening will be performed by a range of screening and separating equipment, utilising the latest technology and innovation in the overall plant design. Sorted/screened waste will be either transported to product bays via front end loader or conveyor or if requiring further processing, stockpiled in intermediate stockpiles in the sorting or processing area.
Standard 4: Waste storage requirements	
4.1 Waste storage area	Material processed in the warehouse will be stockpiled in segregated product bays or temporary stockpile areas prior to dispatch. Generally, stockpiles will be: • waste stockpiles (ie truck tipping area and hand unloading area); • product stockpiles; • intermediate stockpiles; or • non-recyclable residues stockpiles. Intermediate stockpiles formed during sorting and transfer will be stockpiled in the unloading and processing area or within bins beneath processing equipment.
4.2 Inspection point 3 – waste storage area	Employees will carry out regular inspections, including: • inspection of waste storage labelling; • inspection of waste stockpiles to ensure the waste is labelled correctly, and that it is not contaminated with any other type of waste; and • recording observations, such as incidents of waste stored in the wrong area, and including the date, time, and the name and role of the trained personnel carrying out the inspection.
Standard 5: Transport requirements	
5.1 Transport requirements	Construction waste will not be transported from the ARRC unless it has been inspected, sorted, and stored in accordance with the EPA's Standards for Managing Construction Waste in NSW (EPA 2019), or it has been rejected from the facility upon initial inspection. The load of waste to be transported is to consist of a listed waste type or waste that meets the requirements of a resource recovery order of the recovered fines specifications.

ii Waste stockpiling and sorting

Co-mingled and other pre-classified waste will be directed to the unloading and processing area within the warehouse so that the materials can be spread, inspected and manually unloaded safely in an area away from trucks, heavy machinery and mobile plant. Segregated loads will be directed to the appropriate dedicated product bay area.

The incoming feedstock material will generally be stored in a large stockpile segregated from product stockpiles. The product bays will have 10-m tall steel or concrete walls on three sides. There will a roadway at least 10-m wide in front of each product bay so bays containing flammable material will be separated by a wall or a space of at least 10 m.

Waste and recycled product will be stockpiled to a maximum height of 10 m.

Waste requiring sorting will be sorted by screen and/or hand-picking line. Inspected or sorted construction waste will not be mixed with waste that has not yet been inspected or sorted. Screening will be performed by a range of screening and separating equipment, utilising the latest technology and innovation in the overall plant design. The applicants pride themselves on engaging the appropriate consultants and suppliers that will offer latest cutting-edge waste processing plant and equipment. Sorted/screened waste will be either transported to product bays via front end loader or conveyor or if requiring further processing, stockpiled in intermediate stockpiles in the sorting or processing area. The plant designers have also been provided a design brief to 'future proof' the plant design. This includes the ability to incorporate robotics and other new automation processes to the overall sorting/screening process.

A preliminary flow chart describing the technology and general material process flow within the ARRC is outlined in Figure 2.3. The key elements of the technology proposed in the ARRC comprise:

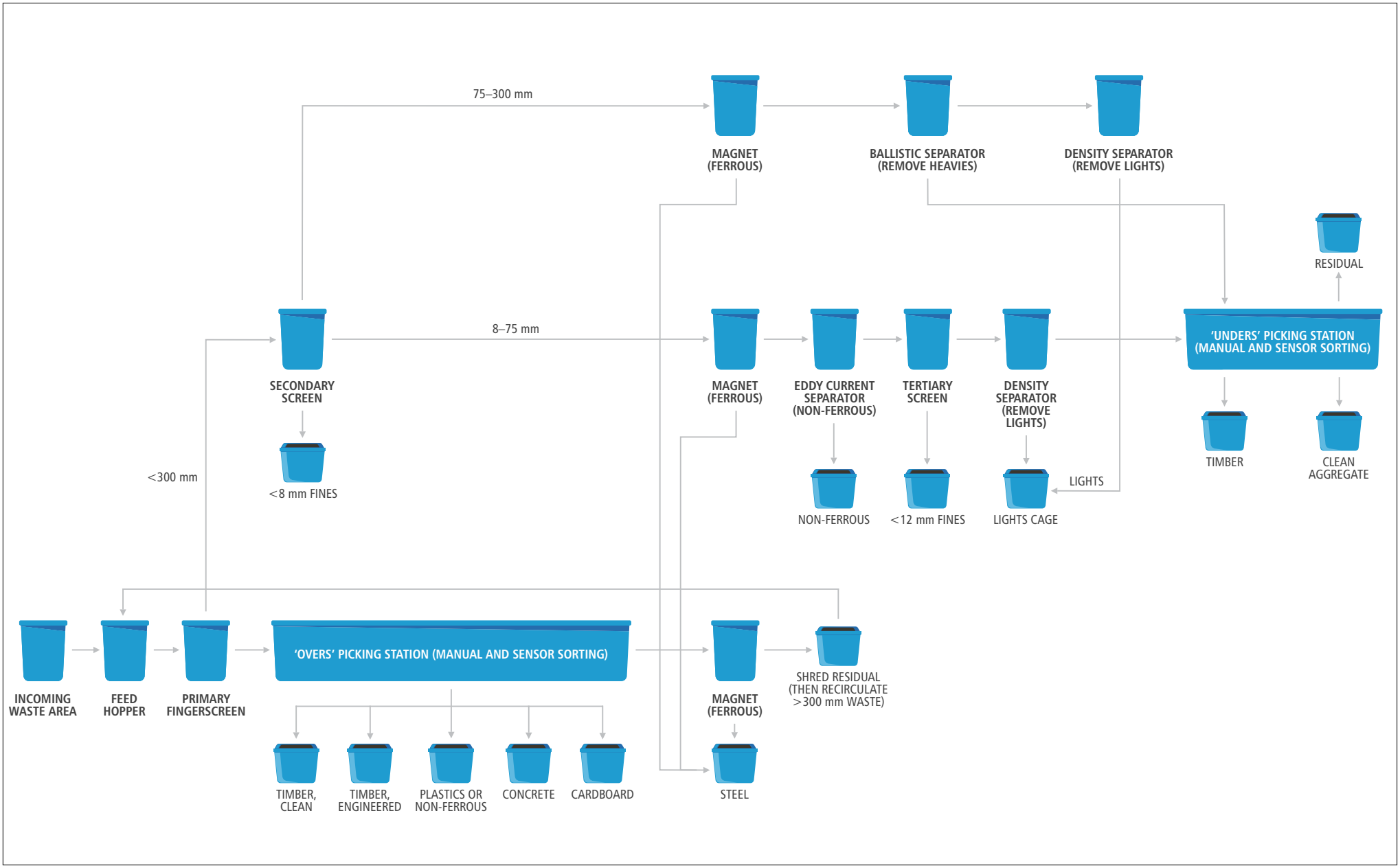
- Pre-sort: prior to mechanical separation and sorting, a pre-sorting in the incoming waste area will enable effective management of incoming construction waste, isolating and reloading contaminated loads immediately.
- Primary finger-screen: primary screening of waste into two preliminary size fractions for subsequent processing.
- Secondary and tertiary screens: subsequent screening using vibratory equipment to divide the waste stream into size fractions and more easily processed waste streams, enabling further processing and sorting based upon weight, shape and density.
- Ferrous and non-ferrous separator: large industrial electromagnets and eddy current separators to mechanically separate all ferrous and non-ferrous metals.
- Density separators: a combination of air-belt style and vibratory air-knife systems to remove light weight waste such as paper and light plastics, recovering cleaner concrete, aggregate and timber streams.
- Ballistic separation: screening out large and fine waste with mid fraction material processed by sorting material according to shape. Three-dimensional materials, such as bricks or hard plastics, will be separated from two-dimensional materials such as gyprock or sheets. This will provide consistently shaped material categories suitable for final sensor sorting and quality control.
- Shredding: larger fraction materials and complex waste items, such as furniture, will be shredded to enable increased material recovery, mechanisation of sorting and efficient transportation of recovered materials.

- Sensor sorting: a near infra-red or x-ray sorting sensor prior to final quality control of finished recycling materials will enable a high efficiency recovery of recyclable streams.
- Manual sorting: following mechanisation and automated separation, final quality control will be achieved through manual labour pickers on the key recyclable lines.
- Robotic sorting: the processing plant would be designed to enable future provisions for robotic sensor sorting.

iii Further processing of waste

The concept design, process, and advanced technology currently proposed for the Luddenham ARRC will comprise of plant and equipment designed to efficiently process and separate mixed building and demolition waste in accordance with EPA's *Standards for Managing Construction Waste in NSW* (EPA 2019). The AARC will have the capability to process more than 100 tonnes of mixed building and demolition waste per hour, recovering and recycling upwards of 90% (by weight) of the total waste processed through the plant.

Preliminary input rates and assumed recovery rates, utilising the proposed plant and equipment, have determined the 90% recovery rate for a range of materials, including fines, stone and concrete, clean timber, engineered timber, rigid plastics, light fraction, ferrous, non-ferrous, and mid-heavy residuals. The high recovery rate assumes that fines are recoverable and are not going to landfill, as these make up a large portion of the total preliminary input rates. However, it is the intention of the design of the ARRC to be able to process a wide range of material types and sizes, including the fines.



Material process flow chart

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement

Figure 2.3

EMM
creating opportunities

iv Waste and product storage

Material processed in the warehouse will be stockpiled in segregated product bays or temporary stockpile areas prior to dispatch. Generally, stockpiles will be:

- waste stockpiles (ie truck tipping area and hand unloading area);
- product stockpiles;
- intermediate stockpiles; or
- non-recyclable residues stockpiles.

The permanent locations of waste and product stockpiles are shown in Figure 2.1.

There may also be intermediate stockpiles formed during sorting and transfer, these will be stockpiled in the unloading and processing area or within bins beneath processing equipment.

The maximum amounts of waste that will be stored on site at any one time and the corresponding maximum stockpile volumes are provided in Table 2.4.

Table 2.7 Stockpile size by type

Stockpile	Primary general solid waste (non-putrescibles) waste classification types	Stockpile area (m^2)	Likely indicative stockpile mass (t)
Waste delivery area			
Unloading/processing area/processing feedstock	Mixture of general solid waste (non-putrescible)	1,100	9,900
Recycled product /non-recyclable residue bays			
Concrete/rubble/masonry	Building and demolition waste and associated materials from non-building and demolition activities (eg bricks, concrete and similar materials)	500	5,250
Clean timber*	Untreated timber, wood	450	850
Rigid plastics*	Plastics	220	1,160
Paper/cardboard/film*	Paper or Cardboard	210	160
VENM	VENM	330	4,460
Heavy residual	Building and demolition waste	260	2,730
Fines screened	Recovered fines	500	5,250
Soil audit	Recovered fines	170	1785
Ferrous metals	Building and demolition waste metals	50	750
Non-ferrous metals	Building and demolition waste metals	50	750
Tyres*	Tyres (resource exemption)	20	180
Non-recyclables*	Mixture of general solid waste (non-putrescible)	100	190
Intermediate bays			

Table 2.7 Stockpile size by type

Stockpile	Primary general solid waste (non-putrescibles) waste classification types	Stockpile area (m^2)	Likely indicative stockpile mass (t)
Concrete/rubble/masonry plant bay	Building and demolition waste and associated materials from non-building and demolition activities (eg bricks, concrete and similar materials)	70	350
Fines screened plant bay	Recovered fines	70	350
Clean timber plant bay*	Untreated timber, wood	70	60
Ferrous metals plant bay	Building and demolition waste metals	25	170
Non-ferrous metals plant bay	Building and demolition waste metals	25	170
Total			**34,515**

* Flammable.

The following stockpiles will contain flammable material:

- clean timber;
- rigid plastics;
- paper/cardboard/film;
- tyres;
- non-recyclables; and
- clean timber in plant bay.

While incoming comingled waste will contain all of these materials, the flammable materials in the waste delivery area will generally be mingled with far larger quantities of non-flammable materials and is unlikely to catch fire. The maximum aggregate quantity of segregated flammable waste stored in product bays at the ARRC will be 2,600 t.

v Advanced waste recycling technologies

Opportunities for research and development into new technologies and processes will arises from the applicant's collaboration with NSW Circular and UNSW Material Sciences to drive best practices in the waste recycling industry, drawing ideas and inspiration from innovations worldwide.

2.2.5 Non-recyclable residues

Some waste (generally between 10% to 20% by mass of the ARRC's total throughput) will not be able to be economically recycled (referred to as 'non-recyclable residues'). Non-recyclable residues will either be dispatched to an offsite licensed waste facility or to the adjacent quarry void (following approval of quarry rehabilitation activities).

2.2.6 Waste tracking

KLF uses an Australian-developed integrated software package for the management of its facilities. This system tracks waste sources, receivals, waste and products held on the site, product and non-recyclable residue dispatch and destinations, customer details and manages a range of operational and financial matters. This software, or an equivalent, will be used at the ARRC.

2.3 Vehicles

Light and heavy vehicles delivering waste will travel to the inbound weighbridge and ticket booth, and subsequently enter the warehouse using the entry on the eastern side of the warehouse. Warehouse entry/exit points have been designed in consultation with a traffic engineer to be able to accommodate light and heavy vehicles.

Vehicles delivering waste will proceed along one of the two 10 m-wide internal traffic paths, travelling:

- south – to the unloading/processing area, and then exiting the warehouse at the south entry/exit point which leads to the outbound weighbridge, wheel wash and ticket booth; or
- west – to tip directly in front of the appropriate product bay and exit the warehouse at the western entrance/exit point. Where the empty weight of the vehicle has not been previously recorded (based on its number plate), it may need to exit the warehouse and travel around the ARRC to the outbound weighbridge.

Heavy vehicles dispatching waste will be loaded by a front-end loader adjacent to the product bay and exit the warehouse at the western entrance/exit point. The vehicle may need to travel around the ARRC to the outbound weighbridge. A greater portion of outgoing vehicles will have to travel around the ARRC to be weighed compared to inbound vehicles. However, there will be far less incoming vehicles dispatching waste than outbound vehicles delivering waste.

The number of vehicle movements associated with the ARRC will vary daily. While, the ARRC will operate 7 days/ week (365 days/year), the traffic impact assessment (Appendix L) is based on the assumption that the ARRC will accept, process and dispatch 600,000 tonnes of waste annually over 5 days/week. This provides the following conservative estimate of daily traffic movements:

- approximately 514 vehicles (a wide range of vehicles, with an average load of 4.4 t) delivering waste (1,082 vehicle movements);
- approximately 71 heavy vehicles trucks (generally truck and dog trucks and B-doubles, with an average load of 33.5 t) dispatching products and waste (142 movements);
- approximately 64 light vehicles (128 light vehicle movements) associated with employees and visitors; and
- a total of 1,368 vehicle movements per day to and from the ARRC site.

As described in Section 7.6.6, Adams Road between the subject property and the Adams Road/Elizabeth Drive intersection, will be upgraded as part of the proposed development so that the pavement is suitable for use by large trucks, up to B-doubles, and so that the lane and shoulder widths meet Ausroads Guidelines. These upgrades will be completed prior to the start of ARRC operations.

Until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using the northern section of Adams Road. Adams Road south of the subject property will not be used by ARRC-related vehicles that are heavier than 3 tonnes prior to the load limit on this section of road being lifted.

2.4 Operating hours

Approval is sought to operate the ARRC up to 24 hours, 7 days per week, with 24-hours operations commencing as soon as commercially viable.

Processing operations are anticipated to occur over two eight-hour shifts with indicative shift times being 7.00 am to 4.00 pm and 8.00 pm to 4.00 am.

CPG/KLF are applying for 24 hour opening hours to allow the ARRC to accept waste from the large civil construction projects in the Western Sydney Aerotropolis (the Aerotropolis) and in wider Western Sydney.

The 24-hour operations will allow large infrastructure projects, which typically produce waste in the evening and overnight, to deliver waste to the facility without stockpiling at the source. Public infrastructure projects, such as road and rail construction and maintenance, are commonly scheduled during these times to minimise delays to the public. The WSA also has consent to undertake construction at night.

These public and private projects generate large volumes of the types of waste that would be accepted by the facility, particularly excavated materials. As well as minimising inconvenience to public infrastructure users, night works can allow the efficient transport of inert wastes generated by civil works on the less busy road network.

2.5 Workforce

At full production, the ARRC is expected to be operated by approximately 70 full-time equivalent (FTE) employees (Table 2.8).

Table 2.8 Site employees – full production

	Number of employees (FTE)	
	Day-shift	**Night-shift**
Machine operators	6	3
Labourers	26	15
Weighbridge manager	1	1
Operations manager	1	1
Leading Hand	1	0
Forklift/water cart	1	1
Traffic control/inspection	2	1
Admin	4	0
Off-site sales representatives	6	0
Total	**48**	**22**

In addition, there will be approximately 15–20 (FTE) truck drivers dispatching products and a range of contractors, eg tradespeople and other services.

2.6 Construction

It is anticipated that the ARRC will take approximately 18 months to construct and commission (Table 2.9).

Table 2.9 Indicative construction timeframes

Phase	Quarter					
	Q1	Q2	Q3	Q4	Q5	Q6
Site establishment						
Upgrades to Adams Road						
Access and site roads						
Earthworks/site drainage						
Foundations/slabs						
Warehouse construction						
Offices construction						
Warehouse and offices fit-out						
Install site infrastructure						

Construction of the ARRC will generally be carried out during standard construction hours as per the *Interim Construction Noise Guideline* (ICNG)(DECC 2009):

- Monday to Friday: 7:00 am to 6:00 pm;
- Saturday: 8:00 am to 1:00 pm; and
- no work on Sundays or public holidays.

Outside of these hours, some works will be carried as required (such as limited construction activities, environmental management such as dust control and delivery of oversized equipment). In these circumstances, works will be undertaken in accordance with the noise criteria for outside of recommended standard hours in the ICNG.

It is anticipated that approximately 30 people will be on site during the construction period.

2.7 Interactions between approved and proposed operations on site

The proposed ARRC and reactivated quarry will share the site access off Adams Road. Quarry vehicles will either access the quarry from the access road arrangements outlined in the Modification Report for MOD5 (EMM 2020b) and shown in Figure 1.4 or via the southern-most point of the proposed ARRC access road. Quarry traffic may also travel around the northern and eastern boundary of the ARRC site. Following construction of the ARRC, quarry operations may also use some ARRC site components such as parking, site office and amenities.

The development footprint of the proposed ARRC will impact on the northern noise bund (shown in Figure 1.4) to accommodate a water treatment plant for the ARRC and an ARRC access road. The southern wall of the ARRC warehouse will be parallel and directly adjacent to the northern noise bund. It will be 138-m long and be 16-m tall. The building will negate 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.

The quarry and ARRC surface water management systems have been designed to operate independently with no interaction between the two systems.

The ARRC project is the integral component to the applicants' final land use vision for the subject property. The proposed internal access road included in the project will be used by future developments on the subject property (refer Figure 1.5). They will undergo minor upgrades to extend the road at some point in the future to accommodate Stage 3 of the overall site development. Future commercial development will utilise the site access road and internal road components of the ARRC site as well as other components such as stormwater drainage system, lighting or parking facilities.

CHAPTER 3

Strategic context

3 Strategic context

3.1 Introduction

This chapter identifies the key strategic issues that are relevant to the assessment and evaluation of the merits of the project, as well as the project's strategic need and potential benefits, in accordance with the draft EIS guidelines (DPE 2019). The strategic context has been identified with regard to Government plans and policies, economic and social trends, and the state (present and changing) of the existing natural and built environment.

3.2 Future land use at the subject property

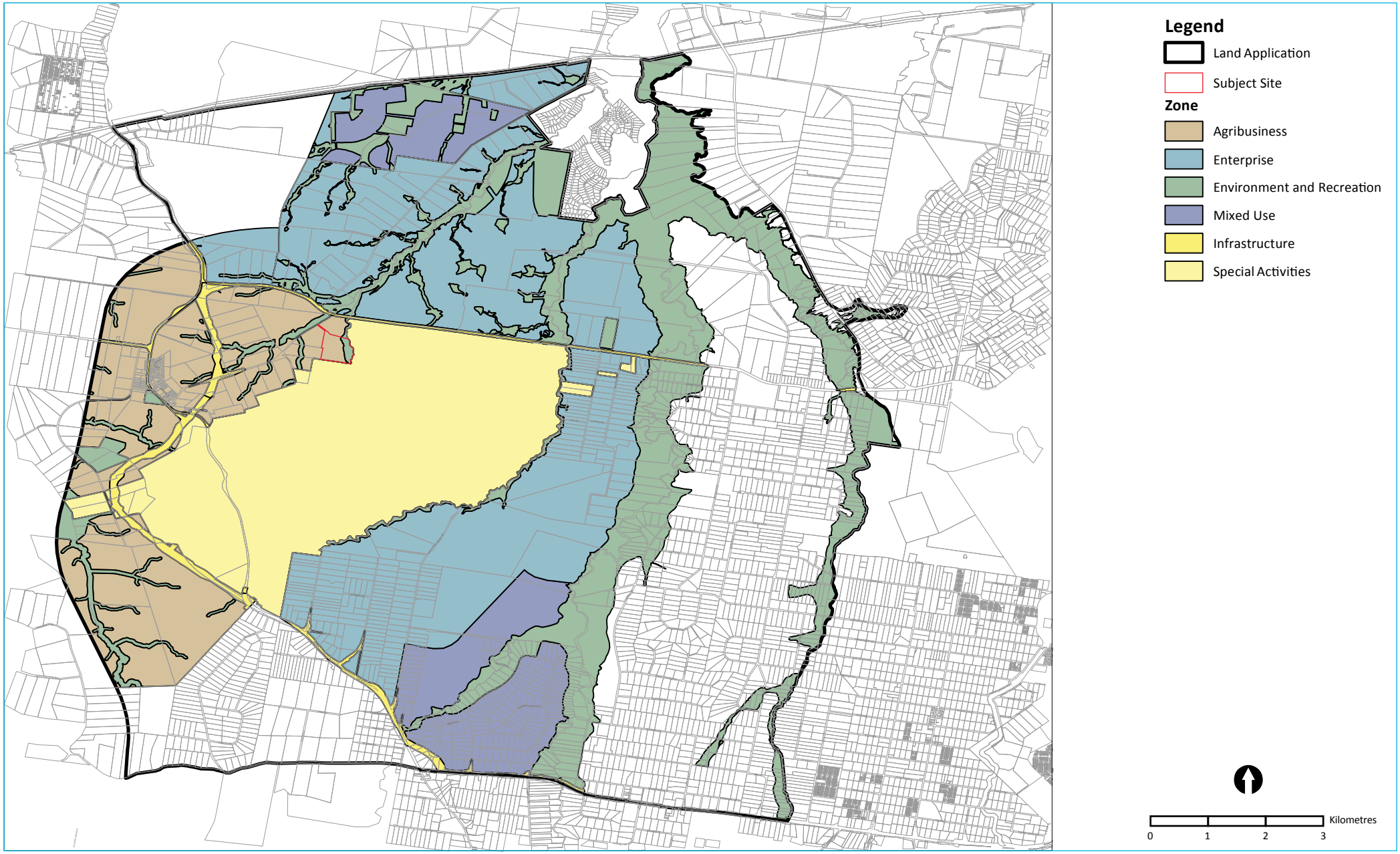
The subject property is adjacent to land that, in 2014, was confirmed by the federal government as the site of Sydney's second airport. The government's vision for the land surrounding the airport is detailed in the draft Aerotropolis Plan (WSAPP 2019). Development of the Aerotropolis helps meet the vision for Western Sydney as set forth in the *Greater Sydney Region Plan – A metropolis of Three Cities* (Greater Sydney Commission 2018a) and the *Western City District Plan* (Greater Sydney Commission 2018b).

The Aerotropolis Plan will be implemented through a statutory planning framework that includes a new Aerotropolis State Environmental Planning Policy (Aerotropolis SEPP). Under the draft Aerotropolis SEPP, the subject property is proposed to be zoned predominately as agribusiness with a portion of the subject property along the eastern boundary, associated with the riparian zone of Oakey Creek, proposed to be zoned environment and recreation. The draft Aerotropolis SEPP zoning for the site and surrounds is shown in Figure 3.1.

As outlined in Section 1.1, the applicants have a staged vision to the long-term development of the subject property. This vision is aligned with the long-term vision contemplated by the draft Western Sydney Aerotropolis Plan (draft Aerotropolis Plan) (WSPP 2019) and the proposed Aerotropolis SEPP. This vision will realise the objectives of the proposed agribusiness zoning and will not impact WSA aviation operations.

The ARRC is well located to service the extensive construction activity that will be associated with the development of the Aerotropolis over the coming decades. The ARRC will be one of the first developments in the Aerotropolis and will be an early contributor to the economic benefits of the Aerotropolis. As all activities will be within an enclosed warehouse, the ARRC will be in keeping with surrounding development.

In addition to the benefits that the ARRC will bring as a stand-alone development, it is integral in achieving the intended future agribusiness/industrial land use for the whole of the subject property as the facility provides an environmentally sustainable and economically viable means to infill and rehabilitate the quarry void (once consent is received for the filling and rehabilitation of the quarry void) to allow for development compatible with the WSA and the vision of a technology-led agribusiness precinct as part of the Aerotropolis. In recognition of this vision, the applicant has developed a concept master plan of the final land use as presented in Figure 1.5.



EMM
creating opportunities

Proposed Aerotropolis zoning

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement

Figure 3.1

3.3 Alignment with strategic planning instruments

The Greater Sydney Region Plan and the Western City District Plan were both prepared in accordance with Section 3.3 of the EP&A Act and form the basis of strategic planning, having regard to the region's economic, social and environmental needs.

Both plans include provisions which point to the need to safeguard the capacity of the suitable lands to provide urban services, such as waste management, recycling and landfill, into the future as outlined further in the following sections.

3.3.1 Great Sydney Region Plan: A Metropolis of Three Cities

The Greater Sydney Region Plan, *A Metropolis of Three Cities* 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 Western Sydney Airport and Aerotropolis is identified in the Plan as being the strength of connecting established centres and potentially connecting the Western Parkland City and the Central River City.

Objective 23 of the Greater Sydney Region Plan is particularly relevant: industrial and urban services land is planned, retained and managed. The term 'urban services' is used to describe 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 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 Western Sydney Airport. Supported by a freight link, these lands will provide for Greater Sydney's long-term freight and logistics and industrial needs.

The subject property, being located at the northern end of the future Western Sydney Airport is in close proximity to the main transport corridor of Elizabeth Drive via a 250-m long section of Adams Road. The proposed development of the ARRC on the subject property will provide recycling service to the foreseeable demand associated with future development activities within the Aerotropolis and subject to separate development consent, 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.

3.3.2 Western City District Plan

The Western City District 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.

The key planning priority outlined in the Western City District Plan relevant to the subject property's desirable future land uses is Planning Priority W19 – Reducing carbon emissions and managing energy, water and waste efficiently. This Planning Priority can only be achieved through the provision of urban services sites which enable activities such as waste transfer and recycling to occur. This is reflected in Action 83 of the District Plan to "protect existing and identify new locations for waste recycling and management".

3.3.3 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') (LCC 2019) 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 project aligns with two of the Council's planning priorities considered below.

i 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 ARRC, as the second 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.

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

The project, 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 project (refer Figure 2.1) and final land use concept plan, avoid direct impacts on the Oaky Creek Riparian Corridor (refer Figure 1.5).

3.4 Development of Western Sydney

Western Sydney has long been the centre for Sydney's population growth and currently supplies a large proportion of the city's workforce. Many Australian businesses and government departments have also moved their offices and operations to the suburbs of Western Sydney.

The State Government has been cognisant of the need to enhance the infrastructure, housing, employment and liveability in the Greater Western Sydney region. 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):

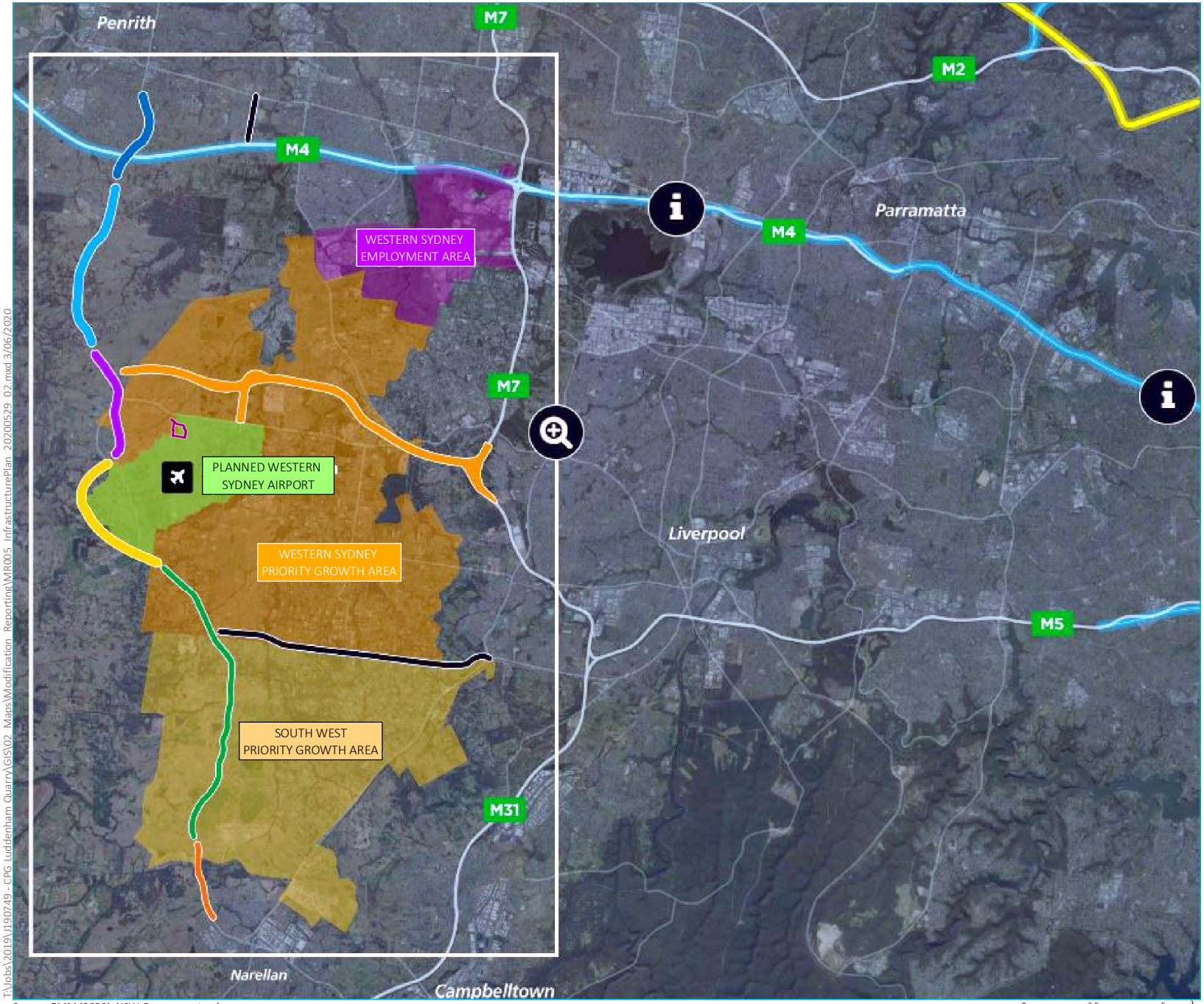
- $35 million total infrastructure pipeline;
- $1.68 billion redevelopment of Westmead, Blacktown and Mr Druitt hospitals;
- $5.3 billion investment for Western Sydney Airport (dual runway option);
- $3.6 billion investment into Western Sydney planned roads infrastructure; and
- 664,000 new homes needed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

The ARRC 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 to the south (NSW Government n.d.). The area to the north of Elizabeth Drive, which encompasses the Western Sydney Employment Area, is also referred to as the Northern Gateway Precinct. These growth regions are illustrated in Figure 3.2. The NSW Government's aim for the WSP Growth Area is for it to be transformed into an economic hub that delivers new jobs, homes, infrastructure and services.

The *Western City District Plan* (Greater Sydney Commission 2018b) was prepared to guide development of Western Sydney as one of three city areas within Greater Sydney. The plan details the potential for further infrastructure investment. This investment in residential, commercial and industrial development and infrastructure will result in an increase in demand for waste services within these growth regions, including processing of demolition and construction wastes generated during development of the WSP Growth Area and the Greater Western Sydney region. The ARRC will provide the necessary infrastructure, in a strategic location, to accept and process these wastes for the recovery of essential resources.

The *Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan Stage 1: Initial Precincts* (DPE 2018) sets out the vision for the 11,200 ha Aerotropolis. The Aerotropolis will consist of six initial precincts to be developed during the coming years and four additional precincts to be rezoned. The Aerotropolis sets the groundwork for the creation of 200,000 jobs in Western Sydney and the construction of 60,000 homes in the Aerotropolis. The Aerotropolis will be Australia's third-largest economy by 2036 and will be one of the country's fastest growing regions. The "greenfield development of the Aerotropolis will make it an engine for jobs growth, will optimise the significant rail and road investment in the region and will facilitate private sector investment" (DPE 2018).

The Stage 1 of the WSA, planned to be operational by 2026, includes a 3.7-kilometre runway and facilities for up to 10 million passengers annually. Further stages will aim to accommodate a projected 82 million passengers a year by 2060.



T:\jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\Modification Reporting\MR005 InfrastructurePlan 20200529 02.mxd 3/06/2020

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

Environmental Impact Statement
Figure 3.2

EMM
creating opportunities

3.5 Aerotropolis-specific strategic context

3.5.1 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 the ARRC are as follows:

- Objective 2: High-value jobs growth is enabled, and existing employment enhanced;
- Objective 3: Safeguarded airport operations; and
- Objective 5: A sustainable, low carbon Aerotropolis that embeds the circular economy.

The ARRC's alignment with these Objectives 3 and 5 is discussed below.

i Compatibility with the Western Sydney Airport

Section 5 of the draft Aerotropolis Plan outlines planning requirements to safeguard the proposed 24/7 airport operations. A detailed Aeronautical Impact Assessment (AIA) has been carried out for the ARRC (Appendix H and summarised in Section 7.2). An assessment of the ARRC against each of the safeguard planning requirements outlined in the draft Aerotropolis Plan is presented in Table 3.1

Table 3.1 Safeguard planning requirements for 24-hour airport

Safeguard planning	Assessment of the site against safeguard planning
• preventing the encroachment of noise-sensitive land uses into areas affected by aircraft noise and operational airspace	The proposed ARRC will not be a noise sensitive land use.
• locating buildings to avoid wind shear and turbulence	The ARRC site is located outside of the assessment trigger area, therefore the warehouse would not be considered to create wind shear or turbulence (Appendix H)
• managing wildlife attraction	The ARRC will not attract wildlife as only non-putrescible waste will be permitted to be accepted on site. A Wildlife strike and birdstrike risk review found the subject property posed an extremely low wildlife and birdstrike risk to WSA (appended to the AIA (refer Appendix H).
• locating wind turbines appropriately	No wind turbines are proposed.
• ensuring lighting does not distract/confuse pilots	While 24-hour operations are proposed, lighting will be designed to comply with lighting requirements for airport operation.
• maintaining an obstacle free operational airspace	The ARRC will comply with height requirements for airport operations and will not intersect the WSA's OLS during construction or operation.
• ensuring off-airport development does not impact the communication, navigation and surveillance (CNS) equipment	The AIA found the project would not impact on WSA communication, navigation and surveillance (CNS) equipment (Appendix H).
• managing land uses in public safety areas	The ARRC is on privately owned land.

ii Contribution to a circular economy

Section 6.1 of the draft Aerotropolis Plan acknowledges the *NSW Circular Economy Policy Statement* (NSW Government 2019) and the *Circular Economy Innovation Network Guide*. A circular economy changes the way products are produced, assembled, sold and used to minimise waste and to reduce environmental impact. By getting as much use out of product and materials as possible, waste is reduced. This can be achieved by recycling products and materials (for example concrete or timber) for reuse, rather than waste going to landfill. The NSW *Waste Avoidance and Resource Recovery Strategy* 2014-21 (EPA 2014d) mentioned in Section 3.6 set out targets to achieve NSW Government's waste targets. The proposed resource recovery centre is aligned with Objective 5 of the draft Aerotropolis Plan, contributing to the realisation of a circular economy.

The applicants are actively engaging with NSW Circular and UNSW Material Sciences to explore opportunities to innovate and pioneer new processes to support circular economy principles.

iii 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 3.2 with consideration of how the project aligns with these.

Table 3.2 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 ARRC is not a noise sensitive land use.
2	Safeguarding for Airport operations	This EIS 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). An AIA (refer Appendix I) has been prepared for the proposed development.
3	Supporting existing rural industry to minimise land use conflicts	The project, as the second step in CPG's vision (refer Section 1.1) provides a pathway for a viable future industrial/commercial land use across the subject property that could accommodate future agribusiness land use. In the context of the development of the WSA adjacent to the subject property, the ARRC will not result in land use conflicts with rural industry.
4	Incorporating existing rural landscape, sustainability and biodiversity values	The ARRC will contribute to a sustainable circular economy. The biodiversity values of the Oaky Creek riparian corridor will not be impacted by project. Biodiversity values are discussed in Section 7.8. Refer also to response for strategic outcome #15. Principles of ecologically sustainable development (ESD) are considered in Chapter 8.

Table 3.2 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
5	Recognition of existing communities, such as Luddenham	The project is expected to have a number of socio-economic benefits such as employment opportunities, providing local waste services, resource recovery for use in construction, and economic benefits to the local area and Western Sydney economy. Social impacts have been considered in Section 7.7.
6	Wildlife attraction	The project is not expected to attract wildlife as it incorporates a fully enclosed design and will not accept putrescible waste. The *Wildlife Strike and Birdstrike Risk Review* carried out as part of the AIA found the subject property currently poses an extremely low wildlife and birdstrike risk to the new Western Sydney Airport and that development of the ARRC is likely to reduce this risk further (Appendix H).
7	Biosecurity	Biosecurity is discussed in Section 7.8.
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 project, as the second step in CPG's vision (refer Section 1.1) provides a pathway for a viable future agribusiness land use on the subject property. There will be extensive development within the Aerotropolis to over the coming decades to deliver these outcomes. The ARRC will be a vital local service for these construction projects.
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.	Refer to response for strategic outcomes #1.
3	Enable smart city and digital integration into research, education and logistics.	Refer to response for strategic outcomes #1. The ARRC will incorporate opportunities for research and development into new technologies and processes will arises from the applicant's collaboration with NSW Circular and UNSW Material Sciences (refer to Section 2.2.4).
4	Protect the character and history of the Luddenham Village.	The project 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.	Refer to response for strategic outcomes #1.

Table 3.2 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
6	Integrate sustainable energy, waste and water as well as circular economy design principles into development and operations.	The proposed resource recovery centre will contribute to the realisation of a circular economy. The ARRC will assist waste from development within the Aerotropolis and Western Sydney to be recycled locally. Rain will be harvested from the warehouse roof for use within the ARRC and the WTP will allow the reuse of process water preventing it from being discharged to the environment.
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.
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.
10	Facilitate education, research and development and high technology land uses associated with food production and processing.	Refer to response for strategic outcomes #1.
11	Capitalise on the increasing domestic and international demand for high-quality fresh food and value-added pre-prepared meals.	Refer to response for strategic outcomes #1.
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
13	Allow for limited residential development that is ancillary to Agricultural and Agribusiness operations outside of the ANEC/ANEF 20 and above contours.	Not applicable.
14	Address any potential for land use conflict between adjoining land uses as a result of future development, including airport operations.	Refer to response for strategic outcomes #1. Potential land use conflicts, including with the operation of WSA, have been assessed in detail in this EIS. The ARRC will not curtail development of the surrounding land and will not impact airport operations.
15	Deliver an urban tree canopy along important corridors to contribute to the amenity of the area.	The project will not impact on the riparian corridor of Oaky Creek. A detailed landscaping plan has been prepared for the ARRC (Appendix T). This includes plantings along the site access road and in areas surrounding the ARRC warehouse.

Table 3.2 Agribusiness precinct considerations and strategic outcomes as outlined in the draft Aerotropolis Plan

Ref. no	Agribusiness Precinct – Liverpool and Penrith LGA	Consideration
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 project. In addition, refer to response provided for strategic outcomes #3 and #6.
17	Allow for sustainable and holistic development of agritourism product and experiences within the precinct	Refer to response for strategic outcomes #1.
18	Early protection of transport corridors to minimise possible land use conflict with adjacent areas and ensure the orderly and timely provision of infrastructure.	Not applicable.

3.6 Need for waste and resource recovery infrastructure

i The circular economy

NSW currently generates around 21.4 million tonnes of waste per annum and it is predicted, with continued population and economic growth, that this will increase to more than 31 million tonnes over the next 20 years (DPIE 2020). The current waste strategy for NSW is the *NSW Waste Avoidance and Resource Recovery Strategy 2014–21* (EPA 2014d). This strategy describes six key result areas over the seven-year period which includes, of relevance to the project, 'Key Result Area 2: Increase recycling' and 'Key Result Area 3: Divert more waste from landfill'.

The NSW Government issues paper *Cleaning Up Our Act: The Future for Waste and Resource Recovery* released in 2020 (DPIE 2020) identifies a critical need to plan and prepare early for all types of waste and resource recovery infrastructure. Direction 3 of the issues paper is to 'Plan for future infrastructure' and notes the challenges in finding appropriate lands for waste and resource recovery land.

The majority, (more specifically around 60%) of wastes currently generated in NSW come from the construction sector (DPIE 2020). The ARRC will process a range of construction and demolition wastes, including timber, concrete, brick, soil, and sand to make recycled soil, aggregate, recycled bedding sand for pipe laying, wood, mulch and road base. The centre will provide an environmentally beneficial means of dealing with construction and demolition (non-putrescible general solid) waste, with recycled products turned into valuable sustainable products and sold back into the industry for use in a variety of applications.

The NSW Government has announced the extension of the Waste Less, Recycle More initiative with a further $337 million over four years from 2017 to 2021. It aims to transform the waste and recycling sector and deliver economic and environmental benefits in NSW by responding to the targets set in the *NSW Waste Avoidance and Resource Recovery Strategy 2014–21* (EPA 2014d). These targets include:

- reduce the rate of waste generation per capita;
- increase recycling rates across all waste streams; and
- increase the proportion of waste diverted from landfill to 75%.

The project supports these strategies and their ingoing implementation and will assist the NSW Government in meeting waste reduction targets and increasing the recovery and reuse of material.

ii Development of Western Sydney

As described in Section 3.4, development of the Aerotropolis is predicted to create Australia's third-largest economy by 2036. Development of the Aerotropolis over the coming decade will require a huge number of construction projects for the delivery of the required community infrastructure including roads, the Western Sydney Metro, schools, health services; for the construction of the premises for large and small businesses; and for housing construction. All of these developments will generate construction and demolition waste and many will create commercial and industrial waste once in operation.

The ARRC is ideally located to meet this rapidly growing demand for construction and demolition waste, and commercial and industrial waste, recycling in the Aerotropolis and the South West Growth Area.

Given the commitment to undertake all waste handling, processing and stockpiling with an enclosed building, a warehouse with sufficient capacity has been proposed to allow the ARRC to meet this demand for recycling services over many years. Space has also been allowed for the development of new and innovative recycling technologies.

3.7 Economic needs analysis

CPG and KLF engaged MRA Consulting group (MRA) to carry out high-level economic needs analysis on the ARRC and subsequent infilling of the quarry void with inert waste (MRA 2019). This analysis report is contained in Appendix E.

The analysis found that the subject property is in a strategic location to take advantage of the expected construction and demolition waste generated from the developing Aerotropolis and the South West Growth Area, whilst providing ongoing operational and construction jobs throughout the different development phases of the site.

The projected inert waste volumes to be disposed in Sydney Metropolitan Area inert landfills is predicted to increase by the historical compound annual growth rate of 4.1% based on the latest EPA construction and demolition waste data, with 23.7 million tonnes generated by 2040.

With a maximum throughput of 600,000 tonnes per annum, the proposed construction and demolition resource recovery facility would only provide 20% of the required additional processing capacity required in the Sydney Metropolitan Area.

3.8 Need for local jobs

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 has more workers than jobs with some 300,000 leaving the area each morning for work (Deloitte 2015). Further population growth predicted for Sydney is expected to be mostly absorbed by Western Sydney with the job imbalance set to become more pronounced (Deloitte 2015). Growth in employment opportunities within the Western Sydney region is a key objective of the *Greater Sydney Region Plan*, the *Western City District Plan* and the draft Aerotropolis Plan.

With an estimated 70 FTE directly created at the ARRC and an additional 108 indirect jobs created (ie as a result of the contribution of the project to the economy of Western Sydney), the project would align with these State goals.

CHAPTER 4

Statutory context

4 Statutory context

4.1 Introduction

This chapter identifies the key relevant statutory requirements for the project having regard to the EP&A Act and EP&A Regulation, other NSW and Commonwealth legislation, and environmental planning instruments.

This section has been set out in accordance with the draft EIS guidelines, to cover the following:

- power to grant approval (ie approval pathway);
- permissibility;
- other approvals;
- pre-conditions to exercising the power to grant approval; and
- mandatory matters for consideration.

Detailed consideration of relevant statutory requirements is given in the assessment sections of the EIS.

4.2 Approval pathway

The EP&A Act defines the statutory framework for planning approval and environmental assessment in NSW. The EP&A Act is administered by the Minister for Planning and Public Spaces, statutory authorities, and local councils.

Part 4 of the EP&A Act relates to development assessment; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (ie SSD). The project is determined to be SDD under clause 23 of the State Environmental Planning Policy (State and Regional Development) 2011 as it is development for the purpose of resource recovery or recycling facilities that will handle more than 100,000 tonnes per year of waste.

The Minister for Planning and Public Spaces or the Independent Planning Commission (IPC) is the consent authority for the project under section 4.5 of the EP&A Act. The Minister may, pursuant to section 2.4 of the EP&A Act, delegate the function of determining an application for approval to a range of persons or public authorities, including a person employed in DPIE or IPC. A DA for SSD must be accompanied by an EIS, prepared in accordance with the EP&A Regulation. Before preparing an EIS, the applicant must request SEARs which specify what must be addressed in the EIS. The SEARs for the project are discussed in Section 1.4 and a table noting where each requirement is addressed is provided in Appendix A.

The EIS will be placed on public exhibition for a minimum of 30 days by DPIE and submissions will be sought from local and State government agencies and the community. Any submissions received by DPIE will be reviewed and forwarded to the applicant to consider and respond to (via a response to submissions (RTS) report). Following receipt of the RTS report, DPIE will prepare its assessment report considering this EIS, all submissions received during the exhibition process, and the RTS report. DPIE's assessment report will be considered by the consent authority before the DA is determined.

4.3 Permissibility

The ARRC site is zoned RU1 Primary Production under the Liverpool LEP. The development for a resource recovery facility is not permissible in land zoned RU1 Primary Production under Liverpool LEP. However, clause 121 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) provides that development for the purpose of waste or resource management facilities (which includes resource recovery facilities), may be carried out by any person with consent on land in a prescribed zone. A prescribed zone includes RU1 Primary Production.

As detailed in Section 3.2, the ARRC site is zoned Agribusiness under the Draft Aerotropolis SEPP. Under the Agribusiness zone, waste and resource management facilities are not permissible. The applicants are currently consulting with the WSPP and the Aerotropolis Authority regarding the opportunity to add waste and resource management facilities as an additional site-specific permitted use as envisaged by clause 3.9 of the Draft Aerotropolis SEPP (refer Appendix D) given the uniqueness of the subject property as an existing quarry. There are few commercially viable development options to fill and rehabilitate the quarry void to a land use consistent with the vision of the Aerotropolis plan. The proposed ARRC and intended landfilling of non-recyclable residues (subject to separate development consent) represent such an option to allow the subject property to fulfil the proposed objectives of the draft Aerotropolis SEPP. In combination, these will not only rehabilitate the subject property for future agribusiness land use but will also support the realisation of the Aerotropolis as a sustainable circular economy.

4.4 Other approvals

This section identifies other approvals that are required to carry out the project and explains why they are required. These approvals are outlined in Table 4.1 and have been grouped into the following categories:

- *integrated approvals*: which are approvals that cannot be refused and are required to be issued consistently under section 4.42 of the EP&A Act if the project is approved;
- whether approval is required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *other approvals*: approvals that are not expressly integrated into the SSD assessment process; and
- *approvals not required*: approvals that would have been required if the project was not SSD as per section 4.41 of the Act.

Table 4.1 Approvals and licences required

Approval	Requirement
Integrated Approvals	
An environment protection licence (EPL) under Part 3 of the NSW *Protection of the Environment Operations Act 1997* (POEO Act)	An EPL is required to be held as the following scheduled activities, as defined in Schedule 1 of the POEO Act, are to be undertaken for the project: • resource recovery – having on site at any time more than 1,000 t or processing more than 6,000 t of general waste; • waste processing (non-thermal treatment) – having onsite at any time more than 1,000 t or processing more than 6,000 t of general waste; and • waste storage – received from off-site and storing of more than 1,000 t of waste at any time or more than 6,000 t per day.
A approval under section 138 of the NSW *Roads Act 1993* (Roads Act)	Approval will be required under Section 138 of the Roads Act from the Council for works in, on or over a public road. The project will require works at the intersection of the proposed access road and Adams Road as detailed in Section 1.3.
EPBC Approval	
	Not required as detailed in the Biodiversity Development Assessment Report (Appendix Q).
Other approvals	
	None required for the project.
Approvals not required	
	No approvals listed in Section 4.41 of the Act would have been required for the project.

4.5 Pre-conditions to exercising the power to grant approval and mandatory considerations

In accordance with the draft EIS guidelines, Table 4.2 and Table 4.3 identify any pre-conditions to exercising the power to grant approval for the project and the mandatory conditions that must be satisfied before the determining authority may grant approval, respectively.

Table 4.2 Preconditions to being able to grant approval for the project

Statutory reference	Pre-condition	Relevance	Section in EIS
State Environmental Planning Policy (Infrastructure) 2007, Clause 104(3)	Before determining a development application for traffic generating development, the consent authority must give written notice of the application to RMS [TfNSW] within 7 days after the application is made.	The project is traffic generating development as it is a waste or resource management facility with access to a road.	Not applicable.
State Environmental Planning Policy No 64 –Advertising and Signage, Clause 8	A consent authority must be satisfied that signage viewed from a public place is consistent with the objectives of the Policy and satisfies the assessment criteria specified in Schedule 1.	A business identification sign would be placed at the entry to the site on Adams Road.	Section 7.9.

Table 4.3 Mandatory considerations for the project

Statutory reference	Mandatory consideration	Section in EIS
Considerations under the Act and Regulation		
Section 1.3	• relevant objects of the Act	-
Section 4.15	• relevant environmental planning instruments – State Environmental Planning Policy (Infrastructure) 2007 – State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 – State Environmental Planning Policy No 33 – Hazardous and Offensive Development – State Environmental Planning Policy No 55 – Remediation of Land – State Environmental Planning Policy No 64 – Advertising and Signage – Sydney Regional Environmental Plan No 9 – Extractive Industry (No 2–1995) – Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River – Liverpool Local Environmental Plan 2008 – Draft State Environmental Planning Policy (Western Sydney Aerotropolis) 2019	See below
	• Liverpool City Council's Development Control Plan • Draft Aerotropolis Development Control Plan 2019 Phase 1	See below
	• 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 7
	• the suitability of the site for the development	Chapter 3
	• the public interest	Chapter 3 and 8

Table 4.4 Mandatory considerations for the project

Statutory reference	Mandatory consideration	Section in EIS
Mandatory relevant considerations under EPIs		
State Environmental Planning Policy (Infrastructure) 2007, Clause 104(3)	(i) any submission that RMS provides in response to that notice within 21 days after the notice was given (unless, before the 21 days have passed, RMS advises that it will not be making a submission),	Not applicable
	(ii) the accessibility of the site concerned, including—	Section 7.6
	(A) the efficiency of movement of people and freight to and from the site and the extent of multi-purpose trips, and	
	(B) the potential to minimise the need for travel by car and to maximise movement of freight in containers or bulk freight by rail, and	
	(iii) any potential traffic safety, road congestion or parking implications of the development.	Section 7.6
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, Clause 13(2)	(2) Before determining an application to which this clause applies, the consent authority must—	
	(a) consider—	
	(i) the existing uses and approved uses of land in the vicinity of the development, and	Section 1.4
	(ii) whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and	Section 2.7
	(iii) any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and	Section 2.7
	(b) evaluate and compare the respective public benefits of the development and the uses, extraction and recovery referred to in paragraph (a)(i) and (ii), and	Chapter 8
	(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).	Section 2.7

Table 4.5 Mandatory considerations for the project

Statutory reference	Mandatory consideration	Section in EIS
Mandatory relevant considerations under EPIs		
State Environmental Planning Policy No 33 – Hazardous and Offensive Development, Clause 8	Departmental guidelines: • Applying Sepp 33 • HIPAP No. 3 – Risk Assessment • HIPAP No. 12 – Hazards	Chapter 6
State Environmental Planning Policy No 55 – Remediation of Land, Clause 7	As the development will involve a change of use on land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out, a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.	Section 7.12
Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2–1997), Clause 4	General planning considerations:	
	• The aim of the plan: to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.	Section 7.5
	• The strategies listed in the Action Plan of the Hawkesbury-Nepean Environmental Planning Strategy	Not applicable
	• Whether there are any feasible alternatives to the development or other proposal concerned	Section 1.3
	• The relationship between the different impacts of the development or other proposal and the environment, and how those impacts will be addressed and monitored.	Chapter 7
	Specific planning policies and recommended strategies:	
	(3) Water quality	Section 7.5
	(4) Water quantity	Section 7.5
	(5) Cultural heritage	Section 7.10
	(6) Flora and fauna	Section 7.8
Clause 11(18)	Development controls for waste management facilities include matters for consideration by the consent authority:	
	(a) Any potential for groundwater contamination.	Section 7.5
	(b) The adequacy of the proposed leachate management system and surface water controls.	Section 7.5

Table 4.6 Mandatory considerations for the project

Statutory reference	Mandatory consideration	Section in EIS
Mandatory relevant considerations under EPIs		
	(c) The long-term stability of the final landform and the adequacy of the site management plan.	Not applicable
	(d) If extraction of material is involved in the creation or other development of the waste management site, whether the extractive operation will have an adverse impact on the river system.	Not applicable
Liverpool Local Environmental Plan 2008	• Objectives and land uses for RU1 zone	Section 4.3
	• Clause 7.31 Earthworks	Section 7.11
Considerations under other legislation		
Biodiversity Conservation Act 2016	The likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values.	Section 7.8

4.6 Local government infrastructure

As the proposed ARRC is within the Liverpool LGA, it may be subject to Council's contribution requirements with respect to the provision and maintenance of local infrastructure. The ability to impose costs on developers for local infrastructure is permitted by:

- Section 7.11 of the EP&A Act – that allows Council to apply a charge to conventional lot developments; and
- Section 7.12 of the EP&A Act – that allows Council to apply a levy to developments other than conventional lot developments for the provision of public services and amenities as a condition of development.

Implementation of the provisions of the Liverpool LEP and Liverpool DCP are supported by a series of contribution plans, most of which address conventional lot development in the urban growth areas. The proposed development is considered a development type other than a conventional lot development and is covered by Section 2.10 of the *Liverpool Contributions Plan 2009*, that sets out, in part, that:

> Contributions for development types other than conventional lots must be calculated individually based on the number of bedrooms, site area, number of residents etc. The actual amounts are not stated in this schedule, as each development is unique in terms of these factors.

The northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant prior to the start of ARRC operations as part of the proposed development so that the pavement is suitable for use by large trucks, up to B-doubles, and so that the lane and shoulder widths meet Ausroads Guidelines and, until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using the northern section of Adams Road.

The only identified potential ongoing impact to local infrastructure is the additional wear on Adams Road as a result of ARRC-related traffic. It is understood that contributions to the maintenance of Adams Road may be required. Adams Road will provide access between the ARRC site and Elizabeth Drive (following the applicant's upgrades to the northern section of Adams Road) and The Northern Road (following the lifting of the load limit on the southern section of Adams Road). These are both State roads maintained by TfNSW and are not considered to be local infrastructure in regards to contribution requirements.

CHAPTER 5

Engagement

5 Engagement

This chapter provides details of the community and stakeholder engagement undertaken that has informed the preparation of the EIS.

The draft *Engagement in EIA – Guidance for State Significant Projects* (Draft Engagement in EIA Guideline) (DPE 2019), requires proponents to prepare a Community Engagement Strategy to ensure stakeholders have the opportunity to be involved in the planning, design and assessment of SSD projects.

The SEARs require consultation with the following stakeholders:

- Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC);
- Western Sydney Planning Partnership (WSPP);
- Western Sydney Airport Corporation (WSA Corp);
- Western Sydney Aerotropolis (Aerotropolis Authority);
- Environment Protection Authority (EPA);
- Liverpool City Council;
- DPIE Water;
- DPIE Environment, Energy and Sciences (EES);
- Transport for NSW (TfNSW);
- Fire and Rescue NSW (FRNSW);
- Endeavour Energy;
- Sydney Water; and
- local community and other stakeholders.

A community and stakeholder engagement strategy was prepared in accordance with the Draft EIA Guideline on behalf of CPG and KLF during the scoping phase of the project to guide the planning, scheduling and evaluation of consultation activities during the planning, design and assessment phases of the project. This strategy has subsequently been revised to include additional stakeholders identified in the SEARs and is included in Appendix F. The strategy includes an identification of who has been consulted and a justification for their selection, the form of the consultation and a justification for the approach. The engagement strategy has been modified in response to the COVID-19 pandemic with some planned in-person meetings undertaken by telephone or video conference. Recently, more in-person meetings have been held with the easing of COVID-19 restrictions.

The results of the implementation of the strategy, including the issues raised to date, are outlined in this chapter along with how the issues have been addressed. A key project refinement since the scoping phase of the project in response to stakeholder feedback has been the decision to fully enclose the ARRC with all waste, recycled products and non-recyclable residues will now be accepted, processed, stored and dispatched within a fully enclosed warehouse (refer Chapter 2).

5.1 Community consultation

In accordance with the community and stakeholder engagement strategy, local community stakeholders identified as being potentially impacted by the ARRC were sent a project information letter in April 2020. The letter provided an overview of the proposed ARRC and sought comments to be considered in the preparation of the EIS. Adjacent and nearby landholders were also personally contacted by a Director of KLF and briefed in person or over the phone. The method and outcomes of the community consultation are detailed in Table 5.1. In summary, a number of issues were raised and discussed but no objections were received.

Table 5.1 Summary of community consultation

Address[1]	Classification	Consultation method	Comment
5 Anton Road, Luddenham (R4)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020. Phone call and follow up face to face meeting on 11 June 2020 with Director of KLF.	No concerns raised. Property owner expressed interest in the establishment of the ARRC as have business interests in the construction demolition industry. Property owner was happy to be informed the ARRC access road would be sealed and expressed potential amenity impacts were not of concern in the context of the adjacent construction and operation of the WSA.
185 Adams Road, Luddenham (R5)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020. Phone call and follow up face to face meeting with the long-term tenant on 11 June 2020 (property owner lives abroad).	No concerns raised. The property occupier had enquires relating to potential odorous and/or asbestos waste streams. They were pleased that the ARRC would not accept either asbestos or odorous waste.
225 Adams Road, Luddenham (R6)	Residential	Phone call on 24 April 2020. Consultation letter containing project information and overview figure sent to the resident on 17 April 2020. Phone call and face to face meeting on 30 May 2020.	Property owner expressed appreciation being contacted directly by the Director of KLF and pleased that the site access road would be sealed. Property owner asked whether consideration had been given to constructing noise bunds along site access road. Noise management and mitigation is discussed in Section 6.5. Enclosing the AARC activities will substantially reduce noise levels at the neighbouring properties.

Table 5.1 Summary of community consultation

Address[1]	Classification	Consultation method	Comment
285 Adams Road, Luddenham (R3)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020. Phone calls and face to face meetings on 5 May 2020.	CPG and KLF have conducted ongoing consultation with the property owner of 285 Adams Road. The property owner has 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 this landowner. As this discussion is in progress, this property has been included as a sensitive receptor (R3) for the purposes of the environmental assessments.
161 Adams Road, Luddenham (R7)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020.	No response received.
2510–2550 Elizabeth Drive, Luddenham (R8)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020.	Email received acknowledging receipt of letter. Property owner communicated intention of lodging a submission during the EIS exhibition. Follow up email enquiring whether the property owner had specific concerns in relation to the project, no further response was received.
Hubertus Club (C1/AR1)	Commercial/ Active recreation	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020. Phone calls and follow up face to face meeting on 11 June 2020 with Hubertus Country Club Event Manager.	Event Manager expressed that the Club owners would view the project favourably as would support business at the Hubertus Club. Enquired about waste streams and pleased that no odorous waste would be accepted. Concerned that noise and visual bund along western edge of the subject property associated with quarry operations on the subject property may be removed. Pleased that it would be retained until the final rehabilitation of the quarry. Requested the KLF communicate to their construction and operational employees that the Club would welcome them for meals and to consider the club for events.
2161–2177 Elizabeth Drive, Luddenham (R1)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020.	No response received.
2111–2141 Elizabeth Drive, Luddenham (R2)	Residential	Consultation letter containing project information and overview figure sent to the resident on 17 April 2020.	No response received.

1. See Table 7.3 for assessment locations.

5.2 Government

Government agencies were consulted in accordance with the SEARs and community and stakeholder participation strategy. A letter was provided to the above agencies acknowledging their previous responses to DPIE in relation to the SEARs and requesting any further comments.

Meetings were also conducted with key agencies including WSA, the Aerotropolis Authority, WSPP, EPA, TfNSW and Council. The outcomes of the consultation with government agencies are detailed in Table 4.2.

Table 5.2 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
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.	Topics discussed included the planning pathway for the proposed quarry modification and the ARRC application requirements.	A scoping report for the proposed modification was prepared and submitted in March 2020 (EMM 2020m).
	A scoping meeting for the ARRC application was held on 24 March 2020 by teleconference.	DPIE requested that a scoping report be prepared.	The subsequent SEARs, and how they have been addressed, are summarised in Appendix A.
	A teleconference meeting on 9 April 2020 between CityPlan (on behalf of CPG and KLF) and DPIE to discuss the applicants' first submission to the draft Aerotropolis SEPP.	DPIE advised the issues raised in the first submission were understood and would be given appropriate weight in future zoning decisions.	
	A second submission, superseding the first, to the draft Aerotropolis SEPP was send to DPIE on 28 May 2020.	DPIE acknowledged the receipt of the second submission and advised it will consider it in its review if the draft Western Sydney Aerotropolis planning package.	
	A teleconference on 8 July 2020 between CPG and KLF, DPIE, and EMM discussed the draft EIS and the feedback provided by DPIE in the letter sent on 2 July 2020.	Clarifications were discussed regarding issues raised in the letter sent by DPIE, requesting the revised EIS by 11 August 2020.	The draft EIS was amended to address DPIE's adequacy comments.
Aerotropolis Authority	CPG, KLF and EMM met with the Western Sydney Aerotropolis Authority (Aerotropolis Authority) on 19 December 2019. A teleconference meeting on 18 May 2020 between CityPlan (on behalf of CPG and KLF) and the Aerotropolis Authority to discuss the applicants' first submission to the draft Aerotropolis SEPP. Consultation letter notifying the Aerotropolis Authority of the revised project design and inviting further comment was sent on 11 June 2020.	The Aerotropolis Authority noted that the ARRC would not be permissible in the proposed Agribusiness zoning. Feedback provided noted there was some confusion about how the various application pertaining to the subject property fit together. No response to the further consultation letter has been received to date.	The permissibility of the project is discussed in Section 4.3. The staged long-term development vision has been provided to clarify which stages the various applications apply to.

Table 5.2 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
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. Consultation letter notifying the WSPP of the revised project design and inviting further comment was sent on 11 June 2020. CPG sent a letter to WSPP on 19 May 2020 outlining the staged long-term development vision for the site.	Permissibility issues were discussed during both meeting. 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. No response to CPG's letter has been received to date.	The permissibility of the project is discussed in Section 4.3. The future land use vision for the subject property is discussed in Section 1.3. The staged long-term development vision has been provided to clarify which stages the various applications apply to.
WSA Corp	CPG, KLF and EMM met with WSA Corp at the combined meeting with PPO, DPIE and Liverpool City Council on 18 February 2020. CPG, KLF, Landrum and Brown and EMM met (teleconference) with WSA Corp on 10 June 2020 to discuss the overall development for the subject property, the revised design of the ARRC, and the preliminary findings in the AIA. Consultation letter notifying WSA Corp of the revised project design and inviting further comment was sent on 12 June 2020.	At the 18 February meeting, WSA Corp raised concerns regarding the establishment of a resource recovery centre on the subject property. WSA Corp noted requirements to safeguard 24-hour airport operations. The 10 June 2020 meeting focused on the revised design of the ARRC and the outcomes of the AIA assessment. WSA Corp noted the risk of wildlife attraction would require a thorough evaluation in the EIS and noted concerns of dust impacts on aircraft and WSA infrastructure. The location of the WSA Ground Based Augmentation System (GBAS) was also discussed. Regular discussions and consultation with WSACo and Airservices Australia will continue as the airport layout and systems are defined. WSACo have indicated their willingness to include the operators of the ARRC as a participant in their future safety committee.	As a result of WSA Corp's initial feedback and response to the SEARs, the applicants revised the design of the ARRC to a fully enclosed design (refer Chapter 2). An aeronautical impact assessment (AIA) has been carried out for the project. This AIA is summarised in Section 7.2 and is appended as Appendix H. A wildlife strike and birdstrike risk review has been carried to support the AIA (Appendix H) and is appended to the AIA assessment.

Table 5.2 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
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. Consultation letter notifying the Council of the revised project design and inviting further comment was sent on 12 June 2020. The Council has been emailed regarding the load limit on Adams Road A teleconference meeting on 17 July 2020 between Council and EMM was carried out to provide a status briefing and to discuss the potential impacts on Adams Road.	Council noted that a range of impacts, such as transport- and noise- related impacts, will need to be addressed. Council noted that sections of Adams Road will need to be upgraded prior to the lifting of the 3-tonne load limit on all or part of Adams Road, allowing the applicable sections to be used by heavy vehicles accessing the subject property. Council also noted that road surveys were required to inform the design of road upgrades.	Noise-related impacts are assessed in Section 7.4 and Appendix J. Transport-related impacts are assessed in Section 7.6 and Appendix L. Following the 17 July 2020. The applicants will upgrade the northern section Adams Road between the site access road and Elizabeth Drive. Surveys will be completed to inform the upgrade design and the road/pavement design submitted to Council with a request that the load limit is lifted. The southern section of Adams Road will not be used by ARR-related heavy vehicles until the road is upgraded such that the load limit can be removed.
EPA	CPG, KLF and EMM met with EPA on a teleconference on 3 April 2020. Consultation letter notifying EPA of the revised project design and inviting further comment was sent on 11 June 2020.	Topics discussed in the teleconference included an introduction to the staged development of the subject property, with a focus of the ARCC. The subject property's current suspended EPL has been revoked (as requested by the applicant). The EPA acknowledged receipt of the consultation letter. No further response has been received to date.	As a result of EPA's response to the SEARs, the applicants have decided to revise the design of the project to a fully enclosed design (refer Chapter 2). A new EPL will be required following approval of the ARRC.
TfNSW	CPG, KLF and EMM met with TfNSW on the 4 February 2020to 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. Consultation letter notifying TfNSW of the revised project design and inviting further comment was sent on 12 June 2020. There has been ongoing engagement regarding the preparation of the Traffic Impact Assessment.	A response to the consultation letter was received on 16 June 2020 acknowledging receipt of the consultation letter but included no further comment for this stage of the project.	The traffic impact assessment (refer Appendix L and Section 7.6) has been prepared in consultation with TfNSW.

Table 5.2 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
DITRDC	Consultation letter notifying DITRDC of the revised project design and inviting further comment was sent on 11 June 2020. A follow up email to the consultation letter requesting feedback or the option of a teleconference was sent on 7 July 2020.	No response to the consultation letter or follow up email has been received to date.	The comments and recommendations in DITRDC's response to the SEARs relating to airport safeguarding and airspace protection and planning policy are addressed in Section 7.2 and Chapters 3 and 4 respectively.
NSW Circular	CPG, KLF and EMM met (teleconference) with NSW Circular on 19 May 2020 to introduce the ARRC. A further meeting (teleconference) occurred on 4 June 2020 between the original participants and UNSW Materials Science to further discuss the ARRC.	On the basis of these two meetings, it was decided to further explore opportunities to collaborate in advancing circular economy principles and innovation for the ARRC.	CPG and KLF intend to collaborate with NSW Circular and other parties such as UNSW Materials Science on adopting and developing innovative waste recovery methods to support circular economy principles. A memorandum of understanding is currently being drafted between NSW Circular and the applicants.
DPIE Water	Consultation letter notifying DPIE Water of the revised project design and inviting further comment was sent on 11 June 2020.	No response to the consultation letter has been received to date.	DPIE Water response to the SEARs is addressed in Section 7.5 and Appendix K.
ESS	Consultation with agency as part of the consultation carried out during the preparation of the draft Aboriginal cultural heritage assessment (ACHA). Consultation letter notifying ESS of the revised project design and inviting further comment was sent on 12 June 2020.	ESS provided a list of Aboriginal stakeholders known to ESS that may have an interest in the project. A response to the consultation letter was received on 18 June 2020 noting ESS had no further comment at the stage of the project.	Consultation in relation to the ACHA is summarised in Section 7.10 and presented in the Aboriginal assessment (refer Appendix P).
FRNSW	Consultation letter notifying FRNSW of the revised project design and inviting further comment was sent on 12 June 2020.	No response to the consultation letter has been received to date.	FRNSW's response to the SEARs is addressed in Section 6.4.
Endeavour Energy	CPG and KLF, through their civil design team, have submitted a technical review request to Endeavour Energy (ref. ENL3756). Consultation letter notifying Endeavour Energy of the revised project design and inviting further comment was sent on 13 June 2020.	Endeavour Energy has acknowledged the receipt of the technical review request. A further response to the consultation letter was received providing further information on Endeavor Energy's requirements on 17 June 2020.	Endeavour Energy's response to the SEARs is addressed in Section 7.13 and Appendix S.

Table 5.2 Summary of government agency consultation

Stakeholder	Consultation method	Outcomes	Response
Sydney Water	CPG and KLF have also commenced the Sydney Water Feasibility Application Process (Application number 185346). Consultation letter notifying Sydney Water of the revised project design and inviting further comment was sent on 13 June 2020.	Sydney Water has acknowledged receipt of the Water Feasibility application (CN185346).	Sydney Water's response to the SEARs is addressed in Section 7.13 and Appendix S.
NSW Rural Fire Service - Luddenham	Consultation letter notifying the Luddenham NSW Rural Fire Service of the revised project design and inviting further comment was sent on 12 June 2020.	NSW Rural Fire Service responded on 6 July 2020, acknowledging receipt of the consultation letter and advised that the advice issued 14 April 2020 to DPIE, in relation to the request for SEARs, remains applicable to the development and the revised project layout.	NSW Rural Fire Service's response to the SEARs is addressed in Section 6.4 and the Bushfire assessment contained in Appendix N.

5.3 Ongoing consultation

This EIS will be placed on public exhibition and the applicants will respond to any submissions received. This process may highlight the need to consult with other interested individuals or groups.

Ongoing consultation is planned with the following:

- WSA through the detailed design, construction and operation of the ARRC;
- WSPP in relation to the addition of waste and resource management facilities as an additional site-specific permitted use as envisaged by clause 3.9 of the Draft Aerotropolis SEPP (refer section 4.3);
- Council: regarding this EIS, development approval and subsequent consents;
- the EPA: regarding an EPL;
- DPIE ESS regarding meeting offset requirements under the BC Act;
- other government agencies providing comment on this EIS; and
- one-on-one consultation regarding the EIS and upcoming activities at the site if requested by neighbours/adjoining occupiers.

CHAPTER 6

Hazards and risk

6 Hazards and risk

6.1 Introduction

This chapter summarises the results of the preliminary risk assessment carried out for the project (refer Appendix G) and provides a detailed consideration as the whether the ARRC is a potentially hazardous or offensive development according to SEPP 33.

This chapter also describes the fire and incident management measures that have, or are intended to be, incorporated into the design and operation of the ARRC with consideration to the findings of the bushfire impact assessment undertaken for the project (refer Appendix N).

6.2 Risk assessment

The potential environmental risk from the construction and operation of the ARRC has been assessed in accordance with Australian/New Zealand Standard International Organisation for Standardisation 31000-2009 *Risk Management – Principles and Guidelines* (AS/NZS ISO 31000-2009) based on the implementation of management measures described in Chapter 7 and Appendix C of the EIS.

The risk assessment identified potential impacts for each characteristic and ranked them as low, medium or high priority for assessment, according to their likelihood of occurrence and the potential consequences of the impact to people, property, environment and/or community if they occurred.

The risk rating tables and the environmental risk assessment table are provided in Appendix G.

The environmental risk assessment provided in Appendix G shows that there is generally a low risk that the ARRC will adversely impact the environment. The environmental risk assessment, however, identified two environmental aspects – air quality and noise – with a Level 2 'medium' rating associated with the predicted impacts of the project as summarised in Table 6.1. Detailed quantitative technical assessments have been carried out to assess these and other predicted impacts of the project and have recommended the application of management measures to mitigation these impacts (refer Chapter 7 and appended technical assessments).

Table 6.1 Environmental risks rated Level 2 'medium'

Risk description	Consequence	Probability	Risk rating	Predicted impacts and addressed section
Air quality				
Dust levels exceed criteria at sensitive receiver locations.	2	D	Level 2 (medium)	Dust will be generated during construction and operation. Dust suppression measures will be implemented during the 18-month construction period to control generation of dust from the ARRC site. Operational dust impacts are predicted to be low given that most site activities will occur within the enclosed waste acceptance, processing and storage warehouse. Wheel generated dust from trucks entering and exiting the site, the largest contributing source, will be minimised though the installation of a wheel wash and through deployment of a street sweeper twice a day. Some air quality exceedances are predicted at R3 (unoccupied residence). Best practice control measures, related to dust suppression are outlined in Section 7.3.5 and the air quality impact assessment (Appendix I). Dust from the project is not predicted to impact airport operations.
Noise and vibration				
Noise and vibration levels from construction, and noise from operation of recycling facility exceed noise and vibration criteria at sensitive receiver locations.	2	E	Level 2 (medium)	Noise will be generated during the construction and operation of the ARRC. Vibration will be generated during the construction of the ARRC. Control measures will be implemented to mitigate and manage noise and vibration during the 18-month construction period (refer Section 7.4.7 and Appendix J. All waste processing activities (ie screening and sorting) will occur within the enclosed warehouse. Prior to rezoning, noise levels are predicted to be above applicable criteria at sensitive receiver locations. If the area is not rezoned, additional control measures will need to be agreed with the impacted residents. Following rezoning, noise levels are predicted to be below applicable criteria at sensitive receiver locations.
Noise levels from road transport exceed noise criteria at sensitive receiver locations.	2	D	Level 2 (medium)	The ARRC will generate traffic noise during the construction and operation. If load limits on Adams Road south of the subject property are lifted and this section is used by ARRC-related traffic, there is the potential for exceedances of road noise criteria at sensitive receiver locations south of the ARRC site in the early years of operation prior to background traffic growth due to Aerotropolis development.

The proposed mitigation and management measures outlined in Chapter 7 and Appendix C will minimise residual environmental impacts as far as practicable, including the impacts rated 'Level 2 (medium)'.

6.3 Potentially hazardous or offensive development

SEPP 33 requires the consent authority to consider a project's potential to cause hazards or be offensive, including consideration of the location of the development and the way in which it is to be carried out.

Potentially hazardous or offensive development is defined by SEPP 33 as development which poses a significant risk to, or which would have a significant adverse impact on human health, life, property or the biophysical environment, if it were to operate without employing any control measures.

This section considers whether the ARRC is a potentially hazardous or offensive development according to SEPP 33 and whether a Preliminary Hazard Analysis (PHA) is required with reference to *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33* (*Applying SEPP 33*) (DoP 2011a) and the *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Safety Planning* guidelines (DoP 2011b).

6.3.1 Potentially hazardous development

i Applying SEPP 33 risk screening method

A development is classified as a hazardous or offensive development if the thresholds in *Applying SEPP 33*, which compare the quantities of stored or used hazardous materials to the distance from publicly accessible areas, are exceeded. The hazardous materials classifications in the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2007) (the Dangerous Goods Code) are used in *Applying SEPP 33*.

a Hazardous materials stored, processed or handled

Hazardous materials that are proposed to be stored and used at the ARRC are generally fuels, oils and grease. Storage conditions, quantities and hazardous properties of the materials are provided in Table 6.2. Hazardous materials will be stored in designated storage areas within the ARRC warehouse.

No hazardous wastes will be accepted by the ARRC.

Table 6.2 Dangerous goods and other potentially hazardous materials to be stored onsite

Classification	Name	Storage conditions	Approximate quantity
Dangerous Goods			
	Battery terminal spray	Purpose built container, in designated storage area in the ARRC warehouse	0.5 L
	Hi press spray grease	Purpose built container, in designated storage area in the ARRC warehouse.	0.5 L
	Acetylene	Around three size G bottles (for 9.3 m^3 of gas at atmospheric pressure) chained to wall of the ARRC warehouse.	37 kg
Class 2.2 Non-flammable, non-toxic gas*	Oxygen	Around five size G bottles (for 8.9 m^3 of gas at atmospheric pressure) chained to the wall of the ARRC warehouse.	15 kg
	Contact cleaner aerosol	Purpose built container, in designated storage area in the ARRC warehouse	0.5 L
Class 3 Flammable Liquid PG II	Plumbers priming fluid	Purpose built container, in designated storage area in the ARRC warehouse	0.6 L
	Unleaded petrol	Purpose built container, in designated storage area in the ARRC warehouse	25 L

Table 6.2 Dangerous goods and other potentially hazardous materials to be stored onsite

Classification	Name	Storage conditions	Approximate quantity
	Grip base	Purpose built container, in designated storage area in the ARRC warehouse	0.5 L
	Gasket sealant	Purpose built container, in designated storage area in the ARRC warehouse	0.06 L
	Quick dry enamel	Purpose built container, in designated storage area in the ARRC warehouse	4 L
Class 3 Flammable Liquid PG III	Hi-Tec heavy duty degreaser	Purpose built container, in designated storage area in the ARRC warehouse	25 L
Class 8 Corrosive substances PG III	Chemtech Heavy Duty Degreaser	Purpose built container, in designated storage area in the ARRC warehouse	25 L
Other hazardous materials			
Class 9 Miscellaneous dangerous substances PG III*	Diesel**	Self-bunded diesel tank located within ARRC warehouse on eastern wall.	35,000 L
	Flocculent	Purpose built container, in designated storage area in the ARRC warehouse	1,250 L
	Oils (engine and hydraulic)	Purpose built container, in designated storage area in the ARRC warehouse	1,040 L
	Penetrant spray	Aerosol container in designated storage area in the ARRC warehouse	5 L
	Concentrated traffic film remover	Purpose built container, in designated storage area in the ARRC warehouse	25 L
	Lubricant	Purpose built container, in designated storage area in the ARRC warehouse	0.6 L
	Grease	Purpose built container, in designated storage area in the ARRC warehouse	19 kg
	Coolant	Purpose built container, in designated storage area in the ARRC warehouse	50 L

* Exempt from "Applying SEPP" risk screening test.
** The Dangerous Goods Code states that diesel is not subject to the code as it is has a flash point of more than 60°C. The Work Practice Data Sheet provided by Chemwatch identifies Diesel as a Dangerous Good Glass 9.

Based on the information provided in Table 6.3, a screening test against the thresholds in SEPP 33 for dangerous goods is provided in Table 5.2. All Class 3 PG II and III flammable liquids have been grouped together as Class 3 PG II which has a more stringent screening distance.

The screening test determines that the hazardous materials are not potentially hazardous.

Table 6.3 Applying SEPP 33 screening test

Dangerous goods classification	Total quantities	SEPP 33 screening threshold	Potentially hazardous?
Class 2.1 (liquefied excluding LPG)	37 kg	Greater than 500 kg at specified distance	No
Class 3 PG II	62 kg	Greater than 5 t at specified distance	No
Class 8 PG III	25 kg	50 t	No

*Notes: *Conversion used for LPG 1 L = 0.53 kg.*

b Transport of hazardous materials

Applying SEPP 33 (DoP 2011a) also sets threshold limits for the transportation of hazardous materials to and from a site. The number of weekly and annual deliveries and the approximate quantities per load to the ARRC are well below transport screening thresholds outlined in Table 2 of Applying SEPP 33 (DoP 2011a) as shown in Table 6.4.

Table 6.4 Applying SEPP 33 transportation screening test

Hazardous materials	Deliveries		Quantities per load	Potentially hazardous
	Weekly (peak)	Annual		
Class 2.1 Flammable Gas	1	6	7.5 kL	No
Other hazardous materials	5	65	15 kL	No

ii Other risk factors

Applying SEPP 33 (DoP 2011a) requires an assessment of other hazards/risk factors outside the scope of the risk screening method. An assessment of other types of hazards associated with the ARRC is provided in Table 6.5.

Table 6.5 Other types of hazards

Type of hazard	Comments
Any incompatible materials (hazardous and non-hazardous materials)	No
Any wastes that could be hazardous	No. Wastes delivered to ARRC site will be inspected and will not be accepted if they contain hazardous materials (Section 2.2.2).
The possible existence of dusts within confined areas	Yes, however misters will be installed inside the ARRC warehouse to suppress airborne particles.
Types of activities the dangerous goods and otherwise hazardous materials are associated with (storage, processing, reaction, etc.)	Only as indicated in Table 6.3.
Incompatible, reactive or unstable materials and process conditions that could lead to uncontrolled reaction or decomposition	No.
Storage or processing operations involving high (or extremely low) temperatures and/or pressure	No.
Details of known past incidents (and near misses) involving hazardous materials and processes in similar industries	No known incidents involving hazardous materials and processes at recycling facilities accepting only the type of inert/non-hazardous materials proposed at the ARRC.

There are no other hazards/risk factors associated with the ARRC outside the scope of the *Appling SEPP 33* (DoP 2011a) risk screening method.

iii Hazard management

A range of hazard control measures will be implemented during construction and operation of the ARRC. Each of these will be appropriate for the hazard they are designed to control and will generally follow the *Hierarchy of Hazard Controls* (Safe Work Australia 2018):

- engineering controls:
  - design: components will be designed and constructed to comply with relevant standards; and
  - enclosure: components will be enclosed as appropriate.
- administrative controls:
  - operating procedures and scheduled maintenance; and
  - training and reinforcing correct work procedures.

Storage and use of hazardous materials will be 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.

6.3.2 Potentially offensive development

Relevant emissions and discharges to air, noise, and water arising from construction and operation of the ARRC have been assessed to determine if the it is classified as a potentially offensive industry. These assessments, summarised in the follow sections, concluded that the ARRC will not result in unacceptable levels of pollution that will impact the amenity of the area, and as such is not a potentially offensive industry.

i Odour

An understanding of the types of general solid waste (ie not special, liquid or hazardous waste) is important in the context of potential odour emission from the ARRC site:

- Putrescible: solid waste that contains organic matter capable of being decomposed by microorganisms. As putrescibles wastes decay and are processed they produce odours, as does composting.
- Non-putrescible: waste that does not readily decay under standard conditions; emit offensive odours; or attract vermin or other vectors (including flies, birds and rodents).

The ARRC will only accept non-putrescible waste, and will have management measures in place to ensure vegetation waste will not compost onsite. The site will not accept kerbside green or putrescible waste from local council collections. The air quality assessment carried out for the project did not identify and odour sources associated with the construction and operation of the project (refer Section 6.4 and Appendix I).

ii Noise

Prior to rezoning, a range of noise criteria will be exceeded at properties around the ARRC site and additional noise mitigation measures will be required if the area is not rezoned. After the rezoning of the land, it is predicted that the ARRC noise levels will satisfy the applicable noise criterion at all assessment locations.

iii Water

The key water management strategy adopted across the ARRC site is containment and management of water that has potentially been in contact with waste material, with reuse where feasible. The key features of the proposed water management system include:

- fully enclosing all waste handling and storage within the ARRC warehouse to prevent rainfall interacting with waste (or recycled products) and to prevent rainfall on hardstand that is used to store waste (or recycled products);
- collection of stormwater within an onsite detention storage;
- capture, treatment and reuse of water recycled from site activities in the warehouse; and
- discharge of excess stormwater from the onsite detention storage to Oaky Creek.

The surface water assessment (summarised in Section 7.5 and appended as Appendix K) concluded that the ARRC's water quality controls are expected to function to prevent any material change or degradation of the water quality of Oaky Creek due to discharges.

6.4 Fire and incident management

The ARRC fire protection system is described in Section 2.1.8. Further details are provided below.

6.4.1 Bushfire

A bushfire assessment has been prepared for the project in consideration of the NSW *Rural Fires Act 1977, Planning for Bushfire Protection* (PBP) (RFS 2006 and 2018) and AS 3959-2018 Construction of Buildings in Bushfire-prone Areas. The assessment is appended as Appendix N and summarised below.

This bushfire assessment identified the bush fire protection measures applicable to design, construction, operation and ongoing management of the ARRC. A summary of recommendations from the bushfire assessment that will be incorporated into the detailed design of the ARRC and Emergency and Incident Management Plan (EIMP) (refer Section 6.4.4) for the construction and operational phases of the project is provided in Table 6.6.

Table 6.6 Summary of recommended bushfire management measures

Mitigation element	Protection measure
Asset protection zones	• APZs will be provided commensurate with the construction of the building. • A defendable space will be provided. • Landscaping withing APZ will be managed within APZs in perpetuity.
Access	• Firefighting vehicles will be provided with safe, all-weather access to structures and hazard vegetation. • There will be appropriate access to water supply. • Firefighting vehicles will be able to access and exit the property safely.
Water supply	• Water supply requirements for firefighting, including the provision of hydrants and hose reels, will be designed, constructed in accordance with the relevant Standards and PBP.
Other services	• The location of electricity services will limit the possibility of ignition of surrounding bush land or the fabric of buildings.
Construction standards	• The ARRC warehouse will be designed to withstand bush fire attack in the form of embers, radiant heat and flame contact.
Landscaping	• Landscaping will be designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.
Storage of hazardous materials	• The storage of hazardous materials will be away from the hazard wherever possible.
Bushfire management plan (including emergency management)	• A bushfire management plan (BFMP) will be incorporated into the overall EIMP for the site and include details for the ongoing management and maintenance of bushfire protection measures. • The EIMP will include a bushfire emergency management and evacuation plan.

6.4.2 Access for fire appliance vehicles

The *Fire Safety Guideline – Access for Brigade Vehicles and Firefighters* (FRNSW 2019) requires facilities to be designed to accommodate a general fire appliance vehicle (10-m long) and a specialist fire appliance vehicle (12.5-m long). The PBP requires the capacity of road surfaces is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes) and to provide adequate turning areas for fire appliance vehicles. The swept path analysis carried out for the design confirm that a vehicle up to 26-m long can manoeuvre safely through the ARRC site.

6.4.3 Fire water containment

A 2.6-ML underground fire water containment tank has been incorporated into the concept design for the ARRC.

The fire containment system will be designed to meet the worst credible fire scenario as part of the detailed design and having regard to the other fire management measures identified above. This system will be fully automated and will not rely upon on-site staff or emergency services personnel to access or activate provided systems or valves in the event of fire.

After a fire event, the retained fire water would be tested to determine if it is safe to discharge into the stormwater system. If not, firewater would be pumped to tankers and transported offsite for disposal of at an appropriately licensed facility. This process would be detailed as part of a water management plan for the ARRC.

6.4.4 Emergency and incident management plan

An EIMP will be prepared as part of the OEMP that describes procedures to manage incidents (eg spills or fire) that may occur at the site that have the potential to harm to people or the environment. The EIMP will complement the Pollution Incident Response Management Plan (PIRMP) that is expected to be a requirement under the EPL.

Management measures that will be implemented to prevent fires include:

- refuelling will be undertaken in a refuelling area clear of stockpiles;
- the small quantities of hazardous materials that will be kept on site will be stored and mapped in accordance with Australian Standard 1940;
- site personnel will be trained in fire response;
- there will be fire extinguishers in vehicles, the weighbridge offices and in the kitchen, office and processing areas of the ARRC warehouse;
- fire hoses and sprinkler system will be installed in accordance with the National Construction Code and the relevant Australian Standards; and
- spill response kits will be available should there be a spill of flammable substances.

6.4.5 Other hazards

The following other potential hazards have been considered:

- Flooding: the majority of the site will not be affected by flooding and will not impact flood levels in Oaky Creek (Section 6.5.4).
- Interactions between ARRC site and quarry site: the ARRC will include appropriate fencing, security and safety provisions to separate construction and operations of the project from the quarry site and operations. Both site activities will also have approved traffic management plans to ensure the safe circulation of project and quarry traffic through the subject property.

6.5 Conclusion

The environmental risk assessment provided in Appendix G shows that there is generally a low risk that the ARRC will adversely impact the environment. The environmental risk assessment, however, identified two environmental aspects – air quality and noise – with a Level 2 'medium' rating associated with the predicted impacts of the project. Detailed quantitative assessments have been carried out to assess these and other predicted impacts of the project and have recommended the application of management measures to mitigate these impacts.

An assessment of the project against *Applying SEPP 33* (DoP 2011a) found the ARRC is not a potentially hazardous or offensive development according to SEPP 33.

Fire safety design will be finalised as part of the detailed design process in accordance with National Construction Code provisions, *Planning for Bushfire Protection* (PBP) (RFS 2006 and 2018) and *Fire Safety Guideline – Fire Safety in Waste Facilities* (FRNSW 2020) specifically in relation to fire hydrant systems, automated fire sprinklers, smoke hazard management and fire water run-off containment.

Fire and incident management, including bushfire management, will be formalised through an emergency and incident management plan (EIMP) to be prepared as part of the OEMP.

CHAPTER 7

Assessment of impacts

7 Assessment of impacts

7.1 Overview

The potential environmental impacts of the project are identified in the *Luddenham Resource Recovery Centre Scoping Report* (EMM 2020a) and accompanying Scoping Worksheet. The assessment approach for each environmental aspect was determined based on the potential environmental impacts and the SEARs. The environmental aspects for which stand-alone technical reports were prepared are detailed in Table 7.1. The findings of each technical report are summarised in this chapter, except for bushfire which is summarised in Section 6.4.1. The potential impacts of the project on historic heritage, urban design, visual amenity, and social values, are assessed in this chapter alone with no stand-alone technical report prepared.

Table 7.1 Environmental assessments

Environmental aspect	Technical assessment	EIS section
Airport safeguarding	Appendix H	Section 7.2
Air quality	Appendix I	Section 7.3
Noise and vibration	Appendix J	Section 7.4
Surface and groundwater	Appendix K	Section 7.5
Traffic and transport	Appendix L	Section 7.6
Economic Assessment	Appendix M	Section 7.7
Bushfire	Appendix N	Section 6.4.1
Biodiversity	Appendix O	Section 7.8
Aboriginal Cultural Heritage	Appendix P	Section 7.10
Historic heritage	-	Section 7.10
Land and soils	Appendix Q	Section 7.11
Contamination	Appendix R	Section 7.12
Urban design and visual	-	Section 7.9
Social	-	Section 7.7

7.2 Airport safeguarding

7.2.1 Introduction

An *Aeronautical Impact Assessment* report was prepared for the project by Landrum & Brown Worldwide (Aust) Pty Ltd (Appendix H). The report assesses the aviation environment around the subject property to determine the likely impact of any buildings, construction activity and wildlife attractors associated with the project. The report was prepared in consideration of the following:

- Commonwealth *Airports Act 1996* provisions for protection of prescribed airspaces;
- Airports (Protection of Airspace) Regulations 1996;

- relevant National Airports Safeguarding Framework (NASF) Guidelines;
- the requirements of the relevant aviation authorities; and
- the SEARS.

A Wildlife Strike and Birdstrike Risk Review was undertaken by EMM and is included in Appendix H.

7.2.2 Existing environment

The subject property shares its southern and eastern boundaries with the WSA development site. As part of the proposed airport development, two parallel runways will be constructed – 05L/23R and 05R/23L as shown in Figure 7.1. Both WSA runways are proposed to be 60 m wide and be provided with runway strips (RWS) 140 m either side of the centreline of the runway. The subject property is located outside of the RWS, with its nearest point approximately 1,100 m north of the WSA Aerodrome Reference Point and approximately 250 m north-west of the center of Runway 05L/23R, immediately adjacent to the perimeter of the airport (see Figure 7.1).

The Airports (Protection of Airspace) Regulations 1996 specifies volumes of Prescribed Airspace related to Federally leased airports, to protect aircraft operations from uncontrolled obstacle growth that may have an adverse impact upon flight safety or the regularity of flight operations at those airports.

The Regulations define Prescribed Airspace for an airport as the airspace above any part of the:

- Obstacle Limitation Surfaces (OLS), conceptual surfaces associated with runways that are designed to protect aircraft operations from unrestricted obstacle growth;
- Procedures for Air Navigation Services – Aircraft Operations (PANS OPS) surfaces, conceptual surfaces that provide a buffer between instrument approach and departure flight paths and terrain or obstacles; and
- other airspace declared under regulation 5 of the Regulations.

The WSA Prescribed Airspace is comprised of OLS and PANS OPS surfaces and is shown, in part, on Figure 7.1. PANS OPS surfaces for WSA relate to the Basic Instrument Landing Systems (ILS) surfaces and the Standard Instrument Departures (SID) procedures for each runway. Other instrument approach procedures and Instrument Flight Rules (IFR) Circling Procedures may be implemented at WSA and were considered in the assessment. Although OLS and PANS OPS surfaces have been declared for WSA, there is still the possibility that they may change slightly as the construction program progresses and consequently, the airport's Prescribed Airspace may also change slightly. Any minor changes are unlikely to affect the conclusions of the Aeronautical Impact Assessment for the project.

7.2.3 Impact assessment

The tallest ARRC element, with the potential to infringe on WSA's Prescribed Airspace is the warehouse which will be approximately 16 m AGL (80 mAHD). Cranes, to approximately 80 to 100 mAHD, may be temporarily used during construction (which will be completed prior to the start of airport operations). The *Aeronautical Impact Assessment* concluded that these project elements would not infringe WSA's Prescribed Airspace as:

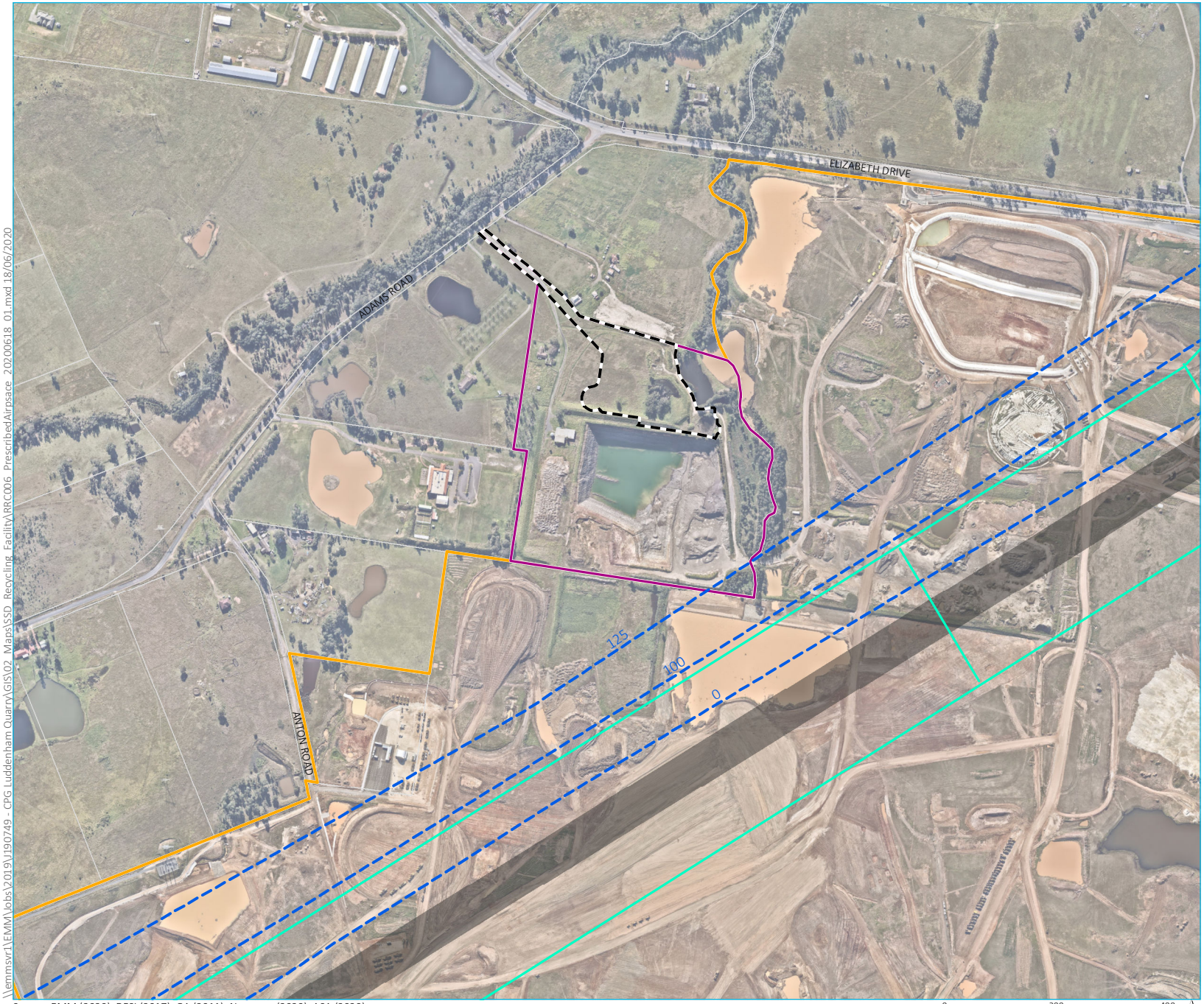
- the maximum height of project elements are below the OLS elevation which is approximately 110 m to 125.5 mAHD at the subject property;
- the maximum height of project elements are below the Basic ILS PANS OPS surfaces which are approximately 138 mAHD at the south east corner of the ARRC; and
- the ARRC is located outside of the PANS OPS surface for the SID procedures and would be outside the PANS OPS surface for other instrument approach and IFR Circling procedures, if implemented.

Therefore, the project is not a controlled activity and does not require approval under the Commonwealth *Airports Act 1996*.

The Aeronautical Impact Assessment also concluded that the project:

- is unlikely to increase the potential for wildlife collisions with aircraft due to the area around and including the airport site already being considered a natural habitat for birdlife and mitigations and activities at the ARRC are likely to reduce the number of birds in the area;
- would not impact aviation facilities, such as Air Traffic Control (ATC) Surveillance or Communication systems;
- is outside of Building Restricted Areas (BRA) for navigation aids associated with the ILS;
- will not infringe any BRA for the Ground Based Augmentation System (GBAS) during WSA Stage 1 airport development, but is likely to infringe the BRA for the GBAS at WSA Stage 2 airport development, if the GBAS is located adjacent to the site (noting the location of the GBAS facility has not been finalised);
- is located in an area where Australian Noise Exposure Concept Contour (ANEC)/Australian Noise Exposure Forecast Contour (ANEF) contours would not inhibit the development of light industrial or other industrial land use (see Figure 7.2);
- is unlikely to produce an exhaust plume that will require assessment by the Civil Aviation Safety Authority;
- is located within Zone A and Zone B of the airport lighting zones that surround the airport;
- is unlikely to cause any hazard from sunlight reflections due to reflectivity values of other objects in the area;
- is located outside of the adopted Public Safety Area template;
- will not cause any adverse wind shear effects as the development site is located outside of the assessment area for wind shear impacts; and
- is unlikely to create any significant dust hazards that would reduce flight visibility below the recommended level of 5,000 m.

Airservices Australia, as the navigation aid authority in Australia, will need to conduct their own analysis of the project's impact on navigation aids. The provision of detailed plans, once available, will be supplied to them for review.



KEY

- Subject property
- ARRC site
- Western Sydney Airport
- Proposed WSA runway (indicative)
- Cadastral boundary
- PANSOP surfaces for DIS procedures
- OLS contours

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

0 200 400 m

GDA 1994 MGA Zone 56

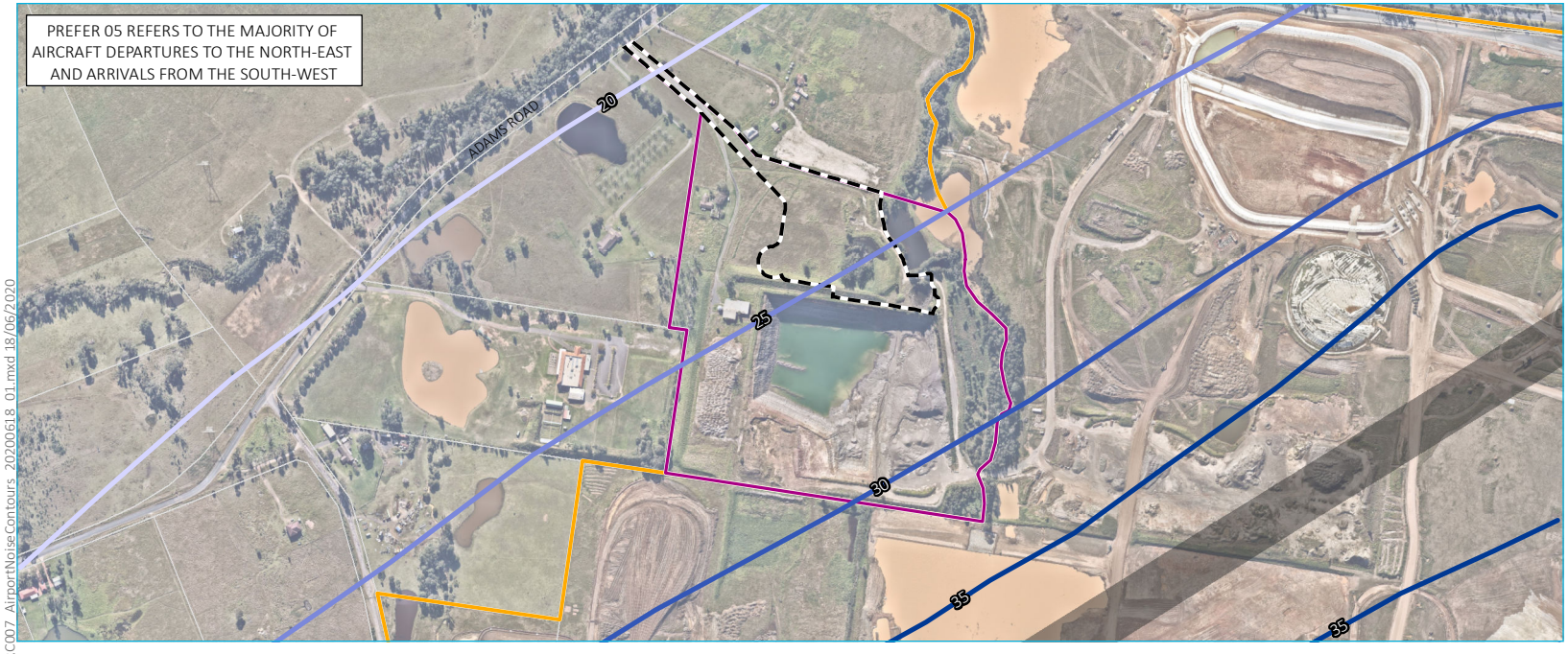
N

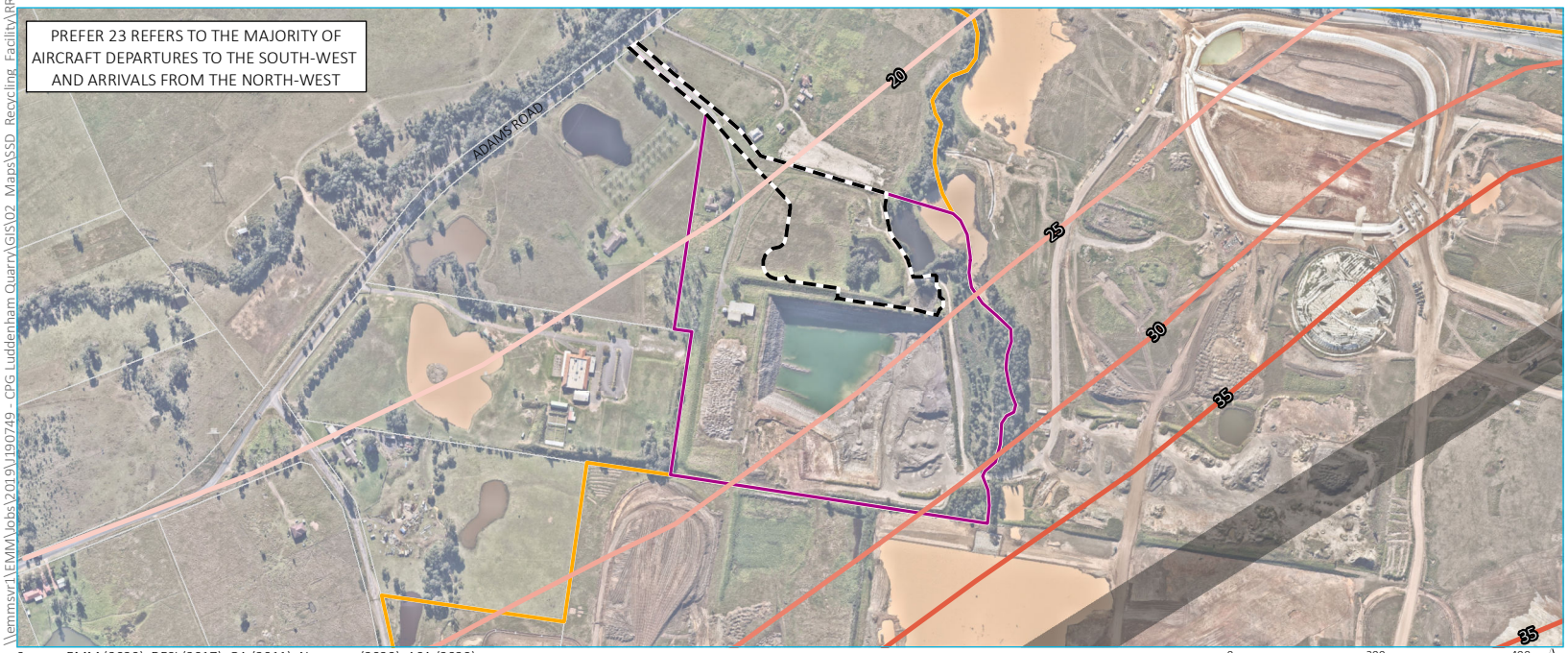
\\emmsvr1\EMM\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\RRC006 PrescribedAirspace 20200618 01.mxd 18/06/2020

Site location in relation to Prescribed Airspace

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.1

EMM
creating opportunities





KEY

- Subject property
- ARRC site
- Western Sydney Airport
- Proposed WSA runway (indicative)
- Cadastral boundary

2030 prefer 05 contour (ANEC)

- 20
- 25
- 30
- 35

2030 prefer 23 contour (ANEC)

- 20
- 25
- 30
- 35

Runway 05L/23R ANEC contours

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

0 200 400 m

GDA 1994 MGA Zone 56

N

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.2

EMM creating opportunities

\\emmsvr1\EMM\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\ARRC007 AirportNoiseContours 20200618 01.mxd 18/06/2020

7.2.4 Mitigation measures

Despite the Wildlife strike and Birdstrike Risk Review identifying the ARRC site as very low risk site from the perspective of increasing birdlife strikes at the airport, the following mitigation and management measures will be implemented as recommended:

- no flora that produces fruit or flowers and that are likely to attract birds and wildlife will be planted on the site (refer to Appendix S);
- any new water features (such as the onsite water detention basin) will either be netted or have lines across it with moving flags on them to deter birds using it;
- the existing water management dam on the subject property will be netted or have lines for flags across it to deter birds from utilising it;
- building designs, including on fences and lighting, will ensure that they minimise areas for wildlife, especially birds, to use for breeding, roosting, or perching, such as:
    - having no eaves or ensuring there is no access to the roof through the eaves; and
    - using 'bird-spikes' on roof edges, fences and lighting.
- waste management on site will include careful management of any food waste from employees, for example by providing waste bins which are inaccessible to birds and vermin; and
- the above measures are to be documented in a management plan as part of the site's overall environmental management plan to define roles, responsibilities, and actions to ensure the above are implemented, managed, and maintained.

Should birds or other wildlife start using the site, particularly in numbers of concern, the operator of the ARRC and/or quarry would engage specialists to survey/monitor the species utilising the site to remedy the situation.

Regular discussions and consultation with WSACo and Airservices Australia will continue as the airport layout and systems are defined. This is a standard process that is ongoing, using in the form of an airport safety committee, for the life of all projects to ensure that aviation safety standards are maintained to the required level. WSACo have indicated their willingness to include the operators of the ARRC as a participant in their future safety committee

7.2.5 Conclusion

The project would not have adverse impacts on operation of the WSA and is not an activity that would infringe on Prescribed Airspace and require approval under the Commonwealth *Airports Act 1996*.

7.3 Air quality

7.3.1 Introduction

An air quality impact assessment (AQIA) has been prepared by EMM to assess the air quality impacts of the ARRC on sensitive assessment locations and the WSA (Appendix I). The relevant SEARs and how they are addressed, are summarised in Appendix A.

7.3.2 Assessment approach

i Overview

Particulate matter pollutants (TSP, PM_{10} and $PM_{2.5}$) were assessed as the key pollutants with regards to both magnitude of emissions generated by the project and the associated compliance with impact assessment criteria at surrounding receptors.

No odorous waste streams would be accepted by the ARRC. Vegetation waste (eg garden waste, branches, leaves, grass) and timber and wood waste (eg pallets, offcuts, shavings, building and demolition timber) will be accepted, however the processing of this waste will be limited to shredding and blending (all of which will occur within the warehouse). There will be no composting onsite. As there were no sources of odour emissions identified from ARRC operations, odour was not quantitively assessed.

The AQIA was prepared in general accordance with the guidelines specified by the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2016a). The AQIA provides a Level 2 assessment approach:

- emissions were estimated for all relevant activities, using best practice emission estimation techniques;
- dispersion modelling using a regulatory dispersion model was used to predict ground-level concentrations for key pollutants at surrounding sensitive receptors; and
- cumulative impacts were assessed, taking into account the combined effect of the project with existing baseline air quality, as well as neighbouring projects and proposed/approved future development.

ii Assessment criteria

The impact assessment criteria for particulate matter are presented in Table 7.2.

Table 7.2 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)

Notes: µg/m^3: micrograms per cubic meter; g/m^2/month: grams per square metre per month

iii Assessment locations

The nearest sensitive locations to the quarry are listed in Table 7.3 and shown in Figure 7.3. The closest residence (R3) is located adjacent to the lot's northern boundary and about 70 m east of the site access road. This is currently unoccupied. The closest occupied residence (R6) is adjacent to the lot's western boundary and about 200 m west of the closest part of the ARRC site. The Hubertus Country Club and pistol range is located south-west of the ARRC site.

Table 7.3 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

In addition, air quality at receptors associated with the Western Sydney Airport was modelled for discrete receptor points are at the future terminal area, runway area, fuel farm area and airport infrastructure area.

7.3.3 Existing environment

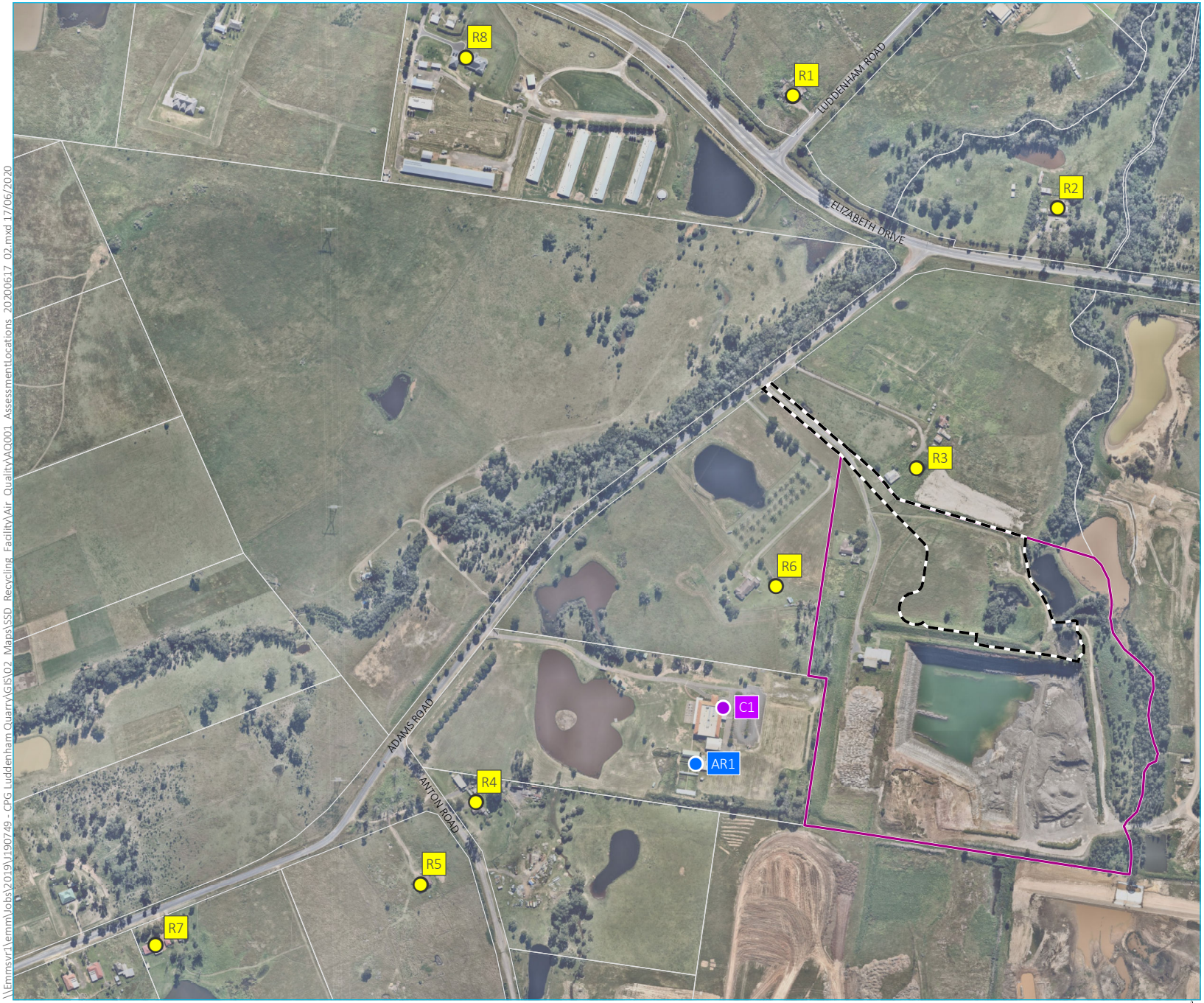
i Introduction

Consideration of cumulative impacts is required to assess how a project will interact with existing and future sources of emissions to determine compliance with impact assessment criteria. Cumulative impacts are assessed by taking into account the existing baseline, or background, air quality and the potential future development that is not captured by historical background monitoring data.

The existing local air quality environment is expected to be primarily influenced by traffic, other commercial activity, seasonal emissions from household wood heaters, episodic emissions from bushfires and the construction of the WSA (bulk earthworks started in late 2018). The existing baseline or background air quality was determined based on monitoring data from the monitoring site at Bringelly, approximately 6 km south-east of the subject property. A detailed overview of the local meteorology is provided in Appendix I.

ii Background levels

Future changes to the local air quality environment can be expected from the reactivation of the Luddenham Quarry (until 2024), filling of the quarry void and the future operation of the WSA (from 2026).



KEY

- Subject property
- ARRC site
- Cadastral boundary

Assessment location

- Active recreation
- Commercial
- Residential

\\Emmsvr1\emm\Jobs\2019\I190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\Air Quality\AQ001 AssessmentLocations 20200617 02.mxd 17/06/2020

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

0 100 200 m

GDA 1994 MGA Zone 56

N

Assessment locations
(air quality)

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.3

EMM
creating opportunities

a Airborne dust

The relevant baseline summary statistics for PM_{10} and $PM_{2.5}$ for the previous five years were assessed to determine an appropriate baseline dataset for use in the AQIA. Excluding 2019 which had unusually high airborne particulate concentrations, annual mean PM_{10} concentrations range are 18.5 µg/m³, or 74% of the EPA annual average criterion of 25 µg/m³. Excluding 2019, annual mean $PM_{2.5}$ concentrations range are 7.3 µg/m³ or 92% of the EPA annual average criterion of 8 µg/m³.

Exceedances of the 24-hour average reporting standards for PM_{10} occurred in all years, ranging from one day in 2015 to nine days in 2018. Exceedances of the 24-hour average reporting standards for $PM_{2.5}$ occurred in 2017 (twice) and 2018 (four times). The highest concentration not above the relevant EPA annual average criterion was used for cumulative assessment to determine if additional exceedances would occur.

Baseline annual average TSP concentrations were derived from the PM_{10} data.

b Dust deposition

Dust deposition monitoring was conducted onsite between 2015 to 2018. A complete year of monthly monitoring results are only available for 2016 and 2017. The annual average dust deposition for these years range from 0.7 to 3.7 g/m²/month, with an average across all sites of 1.5 g/m²/month.

iii Proposed future development

The construction of the WSA is underway, however the influence of associated emissions on local air quality is not necessarily captured by the 2017 monitoring data at Bringelly. Construction activities will occur between 2019 and 2025. Based on the *Western Sydney Airport Construction Plan – Stage 1 Development* (WSA Co 2018), Bulk earthwork activities, which feature the highest potential for particulate matter emission generation, are expected to completed by the end of 2022.

The cumulative impacts of quarry operations have been modelled with the operation of ARRC for all assessment locations. If the current application to reactivate the quarry is approved, the quarry would operate for approximately four years, until the end of 2024.

Site establishment and construction of the ARRC are expected to take approximately 15 to 18 months, therefore, assuming operation of the ARRC commences around 2022, the following cumulative scenarios were assessed:

- Scenario 1: concurrent operation of the ARRC with the Luddenham Quarry and construction phase of the WSA for approximately 3–4 years (from about 2022 to 2025), noting that if the void filling is subsequently approved, this scenario would can be taken to be representative of a cumulative scenario for this activity also;

- Scenario 2: concurrent operation of the ARRC with the operation of the WSA, from the completion of quarry rehabilitation. It is noted that the modelled operational scenario for Stage 1 of the WSA assumes full passenger capacity in 2030, therefore technically the results presented for this cumulative scenario would be from 2030 onwards.

Subject to approval, quarry rehabilitation will include filling the quarry void will with non-recyclable residue from the ARRC. The details of filling the void are not yet known, however, the equipment required and the intensity of the activity are expected to be less than the quarry operations. Therefore, Scenario 1 can be taken to be representative of a cumulative scenario up to completion of quarry rehabilitation, noting that there will be a lower cumulative contribution from WSA, as it moves from construction to operational phase.

Atmospheric dispersion modelling used the AERMOD dispersion model.

7.3.4 Impact assessment

i Emissions

All material handling and processing will occur within the warehouse, which is enclosed on all sides. All dust emissions, except for wheel generated dust on the access roads, will be generated with the warehouse and subject to controls afforded by enclosure and misters at the entrances. A single emissions scenario was modelled based on the maximum throughput rate of 600,000 tpa. The AQIA provides details the of emission sources and the dust control factors applied.

As waste handling and stockpiling is enclosed, the most significant source of emissions of TSP and PM_{10} is associated with the haulage of waste and product (external to the warehouse), followed by activities occurring within the warehouse.

As discussed in Section 7.3.3iii, the AQIA assessment considered dust emissions associated with the reactivation of the quarry.

ii Modelling results

The predicted incremental and cumulative annual average PM_{10} and $PM_{2.5}$ concentrations are presented in Table 7.4. Predicted exceedances of the impact assessment criteria are shown in bold. Contour plots for the predicted incremental annual average PM_{10} and $PM_{2.5}$ concentrations are presented in Appendix D of the AQIA (Appendix I).

Table 7.4 Predicted incremental and cumulative annual average PM_{10} and $PM_{2.5}$ concentrations

	PM_{10} (µg/m³)			$PM_{2.5}$ (µg/m³)		
	Increment	**Cumulative Scenario 1 (Construction of WSA + Luddenham Quarry)**	**Cumulative Scenario 2 (Operation of WSA only)**	**Increment**	**Cumulative Scenario 1 (Construction of WSA + Luddenham Quarry)**	**Cumulative Scenario 2 (Operation of WSA only)**
Goal		**25 µg/m³**			**8 µg/m³**	
R1	0.2	19.1	18.8	0.1	7.5	7.5
R2	0.3	19.4	18.9	0.1	7.6	7.5
R3	3.9	24.7	22.6	1.3	**9.2**	**8.8**
R4	0.1	19.4	18.8	0.1	7.6	7.6
R5	0.1	19.2	18.8	0.1	7.6	7.6
R6	1.1	21.2	19.8	0.4	**8.2**	7.9
R7	0.1	19.1	18.8	0.0	7.6	7.5
R8	0.1	19.0	18.7	0.0	7.5	7.4
C1	0.5	20.8	19.2	0.2	8.0	7.7
AR1	0.3	20.5	19.1	0.2	7.9	7.7

The highest predicted project increment for annual average PM_{10} is 3.9 µg/m³ at assessment location R3. The next highest predicted project increment (1.1 µg/m³) occurs at R6. There are no exceedances of the impact assessment criterion for annual average PM_{10}.

The highest predicted project increment for annual average $PM_{2.5}$ is 1.3 µg/m³ also at assessment location R3. The next highest predicted project increment (0.4 µg/m³) occurs at R6. For both cumulative assessment scenarios, there is an exceedance of the impact assessment criterion for annual average $PM_{2.5}$ at R3 (9.2 µg/m³ for Scenario 1 and 8.8 µg/m³ for Scenario 2). For Scenario 1, while the construction of the WSA and the operation of the quarry are both occurring, there is also an exceedance of the impact assessment criterion for annual average $PM_{2.5}$ at R6 (8.2 µg/m³) primarily due the high background concentrations.

a 24-hour average PM_{10} and $PM_{2.5}$

The predicted incremental and cumulative 24-hours average PM_{10} and $PM_{2.5}$ concentrations are presented in Table 7.5. Exceedances of the impact assessment criteria are shown in bold, and the number of additional days above the goal are shown in brackets. Contour plots for the predicted incremental 24-hours average annual average PM_{10} and $PM_{2.5}$ concentrations are presented in Appendix D of the AQIA (Appendix I).

Table 7.5 Predicted incremental and cumulative 24-hour average PM_{10} and $PM_{2.5}$ concentrations

	PM_{10} (µg/m³) (number of additional days above goal shown in brackets)			$PM_{2.5}$ (µg/m³) (number of additional days above goal shown in brackets)		
	Increment	Cumulative scenario 1 (Construction of WSA + Luddenham Quarry)	Cumulative scenario 2 (Operation of WSA only)	Increment	Cumulative scenario 1 (Construction of WSA + Luddenham Quarry)	Cumulative scenario 2 (Operation of WSA only)
Goal		**50 µg/m³**			**25 µg/m³**	
R1	0.9	47.9	45.0	0.4	23.6	23.6
R2	1.2	48.1	45.0	0.5	23.4	23.4
R3	9.1	**53.4 (6)**	**50.4 (2)**	3.2	**26.2 (2)**	**26.2 (2)**
R4	1.9	48.0	46.0	0.9	23.7	23.7
R5	0.9	48.1	46.1	0.5	23.7	23.7
R6	5.0	49.6	47.0	2.1	24.3	24.3
R7	1.1	47.8	45.8	0.5	23.7	23.7
R8	1.1	47.7	44.7	0.5	23.2	23.2
C1	3.4	49.5	47.1	1.4	24.0	24.0
AR1	1.9	49.2	46.9	1.0	24.0	24.0

The highest predicted project increment for 24-hour average PM_{10} is 9.1 µg/m³, at assessment location R3. The next highest predicted project increment (5.0 µg/m³) occurs at assessment location R6. The highest predicted project increment for 24-hour average $PM_{2.5}$ is 3.2 µg/m³, at assessment location R3. The next highest predicted project increment (2.1 µg/m³) occurs at R6.

As described in in Section 7.3.3, there are six existing exceedances of the daily PM_{10} criterion in the 2017 background dataset. With the additional contribution from the construction and operation of the WSA, there are another two exceedances of the daily PM_{10} criterion (total of eight existing exceedances across all receptors assumed for background). Therefore, for PM_{10}, the 9th highest cumulative concentrations are presented.

At R3, there are predicted to be six and two additional days over the daily PM_{10} criterion for Scenario 1 and 2 respectively. The background (plus WSA construction) contributes most to each daily exceedance. It is also evident that on a number of days the exceedance is negligible and based on the conservative assumptions used in the modelling, these would be unlikely to eventuate.

There are two existing exceedances of the daily $PM_{2.5}$ criterion in the 2017 background dataset. With the additional contribution from the construction and operational phase of the WSA, no additional exceedances are predicted to occur. Therefore, the third highest cumulative concentrations are presented for 24-hour average $PM_{2.5}$ for both scenarios. There are two additional days over the impact assessment criterion for both scenarios at R3.

b Annual average TSP and dust deposition

The predicted project increment and cumulative annual average TSP concentrations and dust deposition levels are presented in Table 7.6. Exceedances of the impact assessment criteria are shown in bold. Contour plots for the predicted incremental annual average TSP concentrations and dust deposition levels are presented in Appendix D of the AQIA (Appendix I).

Table 7.6 Predicted incremental and cumulative TSP concentrations and dust deposition levels

	TSP (µg/m³)			Dust deposition (g/m²/month)		
	Increment	Cumulative Scenario 1 (Construction of WSA + Luddenham Quarry)	Cumulative Scenario 2 (Operation of WSA only)	Increment	Cumulative Scenario 1 (Construction of WSA + Luddenham Quarry)	Cumulative Scenario 2 (Operation of WSA only)
Goal		**90 µg/m³**		**2 g/m²/m**	**4 g/m²/month**	
R1	0.5	51.2	50.2	0.03	1.7	1.6
R2	1.1	52.9	50.8	0.06	1.7	1.6
R3	16.7	**92.5**	66.4	0.8	2.4	1.7
R4	0.5	51.1	50.2	0.02	1.6	1.6
R5	0.3	50.7	50.0	0.01	1.6	1.6
R6	3.9	61.2	53.6	0.2	1.8	1.6
R7	0.2	50.2	49.9	0.01	1.6	1.6
R8	0.3	50.5	50.0	0.01	1.6	1.6
C1	1.7	54.9	51.4	0.07	1.7	1.6
AR1	1.1	53.1	50.8	0.05	1.6	1.6

The highest predicted project increment for annual average TSP is 16.7 µg/m³, at assessment location R3. The highest predicted project increment for annual average dust deposition (0.8 g/m²/month at R3) is below the incremental impact assessment criterion of 2 g/m²/month.

For cumulative scenario 1, there is an exceedance of the impact assessment criterion for annual average TSP at R3 (92.5 µg/m³). There are no exceedances of the cumulative impact assessment criterion of 4 g/m²/month for dust deposition.

c Modelling predictions for future airport receptors

The air quality at receptors associated with the Western Sydney Airport was modelled for discrete receptor points are at the future terminal area, runway area, fuel farm area and airport infrastructure area. Modelling predictions are presented in Table 7.7 for Scenario 2 only (as the quarry would not operate concurrently with airport operations).

No exceedances of air quality assessment criteria are predicted at the airport terminal, runway, fuel farm or airport infrastructure areas.

Table 7.7 Incremental and cumulative modelling predictions for airport receptors – Scenario 2

	24-hour PM_{10} (µg/m³)		Annual PM_{10} (µg/m³)		24-hour $PM_{2.5}$ (µg/m³)		Annual $PM_{2.5}$ (µg/m³)		Annual TSP (µg/m³)		Annual dust deposition (g/m²/month)	
	Increment	Cumulative	Increment	Cumulative	Increment	Cumulative	Increment	Cumulative	Increment	Cumulative	Increment	Cumulative
Terminal R1	1.1	45.8	0.04	18.9	0.7	23.8	0.02	7.5	0.1	49.8	0.06	1.6
Terminal R2	0.8	45.8	0.04	18.9	0.4	23.8	0.02	7.5	0.1	49.8	0.05	1.6
Terminal R3	0.8	45.8	0.05	19.0	0.3	23.9	0.03	7.5	0.2	49.9	0.08	1.6
Runway R1	1.3	45.8	0.06	19.0	0.6	23.8	0.03	7.5	0.2	49.9	0.12	1.6
Runway R2	1.3	45.9	0.12	19.0	0.7	23.8	0.06	7.6	0.4	50.1	0.19	1.6
Runway R3	1.4	45.8	0.13	19.0	0.8	23.9	0.07	7.6	0.4	50.1	0.18	1.6
Fuel farm R1	1.9	45.9	0.33	19.2	0.8	24.2	0.14	7.6	1.3	51.0	0.60	1.7
Fuel farm R2	2.8	45.9	0.42	19.3	1.4	24.2	0.19	7.7	1.5	51.2	0.75	1.7
Fuel farm R3	3.0	45.9	0.32	19.2	1.4	24.0	0.16	7.7	1.1	50.8	0.52	1.6
Infrastructure R1	0.4	45.8	0.03	18.9	0.2	23.8	0.01	7.5	0.1	49.8	0.04	1.6
Infrastructure R2	0.5	45.8	0.04	18.9	0.4	23.8	0.02	7.5	0.1	49.8	0.06	1.6
Infrastructure R3	0.4	45.8	0.03	18.9	0.2	23.8	0.02	7.5	0.1	49.8	0.05	1.6

7.3.5 Mitigation measures

i Dust management and monitoring

The proposed dust controls for the ARRC site will include:

- all waste, recycled products and non-recyclable residues will be handled, processed and stored within the enclosed warehouse;
- the access road and roads around the ARRC will be sealed;
- a water cart will operate on the sealed roads;
- water sprays would be applied directly to the crusher and screens;
- misting water sprays to operate at each exit point of the warehouse; and
- a street sweeper will be used at least twice a day on the access roads when silt levels accumulate or as required.

Other control measures not explicitly applied as a reduction factor in the emission inventory include:

- double handling of material will be avoided wherever possible;
- vehicle speed limits (40 kph on sealed roads) will be applied; and
- a wheelwash will be installed that will reduce dust levels on tires.

Wheel generated dust from trucks entering and exiting the site was the largest contributing source in the air quality model. The installation of a wheel wash deployment of a street sweeper twice a day will reduce the silt loading of the road surface and will significantly reduce dust emissions from truck movements.

The dust controls will be formally documented in an air quality management plan, prepared following approval of the ARRC and are expected to be effective for eliminating potential exceedances of the impact assessment criteria at adjacent receptors.

A Best Management Practice (BMP) determination is provided in Section 7.1 of the AQIA (Appendix I).

ii Monitoring

An *Air Quality Monitoring Programme* was developed in 2009 for the operation of the quarry (Golder 2009) and will be reviewed and augmented following approval for the reactivation of the quarry. It is anticipated that, a combined Air Quality Management Plan will be developed for the subject site, monitoring the operation of the quarry and ARRC.

The combined Air Quality Management Plan would outline the monitoring requirements, including equipment type, locations, frequency and duration.

The existing quarry monitoring programme, comprising four dust deposition gauges, would also continue (existing locations will be reviewed based on the revised quarry plan if the reactivation is approved).

In addition, daily visual monitoring of activities would be undertaken to monitor the effectiveness of dust controls and allow for reactive and corrective measures to be implemented. The inspections will focus on the following key issues:

- inspect the sealed roads for high silt loading and clean surface using water cart/street sweeper if required;
- inspect and report on water cart activity and effectiveness; and
- inspect and report on dust leaving the warehouse building and effectiveness of water misting sprays at exit points.

7.3.6 Greenhouse gas assessment

i Introduction

The estimation of GHG emissions for the project was based on the Commonwealth Department of the Environment and Energy (DoEE) National Greenhouse Accounts Factors (NGAF) workbook (DoEE 2019).

ii Activity data

The estimated diesel consumption was based on the proposed equipment, estimated utilisation and published fuel consumption for similar equipment (see Appendix I) at a similar facility scaled according to the relative annual throughput for the ARRC.

iii Emission estimates

The estimated annual GHG emissions for each emission source are presented in Table 7.8. The significance of project GHG emissions relative to state and national GHG emissions is made by comparing annual average GHG emissions against the most recent available total GHG emissions inventories (AEGIS (2015) for calendar year 2017) for NSW (128,870 kt CO_2-e) and Australia (530,841 kt CO_2-e). Annual average GHG emissions (Scope 1 and 2) generated by the project represent approximately 0.001% of total GHG emissions for NSW and 0.0003% of total GHG emissions for Australia, based on the National Greenhouse Gas Inventory for 2017.

Table 7.8 Estimated annual greenhouse gas emissions

Scope 1 (t CO_2-e/year)	Scope 2 (t CO_2-e/year)	Scope 3 (t CO_2-e/year)	
Diesel	**Electricity**	**Diesel**	**Electricity**
843	575	43	13

GHG emissions from the project are principally associated with on-site energy consumption, specifically diesel combustion and consumption of purchased electricity.

iv Emission management

Measures and practices designed to improve energy efficiency, will assist with the management of project GHG emissions, for example:

- regular maintenance of plant and equipment to minimise fuel consumption;
- efficient site operations planning (eg minimising rehandling and haulage of material) to minimise fuel consumption; and
- consideration of energy efficiency in the plant equipment selection phase.

Opportunities to improve energy efficiency will be investigated on an ongoing basis throughout the life of the project.

7.3.7 Conclusion

In summary, the AQIA (Appendix I) predicted that criteria for annual average PM_{10} and annual average dust deposition will be met at all sensitive receivers, while the criteria for 24-hour average PM_{10}, annual average $PM_{2.5}$, 24-hour average $PM_{2.5}$ and annual average TSP will be met at all sensitive receivers, with the exception of:

- 24-hour average PM_{10} – annually, there will be six additional days over the criterion for Scenario 1 and two additional days over the criterion for Scenario 2 at receptor R3;
- annual average $PM_{2.5}$ – the criterion will be exceeded for both cumulative assessment scenarios at receptor R3;
- annual average $PM_{2.5}$ – the criterion will be exceeded for Scenario 1 at receptor R6, primarily due to the high background concentration;
- 24-hour average $PM_{2.5}$ – annually, there will be two additional days over the criterion for both scenarios at receptor R3; and
- annual average TSP – an exceedance of the criterion is predicted for Scenario 1 at receptor R3.

No air quality assessment criteria are predicted to be exceeded at the airport terminal, runway, fuel farm or airport infrastructure areas.

The risk of exceedance is higher during Scenario 1 (the concurrent construction phase of the WSA and operation of the quarry), which is expected to relatively short-lived (ie limited to the first 3–4 years of operation of the ARRC). It is noted that the quarry will be rehabilitated (filled) following the completion of quarrying, however the intensity of this activity is expected to be less than the quarry operations and impacts are expected to the lower than during these first 3–4 years.

The potential for short-term impacts will be managed by planning for adverse weather and through reactive and corrective dust controls, which will be formally documented in an air quality management plan.

Annual average GHG emissions (Scope 1 and 2) generated by the project represent approximately 0.001% of total GHG emissions for NSW and 0.0003% of total GHG emissions for Australia, based on the National Greenhouse Gas Inventory for 2017.

7.4 Noise and vibration

7.4.1 Introduction

A noise and vibration impact assessment (NVIA) has been prepared by EMM (Appendix J). The relevant SEARs and how they are addressed, are summarised in Appendix A.

7.4.2 Assessment approach

The NVIA considers the noise and vibration impacts of the ARRC operations and related traffic impacts at noise-sensitive assessment locations. The assessment allows for the operation of the quarry, the potential changes to the area as the Western Sydney Aerotropolis develops and noise exposure as outlined in the *Western Sydney Airport EIS, Assessment of Ground-Based Operational Noise* (Wilkinson Murray 2015).

The NVIA was prepared in accordance with:

- *Noise Policy for Industry* (NPfI) (EPA 2017);
- *Interim Construction Noise Guideline* (ICNG) (DECC 2009); and
- *NSW Road Noise Policy* (RNP) (EPA 2011).

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.

Road traffic noise levels from the ARRC were assessed by calculating existing noise and existing plus project traffic noise at representative residential assessment locations. The potential road traffic noise impacts on residential properties on Adams Road and Elizabeth Drive were considered assuming that there is an even distribution of ARRC traffic on Adams Road north and south of the ARRC site and that the ARRC is operating at full production.

7.4.3 Existing environment

i Assessment locations

The same noise sensitive receivers (also referred to assessment locations) were used in the AQIA and NVIA (listed in Table 7.3 and shown in Figure 7.4).

ii Ambient noise

Unattended noise monitoring was undertaken from 25 February to 5 March 2020 by EMM at three locations surrounding the site (Figure 7.4):

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

A summary of existing background and ambient noise levels are provided in Table 7.9.

KEY

- Subject property
- ARRC site
- Cadastral boundary
- Noise measurement location

Assessment location

- Active recreation
- Commercial
- Residential

\\Emmsvr1\emm\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\Noise & Vibration\NVIA001 AssessmentLocations 20200616 02.mxd 17/06/2020

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

0 100 200 m

GDA 1994 MGA Zone 56

N

Noise monitoring and assessment locations

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.4

EMM
creating opportunities

Table 7.9 Summary of existing background and ambient noise

Monitoring location	Period[1]	Rating background level (RBL), dBA	Measured $L_{Aeq,\ period}$ noise level[2], dBA
NM1 – 2111 Elizabeth Street, Luddenham	Day	46	60
	Evening	40	55
	Night	39	55
NM2 – 275 Adams Road, Luddenham	Day	39	50
	Evening	38	54
	Night	35	45
NM3 – 225 Adams Road, Luddenham	Day	37	49
	Evening	38	45
	Night	33	43

1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am, Sunday to Friday and 10 pm to 8 am Saturday and public holidays.
2. The energy averaged noise level over the measurement period and representative of general ambient noise.

7.4.4 Future acoustic environment

i Western Sydney Airport

Operation of WSA from 2026 will significantly alter the acoustic environment around the ARRC site. The NVIA (Appendix J) considered noise levels from ground running and taxiing noise were predicted for worst-case meteorological conditions for 2030, representing Stage 1 of WSA. Ground running of aircraft has the potential to impact up to 7,258 residences above the criterion of 45 dBA and taxiing to impact up to 3,117 residences above a criterion of 40 dBA (Wilkinson Murray 2015). The noise contours for taxiing activities in 2030 (Wilkinson Murray (2015) Figure 3-3) confirm that residences and other land uses within 1,500 m of the Luddenham quarry operations would be exposed to noise levels from WSA activities of $L_{Aeq,15min}$ 50–60 dBA.

ii Land use and rezoning

The subject property and adjacent areas including residential properties and the Hubertus Club are proposed to be rezoned to Agribusiness (see Section 4.3). Agribusiness is to "allow for limited residential development that is ancillary to Agricultural and Agribusiness operations outside of the ANEC/ANEF 20 and above contours". The proposed Aerotropolis SEPP ANEC/ANEF mapping shows that all existing residences in the vicinity of the subject property are located within the ANEC/ANEF 20 contour for the proposed WSA. The proposed Agribusiness land use table to states that an objective is to: "*Ensure there are no sensitive land uses (such as residential, aged care, early education and childcare, educational establishments and hospitals amongst other uses) located within the ANEC 20 and above contours*."

Changing land use in the vicinity of the proposed ARRC needs to be considered in developing appropriate noise assessment criteria. It is anticipated that the existing residential properties in closest proximity to the ARRC site (R3 to R6) are unlikely to remain in the medium term (3–5 years) with transition to uses aligned with the new zoning under the Aerotropolis SEPP.

7.4.5 Assessment criteria

Given the expected change to the zoning of the ARRC site and surrounds, the NVIA assessment considered compliance with PTNLs currently applicable to the project and predicted compliance with the amenity criteria for the rezoned land following commencement of the Aerotropolis SEPP.

Subject to final gazetting of the Aerotropolis SEPP, future development of the land surrounding the ARRC site will need to consider the ANEC/ANEF contours to ensure there is no development in noise sensitive land uses within the ANEC/ANEF 20 and above contours. The ARRC site and assessment locations R1 to R7 are within this contour.

i Operations prior to 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 ARRC 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 PNTL is the lower of the calculated intrusiveness or amenity noise level. Sleep disturbance criteria also apply prior to rezoning.

ii Operations after rezoning

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) $L_{eq,period}$ / 68 dB(A) $L_{eq,15min}$ has been applied to the existing isolated residential properties following rezoning of the area. The sleep disturbance criteria would no longer apply after the area is the rezoned.

Considering the predicted noise exposure from previous quarry operations and transitional nature of the area in the context of the development of the WSA and broader Aerotropolis, the application of an amenity criteria for limited day operations may be considered appropriate prior to rezoning and would result in a PNTL of 53 dBA.

iii Road traffic noise

The impact of the road traffic noise was assessed against the criteria specified by the *NSW Road Noise Policy* (EPA 2011). Under this policy, Elizabeth Drive is classified as an arterial road and Adams Road is classified as a sub-arterial road.

iv Construction noise and vibration

Noise management levels (NMLs) during construction were established using the method provided in the *Interim Construction Noise Guideline* (DECC 2009). The assessment vibration during construction considered safe working distances as they apply to cosmetic damage of typical buildings and to human comfort.

7.4.6 Impact assessment

i Operational noise

Operational noise associated with the ARRC will principally be from mobile plant and equipment, including road trucks. All waste acceptance, processing, storing and dispatching operations will be carried out within a large warehouse building.

Predicted operational noise levels at each assessment location are provided in Table 7.10 for day, evening and night operations of the ARRC. The daytime noise levels from the combined ARRC and quarry are also provided. The levels presented for each assessment location represents the energy-average noise level over a 15-minute period under noise enhancing conditions including 3 m/s winds (evening and night). The predictions have also considered cumulative noise associated with concurrent ARRC and MOD5 quarry operations during day hours.

Predicted $L_{Aeq,15min}$ operational noise contours representing day operations under ISO9613 noise enhancing conditions are provided in Figure 5.1, Figure 5.2 and Figure 5.3 of Appendix J.

Table 7.10 Predicted operational noise levels – ISO9613 and 3 m/s wind (evening/night)

Assessment location	Classification	Period	PNTL[1], dB $L_{Aeq,15min}$	Industrial amenity criterion[2], dB $L_{Aeq,15min}$	Predicted ARRC and [ARRC + quarry] noise level, dB $L_{Aeq,15min}$
R1	Residential	Day	51	68	41 [44]
		Evening	43		40-43
		Night	38		**40-43**
R2	Residential	Day	51		45 [47]
		Evening	43		**45-47**
		Night	38		**45-47**
R3[4]	Residential	Day	44		**60 [61]**
		Evening	43		**59**
		Night	38		**59**
R4	Residential	Day	42		40 **[47]**
		Evening	42		**40-42**
		Night	38		**39-42**
R5	Residential	Day	42		38 **[46]**
		Evening	42		38-41
		Night	38		38-**41**
R6	Residential	Day	42		**51 [55]**
		Evening	42		**50-52**
		Night	38		**50-52**
R7	Residential	Day	42		35 [42]
		Evening	42		35-38
		Night	38		35-38
R8	Residential	Day	51		37 [42]
		Evening	43		37-39

Table 7.10 Predicted operational noise levels – ISO9613 and 3 m/s wind (evening/night)

Assessment location	Classification	Period	PNTL[1], dB $L_{Aeq,15min}$	Industrial amenity criterion[2], dB $L_{Aeq,15min}$	Predicted ARRC and [ARRC + quarry] noise level, dB $L_{Aeq,15min}$
		Night	38		36-**39**
AR1	Active recreation	When is use	53	68	43-48 [50]
C1	Commercial	When is use	63		45-48 [52]

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

Calculated levels from cumulative MOD5 quarry + ARRC operations are in brackets [] for day-time operations up to 2024

a Prior to rezoning

For the operation of the ARRC alone, it is predicted that the PNTLs at assessment locations will be exceeded at:

- Day: R3 (+16 dB) and R6 (+9 dB);
- Evening: R2 (+4 dB), R3 (+16 dB) and R6 (+10 dB); and
- Night: R2 (+9 dB), R3 (+21 dB), R4 (+4 dB), R5 (+3 dB) and R6 (+14 dB).

Prior to the rezoning of the land, it is predicted that the ARRC noise levels will satisfy the day amenity level (53 dBA) at most assessment locations, with the exception being R3 (currently unoccupied).

Noise exceedances were predicted for a number of residential assessment locations during the day under standard ISO9613 noise enhancing conditions for MOD5 quarry operations (EMM 2020b). For the operation of the combined ARRC and quarry (Table 7.10), it is predicted that the PNTLs will be exceeded at the following assessment locations:

- R3 (+17 dB);
- R4 (+5 dB);
- R5 (+4 dB); and
- R6 (+13 dB).

The modelling predicts that the applicable amenity noise levels will be satisfied at the active recreation (AR1) and commercial (C1) components of the Hubertus Club for both ARRC and cumulative ARRC and MOD5 quarry operations.

These predictions assume that all quarry equipment is operating and that all ARRC components (including deliveries, processing and dispatch) are operating simultaneously at a rate that would allow 600,000 tpa of waste to be delivered, processed and the products/unrecyclable residues dispatched, and that airport construction activities are also occurring. With ARRC operations expected to start in early 2022, it is unlikely that the ARRC will reach full capacity prior to the completion of quarrying activities at the end of 2024. Therefore, the predictions above represent a worst-case scenario.

Additional noise mitigation measures, such as restricting operational hours, noise mitigation measures or negotiated agreements, will be required if ARRC operations commence prior to the area being rezoned (see Section 7.4.7i).

b After rezoning

After to the rezoning of the land, it is predicted that the ARRC noise levels will satisfy the applicable industrial amenity criterion (68 dB $L_{Aeq,15min}$) at all assessment locations (Table 7.10).

This recognises the envisaged future commercial/industrial use of the agribusiness zone. Over time, particularly after the start of airport operations (Section 7.4.4), the acoustic environment will be significantly altered with ambient background and L_{Aeq} noise levels significantly increased. Notwithstanding, the applicants will consult with the affected residents regarding potential noise mitigation measures (see Section 7.4.7i).

It is noted, that while the applicable noise criteria at the residences will increase with the rezoning of the land, the value of the land will also increase substantially as a result of the rezoning.

As the amenity criterion (68 dB $L_{Aeq,15min}$) is predicted to be met at all assessment locations on surrounding properties, it is generally predicted that the criterion will be met at all future developments on these properties. However, this will be in part dependent on the configuration of the developments.

ii Intermittent noise events (sleep disturbance)

a Prior to rezoning

Results of modelling confirm compliance with the sleep disturbance screening level of 52 dBA for most residential assessment locations with the exception of R3 and R6 prior to rezoning. Residences R3 and R6 may be offered at-receiver noise mitigation under VLAMP procedures and negotiated agreements associated with MOD5 quarry operations (EMM 2020b). The incorporation of at receiver mitigation or the application of negotiated agreements would address any potential impacts for associated with sleep disturbance impacts of the ARRC if operations start prior to rezoning.

Additional noise mitigation measures will be required if operations commence prior to the area being rezoned (see Section 7.4.7i).

b After rezoning

The sleep disturbance screening levels will not apply after the area is rezoned. Notwithstanding, the applicants will consult with the affected residents regarding potential noise mitigation measures.

iii Road traffic noise

Road traffic noise levels are predicted to satisfy RNP assessment requirements on the Adams Road north of the ARRC site and on Elizabeth Drive. There is the potential for road traffic noise levels to exceed RNP assessment criteria on Adams Road south of the ARRC site and management measures or restrictions on project-related traffic movements may be required.

iv Construction

Construction noise levels from the project are predicted to exceed noise management levels (NMLs) at the closest assessment locations, with exceedances greater than 10 dB above NML at R3 and R6. Accordingly, residents will be notified prior to works commencing. Noise monitoring during construction will be considered to determine if actual construction noise levels are above NMLs. Subject to the measured level of exceedance, availability of feasible and reasonable noise mitigation and management measures will be determined. It is noted that the predicted noise

exceedances for construction activities are generally consistent (within 2 dB at R3) or less (R6) than predicted operational noise exceedances for ARRC and ARRC + Quarry operations during the daytime period at R3 and R6.

The potential for vibration impacts on residents and vibration sensitive structures near construction has been assessed. The nearest residence to construction activity is R3 which is approximately 40 m away from closest construction activities. This assessment location is outside of the safe working distances of likely plant, required to maintain acceptable human response and structural vibration levels. Vibration impacts from construction at residential assessment locations are therefore highly unlikely.

With the effective management and incorporation of mitigation and management measures listed in Section 7.4.7ii, construction noise and vibration emissions from the project can be managed to minimise impacts.

7.4.7 Mitigation measures

i Onsite noise

The operation of the ARRC is expected to commence following the rezoning of the land under the Aerotropolis SEPP. This is expected to occur in 2020. It is anticipated that ARRC construction will commence in early to mid 2021 and ARRC operations will commence in early 2022. If the application to modify the quarry's consent (MOD5, see Section 1.2) is approved, quarry operations will recommence as soon as possible and will be complete by December 2024. Airport operations are scheduled to start in 2026.

With the transition of land to industrial or commercial land use under either the Agribusiness zone, application of the industrial amenity criteria in accordance with the procedures of the NPfI (NPfI Table 2.2) for isolated residences in industrial zoned land would result in noise compliance with the relevant amenity noise goal of $L_{Aeq,period}$ 65 dB / $L_{Aeq,15min}$ 68 dB. Notwithstanding, the applicants will consult with the affected residents regarding potential noise mitigation measures.

Additional noise mitigation measures to reduce noise impacts, to comply with PTNLs as closely as reasonably and feasibly possible, will be required if operations commence prior to the area being rezoned (see Section 7.4.6i).

If construction of the ARRC is completed (anticipated to be late 2021) prior to rezoning of the area (anticipated to occur in 2020), the ARRC will only be operated during daytime hours until the completion of quarry operations in December 2024.

With the restriction in ARRC operations to daytime only, noise exceedances are restricted to assessment locations R3 (unoccupied) and R6. In this case, additional further noise mitigation measures will also be required to reduce noise impacts at R3 and R6. These measures may including the following:

- including of acoustic walls in the site design;
- automatic doors on the warehouse;
- acoustic treatments to residences; and
- negotiated agreements with residents.

ii Traffic noise

Based on current traffic growth projections on Adams Road, traffic noise increase criteria are predicted to be exceeded on the Adams Road south of the ARRC site, assuming that the load limit on the southern section of Adams Road has been lifted, and there is an even distribution of ARRC traffic on Adams Road north and south of the ARRC site and that the ARRC is operating at full production.

Potential measures that could be implemented are:

- Restrict project-related truck trips on Adams Road south of the ARRC site as follows:
  - Daytime (7am to 10 pm): 225 truck trips (in 2024) and 330 truck trips (in 2029); and
  - Night (10 pm to 7 am): 72 truck trips (in 2024) and 81 truck trips (in 2029).
- At-receiver treatments for impacted residential buildings.

These would need to be adjusted based on to the actual non-project related traffic using Adams Road in these years.

iii Construction

Construction is expected to commence in early to mid-2021. Construction noise levels above NMLs have been predicted for residential assessment locations prior to rezoning (expected to occur in 2020). It is not uncommon for construction projects to exceed NMLs. For this reason, they are not considered as noise criteria, but as a trigger for all feasible and reasonable noise mitigation and management to be considered, once exceeded.

Work practice methods to minimise construction noise will include:

- regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration;
- 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;
- where possible, avoiding the use of equipment that generates impulsive noise;
- notifying residents prior to the commencement of intensive works;
- 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.

7.4.8 Conclusion

Additional noise mitigation measures, such as restricting operational hours, noise mitigation measures or negotiated agreements, will be required if ARRC operations commence prior to the area being rezoned (see Section 7.4.7i). If construction of the ARRC is completed (anticipated to be late 2021) prior to rezoning of the area (anticipated to occur in 2020), the ARRC will only be operated during daytime hours until the completion of quarry operations in December 2024. After the rezoning of the land, it is predicted that the ARRC noise levels will satisfy the applicable industrial amenity criterion (68 dB $L_{Aeq,15min}$) at all assessment locations.

Traffic noise increase criteria are predicted to be met on Elizabeth Drive and on Adams Road north of the ARRC site however they may be exceeded on Adams Road south of the ARRC site and measures may need to be applied depending on the growth of project and project-related traffic.

With the effective management and incorporation of mitigation and management measures listed in Section 7.4.7ii, construction noise and vibration emissions from the project can be managed to minimise impacts.

7.5 Surface and groundwater

7.5.1 Introduction

A surface water assessment has been prepared by EMM (Appendix K). The relevant SEARs and how they are addressed, are summarised in Appendix A.

7.5.2 Assessment approach

The surface water assessment:

- reviews the existing surface water environment at the site;
- describes the proposed ARRC water management system;
- describes the water balance model of the ARRC water management system that was used to estimate the water volume captured by the water management system, the volume available for reuse, and the volume of site discharges;
- assesses flooding using a two-dimensional hydraulic model, with consideration of the flood modelling results for the WSA (GHD 2016), to provide detailed flood mapping; and
- reviews water licensing requirements.

The surface water assessment considers the following standards and guidelines:

- *Australian Rainfall and Runoff* (ARR) (Ball et al. 2019);
- *NSW Floodplain Development Manual* (DIPNR 2005);
- *Floodplain Risk Management Guideline – Practical Considerations of Climate Change* (DECC 2007a);
- *Floodplain Risk Management Guide – Incorporating 2016 Australian Rainfall and Runoff in Studies* (OEH 2019);
- *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom 2004);
- *NSW Water Quality and River Flow Objectives* (DECCW 2006);
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018);
- *Liquid Chemical Storage, Handling and Spill Management: Review of Best Practice Regulation* (DEC 2005); and
- *Storing and Handling Liquids: Environmental Protection: Participant's Manual* (DECC 2007b).

7.5.3 Existing environment

i Topography and geology

The topography of the subject property 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 mAHD. The riparian corridor along the Oaky Creek is the lowest point on the site at 60 mAHD. The ARRC site elevation is approximately 62–68 mAHD.

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.

ii Rainfall

Rainfall and evaporation for the Badgerys Creek McMasters station, 1 km north-east of the site, is presented in Table 7.11. Monthly rainfall is lowest between July and September, and highest from January to March.

Table 7.11 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 subject property 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 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 7.5).

iv Water quality

Water quality monitoring at the site has historically been undertaken at the following locations (see Appendix K):

- 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. Key results are summarised below.

- Salinity (as indicated by electrical conductivity) was elevated in the quarry'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.

KEY

- Subject property
- ARRC site
- Western Sydney Airport
- Major road
- Minor road
- Vehicular track

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 4th order

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

0 250 500 m

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\Surface Water\SW002 Watercourses 20200609 01.mxd 17/06/2020

Watercourses

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.5

EMM
creating opportunities

7.5.4 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. The construction impact zone is across the Oaky Creek headwaters (Figure 7.5). Areas of the Oaky Creek headwaters within the WSA site are being regraded to drain in a north-east direction, away from the subject property, and to provide a level surface for the WSA runway and associated infrastructure.

An increase in impervious catchment associated with the airport runway will be offset by the significant catchment area reductions to Oaky Creek upstream of the subject property. It is expected that Stage 1 will reduce pre-development peak flows at the subject property by approximately 4.5 m^3/s during a one-year average recurrence interval (ARI) event and 22 m^3/s during a 100-year ARI event.

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 was also simulated for the WSA EIS, where the PMF peak flow is expected to be approximately 40 m^3/s adjacent to the subject property and approximately 200 m^3/s downstream of the subject property at Elizabeth Drive.

The modelled flood extents and depths for the 100-year ARI and PMF events are presented in Figure 5.7 and Figure 5.8 of Appendix K respectively. Flood depths within Oaky Creek are estimated to be around 0.4 m to 0.8 m for a 100-year ARI event, with localised deeper sections up to 1.2 m. Flood depths are estimated to be around 1.2 m to 1.4 m for the PMF event with deeper sections up to 1.8 m.

The ARRC is predicted to remain above the limit of flooding along Oaky Creek for all events including the PMF for the Stage 1 development conditions of WSA, with the exception of the onsite detention storage, which is predicted to be inundated by the fringe of the PMF event. Development of the ARRC site is not predicted to increase flood levels in Oaky Creek.

7.5.5 Water management strategy

i Construction

The key objective of the water management strategy during construction of the ARRC is erosion prevention and sediment control. The erosion and sediment control practices that will be implemented during construction are described in Section 7.11.5.

A 40 m buffer zone along the eastern boundary of Oaky Creek will be maintained. No works are proposed within the buffer, which forms the waterfront land of the creek, as part of the ARRC.

ii Operations

The ARRC design incorporates a water management system to meet the following key objectives:

- minimise rainfall contact with waste material;
- separate stormwater runoff from water that may have contacted waste materials;
- minimise the use of potable water from the public supply by using non-potable water where it is acceptable and available;
- provide water quality controls and treatment to enable water reuse;

- minimise water discharges from the site; and
- minimise risks to the downstream receiving environment from discharges.

The key water management strategy adopted across the ARRC site is the containment and management of water that has potentially contacted waste material ('dirty water'), with treatment and reuse where feasible. The key features of the proposed water management system include:

- all acceptance, processing, storage and dispatch of waste and recycled product will be carried out within an enclosed warehouse;
- an internal pit and pipe network to convey stormwater to an onsite detention storage;
- capture of dirty water recycled from site activities in the warehouse within a leachate tank;
- treatment of dirty water within a water treatment plant;
- reuse of treated water and harvested stormwater to supply site activities; and
- discharge of excess stormwater from the onsite detention storage to Oaky Creek.

All dirty water captured from the warehouse will be treated by the water treatment plant, with all treated water reused for site activities. No untreated dirty water or treated dirty water is proposed to be discharged to the onsite detention storage or to Oaky Creek.

a Rainwater tanks

Stormwater runoff from a portion of the warehouse roof will be directed to rainwater tanks which will be used to supply water for toilets and irrigation of the landscaped areas of the site. The rainwater tanks will be topped up as required with treated water from the reuse water tanks.

b Stormwater management

An internal pit and pipe network will be utilised to convey stormwater runoff from the warehouse roof, site offices, roads, carparks and landscaped areas will be directed to the onsite detention storage. Inlet pits will be fitted with a gross pollutant trap to capture gross pollutants and coarse sediment prior to runoff entering the pipe network. The onsite detention storage enables suspended solids to settle out of the water column and also allows stormwater to be used to supplement the supply of water for site activities in the warehouse.

Stormwater overflows from the onsite detention storage will discharge to Oaky Creek. The storage outlet will include scour protection and suitable energy dissipation measures will be constructed at the point of confluence with Oaky Creek. This will reduce erosion potential associated with concentrated discharges and increased runoff rates.

Stormwater runoff from the western end of the access road (approximately 100 m) will be directed via kerb and guttering to an existing table drain on Adams Road and will ultimately discharge to the Liverpool City Council stormwater network. Stormwater runoff from the remaining access road will be captured by the internal stormwater network described above.

c Water treatment plant

A water treatment plant will be installed to treat dirty water from activities within the warehouse. Where practical, this water will be reticulated to a leachate tank. Dirty water stored within the leachate tank will be directed to the water treatment plant for treatment as described in Appendix K.

Treatment requirements will be confirmed through testing. Sludge produced through pre-treatment clarification process will be contained and disposed of at an offsite licensed waste facility.

Treated water will be stored within reuse water tanks and will be used to supply site activities within the warehouse.

Periodic maintenance of the water treatment plant is expected to be required for up to 12 hours per week and include:

- refilling of chemicals;
- inspection of the treatment system;
- de-sludge clarifiers and tanks; and
- monitor and test outflow.

d Warehouse

Water will be supplied to the following activities within the warehouse:

- sprinklers located at the entry and exit points of the warehouse;
- vehicle and plant washdown;
- dust suppression of waste and product stockpiles; and
- soil washing process.

The misters will be supplied by potable water due to human health risks. Water for washdown, dust suppression and soil washing activities will be obtained from the following sources (in order of supply):

- treated water from the reuse water tanks;
- harvested stormwater from the onsite detention storage; and
- potable water supply.

Fuel and any hazardous chemicals will be stored in bunded facilities within the warehouse in accordance with NSW government guidelines (refer to Section 7.5.2) and Australian Standard AS1940:2004.

e Potable water and wastewater

Potable water for the offices, amenities and misters located at the entry and exit points of the warehouse will be sourced from the Sydney Water potable water supply network or, prior to the ARRC site being connected to mains water, by tanker and stored within a 100-kL tank, which is expected to be refilled up to once per week. Potable water will also be used for washdown, dust suppression and soil washing activities when demand exceeds the supply from the reuse water tanks and onsite detention storage.

Prior to a connection to Sydney Water's reticulated wastewater system, wastewater generated by onsite amenities will be discharged to a septic holding tank, which will be pumped out by an approved licensed contractor when required.

7.5.6 Impact assessment

As described above, the ARRC onsite detention storage will receive stormwater runoff from the warehouse roof, site offices, roads, carparks and landscaped areas. Reuse of harvested stormwater will reduce the volume and frequency of discharges from the onsite detention storage to Oaky Creek. The storage will function to attenuate stormwater flows from the site as well as providing water quality treatment through sedimentation. Discharges are predicted to occur from the onsite detention storage into Oaky Creek. Scour protection and energy dissipation will be constructed at the discharge location and at the confluence with Oaky Creek to reduce erosion potential associated with the increased flow rates from the immediate site.

The site is not predicted to change existing flood conditions for all storm events up to and including the PMF event.

With the implementation of the management measures described in Section 7.5.7, discharges to Oaky Creek will be restricted to overflows of stormwater runoff from the onsite detention storage. No discharge of untreated dirty water or treated water is proposed. Therefore, the operation of the ARRC is expected to have negligible impact on the water quality of downstream receiving environments.

7.5.7 Mitigation measures

i Water management system

No untreated dirty water or treated water will be directed to the onsite detention storage or discharged to Oaky Creek. Discharges will occur most frequently following periods of rainfall, at which time there is expected to be dilution by coincident flows in Oaky Creek.

Water quality controls that will be applied to the site to prevent any material change or degradation of the water quality of Oaky Creek due to discharges include:

- all acceptance, processing, storage and dispatch of waste and recycled product will be carried out within an enclosed warehouse;
- separating dirty water that has potentially come into contact with waste material from stormwater runoff from the warehouse roof, site offices, roads, carparks and landscaped areas;
- incoming and processed waste will be stored, processed and handled under cover;
- installing and operating a water treatment plant to treat dirty water, with treated water reused preferentially to supply site activities;
- installing a gross pollutant trap within inlet pits to capture gross pollutants and coarse sediment prior to stormwater runoff entering the pipe network; and
- enabling the settlement of suspended solids out of the water column within the onsite detention storage.

The requirement for additional stormwater treatment devices will be determined during the detailed design phase of the project and will be sized to meet Liverpool City Council pollution reduction targets.

ii Monitoring, inspection and maintenance programs

A water management plan will be developed for the ARRC. The plan will address any specific development consent or licence conditions and is recommended to 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.

The proposed water management system monitoring, inspection and maintenance program is described in Chapter 8 of Appendix K. This program will include monitoring of Oaky Creek upstream and downstream of the ARRC site; regular informal and quarterly formal inspections of the water management system; and maintenance of the system, such as the removal of excessive sediment accumulation or macrophyte growth from the onsite detention storage.

iii Water licensing

Stormwater runoff captured by the onsite detention storage will be reused for operational activities or discharged to Oaky Creek. Water take from the storage is excluded works under Schedule 1, item 3 of the NSW 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 consistent with industry best practice to prevent the contamination of a watercourse is also excluded from harvestable rights calculations. Accordingly, the ARRC is not expected to have any requirements for licensing of surface water take.

7.5.8 Conclusion

The ARRC water management system will separate clean stormwater runoff from dirty water from active ARRC areas. The dirty water will be treated and reused. Captured stormwater may be released from the onsite detention storage to Oaky Creek. The use of harvested stormwater will reduce the volume and frequency of these discharges.

Water quality controls, including the storage, processing and handling of waste material will be within the fully enclosed warehouse and the containment, treatment and reuse of water that has potentially come into contact with waste material, will prevent any material change or degradation of the water quality of Oaky Creek due to discharges.

The site is not predicted to change existing flood conditions for all storm events up to and including the PMF event.

7.6 Traffic and transport

7.6.1 Introduction

A traffic impact assessment (TIA) has been prepared by EMM to assess the potential traffic impacts associated with the proposed ARRC (Appendix L). The relevant SEARs and how they are addressed, are summarised in Appendix A.

7.6.2 Assessment approach

The TIA was prepared in accordance with the requirements of the *Guide to Traffic Generating Developments* (RTA 2002) and considers the *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* (Austroads 2016).

The TIA uses the Transport for New South Wales (TfNSW) Strategic Travel Forecasting Model (STFM) for 2026, 2031, and 2036, which provides traffic levels in the region including from existing land uses and future land uses related to the staged Western Sydney Airport and Aerotropolis development.

7.6.3 Existing environment

The site has a narrow frontage on Adams Road with a fenced access road connecting the bulk of the site to Adams Road (Photograph 7.1). The existing access road is generally unsealed and there is no constructed intersection currently on Adams Road.

Photograph 7.1 Existing driveway off Adams Road

Adams Road is a local road managed by Liverpool City Council. It intersects with Elizabeth Drive about 250 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 alignment, number of lanes, carriageway type/width, posted speed limit, heavy vehicle access and traffic function for each of these roads, including photographs, are presented in Appendix L.

The key intersections that will be impacted by development traffic are:

- Elizabeth Drive/Adams Road intersection;
- Elizabeth Drive/Luddenham Road intersection; and
- The Northern Road/Adams Road intersection.

Currently all three intersections are priority-controlled T-intersections. However, The Northern Road/Adams Road intersection is currently being upgraded and as part of the Western Sydney Aerotropolis development as discussed in Appendix L. The *Draft Western Sydney Aerotropolis Plan* (WSPP 2019) provides a structure plan for the land uses surrounding the proposed Western Sydney Airport. This indicates that, in the long-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. However, no details of this realignment are presently available. The new M12 Motorway will provide a direct access from the M7 Motorway to the Western Sydney Airport as well as to The Northern Road. As a result, Elizabeth Drive will be partly relieved from regional traffic.

i Existing traffic volumes

a Intersection counts

Intersection traffic was surveyed between 6.00 am and 9.00 am, as well as between 3.00 pm and 6.00 pm, on 27 November 2019 at the three key intersections.

The survey results indicate that the network peak hours are:

- AM peak hour: 6.30 am to 7.30 am; and
- PM peak hour: 4.45 pm to 5.45 pm.

As it is proposed to reactivate the quarry, dispatching up to 300,000 tpa of clay and shale from the site, quarry traffic was included as part of the baseline traffic data for the assessment of the ARRC. In the absence of the approval to reactivate the quarry, there will be less total traffic from the site and the traffic impacts will be lower.

The baseline traffic volume in 2020 was determined as the sum of the surveyed traffic and quarry traffic (refer to Figure 7.6).

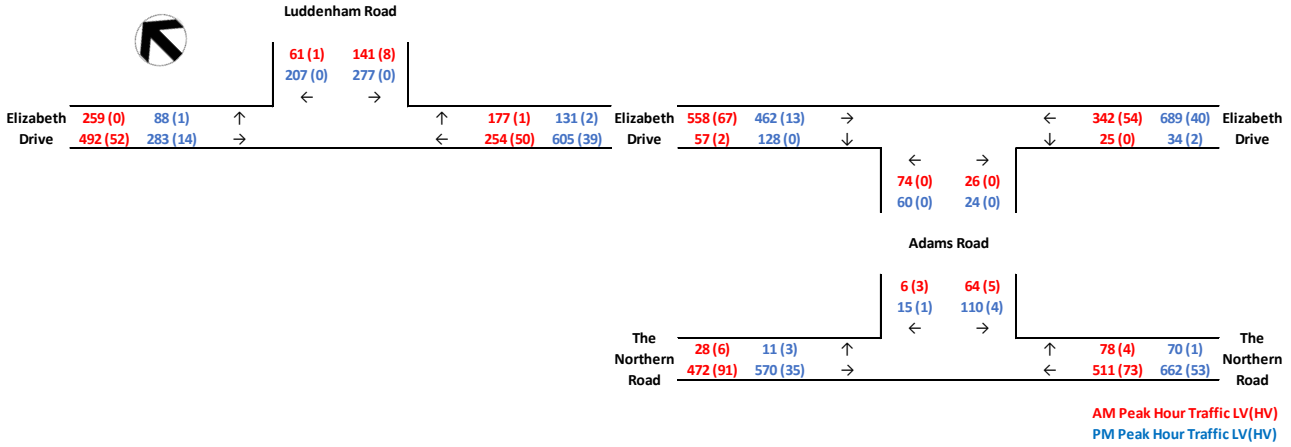


Figure 7.6 2020 AM & PM peak baseline traffic volume

b Tube counts

A tube traffic count was undertaken on Adams Road north of Anton Road for a 7-day period between 27 November 2019 and 3 December 2019. The annual average daily traffic (AADT), weekly 85th percentile speed, and heavy vehicle percentage were recorded (refer to Table 7.12).

The traffic count showed that Adams Road carries about 2,100 vehicles per day with an average of 7% heavy vehicles. Given the rural nature of the road, the high heavy vehicle proportion is considered acceptable. However, the 85th percentile speed of this road was well above the posted speed limit (70 km/h).

There is an existing heavy vehicle load restriction on Adams Road (3 tonnes and over). Consultation is in progress with Liverpool City Council regarding lifting the load limit restriction. In this process, a formal review of the speed in this road is likely to take place.

Table 7.12 Summary of tube count results – Adams Road

	5-day AADT	Heavy vehicle percentage (%)	Weekly 85th percentile speed (km/h)
North-eastbound	1,089	7.4	81
South-westbound	1,009	6.9	82
Combined	2,099	7.2	81

ii Crash analysis

Based on TfNSW Centre for Road Safety data between 2014 and 2018, there were five crashes on Adams Road including at its intersections with Elizabeth Drive and The Northern Road. There were no fatal incidents and the overall crash rate is considered low over the 5-year period, which indicates that the road can be considered safe currently. However, due to the development of the Western Sydney Airport, the future land uses and road network in the locality are expected to change significantly, with significant growth of traffic which is likely to generate different statistics.

iii Public transport

There are currently no public transport services accessible to the site.

The Western Sydney Airport EIS (DIRD 2016) noted that bus routes 789 and 801 will be altered in consultation with the bus operator and TfNSW. The altered bus stops may be accessible to/from the site with more frequent services in the future.

The Commonwealth and NSW State governments have undertaken a scoping study for Western Sydney rail needs. In future, the Western Sydney Airport will be supported by direct rail links to Schofields, Parramatta, Macarthur, and Leppington. The recently announced Sydney Metro Train Greater West will include a station at Luddenham, about 5 km north of the site, and two stations within the Western Sydney Airport site.

iv Active transport

Pedestrian and cycling infrastructure in the area is currently limited, reflecting the predominantly rural character of the area. As the Western Sydney Priority Growth Area and South West Priority Growth Area develop, additional cycleway links will be provided and integrated within the Liverpool cycleway network.

v Future traffic volumes

The future baseline traffic volumes in the locality, incorporating the generated traffic associated with Western Sydney Airport staged development, have been provided by TfNSW in the form of their Strategic Travel Forecasting Model (STFM) 'link' traffic volume outputs for 2026, 2031 and 2036. Due to the lack of detailed intersection information, the higher future 'link' volumes have been used to factor future intersection traffic movements from the existing intersection count data.

A new Northern Road/Adams Road intersection is currently being constructed. Changing the intersection from its current 3-leg configuration to a 4-leg configuration, the TIA assumed that traffic will either enter or exit Adams Road via The Northern Road (ie with no through traffic movements to/from the other section of Adams Road). In addition, the future traffic splits for the new approach (via Adams Road west) were assumed. The future STFM model-derived 2026, 2031 and 2036 intersection turning movements were interpolated/extrapolated to yield 2029, 2034 and 2039 traffic volumes. The 2029, 2034 and 2039 baseline traffic volumes for each intersection are presented in Figure 7.7, Figure 7.8 and Figure 7.9 respectively. There are no known specific developments that would alter these STFM forecasts.

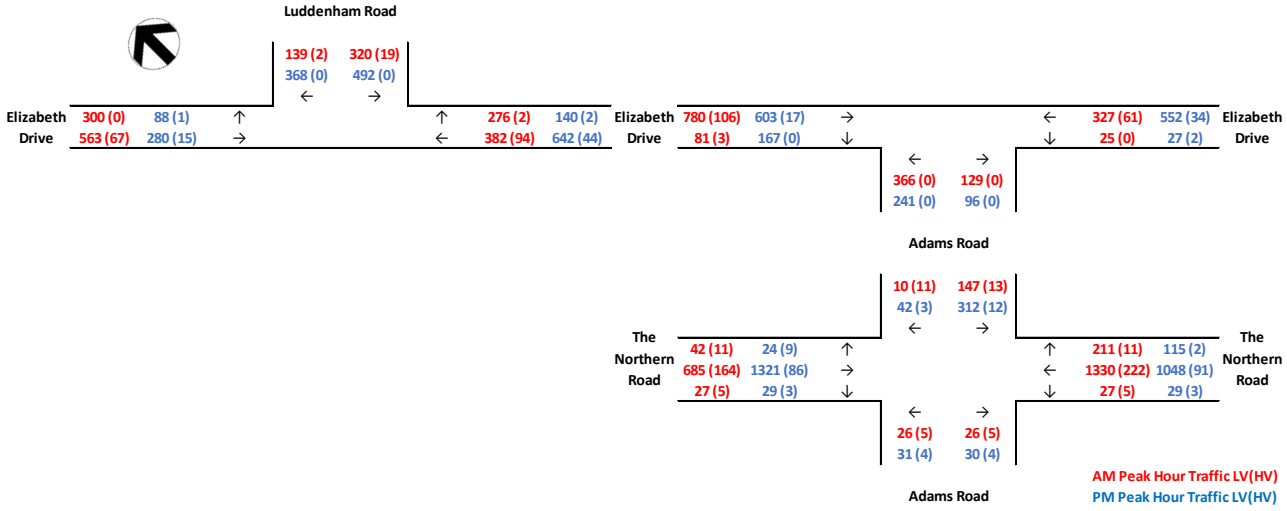


Figure 7.7 2029 STFM traffic volume

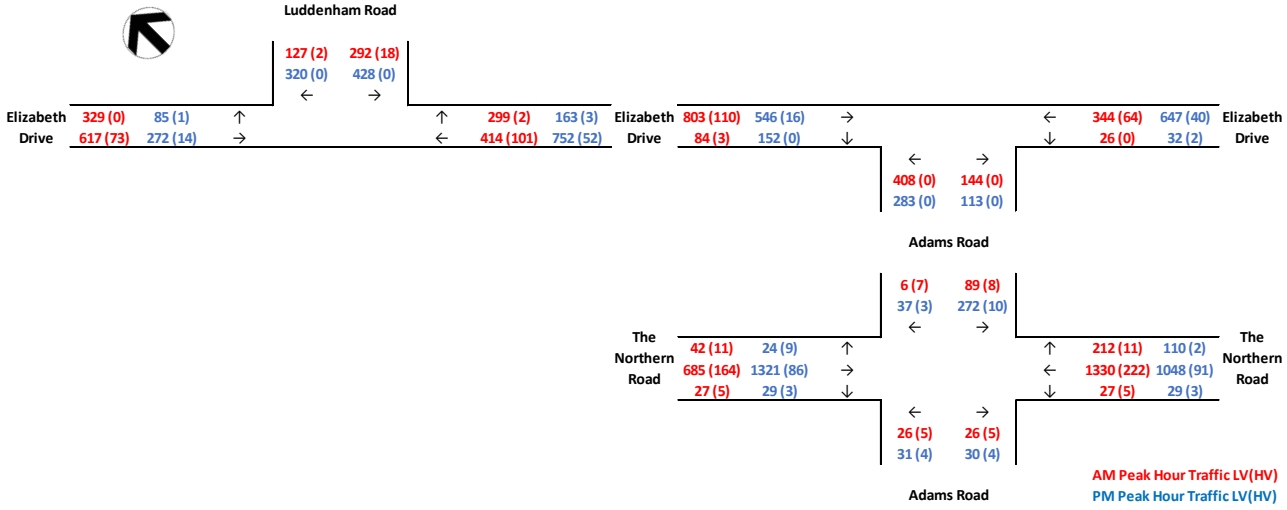


Figure 7.8 2034 STFM traffic volume

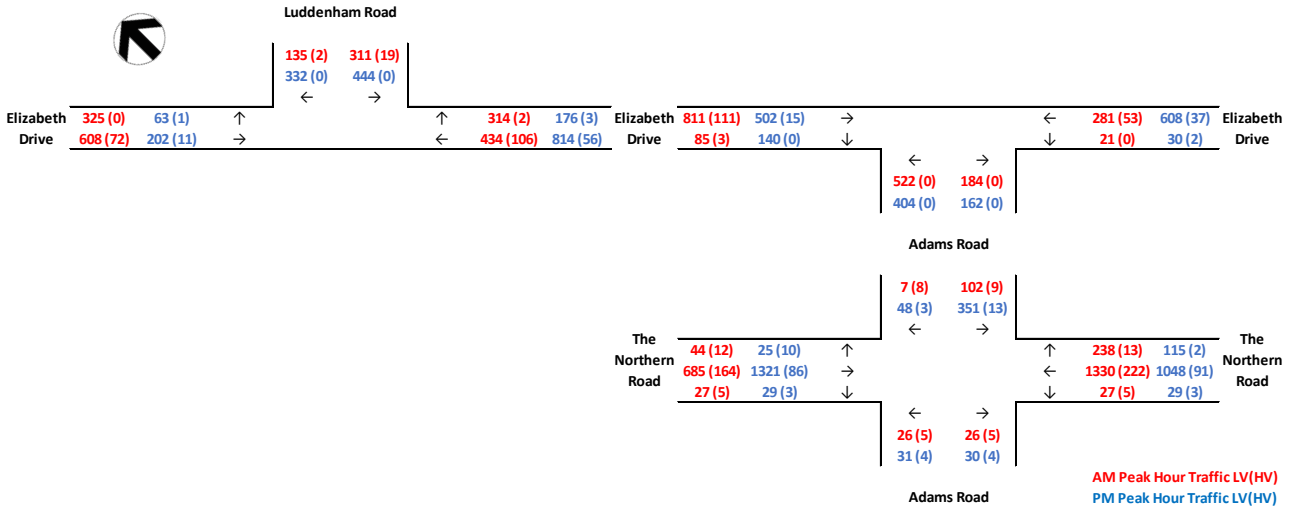


Figure 7.9 2039 STFM traffic volume

7.6.4 Proposed development

i Traffic generation

Based on conservative assumptions, the ARRC will generate a total of 1,368 vehicle movements (see Section 2.3). at full production This equates to approximately heavy vehicle 184 movements in the AM peak hour, and approximately 62 movements in the PM peak hour (refer Appendix L).

The Western Sydney Aerotropolis development would allow the realigned The Northern Road, M12 Motorway and Elizabeth Drive to provide a north-south and an east-west arterial connection to other parts of Sydney (refer Appendix L). It is expected that Elizabeth Drive will be upgraded as part of the M12 construction which will provide the major arterial connections between M7 Motorway and the realigned The Northern Road. Both the M12 construction and Elizabeth Drive upgrade are expected to be completed before the start of Western Sydney Airport operations in 2026. Therefore, it is considered that ultimately incoming waste and outgoing products will be dispatched to various parts of Sydney will able to utilise these upgraded road networks resulting in 50% of AARC traffic travelling to/from the north and 50% there to/from the south on Adams Road (assessed as the 'even distribution').

The whole of Adams Road will need to be upgraded and the 3-tonne heavy vehicle load limit would need to be lifted, before this even distribution scenario is possible, ie for ARRC-related heavy vehicles to use the Adams Road south of the subject property. While the road upgrades are expected to occur as part of the development of the area, it is not known when they will occur.

The applicant is proposing to upgrade the northern section of Adams Road, between the subject property access road and Elizabeth Drive, to allow the load limit on this section of Adams Road to be lifted (see Section 7.6.6). Until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using this northern section of Adams Road and Elizabeth Drive. This has been assessed as the 'alternative distribution'.

The TIA assumes ARRC staff car trips will follow the intersection turn movement proportions of the existing road network.

a Even distribution

The future even distribution car and truck traffic movements at the key intersections have been assessed based on the volumes presented in Figure 7.10. This assumes that the load limit on Adams Road north and south of the subject property is lifted following road upgrades.

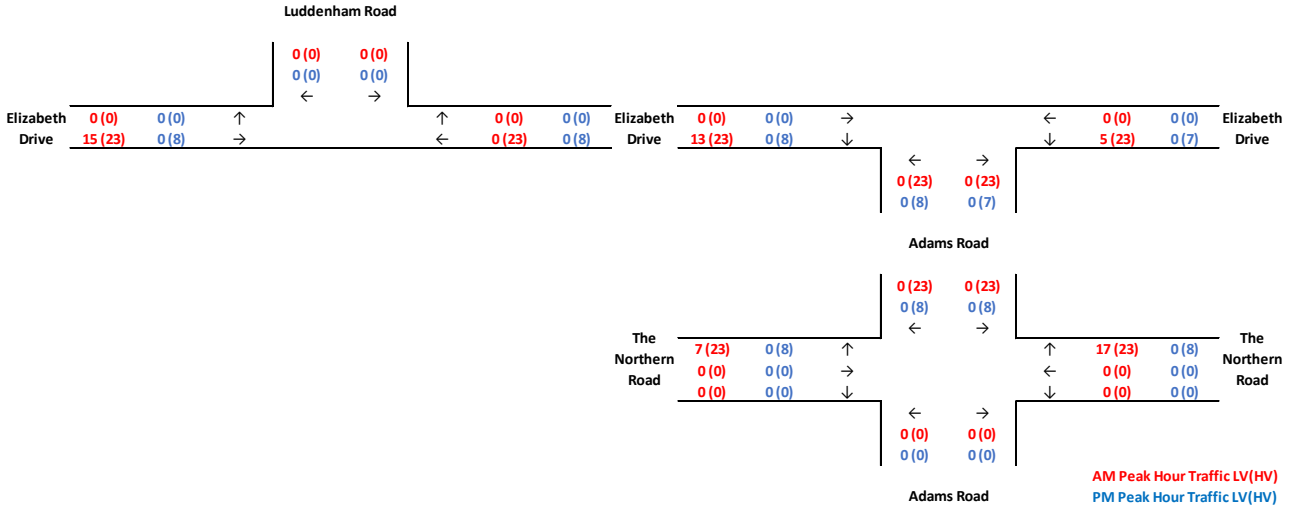


Figure 7.10 Project-related traffic generation – even distribution

b Alternative distribution

The future alternative distribution car and truck traffic movements at the key intersections are presented in Figure 7.11. This assumes that the load limit on Adams Road north of the subject property is lifted following road upgrades but that the load limit on Adams Road south of the subject property remains.

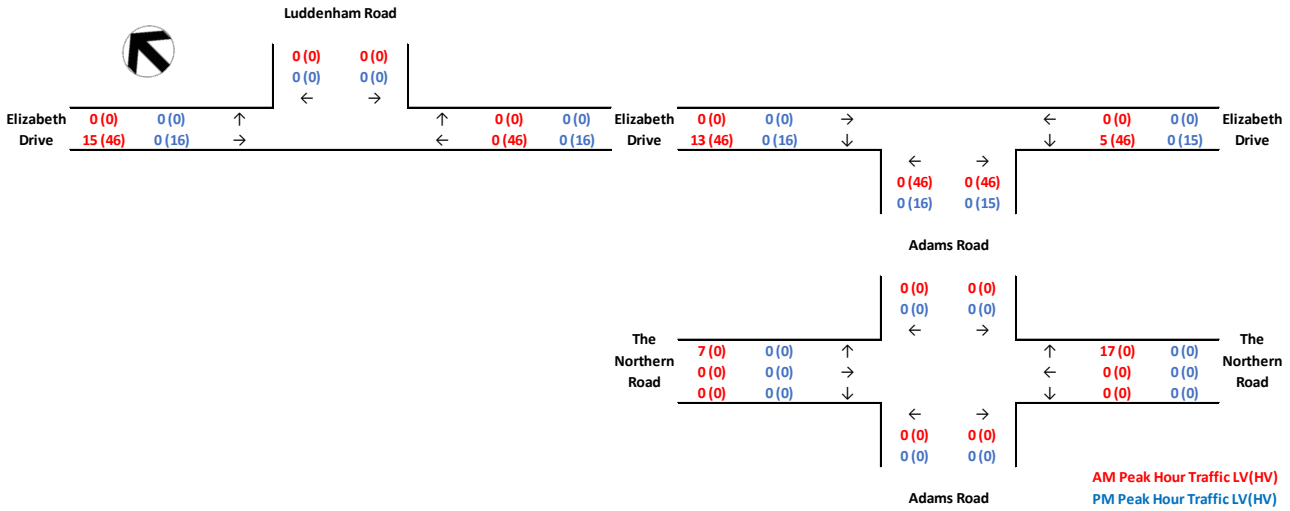


Figure 7.11 Project-related traffic generation – alternative distribution

ii Development traffic

a Even distribution

The even distribution traffic volumes at the key intersections including the baseline traffic and the site generated traffic, subject to the load limits being lifted along the whole of Adams Road as described above, have been calculated for 2020, 2029, 2034, and 2039 (refer to Figure 7.12, Figure 7.13, Figure 7.14 and Figure 7.15 respectively).

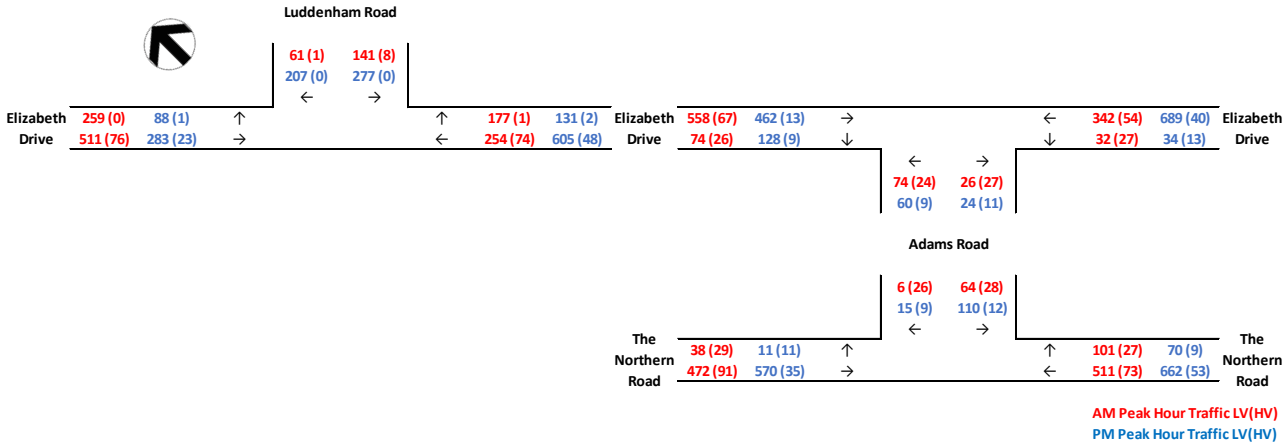


Figure 7.12 Post-development traffic volume – even distribution (2020)

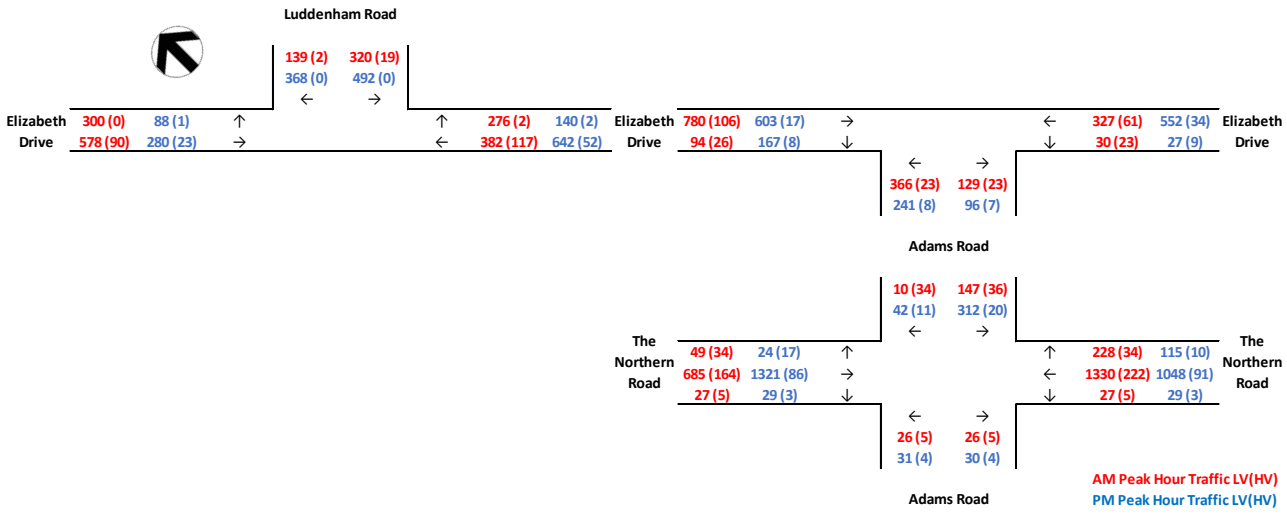


Figure 7.13 Post-development traffic volume – even distribution (2029)

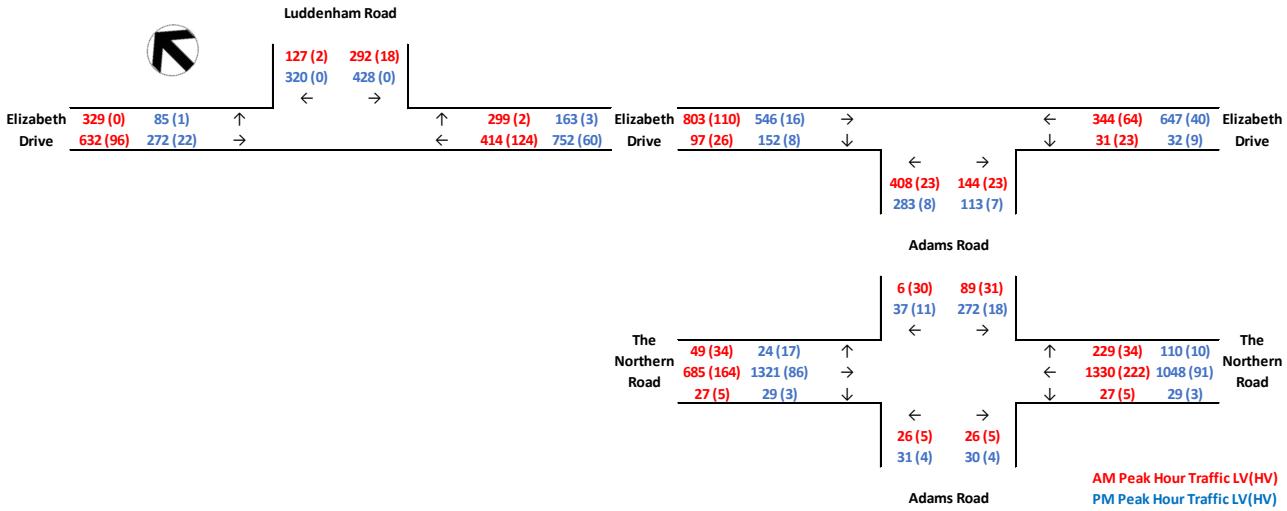


Figure 7.14 Post-development traffic volume – even distribution (2034)

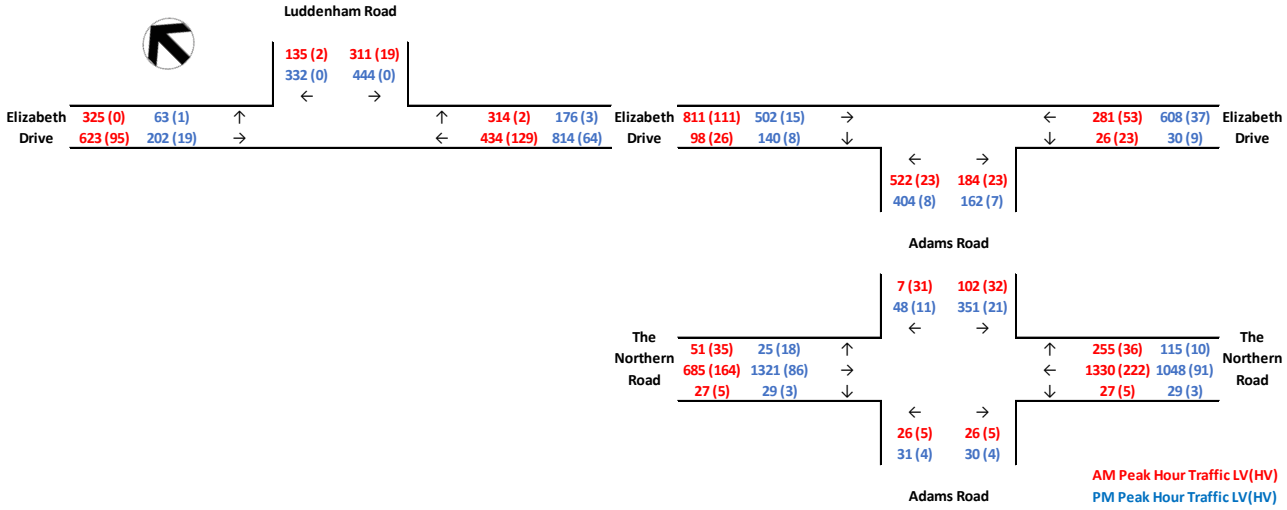


Figure 7.15 Post-development traffic volume – even distribution (2039)

b Alternative distribution

The alternative distribution traffic volumes, subject to the load limits only being lifted on the northern section of Adams Road as described above, are presented in Figure 7.16, Figure 7.17, Figure 7.18 and Figure 7.19.

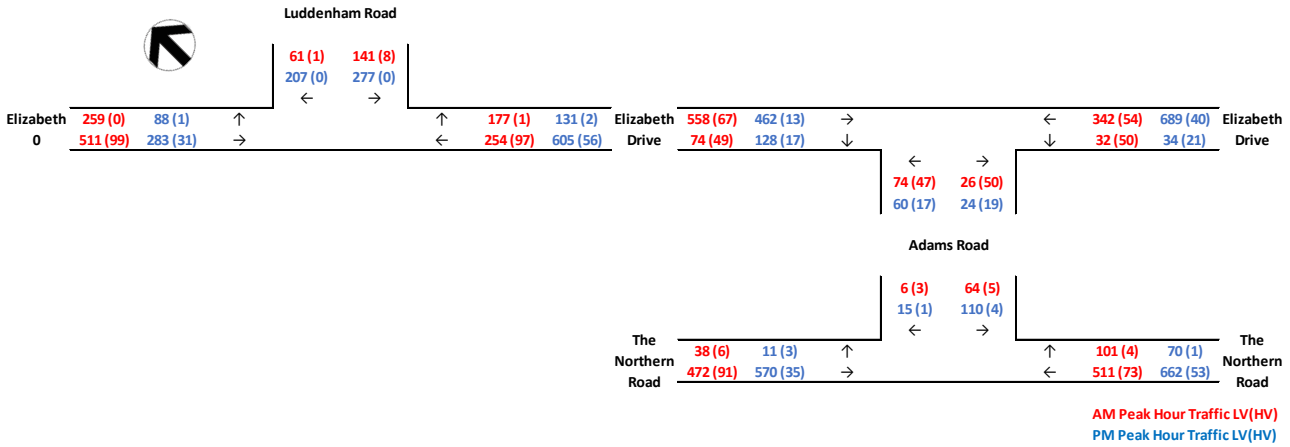


Figure 7.16 Post-development traffic volume – alternative distribution (2020)

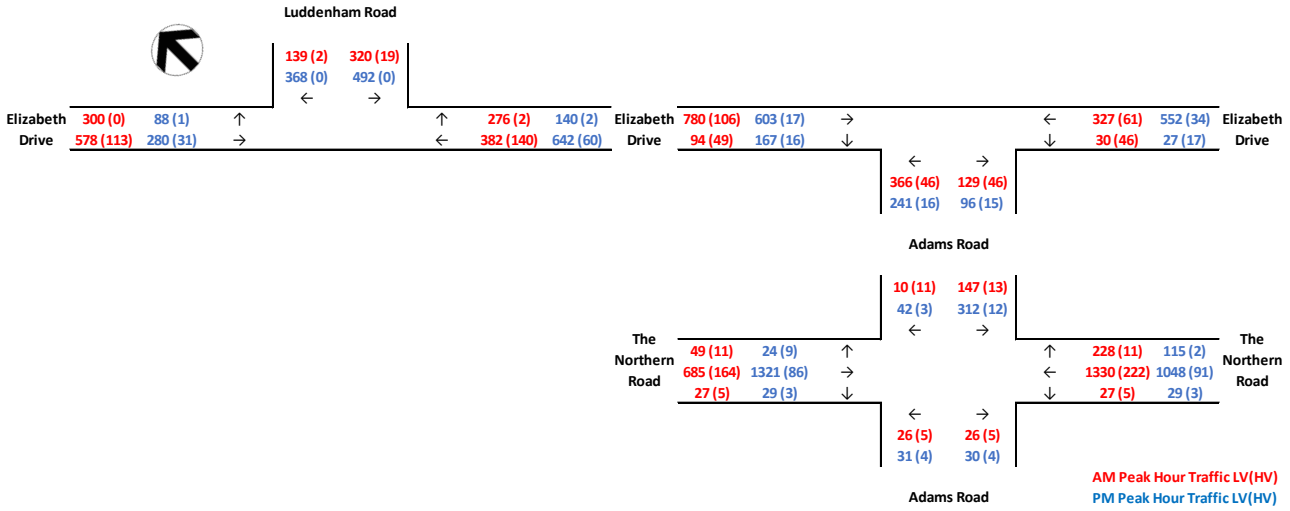


Figure 7.17 Post-development traffic volume – alternative distribution (2029)

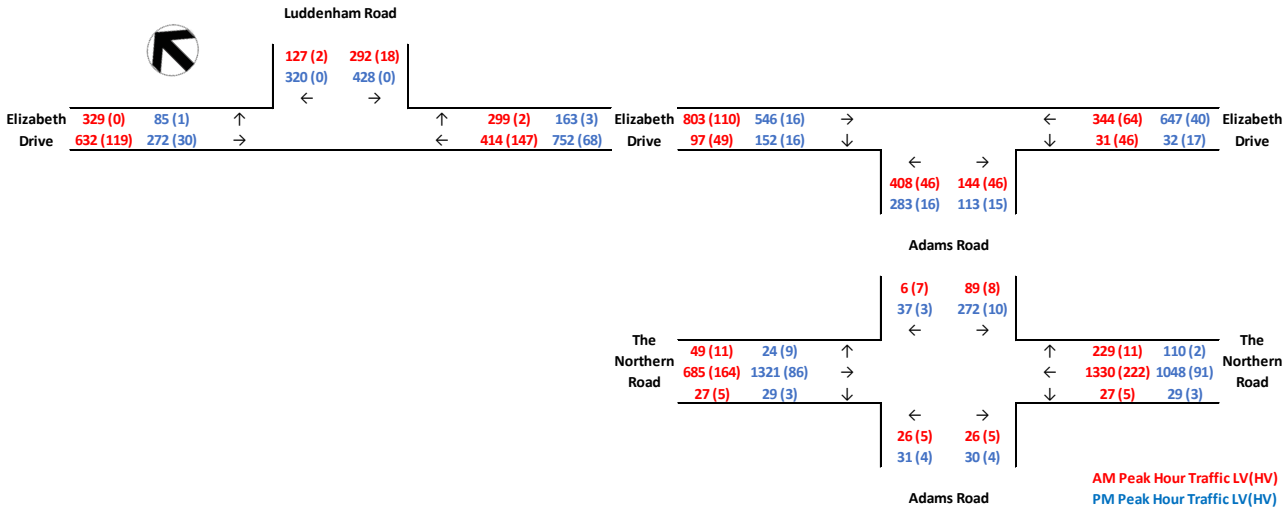


Figure 7.18 Post-development traffic volume – alternative distribution (2034)

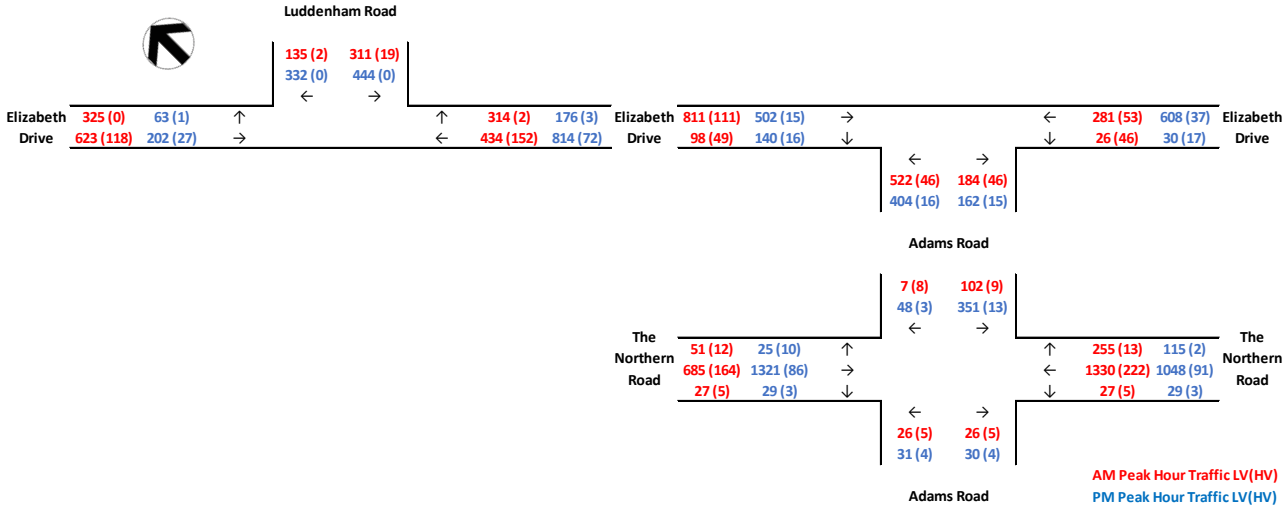


Figure 7.19 Post-development traffic volume – alternative distribution (2039)

7.6.5 Impact assessment

i Swept paths

Swept path assessments were undertaken for the ARRC site road network and for the key road intersections.

The swept path assessment indicated that the Elizabeth Drive/Adams Road intersection 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 indicated that minor splaying at the site access is required as part of the access road upgrade to accommodate the left turn of a 19-m long truck and dog into the site. This splaying will be within the existing access road corridor. It will be upgraded prior to B-doubles accessing the site to deliver waste or dispatch products or non-recyclable residues.

The Northern Road/Adams Road intersection is being upgraded as part of The Northern Road Upgrade project and will be able to accommodate 26-m-long trucks (ie B-doubles).

ii Intersection performance

The key intersections were modelled with the SIDRA Intersection 8.0 software. SIDRA provides performance indicators based on degree of saturation (DOS), average delay (DEL), level of service (LOS) and the 95 percent queue lengths (Q95). The LOS is a good indicator of overall performance for individual intersections, with rating levels from A to F.

The SIDRA results for the even and alternative traffic distributions for the key intersections are presented in Appendix L. In summary:

- The Northern Road/Adams Road intersection is currently operating at LOS A or B. The intersection is being upgraded as part of The Northern Road upgrade project, and with future signalisation it will operate at LOS C and B for the AM and PM peak hours respectively. The additional traffic generated by the project will not deteriorate the performance of the intersection.

- The Elizabeth Drive/Adams Road intersection is currently operating at LOS A with significant capacity to accommodate additional traffic. With an even project traffic distribution, the intersection will have a LOS A or B in all the analysed years up to 2039. In the case where the Adams Road heavy vehicle restriction is not lifted south of the ARRC site (the alternative distribution), all heavy vehicle traffic will travel through this intersection and the intersection will have a LOS C in the AM peak hour.

- The Elizabeth Drive/Luddenham Road intersection is currently operating at LOS B. By 2029, intersection performance is expected to deteriorate to a LOS F with significant traffic queuing, due to traffic anticipated from the Western Sydney Aerotropolis development. The baseline performance of the intersection will continue to worsen by 2034 and 2039, without the project traffic, which will consist of up to 4.1% of the overall traffic in 2029. An intersection upgrade will be required with or without the project-related traffic.

iii Road capacity

All vehicle access to the site will be via Adams Road. By 2029, as the Western Sydney Aerotropolis-related development increases, this will potentially change the locality traffic volumes and traffic conditions for Adams Road. By 2039, the baseline traffic volume will be approximately six times the existing traffic volume. The land uses along Adams Road are expected to change dramatically with the Aerotropolis development. Over time, the project-related traffic will make up a lower proportion of the overall route traffic.

A detailed mid-block capacity analysis was conducted for Adams Road to determine the future LOSs. Based on 2020 data (although the AARC is anticipated to start operations in 2022), Adams Road will operate at a LOS A and B in the existing and post-development scenarios, respectively.

For 2029, 2034 and 2039, scenarios, the capacity of Adams Road will still comply with the maximum urban threshold of 900 vehicles per lane per hour. However, the LOS will deteriorate to E (northbound) and D (southbound) during the AM and PM peak hours in 2039 with locality traffic growth. The AARC will contribute about 9% of this traffic. The LOS E is still considered generally acceptable for the peak hourly traffic flows in urbanised areas in Sydney. It is noted that the configuration of Adams Road may change when it is realigned to connect directly into Luddenham Road. Notwithstanding, the applicant will upgrade the northern section of Adams Road, including shoulder widening if required to meet the Ausroads Guidelines

An analysis of Elizabeth Drive and The Northern Road determined that the ARRC will represent up to 8% and 2% of the future total forecast traffic volume using these roads, respectively, and that the ARRC is not expected to have a traffic flow or traffic safety significant impact on these roads.

iv Car and truck parking provision

There will be up to 42 staff members on site at any given time, with some employees expected to carpool or utilise public transport. Therefore, car parking provision of 45 spaces will be adequate.

The car parking spaces will be designed in accordance with relevant Australian Standard (AS 2890.1:2004).

v Onsite vehicle and pedestrian movements

The internal road and pedestrian network, as well as onsite parking, are detailed in the concept design drawing prepared by Reid Campbell (Appendix B).

The access road and the areas within the ARRC warehouse will be adequate to accommodate waste vehicles without queuing on the public road (Adams Road).

vi Construction traffic impact

The operational traffic volumes of the ARRC will be significantly more than the ARRC construction traffic in the peak hours. Therefore, the relative construction stage impacts to the traffic capacity or amenity on Adams Road or the broader road network will be minimal.

vii Impact on road safety

a Adams Road

As discussed in Section 7.6.3ii, the most recent five year accident history for Adams Road is very low. However, traffic volumes are expected to increase so in 2039, the baseline traffic will be approximately six times the existing traffic. Given the road upgrades that will occur prior to ARRC-related heavy vehicles using the northern or south sections of Adams Road, ARRC-related traffic is not expected to have a significant adverse impact on the safety of Adams Road.

b Elizabeth Drive

By 2039, the ARRC traffic on Elizabeth Drive will be 8% and 3% of the overall AM and PM peak hour traffic respectively. Hence, the additional project-related traffic is not expected to have a significant adverse impact in terms of either traffic flow or traffic safety along Elizabeth Drive.

c The Northern Road

The Northern Road upgrade is changing the alignment of The Northern Road to a straighter section which bypasses the Luddenham town centre. Therefore, it is expected that the crash rate would be lower than the historical values.

By 2039, the ARRC traffic on The Northern Road will be 2% and 0.5% of the overall AM and PM peak hour traffic. Hence, the additional project-related traffic is not expected to have a significant adverse impact in terms of either traffic flow or traffic safety along The Northern Road.

viii Road safety assessment at the site entrance on Adams Road

The access to the site on Adams Road is located at a straight section, hence there are no sight distance or safety issues for entering or existing vehicles to/from the site.

ix Impact on public transport, pedestrians, and cyclists

Currently there is no designated pedestrian or cycling infrastructure along Adams Road or Elizabeth Drive in the vicinity of the site. The construction of pedestrian and/or cycling facilities may follow overall Western Sydney Aerotropolis development. 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.

7.6.6 Mitigation measures

The following mitigation measures will be applied:

- 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 large trucks, up to B-doubles, and so that the lane and shoulder widths meet Ausroads Guidelines. These upgrades will be completed prior to the start of ARRC operations.

- The road upgrade design will be informed by a survey of the current road condition, including a topographic/drainage survey and borehole/CBR [Californian Bearing Ratio] tests.

- An application will be made to the Council and the NHVR to lift the load limit based on the road/intersection designs.

- Until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using the northern section of Adams Road.

- An operational traffic management plan (TMP) will be developed to manage project-related traffic within the ARRC site and surrounding road network during ARRC operations.

A construction traffic management plan (CTMP) will be developed based on the conceptual CTMP presented in the TIA (refer to Appendix L) to manage project-related traffic within the ARRC site and surrounding road network during ARRC construction.

7.6.7 Conclusion

In summary, the TIA (Appendix L) found:

- the proposed car parking provision of 45 car spaces will meet the car parking demand of staff and visitors;

- the ARRC traffic will not deteriorate the performance of the upgraded Northern Road/Adams Road intersection;

- based on its current configuration, the Elizabeth Drive/Adams Road intersection will operate at LOS A or B with the even distribution of ARRC traffic or at LOS C with the alternative distribution of ARRC traffic if the heavy vehicle restriction is not lifted south of the site;

- while the Elizabeth Drive/Luddenham Road intersection is currently operating at LOS B, but by 2029, with the locality traffic growth from the Western Sydney Aerotropolis development, the intersection will deteriorate to a LOS F with significant traffic queuing, regardless of ARRC traffic (which will contribute 4.1% of the traffic) and an intersection upgrade will be required;

- in 2039, the mid-block capacity analysis indicates additional development traffic from the project will represent up to 9%, 8% and 2% of the future total forecast traffic volume using Adams Road, Elizabeth Drive,

and The Northern Road respectively, but this is not expected to have a significant impact in terms of either traffic flow or traffic safety;

- the swept path assessment indicated that:
  - the Elizabeth Drive/Adams Road intersection 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;
  - minor splaying at the site access is required as part of the access road upgrade to accommodate the left turn of a 19-m long truck and dog into the site and will need to be upgraded prior to B-doubles accessing the site to deliver waste or dispatch products or non-recyclable residues; and
  - the Northern Road/Adams Road intersection will be able to accommodate B-doubles.

Accordingly it is proposed that:

- the northern section of Adams Road, between the subject property access road and Elizabeth Drive, will be upgraded by the applicant prior to the start of ARRC operations as part of the proposed development so that the pavement is suitable for use by large trucks, up to B-doubles, and so that the lane and shoulder widths meet Ausroads Guidelines;
- an application will be made to the Council and the NHVR to lift the load limit based on the road/intersection upgrade designs; and
- until the load limit is lifted along the whole of Adams Road, ARRC-related heavy vehicles will only access/depart the ARRC using the northern section of Adams Road.

7.7 Socio-economic

7.7.1 Introduction

The potential socio-economic impacts of the ARRC have been assessed with a focus on amenity impacts on surrounding landholders and economic impacts is provided in this section. A high-level economic assessment of the project has been prepared by Gillespie Economics (Appendix M).

7.7.2 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 for the project, identified the nearest sensitive receivers for potential air quality, noise and visual impacts. Potential sensitive receivers include eight residential properties and the Hubertus Country Club (refer to Figure 7.3).

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. Construction of the associated dwellings and community infrastructure will require services such as construction and demolition waste recycling and recovered materials will be able to be used in construction.

7.7.3 Impact assessment

i Amenity impacts

The key aspects of the proposed modification that could impact surrounding land holdings are summarised in Table 7.13 along with the proposed management measures.

Table 7.13 Impacts to surrounding land holdings

Aspect	Potential impact	Management and mitigation measures	Section addressed
Dust generated by construction and operation of the ARRC	Some air quality exceedances are predicted at R3 (unoccupied residence) and on one day of the year at R6 (occupied residence).	Management and mitigation measures will be implemented to minimise dust generation during construction and operation. The potential for short-term impacts will be managed by planning for adverse weather and through reactive and corrective dust controls, which will be formally documented in an air quality management plan.	Section 7.3
Noise and vibration from operation of the ARRC	Prior to rezoning, noise levels are predicted to be above applicable criteria at sensitive receiver locations. Following rezoning, noise levels are predicted to be below applicable criteria at sensitive receiver locations.	While the applicable noise criteria at the residences will increase with the rezoning of the land, the value of the land will also increase substantially. If the area is not rezoned, additional control measures will need to be agreed with the impacted residents.	Section 7.4
Increased traffic on the surrounding road network	ARRC traffic will not deteriorate the performance of the upgraded Northern Road/ Adams Road intersection. Performance of the Elizabeth Drive/ Luddenham Road intersection is expected to deteriorate regardless of ARRC traffic. Additional ARRC traffic will represent up to 9%, 8% and 2% of the future total forecast traffic volume using Adams Road, Elizabeth Drive, and The Northern Road respectively, but this is not expected to have a significant	The road network is being upgraded as a part of the development of the WSA and Aerotropolis. The applicant will upgrade the northern section of Adams Road as part of the development.	Section 7.6

Table 7.13 Impacts to surrounding land holdings

Aspect	Potential impact	Management and mitigation measures	Section addressed
	impact in terms of either traffic flow or traffic safety.		
Visual impacts from amended infrastructure location (ie amended stockpile, weighbridge and associated infrastructure)	The scenic quality of the site has been assessed as mostly low to moderate, however, the scenic characteristics are expected to dramatically change with the development of the WSA and the Aerotropolis. In the short-term, the ARRC warehouse will be the most prominent feature from the surrounding viewpoints, namely roads (Adams Road and Elizabeth Drive) and sensitive receiver locations. While it will significantly transform the landscape in the short-term, it will eventually align with the Agribusiness precinct objectives and the surrounding WSA and Aerotropolis development.	Mitigation and management measures relevant to air quality , land and soil, surface water and other environmental aspects that can impact the visual quality of the site, will be implemented as part of the project to ensure the site is kept in a neat, tidy and functional condition. Implementation of the site landscaping plan (Appendix T) will minimise visual impacts. Given the proximity of the site to the future WSA, a key consideration is the selection and spacing of trees and plants to minimise attraction to bird and wildlife.	Section 7.9

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 ARRC and the quarry.

ii Economic impacts

The net economic benefits of the project (Appendix M) include:

- an increase in the level of resource recovery and hence reduced financial and environmental costs of land fill;
- reduction in financial and externality costs of road transport arising from the more centrally located ARRC; and
- producer surplus (economic benefit of production) and company tax.

The total estimated annual impact of the project on the Western Sydney economy is given in Table 7.14.

Table 7.14 Economic impact on the Western Sydney economy

	Construction		Operation	
	Annual	**Total over 2-year period[1]**	**Annual**	**Total over 20-year period[1]**
Direct and indirect output or business turnover	$28 million	$38 million	$141 million	$1,489 million
Direct and indirect value added	$11 million	$17 million	$56 million	$596 million
Direct and indirect household income	$6 million	$8 million	$14 million	$143 million
Direct and indirect local jobs[2]	65	-	178	-

1. At 7% discount rate
2. Including 70 direct operational jobs (refer Section 2.6).

iii Other impacts

The ARRC will provide local tradesmen with opportunities to recycle their waste locally. This will reduce waste disposal costs, including travel times, assisting to reduce building costs, and hence the price of new houses and other developments in the area.

Direct socio-economic benefits of the facility include the employment of about 30 people (FTE) for about 18 months and the ongoing direct employment of about 70 people (FTE) once at full production. Employees will be sourced from the local area where possible, to provide local job opportunities consistent with current Government objectives (see Section 3.4).

In addition to the provision of employment, recycling can create a sense of civic pride and satisfaction felt through participation in recycling; and an improved natural resource base for future generations due to higher recycling uptake.

7.7.4 Conclusion

The project is expected to have a number of socio-economic benefits such as employment opportunities, providing local waste services, resource recovery for use in construction, and economic benefits to the Western Sydney economy. Dust and visual impacts have been minimised through the design of the ARRC. Following rezoning, noise levels at sensitive receivers will be high but will be below applicable criteria. However, the value of the land will also increase substantially providing financial opportunities to residents.

7.8 Biodiversity

7.8.1 Introduction

A biodiversity development assessment report (BDAR) was prepared by EMM to address the biodiversity impacts of the project (Appendix O). The SEARs relevant to this assessment and where they are addressed are summarised in Appendix A.

7.8.2 Assessment approach

The BDAR was prepared in accordance with the *Biodiversity Assessment Method* (BAM; OEH 2017a), the SEARs for the project and relevant legislative and assessment requirements (Chapter 4). The BDAR involved a desktop

assessment component as well as field surveys/assessments carried out on 30 January and 24 February 2020 by EMM ecologists. The specific objectives of the BDAR were to:

- describe the existing biodiversity values and existing environment at the RRC site;
- identify and assess the potential for presence of biodiversity values, including threatened species and communities under relevant legislation including the BC Act and the EPBC Act;
- identify ecological constraints within and impacts arising from the project;
- provide mitigation measures to reduce the impacts from the project on biodiversity wherever possible; and
- where impacts are unavoidable, determine appropriate compensatory measures.

i BDAR terminology

The areas discussed in the BDAR are defined as follows:

- study area/subject property: the subject property surveyed for ecological values;
- project area/ARRC site: the area subject to direct impacts;
- indirect impact area: a 20-m buffer from the ARRC site; and
- impact area: the combined direct impact and indirect impact areas.

7.8.3 Existing environment

Vegetation on the subject property and its location in relation to the ARRC site is shown in Figure 7.20.

i Plant community types

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

- 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.

KEY

- Subject property
- ARRC site
- Indirect impact area
- Waterbody
- Cadastral boundary

Plant community type (PCT)

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

- Poor
- Medium

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

- Poor

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

\\emmsvr1\EMM\Jobs\2019\J190749 - CPG Luddenham Quarry\GIS\02 Maps\SSD Recycling Facility\BDAR\SDBDAR005 PCTs 20200615 03.mxd 18/06/2020

Source: EMM (2020); DFSI (2017); GA (2011); Nearmap (2020); DOE (2019)

0 50 100 m

GDA 1994 MGA Zone 56

N

Biodiversity values

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.20

EMM
creating opportunities

ii Composition, structure and function of vegetation on site

The existing vegetation integrity at the subject property is limited to the riparian corridor along Oaky Creek, and a patch of woodland in the north-east corner of the subject property (Figure 7.20). 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 subject property 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 subject property as the corridor to the south has been removed as part of WSA bulk earthworks. The project 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 & Associated 2003).

iii Threatened ecological communities

The field surveys identified two TECs comprising:

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

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

iv Threatened species

a Fauna habitat

Fauna habitat on the subject property primarily comprises the riparian corridor running along the eastern boundary. The extensive history of use of the subject property for agricultural purposes and quarrying, has resulted in large areas of exotic grassland, a highly degraded woodland with no hollow bearing trees, and a narrow riparian corridor. Scattered native trees and some ephemeral dams also provide some habitat. As a result, the subject property provides limited refuge or habitat for fauna.

A shed associated with the quarry is located on the subject property, south-west of the ARRC site. This is a large open tin shed, with no roof voids with no features considered to support fauna species. A bridge crosses Oaky Creek on the south-east boundary of the subject property and is considered to provide potential microchiropteran habitat.

b Candidate species

A number of ecosystem credit species and species credit species were predicted to occur within the habitat present on the subject property, and were assessed using the BAM method (OEH 2017a). Some of the species were excluded from further assessment based on the lack of available habitat on the subject property. Thirteen flora species and five fauna species were identified as requiring further consideration and assessment. The presence or absence of these species in the impact area was determined through target surveys in accordance with Section 6.4 of the BAM (OEH 2017a).

No threatened flora species were recorded during targeted surveys within the subject property. All candidate threatened flora species are not considered to occur within the subject property following target surveys.

Southern Myotis was recorded foraging around the main water bodies and two were observed roosting underneath the bridge that crosses Oaky Creek located just out of the subject property to the south-east (Photograph 7.2). Southern Myotis forage over streams and pools catching insects and small fish by raking their feet across the water surface. They roost close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.

Other candidate species were not recorded in the subject property and are considered to be unlikely to occur within the subject property following targeted surveys.

Photograph 7.2 Roosting Southern Myotis under the bridge

7.8.4 Impact assessment

i Impact avoidance and minimisation

The project has been designed, where possible, to avoid sensitive biodiversity areas. The ARRC site footprint was reduced to avoid potential impacts to the Swamp Oak Floodplain Forest Endangered Ecological Community (EEC), listed under the BC Act (PCT 1800), along the eastern boundary.

Key avoidance measures that are to be implemented by the applicant comprise:

- avoidance of direct impacts to Oaky Creek;
- no impacts to PCT 849;

- minimisation of impacts to PCT 1800, by only impacting on small areas of the fragmented habitat;
- minimisation of impacts to PCT 1800, by avoiding impacts to the vegetation on the south-western boundary;
- utilisation of the existing cleared areas wherever feasible; and
- designing a water management system to minimise potential impacts to Oaky Creek.

None of these EECs are consistent with the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act) listings.

ii Direct impacts

As shown in Figure 7.20, the project has been designed to avoid direct impact on the Oaky Creek riparian zone and to minimise impacts to native vegetation on the subject property. However small patched of native vegetation will be removed within the ARRC site footprint. A total of 0.28 ha of PCT 1800 Swamp Oak forest on riverflats of the Cumberland Plain and Hunter Valley will be cleared. This PCT provides foraging habitat for the Southern Myotis.

iii Indirect impacts

Indirect impacts that could occur as a result of the project include:

- increase in weeds, resulting in degradation of retained native vegetation and habitat;
- stormwater and treated water entering the riparian vegetation and Oaky Creek;
- potential inadvertent disturbance of retained habitats; and
- increased movements of vehicles and people into the area has the potential to transport weeds into the subject property. Weeds have the potential to result in degradation of retained vegetation and fauna habitat.

A total of 0.22 ha of PCT 1800 Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley will be indirectly impacted by the project.

iv Prescribed impacts

The project also has the potential to result in prescribed impacts on water quality and hydrological processes in Oaky Creek that sustain threatened species and threatened ecological communities.

The riparian habitat contains areas of dams and standing water associated with Southern Myotis and Swamp Oak Floodplain Forest EEC. Oaky Creek receives surface and groundwater flows. This creek only flows during times of high rainfall. Swamp Oak Floodplain Forest EEC is dependent on the duration of waterlogging. Swamp Oak Floodplain Forest forms part of a complex of forested wetland and treeless wetland communities found throughout the coastal floodplain of NSW.

Indirect impacts on the hydrological process are likely to be long term, however due to the nature and small scale of these indirect impacts (ie occasional discharges of treated stormwater water and wet weather stormwater overflows) and the highly degraded and modified nature of the subject property, these are unlikely to change the nature of natural drainage into this habitat. Water that will flow into Oaky Creek from the project will be controlled as part of the project's surface water management system.

v Serious and irreversible impacts (SAII)

No species were identified as candidate species for serious and irreversible impacts (SAII), as per Section 6.5 of the BC Act.

vi Offset credits

A total of 7 ecosystem credits and 6 species credits are required to offset the residual impacts of the project. A summary of ecosystem credits and species credits required to offset direct and indirect impacts of the project, are provided in Table 7.15 and Table 7.16. The credit report is provided in the BDAR (Appendix O).

Table 7.15 Summary of ecosystem credits required for impacts to all vegetation zones for the proposed development

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
1	1800 Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley.	Poor	0.16	45.40	0 (direct impact)	-45.40	2
					44.50 (indirect impact)	-0.9	
2	1800 Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley.	Medium	0.34	48.20	0 (direct impact)	-48.2	5
					47.0 (indirect impact)	-1.2	

Table 7.16 Species habitat requiring offsets

Species	Vegetation zone name*	Area (ha)	Candidate SAII	Species credits
Southern Myotis	1800 - medium	0.34	No	5
	1800 - poor	0.14		1

* These areas include both direct and indirect impacts areas.

vii Impacts to Matters of National Environmental Significance

To support a determination as to whether the project is likely to have a 'significant impact' on threatened species the *Matters of National Environmental Significance – Significance Impact Guidelines 1.1* (DoE 2013) have been applied.

A 'significant impact' is defined as "an impact which is important, notable, or of consequence, having regards to its context or intensity. Whether or not an action is likely to have a significant impact depends on the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts" (DoE 2013).

Consideration has been given to all communities, threatened and migratory species with potential to occur within the subject property, with reference to DoE (2013). Significant impact assessments have been completed for the

considered to have potential to be impacted by the project following the processes outlined in the BDAR (Appendix O).

The assessment concluded that no significant impacts are considered in the context of the findings of the project's biodiversity assessment.

viii Lighting impacts

Light spill from night works has the potential to reduce the suitability of retained habitat for some fauna species. Light spill will be minimised through lighting design.

7.8.5 Mitigation measures

i Retention of vegetation, pre-clearing and clearing works

Site preparation works will require clearing of some native vegetation. These works have the potential to have an impact on fauna species including an indirect impact on the retained vegetation and fauna habitat. To help avoid, this occurring and minimise impacts to vegetation and fauna species the following controls will be documented in the project's CEMP and implemented during construction:

- Exclusion zones around all areas of retained vegetation and fauna habitat are to be implemented. These areas will be fenced using appropriate fencing materials and designated and signed as 'No-go Zones' or 'Environmentally Sensitive Areas'.

- Where feasible or when required, tree protection zones (TPZs) are to the set up around all trees to be retained within and immediately adjacent to the disturbance footprint. If required, TPZs are to be established in accordance with the Australian Standard AS 4970-2009 Protection of trees on development sites.

Native vegetation cleared will be mulched and stockpiled for re-use during any rehabilitation works. Large hollow-bearing trees and limbs will be retained as hollows for placement into rehabilitated areas or retained native vegetation.

ii Weed control

Indirect impacts could occur due to the introduction and/or spread of weeds into the subject property. To prevent this occurring the following controls will be implemented:

- weed control in key areas prior to construction works, to minimise the impacts of weeds during construction;
- management and disposal of weed species during clearing works, in accordance with the biodiversity management plan; and
- active and intensive weed control in areas where significant weeds are known to occur within the subject property to reduce the cover of weeds adjacent to the construction activities and prevent the spread of weeds into the riparian habitat associated with Oaky Creek.

iii Sediment control

Management of sedimentation will be a key measure to minimise and mitigate impacts. Management measures for sediment control that will be implemented during construction and operation of the ARRC are outlined in Section 7.11.5.

7.8.6 Conclusion

The ARRC has been designed to avoid sensitive biodiversity areas where possible. The ARRC site footprint was reduced to avoid potential impacts to the Swamp Oak Floodplain Forest Endangered Ecological Community (EEC) listed under the BC Act (PCT 1800) along the eastern boundary. A total of 0.28 ha of PCT 1800 Swamp Oak forest on riverflats of the Cumberland Plain and Hunter Valley will be cleared. This PCT provides foraging habitat for the Southern Myotis.

A total of 7 ecosystem credits and 6 species credits are required to offset the residual impacts of the project.

7.9 Urban design and visual

7.9.1 Introduction

The following section provides a description of the existing landscape at the ARRC site and surrounding areas and assesses the design and visual impact of the ARRC. It considers the landscape values, the visual sensitivity of the location and the design, and the potential visual changes as a result of the project. It also considers the objectives and design criteria of the Agribusiness zone outlined in the draft Western Sydney Aerotropolis Development Control Plan 2019 (WSA DCP 2019).

7.9.2 Existing environment

i Key site features

The topography of the ARRC site is largely flat with an elevation between approximately 62 and 68 mAHD and, consistent with the regional topography, with gently sloping relief (0–10°) generally falling from the west to the east.

Most of the ARRC site is dominated by open grasslands of varying condition and quality. Most of these areas have been heavily impacted by pastoral activities, particularly grazing, and are dominated by exotic plant species (Appendix O). There are a few areas of wooded habitat within the ARRC site comprised of scattered Swamp Oak (*Casuarina glauca*). The woodland is either in medium or poor condition (Figure 7.20). Vegetation in the surrounding

landscape is degraded and largely limited to isolated pockets of woodland, and corridors of riparian vegetation along meandering drainage creeks within a wider agricultural landscape.

The riparian corridor along Oaky Creek and two water dams located to the north-east of the ARRC site are outside the ARRC site. One smaller water dam, within the ARRC warehouse footprint, will be decommissioned as part of the project.

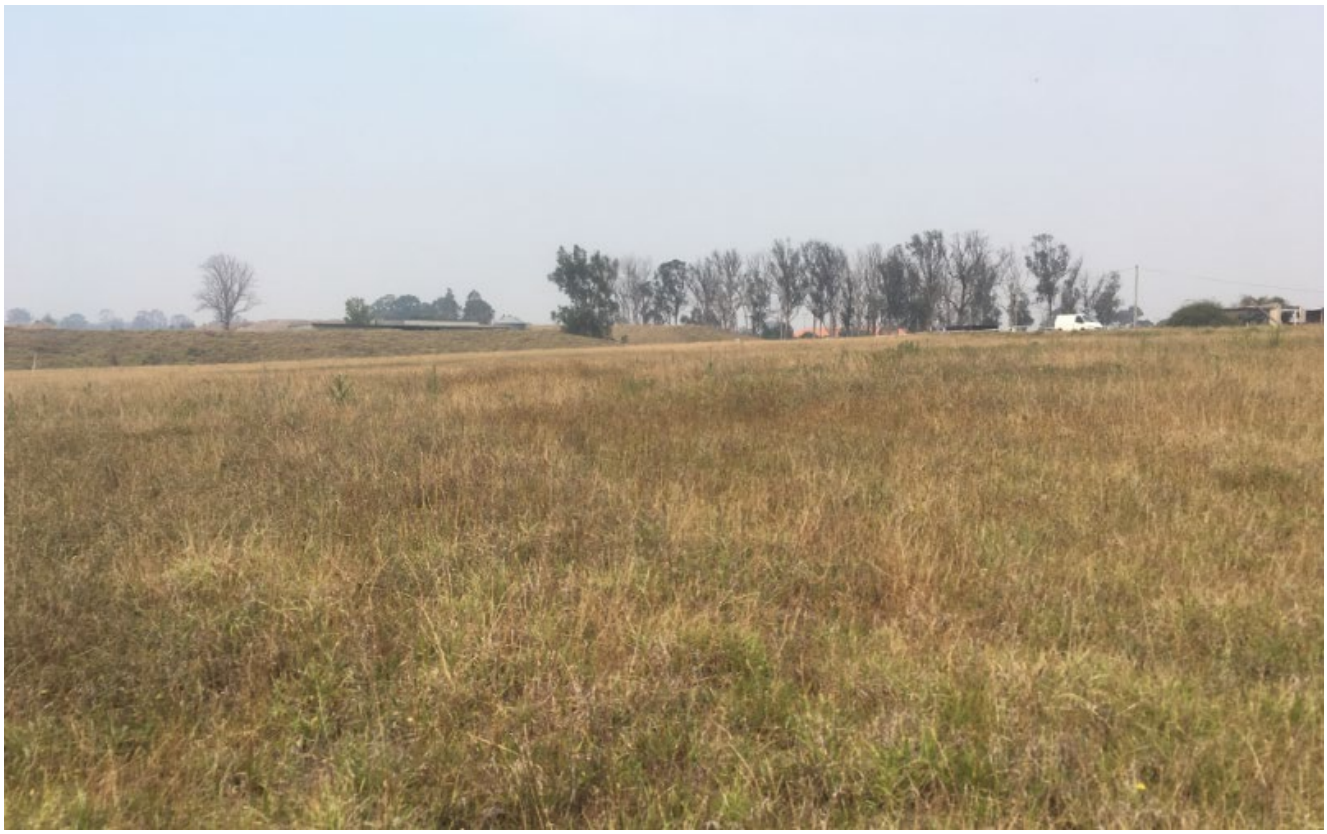
The site access accessible via Adams Road (Photographs 7.3–7.7). The site access road is currently unsealed. It is proposed to seal the site access road and its intersection with Adams Road.

Photograph 7.3 **View of Adams Road/site access road intersection looking south**

Photograph 7.4 **View of Adams Road/site access road intersection looking north showing current street signage**

Photograph 7.5 View from internal road looking towards the ARRC site to the west (ie left) and to the unoccupied/condemned rural property to the east (ie right)

Photograph 7.6 Internal access road looking to Adams Road



Photograph 7.7 The ARRC site looking south from the northern part of the subject property

ii Surrounding land uses

As previously noted, much of the subject property is disturbed by the quarry void and stockpiles.

The character of the land surrounding the ARRC site is predominantly rural to the west and north which corresponds with the site's and surrounding current zoning, RU1 – Primary production. The closest residence about 70 m east of the site access road (285 Adams Road, Luddenham (R3)). This residence is currently unoccupied and it is understood that the property owner intends to develop the property to an Agribusiness/industrial land use. There is a rural residence immediately west of the site (225 Adams Road, Luddenham (R6)).

The Hubertus Country Club (C1) is located south-west of the site but is partially visually shielded from the site by the bund (approximately 5-m tall) along the western side of the quarry void and stockpiles.

Currently, the land to the east of the ARRC site is dominated by the bulk earthworks for the WSA. The site is proposed to be rezoned to the Agribusiness zone under the draft Aerotropolis Plan.

iii Scenic quality

The visual quality of the site of the landscape is rated in Table 7.17. 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 ARRC site are shaded grey in Table 7.17. This indicates that the visual quality of the site is variable (ie low to high depending on the features addressed).

No listed scenic or significant vistas have been identified near the ARRC site.

There are no visible cultural landmarks, such as heritage buildings and other structures on, or in the vicinity of, the site. There are no visible archaeological sites within the site. The one archaeological site on the banks of a dam within the subject property is not visible, even at close range (refer to Section 7.10).

Table 7.17 Scenic quality ratings

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.

Notes: The scenic quality ratings for the ARRC site are shaded grey.

The ARRC site is also assessed based on evaluation of visual significance. The significance of a change in the landscape is a function of magnitude of that change when considered against the view type/context and the sensitivity of the receiver. Typically, a noticeable change in the landscape in a rural or natural landscape, combined with a high visual sensitivity, would be considered to be significant, whereas a change in an already heavily modified landscape would be considered slight or moderate.

Table 7.18 Evaluation of significance matrix

Magnitude of change	Visual sensitivity		
	High	**Moderate**	**Low**
High	substantial	moderate/substantial	moderate
Moderate	moderate/substantial	moderate	slight/ moderate
Low	moderate	slight/moderate	slight
Negligible	slight	slight	negligible

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

- residential dwelling at 2111–2141 Elizabeth Drive, Luddenham (R2);
- residential dwelling at 285 Adams Road, Luddenham (R3);
- residential dwelling at 5 Anton Road, Luddenham (R4);
- residential dwelling at 185 Adams Road, Luddenham (R5);
- residential dwelling at 225 Adams Road, Luddenham (R6);
- Hubertus Club outdoor pistol range (classified as an active recreation premise) (AR1);
- Hubertus Club restaurant including outdoor facilities (classified as a commercial premise) (C1); and
- Western Sydney Airport during operations.

Visual impacts are also considered looking onto the ARRC site from the closest public viewpoints, namely roads.

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 from viewing areas, but it is also influenced by the disposition of the viewer to the nature of development/operations present on site.

While the scenic quality of the site will change with the development of the project, the surrounding residential and commercial land holders are accustomed to industrial activities on the adjoining property (ie the quarry at the subject property) and the changing landscape brought on by the development of the WSA. 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.

7.9.3 Project design and components

i Project design considerations

The ARCC design (Appendix B) takes into consideration the likely interactions between the ARRC and the existing and future site components and activities (ie Stage 1 and Stage 3 of the long-term vision for the subject property). The ARRC has been designed to be compatible with surrounding future Agribusiness land uses and its operations will not impact airport operations.

During the preparation of the EIS, the design of the ARRC has been refined on the basis of stakeholder feedback and the findings of the technical assessments. A key project refinement since the scoping phase of the project has been the decision to fully enclose the ARRC with all waste and recycled product now accepted, processed, stored and dispatched within a fully enclosed warehouse.

The external design of the warehouse and the surrounding site components have been designed with consideration of the Building Code of Australia (BCA) and the Draft Aerotropolis Development Control Plan 2019 Phase 1 (Draft Aerotropolis DCP Phase 1), which sets out the vision of the agribusiness precinct. Clause 11 of the SRD SEPP states that development control plans do not apply to SSD and therefore, the Liverpool Development Control Plan 2008 (Liverpool DCP 2008) has not been considered specifically.

ii Key site components

The majority of the site activities including acceptance, processing and storage of waste will occur within the fully enclosed metal clad warehouse. The warehouse will be the central and most prominent feature of the ARRC site, covering an area of 13,320 m^2 with an elevation up to 16 m AGL or up to approximately 80 mAHD. The site components are described in Section 2.2. The ARRC plans are provided in Appendix B, including elevations and perspective views. The perspective from the site access road is provided in Plate 7.1.

Source: ReidCampbell (Appendix B).

Plate 7.1 Perspective view from site access road

The site design also provides for a strip of landscaping to the west and north-west of the warehouse (Appendix T). The landscaping will add to the visual appeal of the ARRC site and will be visible when entering the site via the site access road from Adams Road or when looking in the direction of the site from the west and south-east.

iii Signage

A sign will be installed at the entrance to the site on Adams Road with the business name of the ARRC, opening hours and a number for a phone that will be attended whenever the site is accepting waste or operating.

7.9.4 Impact assessment

i Proposed visual changes and assessment of project design

The establishment and operation of the ARRC will change the current landscape and character of the site. Visual impacts will occur as a result of the construction of the warehouse, offices, surrounding site components, internal roads, parking, hardstand and landscaping, and traffic and lighting generated by the project.

Waste acceptance, processing and storage will occur within the enclosed warehouse resulting in minimal visual impacts related to ARRC site processes and activities. The ARRC warehouse will be enclosed on all sides with sliding doors providing vehicle access points. These access points will be fitted with awnings to shield light emissions from the ARRC and with misters to minimise dust emissions from the warehouse.

The sign on Adams Road is not expected to contribute to a significant change in the character or scenery of the site entrance road.

ii Impact of proposed visual changes

A visual assessment for the ARRC site was undertaken to determine the potential visibility from the sensitive receivers shown in Figure 7.3 and the surrounding environment. The results from the visual assessment relevant to sensitive receivers are summarised in Table 7.19 and discussed in detail following the table.

Table 7.19 Visual assessment

Sensitive receivers	Type of premise	Viewpoint aspect (looking at the ARRC)	Approximate distance to ARRC warehouse	Site components visible based on assessment including topography	Magnitude of change	Visual sensitivity
2111-2141 Elizabeth Drive, Luddenham (R2)	Residential	North	450 m	Yes	Moderate	Moderate
285 Adams Road, Luddenham (R3)	Residential	North	80 m	Yes	High	High
5 Anton Road, Luddenham (R4)	Residential	South-west	600 m	Yes	Moderate	Moderate
185 Adams Road, Luddenham (R5)	Residential	South-west	720 m	Yes	Moderate	Moderate
225 Adams Road, Luddenham (R6)	Residential	North-west	150 m	Yes	High	High
Hubertus Club outdoor pistol range (AR1)	Active recreation	West	310 m	Yes	Moderate to high	Moderate to high
Hubertus Club restaurant including outdoor facilities (C1)	Commercial	West	250 m	Yes	Moderate to high	Moderate to high
Western Sydney Airport	Infrastructure/ commercial Currently under construction	East, south-east and south	150 m (east across Oaky Creek)	Yes	Moderate to high	Low

The ARRC warehouse will be the most prominent feature visible from the surrounding landscape and assessed sensitive receiver locations. It will have an elevation of 16 m AGL, and will vary in length on each side but from a distance will generally appear to be about 135-m wide from the north, south, east and west.

When considering the proximity of the sensitive receivers and the visibility of the site components, the results of the visual assessment in Table 7.19 indicate that residential dwellings R3 and R6 will experience the most significant visual impacts. R3 is situated approximately 80 m north of the warehouse and 70 m north-east of the site access road, and will have unobstructed views of the northern aspect of the warehouse, the main office, parking areas, and the vehicles entering and leaving the site via the access road. R6 is approximately 150 m west of the warehouse and 170 m south-west of the closest point on the site access road, and will have visibility of the western aspect of the warehouse, site office, parking areas and vehicles entering and leaving the site via the access road. The undulating topography between R6 and the ARRC site and scattered patches of vegetation surrounding R6 will, to a small extent, minimise views to the ARRC site and the site access road. The visual impacts of the views from R3 and R6 were determined to be high because they are residential properties in close proximity to the project.

The ARRC warehouse will also be visible from residential dwelling R2 located to the north of Elizabeth Drive. Given that there are no trees blocking views from a 200 m stretch of Elizabeth Drive immediately north of the site, the top part of the warehouse is expected to be seen from R2 and from vehicles using this stretch of Elizabeth Drive. As commuters move further west along Elizabeth Drive, the views of the warehouse will become obstructed by trees along the western side of Adams Road. Likewise, as commuters move further east along Elizabeth Drive, the views will be obstructed by trees along the Oaky Creek riparian corridor. The visual impacts to the views from R2 were determined to be moderate because the ARRC will change the landscape looking south from R2. However, as discussed further in this section, the entire views of the area will change with the development of the WSA and the Aerotropolis.

The ARRC is expected to be partially screened from AR1 and C1 by the western noise bund (5-m tall) on the subject property. Nevertheless, employees and patrons at the Hubertus Country Club and pistol range will still have partial visibility of the site access road and the south-western aspect of the warehouse. Parts of the site access road will be obstructed by the residential dwelling on R6 and the surrounding patches of vegetation. The visual impacts of the views from AR1 and C1 are considered moderate to high due to the visual proximity of the ARRC to the Hubertus Country Club and pistol range.

Commuters driving along Adams Road will have visibility of the ARRC warehouse. Due to topography differences in the surrounding landscape, commuters driving south-bound will have greater visibility than those travelling north-bound.

Currently there is a noise bund to the south of the ARRC site and north of the quarry void. However, the development footprint of the ARRC will require the removal of part of the northern noise bund to accommodate the water treatment plant and an access road. 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.

The vegetation surrounding the Oaky Creek riparian corridor along the eastern side of the subject property will assist with partial obstruction of ARRC site components when looking from the east and south-east aspect of the site (ie north and north-west from the WSA 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 ARRC. Given that the top of the warehouse is 80 mAHD, and Oaky Creek is at 60 mAHD, the ARRC warehouse will be visible from the passenger jets at the end of Runway 05L/23R.

Operations at WSA are scheduled to start on 2026. The ARRC site will be visible from aircraft. The project has been architecturally designed to suit the intended Agribusiness/industrial land use and combined with the scale of the project is not expected to be a prominent visual feature in the landscape when viewed from the air.

iii Scale and dominance and visual sensitivity

The scale of the project is minor in relation to the surrounding construction works and WSA. The tallest proposed site component will be the warehouse, up to 16 m AGL and 80 mAHD.

The scenic quality of the site and surrounding area is variable (mostly low to moderate). The ARRC warehouse and associated site components will be visible from surrounding properties and roads points, and will cumulatively add to the transformation of the locality from a rural landscape to agribusiness/industrial land use adjacent to the WSA. Thus, while the visual impacts of the project for the surrounding sensitive receivers may be moderate to high (refer Table 7.19) during construction and in the initial stages of operation, these impacts need to be considered in the context of the broader transformation of the Aerotropolis over the next decade regardless of the project.

The project will be visually compatible with the new Agribusiness precinct and the future visual character of the area. The ARRC site components will be well-maintained, and the landscaping will add to the visual appeal of the warehouse when looking at the site from Adams Road, site access road and R3 and R6.

iv Design impact assessment

The design of the ARRC has been refined during the project planning and design phase to minimise any potential environmental impacts. This section considered the relevant objectives outlined in the Draft Aerotropolis DCP Phase 1. The relevant objectives are summarised in Table 7.20.

Table 7.20 Consideration of the Draft Aerotropolis DCP Phase 1

Section of DCP	Objective	Comments
5. General provisions 5.1 Character and place 5.1.1 Urban design 5.1.1.1 Objectives	a) Ensure development responds to the existing topography	The ARRC site and the warehouse have been designed at an elevation that does not protrude far above the surrounding vegetation and the structures anticipated from the WSA development. While the warehouse will be visible from the viewpoints assessed in Table 7.17Table 7.19, it will be relatively small scale compared to the future development for the WSA and Aerotropolis. The WSA development includes a fuel farm near the north-western boundary of the airport, off Anton Road, which is located south of the ARRC site. While the dimensions of the fuel farm are not provided in the WSA EIS, Section 14.5.2 of the EIS notes that the fuel farm will include up to four fuel tanks providing volume for three days' supply (DIRD 2016). The WSA EIS modelled a 100 x 100 m bunded fuel storage area (DIRD 2016). The colour and design of the most visible ARRC feature (ie the warehouse) will be in neutral grey and blue colours, so as not to stand out from the surrounding landscape. The objective of the Agribusiness zone will be "to support high-tech agribusiness uses, including freight, logistics and horticulture in the Agribusiness Precinct". CPG has a long-term vision to rehabilitate the 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 initiatives. This will deliver the vision of a technology-led agribusiness precinct as part of the evolving Aerotropolis. The ARRC will be visually compatible with other development on the subject property (Figure 1.5).
5. General provisions 5.1 Character and place 5.1.1 Urban design 5.1.1.2. Performance Outcomes PO19	Provide suitable interfaces between industrial areas, trade gateways, intermodal facilities, transport corridors and surrounding land uses.	The ARRC will not encroach on the Oaky Creek riparian corridor which provides an interface between the WSA and the ARRC site. The Oaky Creek riparian corridor provides a visual buffer between the ARRC and the airport land.

7.9.5 Mitigation measures

Mitigation and management measures relevant to air quality, land and soil, surface water and other environmental aspects that can impact the visual quality of the site, will be implemented as part of the project to ensure the site is kept in a neat, tidy and functional condition.

The landscaping plan (Appendix T) will inform the landscape design during the detailed design phase of the ARRC. Given the proximity of the site to the future WSA, a key consideration is the selection and spacing of trees and plants to minimise attraction to bird and wildlife.

7.9.6 Conclusion

The scenic quality of the site is mostly low to moderate; however, the scenic characteristics are expected to dramatically change with the development of the WSA and the Aerotropolis. The key site components have been designed with the relevant legislation, guidelines, feedback, future rezoning and technical assessment outcomes in mind.

The ARRC warehouse will be the most prominent and visible feature from the sensitive receivers and viewpoints assessed surrounding the site. Initially, the ARRC site will cause a significant impact in the surrounding landscape. However, it will be in keeping with the WSA and Aerotropolis development, which will occur regardless of the ARRC site. Thus, the project is considered well suited to the future land uses surrounding the site. It will contribute to the Agribusiness precinct objectives, and to the overall character of the future WSA, Aerotropolis and surrounds.

7.10 Heritage

7.10.1 Introduction

A draft Aboriginal cultural heritage assessment (ACHA) for the project was prepared by EMM (Appendix P) and is summarised below. The draft ACHA will be supplemented by the results of planned test excavations within the ARRC site and Registered Aboriginal Parties (RAPs) feedback.

This section also outlines the results of the desktop historical heritage assessment carried out for the project.

7.10.2 Assessment approach

i Aboriginal cultural heritage

The subject property has previously been assessed for Aboriginal heritage as part of the development application for the original consent for the quarry (DA 315-7-2003).

In accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (DECCW 2010a), a due diligence assessment was completed as a first step to identify whether Aboriginal objects or places are likely to be harmed by the project (EMM 2020j) in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010b). Based on a site inspection, the ARRC design, and the disturbance footprint, EMM (2020j) concluded that Aboriginal objects are unlikely to be harmed by the project. However, an archaeological survey of the ARRC site and meeting on 29 June 2020 to discussed the potential impacts to Aboriginal cultural heritage values with the eight of the RAPs. During the survey and discussion, RAPs raised several concerns regarding the loss of land to development and the impact this has on Aboriginal cultural heritage.

ii Historical heritage

The desktop historical heritage assessment reviewed local, state and Commonwealth heritage registers as well as the previous environmental assessment carried out for the approved quarry operations on the subject property.

7.10.3 Aboriginal stakeholder consultation

i The process

Aboriginal consultation has been undertaken in accordance with procedures set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c). These guidelines identify a five-stage process:

1. Pre-notification – identification of the Aboriginal individuals and/or communities relevant to the project area by contacting several state government agencies.

2. Notification – contacting all Aboriginal individuals and/or communities identified in (1) to determine their interest in being consulted during the project. This includes direct communication and the placement of advertisements in local media seeking further expressions of interest from Aboriginal individuals and/or communities that may have been missed through (1). Those Aboriginal individuals and/or communities that wish to be consulted become a 'registered' Aboriginal party (RAP).

3. Presentation of project information/assessment methodology – briefing RAPs about the project and scope of any Aboriginal heritage assessment and investigations. This is usually undertaken through written correspondence, but can include meetings, and may undergo several iterations through the project as the nature of the assessment changes (eg surface ground-truthing may lead to a requirement for test excavations).

4. Impacts and mitigation strategies – discussion of potential impacts to cultural materials and mitigation options with the RAPs prior to developing the ACHA. This is often undertaken either onsite at the end of any field program and/or as part of (5).

5. Report review – the RAPs are provided an opportunity to review and comment upon the draft ACHA, to contribute input into the overall findings, significance and management of cultural heritage.

The consultation process for the ARRC had the following aims:

- to comply with the OEH consultation procedures to obtain input on the ACHA process; and
- to identify cultural places and intangible values that may be affected by the proposed activity.

ii Project consultation

The consultation process identified 61 Aboriginal stakeholders in the region. Of these, 19 registered an interest in the project as detailed in Table 7.21.

Table 7.21 The registered Aboriginal parties for the project

Gandangara Local Aboriginal Lands Council	Barraby Cultural Services
Deerubbin Local Aboriginal Land Council	Yurrandaali
Didge Ngunawal Clan	Yulay
Goodradigbee	Wurrumay
Kamilaroi-Yankuntjatjara Working Group	Butucarbin Heritage
Wailwan Aboriginal Group	Guntawang Aboriginal Resources
Waawaar Awaaa Aboriginal Corporation	A1 Indigenous Services
Dharug Ngurra Aboriginal Corporation	Darug Custodian Aboriginal Corporation
Galamaay	Aboriginal Consultative Committee
Cubbitch Barta	

7.10.4 Existing environment

i Land use history

Early European land use in the area 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 subject property 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 Appendix P. One archaeological site (#45-5-2280) has been found on the subject property but outside of the ARRC 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 (DIRD 2016). 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 subject property (Figure 7.21). 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. The only registered AHIMS site within the subject property was Oaky Creek 1 (#45-5-2880) as described above.

iv Site inspection

The subject property was inspected on 30 January 2020 to validate the desktop analysis results. This involved walking over the accessible areas of the subject property and recording landscape information, as well as targeting ground exposures for the presence of Aboriginal objects. Overall, the field investigation indicated that the subject property 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 existing quarry's water management dam to the east of the ARRC site disturbance footprint.

v Archaeological survey and meeting 29 June 2020

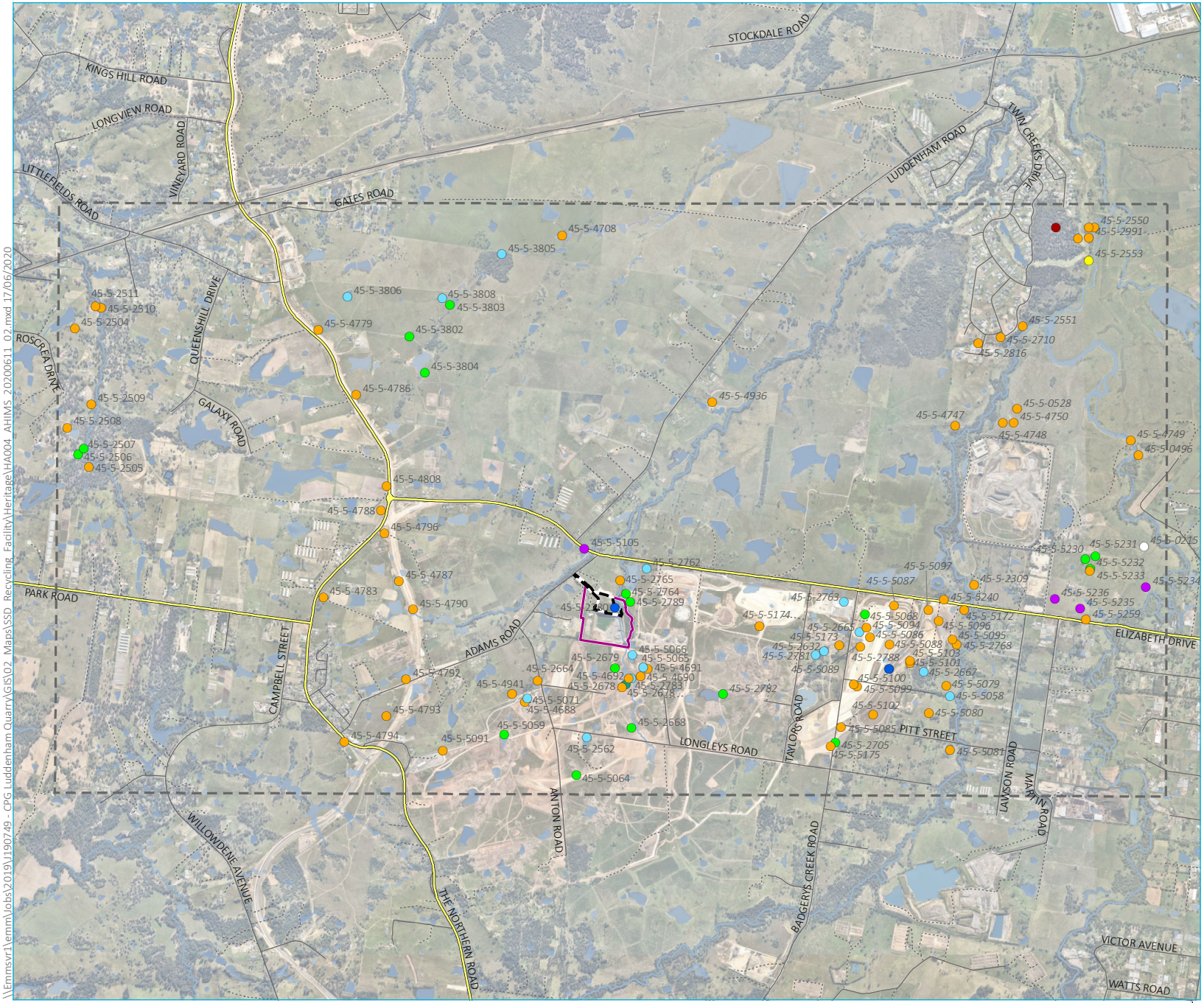
On 29 June 2020, an archaeological survey and meeting with the RAPs was organised to discuss the project and the potential impacts to Aboriginal cultural heritage values. Eight RAP groups were invited to participate in the survey.

As a result of the survey and site meeting, test excavation will be undertaken to characterise the subsurface potential for Aboriginal artefacts. RAPs have been provided with a draft ACHA (pre-excavation) and a test excavation methodology for review. The results of excavation and subsequent management measures derived from the results will be formulated in consultation with RAPs.

vi Historical heritage desktop assessment

A search of local, state and Commonwealth heritage registers and the NSW Government's ePlanning Spatial Viewer did not identify any historical heritage items in or in the immediate vicinity of the subject property. The nearest listed heritage item is Luddenham Road Alignment listed under the Penrith Local Environmental Plan 2010. Luddenham Road from Elizabeth Drive to Mamre Road is listed as a locally significant heritage item as it provides evidence of the early nineteenth century pastoral activities in the Penrith region (OEH n.d).

A review of the environmental assessments carried out for the approved quarry operations on the site did not identify any historical heritage values on the subject property.



AHIMS results

Luddenham Advanced Resource Recovery Centre
Environmental Impact Statement
Figure 7.21

EMM
creating opportunities

7.10.5 Impact assessment

i Aboriginal cultural heritage

The ARRC site is currently a cleared paddock sown with exotic grasses and has a small grove of trees. It is within 200 m of an ephemeral, third order stream, Oaky Creek. The subject property 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 project and is currently protected by fencing.

The tree with a scar that was identified during the site inspection is deemed not to have been culturally modified. It is situated near the western boundary of the subject property to the west of an existing noise bund, outside the ARRC site, and will not be impacted by the project.

The character and actual level of disturbance within the ARRC site could not be established through desktop study and survey alone and unknown artefacts may occur in highly disturbed areas. There is moderate archaeological potential for subsurface deposits within the ARRC site within the level, grassed paddock and in the small grove of trees that is part of the ARRC site.

Given this current ambiguity and strong support for a test excavation programme by the RAPs, a test excavation is proposed to better characterise the archaeological resource within this area. Once the excavation is completed, the extent of impacts to Aboriginal cultural heritage values will be determined and the ACHA will be updated with this information.

ii Historical heritage

There are no identified historical heritage values within the subject property.

Light vehicle movements associated with the construction and operation of the ARRC are likely to travel along the locally listed Luddenham Road alignment. The TIA carried out for the project (Appendix L) noted Luddenham Road currently prohibits vehicles over 5 t in weight and therefore heavy vehicle traffic associated with the project would not travel on Luddenham Road until such time as the load restrictions are removed and therefore no impacts on the historic values of this heritage item will occur as a result of the project.

7.10.6 Mitigation measures

The development of heritage management recommendations in the context of a proposed development is based on the significance, or heritage values of the site concerned, the relevant legislative protection and the feasibility of the overall development. Community consultation with RAPs has indicated their strong desire for a test excavation programme in order to determine the potential for archaeological material and confirm the level of disturbance. Therefore, test excavation is proposed to characterise the archaeological deposit and contribute to updated significance and impact assessments, and in developing appropriate management measures.

The following management measures are proposed:

1. AHIMS site #45-5-2280 will continue to be avoided and protected by fencing.

2. The corrected coordinates for AHIMS site #45-5-2280 will be entered in the AHIMS database.

3. The riparian corridor along the western bank of Oaky Creek will continue to be avoided.

4. A test excavation program will be completed during the public exhibition phase of the EIS, indicatively planned for August 2020. A draft excavation methodology is currently being reviewed by RAPs and is

provided in Appendix P. The results of excavation and subsequent management measures derived from the results will be formulated in consultation with RAPs and will be provided as part of an updated ACHA report (or an addendum to the ACHA), so that DPIE and Heritage NSW can consider any new information prior to project approval. Based on the outcomes of the test excavation and significance of the finds, management options may include conservation, salvage excavation or unmitigated impacts.

5. If works are to proceed, the following would occur:

- In the event that unexpected Aboriginal objects, sites or places are discovered in the project area, it is a requirement that Heritage NSW is notified of the existence of Aboriginal objects as soon as practicable after they are first identified. This is done through the completion of an Aboriginal Site Card which is submitted to the Registrar of AHIMS for inclusion on the Aboriginal site database. Under s85A of the NPW Act, Aboriginal objects remain the property, and under the protection of, the Crown until formal transfer to a person or persons of a class prescribed by the regulations occurs.

- In the event that known or suspected human skeletal remains are encountered within the project area, the following procedure should 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 Heritage NSW 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 Heritage NSW guidelines; and

  - if the remains are historical and not of Aboriginal origin, the Heritage Division of Heritage NSW will be notified for further instruction.

7.10.7 Conclusion

The subject property has been subject to a high level of disturbance. The AHIMS site within the subject property (#45-5-2280) is outside the area that will be impacted by the project and is currently protected by fencing.

The archaeological character and actual level of disturbance of the ARRC site could not be established through desktop study and survey alone and unknown artefacts may occur in highly disturbed areas. There is moderate archaeological potential for subsurface deposits. Given this current ambiguity and strong support for a test excavation programme by the RAPs, a test excavation program will be completed. The results of which will be used to inform appropriate management measures in consultation with RAPs and will be provided so that DPIE and Heritage NSW can consider any new information prior to project approval.

7.11 Land and soil

7.11.1 Introduction

A land, soil and erosion assessment has been prepared by EMM that characterises the existing environment, identifies erosion hazards and provides appropriate management measures (Appendix Q). The SEARs relevant to the assessment, and how they are addressed, are summarised in Appendix A.

7.11.2 Assessment approach

A desktop assessment was undertaken using existing information on soils and soil environments for the subject property and surrounds. This included reviewing soil maps; landscape units; inherent soil fertility; land and soil capability classes; and acid sulfate soil information. Soils were collected from the subject property and tested as described in the *Biophysical Strategic Agricultural Land (BSAL) Site Verification Report* (Minesoils 2020). The erosion potential was determined by reviewing the physical and chemical properties of the soils. This information was used to identify appropriate erosion and sediment control practises.

The land, soil and erosion assessment considered the following standards and guidelines:

- *Land and Soil Capability Assessment Scheme* (OEH 2012);
- *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004);
- *NSW Acid Sulphate Soil Manual* (Stone et al. 1998); and
- *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Sampling and Identification Methods Manual* (Sullivan et al. 2018).

7.11.3 Existing environment

The existing land and soil within the subject property and the AARC site can be characterised as follows:

- The subject property soils are Kurosols and Sodosols. These soils can be generally characterised as:
  - slightly to strongly acid;
  - often hard setting with low permeability and water holding capacity;
  - localised saline, sodic subsoils prone to tunnel erosion and with low chemical fertility and elevated aluminium; and
  - generally having low fertility.
- The hydrologic soil groups (OEH 2017b) present in the vicinity of the ARRC site are Groups C and D, defined as:
  - Group C: soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.
  - Group D: soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.
- The Land and Soil Capability at the ARRC site is mapped as Classes 4–6, which represents land with 'moderate to severe limitations' to cropping (moderate to low capability land, as per the OEH (2012) classifications) with agricultural land uses restricted to grazing, forestry, and nature conservation. Limited options exist to improve the agricultural viability of the land without causing degradation.

- Modelled data indicates that erosion potential is variable across the ARRC site ranging from <20 t/ha/year to <200 t/ha/year. These represent lower range rates of erosion based on topsoil exposure. Subsoil erosion is likely to be higher given that sodic and/or magnesic properties of subsoils are likely to increase at depth.
- It is very unlikely acid sulphate soils (ASS) occur within the ARRC site.
- The ARRC site has not been formally recognised or mapped as biophysical strategic agricultural land (BSAL).
- The ARRC site is not explicitly identified as strategic agricultural land (SAL) or high-value agricultural land in either the Greater Sydney Regional Plan or Western City District Plans (Greater Sydney Commission 2018a; 2018b) and is unlikely to be considered SAL in the future.

7.11.4 Impact assessment

The overall erosion hazard for the project was assessed to be low using the Landcom (2004) method that considers the rainfall erosivity and the slope of the land but that the soils have a high erosion potential due to their electrochemical instability based on the assessment of site soils in accordance with Rosewell (1993).

The greatest erosion risk exists during the construction phase when potentially dispersive subsoils are exposed. A combination of amelioration of dispersive soils, source control of erosion and the use of Type D sediment basins will mitigate potential offsite impacts of this risk.

There is very low erosion risk during the operational phase of the project with the majority of the ARRC site covered by sealed hardstands, buildings or landscaped areas. The hardstands will be swept regularly to remove accumulated sediments. All potential turbid runoff from the hardstand areas will report to the water treatment plant (refer to Section 7.5.5).

7.11.5 Mitigation measures

The objective of erosion and sediment control practices will be to take all reasonable and practicable measures to minimise short- and long-term soil erosion, while minimising sediment transport which can cause damage to assets and result in the need for re-work during and after construction of the ARRC. This will be achieved by applying the principles of erosion and sediment control detailed in Landcom (2004) to the identified site constraints and erosion hazards.

Due to the erosion risk associated with the presence of dispersive soils, priority will be given to the prevention, or at least minimisation, of soil erosion rather than allowing erosion to occur and relying on sediment control measures to trap and contain sediment and turbid runoff.

A soil and water management plan (SWMP) will be prepared for the project. The SWMP will be underpinned by primary erosion and sediment control plans (PESCPs) that will be prepared for all discrete disturbance areas.

The following management and mitigation measures will be applied during construction:

- Soil disturbance:
  - land disturbance will be restricted to those areas required for the active stage of works;
  - flagging tape or bunting will be used during construction to minimise the potential for any disturbance outside of the designated work areas;
  - the electrochemical instability of the site soils will be ameliorated by the incorporation of gypsum into the soil at rates determined by site-specific soil testing;

- where necessary, particularly in preparation for periods of predicted rainfall or during shut down periods, soil stabilising polymers will be applied to exposed soils to protect them from rain drop splash erosion and sheet flows;

- the Landcom (2004) target stabilisation timing and standards for disturbed areas will be applied during construction and post-construction; and

- the highly erodible subsoils will be permanently covered with sealed hardstands preventing erosion during operations.

- Sedimentation basins:

  - clean water will be diverted around the catchments to sedimentation traps/basins to minimise the volume of clean water that encounters exposed soils and requires treatment;

  - Landcom (2004) Type D sedimentation basins will be installed where soil loss calculations exceed 150 t/ha and/or land disturbance exceeds 2,500 m^2;

  - sedimentation basins will be designed to contain an 85^{th} percentile, 5 day rainfall depth and will have a sediment storage zone that will contain the 3-month soil loss as determined by the Revised Universal Soil Loss equation (RUSLE);

  - the selection of appropriate coagulants and/or flocculants for use in the sedimentation basins and the determination of dosing rates will be undertaken using the bench testing procedure described in the *Chemical Coagulants and Flocculants Fact Sheet* (IECA 2018); and

  - in areas where it is not possible to divert all turbid water to a sedimentation basins (referred to in Landcom 2004 as 'local management areas'), a level of erosion and temporary sediment control protection will be implemented to achieve an equivalent level of environmental protection that would be achieved if a sediment basin was constructed.

- Drains:

  - in concentrated flow situations, drains will either have flow velocities less than the maximum permissible velocity of the soils or will be lined to protect the soil from erosion.

- Sequencing:

  - the sequencing of construction and drainage, erosion and sediment control works will allow for the installation of the temporary drainage system, and preferably the permanent stormwater drainage system as soon as practicable;

  - clean, sealed surfaces such as roofs and paved areas will be connected to the permanent drainage system as soon as possible;

  - where necessary, additional erosion and sediment controls will be installed during periods of highest rainfall risk (April to October);

  - all drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required; and

- upon decommissioning any drainage, erosion and sediment control measures, all materials used to form the control measures will be disposed of appropriately.

- Inspection and maintenance:
  - the construction, inspection and maintenance requirements for all drainage, erosion, and sediment control measures will be specified in the PESCPs;
  - inspections will be undertaken 24 hours prior to predicted rainfall events and immediately following rainfall events that cause run-off, and weekly during periods of no rain;
  - all clean and dirty water, debris and sediment removed from drainage, erosion and sediment control measures will be disposed of in a manner that will not create erosion, sedimentation, or a pollution hazard; and
  - when site personnel detect a notable failure in the adopted control measures, the source of the failure will be investigated, and appropriate amendments made to the controls and PESCPs.

- During the operational phase of the project, the only turbid water expected to be generated on site will be from imported waste and all run-off from these areas will report to a water treatment plant as described in Section 7.5.7. The site hardstand will be swept on a regular basis to minimise sediment tracking to public roads.

7.11.6 Conclusion

The greatest erosion risk exists during the construction phase when potentially dispersive subsoils are exposed. A combination of amelioration of dispersive soils, source control of erosion and the use of Type D sediment basins will mitigate potential offsite impacts of this risk.

There is very low erosion risk during the operational phase of the project with the majority of the ARRC site covered by sealed hardstands, buildings or landscaped areas. The hardstands will be swept regularly to remove accumulated sediments. All potential turbid runoff from the hardstand areas will report to a water treatment plant.

7.12 Contamination

7.12.1 Introduction

A preliminary site investigation (PSI) was undertaken by EMM for the project (Appendix R).

7.12.2 Assessment approach

The PSI was prepared in general accordance with the National Environment Protection (Assessment of Site Contamination) Measure, 1999 as amended in 2013 (NEPC 2013) and the relevant guidelines published by the NSW Environment Protection Authority (EPA).

Preparation of the PSI included:

- a review of the history of the ARRC site, using aerial photographs, land titles information and other public information regarding previous land uses (for example, local council databases and EPA registers);
- a review of the current ARRC site setting and characteristics, including geological, hydrogeological and topographic maps, zoning and land use maps and registered groundwater bore records;

- a walkover of the ARRC site to assess the potential presence of contaminants of concern or contaminating activities, on-site and in the surrounding area which have the potential to impact on the RRC site;
- a review of publicly available information regarding contamination on-site and in the surrounding area;
- preparation of a preliminary conceptual site model (CSM) outlining potential sources of contamination, migration pathways and sensitive receptors; and
- determination of the potential for contamination to be present at the ARRC site which may impact the development of the ARRC.

7.12.3 Existing environment

i Database search results

The ARRC site and surrounding properties were not identified on the EPA contaminated land record of notices or as sites notified as contaminated to the EPA.

No sites on the NSW Government PFAS Investigation Program were identified at the ARRC site or in the surrounding area.

The ARRC site was identified as being included on the EPL 12863 issued on 14 December 2000 for the quarry. The licence has now been revoked. The scheduled activity in the EPL was 'land-based extractive activities', with the approved scale being 100,000–500,000 tpa

Waste streams permitted to be accepted at the subject property under this licence included waste that meets the conditions of a resource recovery exemption (RRE) and any waste that is below licensing thresholds in Schedule 1 of the POEO Act. Under this licence, the recipient (Epic Mining Pty Limited) was permitted to discharge effluent into Oaky Creek.

In 2015, the site was investigated by the EPA for unauthorised composting at the licenced premises. A Pollution Study was required to investigate environmental impacts of composting. The licence was subsequently amended to prohibit the receipt of raw mulch or compost at the site.

No other EPLs were identified in the area surrounding the RRC site, within a 500 m buffer. Two properties to the north-west and north-east, were identified as having penalty and clean up notices issued.

ii Previous reports

A 125-m^3 stockpile ('Stockpile A') in the north-eastern portion of the ARRC site was identified to contain foreign material which may have been illegally disposed following cessation of previous operations at the subject property (Hibbs 2020). The stockpile is stable and covered with dense grass. The stockpile was tested and the material was classified as "General Solid Waste" (non-putrescible) for offsite disposal purposes.

7.12.4 Impact assessment

i Conceptual site model

The PSI (Appendix R) considered information from a range of sources to assess potential contamination risks to ARRC site users. A preliminary conceptual site model (CSM) was developed to identify complete or potentially complete linkages between contaminant sources and sensitive receptors, in the context of commercial/industrial land use.

Potential sources of contamination at the ARRC site were considered to be associated with waste storage and disposal on-site, and on the subject property immediately south of the ARRC site, as well as quarrying activities and chemical storage on the southern portion of the subject property, and agricultural activities in the surrounding area.

Potentially complete contaminant source–pathway–resources (S-P-R) linkages were identified for construction and maintenance workers associated with development of the ARRC site and future ARRC site users (workers and visitors to the ARRC). Down gradient users of surface and groundwater were also identified to have potentially complete S-P-R linkages, as were terrestrial and aquatic ecosystems in the Oaky Creek and Cosgroves Creek catchments.

Following removal of Stockpile A to an appropriately licensed facility, there is a low potential for contamination to be present which would prevent the future development of the site as a resource recovery facility.

7.12.5 Mitigation measures

The following mitigation measures will be applied:

- a CEMP, including an unexpected finds protocol, will be prepared and implemented to manage any contamination which may be encountered during development works at the ARRC site; and
- should contamination be identified, an assessment of deeper soils, leachability and/or groundwater may be necessary to assess potential impacts to Oaky Creek and Cosgroves Creek.

7.12.6 Conclusions

The findings of the PSI found that the potential sources of contamination at the ARRC site were considered to be associated with waste storage and disposal on-site, and on the property to the immediate south of the ARRC site, as well as quarrying activities and chemical storage on the southern portion of the subject property, and agricultural activities in the surrounding area. Notwithstanding, the report found that there is a low potential for contamination to be present which would prevent the future development of the site as a resource recovery facility.

7.13 Infrastructure requirements

7.13.1 Introduction

A Servicing Strategy report has been prepared by Indesco Pty Ltd for the project which details the infrastructure required for operation of the ARRC (Appendix S). The report considers the infrastructure requirements for the ARRC as well as for the future development on the subject property. Infrastructure requirements relevant to the ARRC are summarised in the below sections.

Dial Before You Dig (DBYD) plans were obtained from Sydney Water Corporation, Endeavour Energy, and Telstra and NBN Corporation in preparation of the report.

7.13.2 Potable water

The closest potable water main to the subject property was determined based on Sydney Water's HIDRA GIS mapping to be a DN150 watermain in Elizabeth Drive approximately 1.5 km to the north. A Feasibility Application was submitted to Sydney Water on 5 June 2020 to confirm if there are any proposed upgrade works planned in the area and/or what is required to connect the site to an authority water main. It is expected that site will be able to connect to the water main in 2022.

A 100-kL potable water storage tank will be installed at the ARRC. This will have to be refilled about once per week prior to the subject property being connected to mains water. Refilling the tank may require up to five tanker trucks.

The traffic impact assessment (Appendix L) has conservatively assessed that the site will be processing 600,000 tpa as soon as it opens. In reality, ARRC operations will ramp up after starting in 2022 and weekly truck movements for delivering water will be well within the total number of heavy vehicle movements (612 per day).

7.13.3 Wastewater

Based on Sydney Water's HIDRA GIS mapping and DBYD plans, there are no sewer connections currently available within the vicinity of the subject property.

A Feasibility Application was submitted to Sydney Water on 5 June 2020 to confirm if there are any proposed upgrade works planned in the area and/or what is required to connect the site to an authority sewer main (Appendix S). It is our understanding that the adjacent WSA will have its own private pressure sewer and private wastewater treatment plant (WTP) which will not service any surrounding properties. A new regional WTP delivered by Sydney Water for Upper South Creek to service the catchment will be delivered and operating by 2026 (refer to Appendix S).

Prior connecting the site to the trunk sewer, a sewage treatment plant (STP) (a pump out septic system) will be used. All waste water from the STP will be dispatched from site by truck for disposal at a suitably licenced facility. No water from the STP will be discharged on the subject property. The septic tank will need to be pumped out monthly. Transport of sewage once a month will have a negligible impact on total heavy vehicle movements (612 per day).

7.13.4 Electrical power

There are existing aerial high-voltage and low-voltage cabling reticulating along Adams Road with the subject property currently supplied from the aerial low-voltage network via a pole mounted transformer. The aerial HV network tees off from Adams Road to supply an adjacent property.

Preliminary electrical maximum demand calculations indicate the ARRC will require a 1,000-kVA substation.

A technical enquiry was submitted to Endeavour Energy on 1 June 2020 to understand the following:

- what capacity is available in the existing aerial HV feeder along Adams Road;
- what works will be required to accommodate the 1,000-kVA kiosk substation; and
- if there any other works planned for the area that will impact the proposed works.

It is understood that two new zone substations are planned for the area, one at the WSA and another 2 km away on Elizabeth Drive.

The location of the substation will be determined during detailed design following standard requirements for kiosk substation locations and easements. The construction of the substation and easement(s), if required, would be subject to an approval under Part 5 of the EP&A Act.

The Servicing Strategy will be updated once a response from Endeavour Energy is received.

The site access road will have street lighting spaced at 20 m centers.

7.13.5 Communications

Connection to the telecommunications copper network is provided to the subject property. The site is able to connect to the National Broadband Network via Sky Muster technology.

7.13.6 Conclusion

Services augmentations, lead-ins and service connections to the site will be required to support the ARRC. Some temporary services for water and wastewater are proposed until appropriate connections are available in the future.

Applications have been made to Sydney Water for sewer and potable water connections, and to Endeavour Energy for electrical connections. The Servicing Strategy report will be updated after responses from each authority have been received.

CHAPTER 8

Evaluation of Merits

8 Evaluation of merits

8.1 Introduction

This chapter provides an overall evaluation of the development of the ARRC with regard to biophysical, social and economic factors; the principles of ecologically sustainable development (ESD); and the consistency of the project with the objects of the EP&A Act.

8.2 Project design

The proposed ARRC is Stage 2 of the applicants' long-term vision to develop the site:

- 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 an environmentally 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.

The ARRC has been designed to comply with local, State and Federal environmental and planning legislation and guidelines. The design takes into consideration the likely interactions between the ARRC and the existing and future activities on the subject property and surrounding properties. The ARRC will be the first of many commercial/light industrial uses on the subject property and surrounding area. Its enclosed design will fit within the character of these developments.

The ARRC will only accept non-putrescible general solid waste. The design of the ARRC has been refined in response to stakeholder feedback during the preparation of the EIS. All waste and recycled product will now be accepted, processed, stored and dispatched within a fully enclosed warehouse.

The ARRC has been designed with a focus on minimising potential impacts on WSA's operations and to be compatible with the future Agribusiness land use.

The ARRC has been sited within the subject property so as to avoid impact on the important biodiversity values of the Oaky Creek riparian corridor. The design will prevent stormwater runoff contacting waste or waste handling areas and prevent any water from these areas being discharged to Oaky Creek.

8.3 Project need

The projected inert waste volumes to be disposed in Sydney Metropolitan Area inert landfills is predicted to increase by the historical compound annual growth rate of 4.1% based on the latest EPA construction and demolition waste data, with 23.7 million tonnes generated by 2040.

The ARRC, processing up to 600,000 tpa, would only provide 20% of the required additional processing capacity required in the Sydney Metropolitan Area. The scale of the development assists in offsetting the capital and operational costs associated with the enclosed warehouse. The economies of scale that will be achieved also maximises the opportunities for innovative recycling technologies to be developed and applied.

While the Liverpool LGA has experienced rapid population growth, a significant challenge for the LGA remains in ensuring that local employment growth keeps pace with the increase in population. The project will address the need for further employment opportunities in the local area through the creation of an estimated 70 jobs at the ARRC and an additional 108 indirect jobs created as a result of the ARRC's contribution to the economy of Western Sydney.

8.4 Strategic context and site suitability

Development of the Aerotropolis is predicted to create Australia's third-largest economy by 2036. Development of the Aerotropolis over the coming decade will require a huge number of construction projects for the delivery of the required community infrastructure including roads, the Western Sydney Metro, schools, health services; for the construction of the premises for large and small businesses; and for housing construction. All of these developments will generate construction and demolition waste and many will create commercial and industrial waste once in operation.

The subject property, being located at the northern end of the future Western Sydney Airport and readily accessible from major transport links including Elizabeth Drive, M4 Motorway, M7 Motorway the Northern Road and the future M12 Motorway, is strategically located to provide recycling service to meet the projected demand associated with future development activities within the Aerotropolis and surrounding areas.

The property was purchased in late 2019 by CPG, with the intent of filling the quarry void to allow CPG to develop the entire site over the coming decades. As outlined in Section 1.1, the applicants have a staged vision for the long-term development of the subject property. This vision is aligned with the long-term vision contemplated by the draft Western Sydney Aerotropolis Plan (draft Aerotropolis Plan) (WSPP 2019) and the proposed Aerotropolis SEPP.

Without a practical and economically viable method of rehabilitating the quarry site, the void will remain. The void will prevent the realisation of the draft Aerotropolis SEPP's vision at the subject property as about half of the property would be sterilised from future land uses compatible with the WSA and the proposed agribusiness land zoning. Instead, the void will remain as a liability to future generations.

The ARRC and related intended landfilling of non-recyclable residues (subject to separate development consent) is the only commercially viable option identified that will allow the subject property to fulfil the proposed objectives of the draft Aerotropolis SEPP.

8.5 Stakeholder engagement

Stakeholder engagement on the development of the subject property, including the ARRC, commenced in December 2019 and is ongoing. This engagement has guided the development of the project design and assessment process. While many stakeholders recognised the economic benefits of the project; WSA Corp, the Aerotropolis Authority and DITRDC raised concerns regarding the compatibility of the project with WSA, particularly with regard to potential risks associated with wildlife attraction and dust impacts on the operation of the airport.

Engagement with nearby landholders has not raised any objections to date with discussions continuing. The closest residence to the ARRC (285 Adams Road, Luddenham, receptor R3) will be significantly impacted by noise (prior to rezoning) and visual impacts from the ARRC but is currently unoccupied and it is understood that the property owner intends to develop the property to an Agribusiness/industrial land use. The next closest residence to the ARRC (225 Adams Road, Luddenham, receptor R6) will also be significantly impacted by noise (prior to rezoning) and visual impacts by the ARRC and discussions with both neighbours are continuing.

There will be fewer impacts on the Hubertus Club and the applicants will continue discussions with the club to ensure that the club benefits from the development, particularly from patronage from the AARC construction and operations workforce.

8.6 Impact assessment

Detailed technical investigations have been conducted as part of this EIS. These assessments identified residual impacts of the project and appropriate mitigation measures to address these impacts. The residual noise (prior to rezoning), air and visual impacts of the project will mostly accrue to the properties directly to the west and east of the subject property (R3 and R6). The applicants are currently consulting with these properties regarding the project and predicted impacts with options to further mitigate these impacts will be considered as the project design progresses.

The applicants propose to upgrade the northern section of Adams Road, between the site access road and Elizabeth Drive, to allow the current load limit to be lifted and to minimise impact that ARRC-related traffic will have on Adams Road.

The AIA found the ARRC will not impact WSA operations and is not an activity that would infringe on Prescribed Airspace and require approval under the Commonwealth *Airports Act 1996*.

The *Wildlife Strike and Birdstrike Risk Review* carried out as part of the AIA found the subject property currently poses an extremely low wildlife and birdstrike risk to the new Western Sydney Airport and that development of the ARRC is likely to reduce this risk further. Notwithstanding, a range of additional management and mitigation measures will be implemented to prevent wildlife or birds being attracted to the ARRC.

The ARRC will not result in a significant increase in dust deposition within the WSA site boundary and airborne dust will not impact aircraft operations.

8.7 Socio-economic justification

The project represents a major early private investment initiative for the area surrounding WSA. The project is projected to increase local area value-added economic activity generation in the order of $56 million per annum for ongoing operations (net present value of $596 million) and $11 million per annum during construction (net present value of $17 million).

The ‘do nothing option’ would forgo the estimated $141 million in annual direct and indirect output or business turnover contribution of the project to the Western Sydney economy. The ARRC will create 70 direct jobs and project’s contribution to the Western Sydney economy will create an estimated 108 indirect jobs to create a total of 178 direct and indirect jobs. Employees will be sourced from the local area where possible, to provide local job opportunities consistent with current Government objectives.

8.8 Environmental justification

The NSW Government paper *Cleaning Up Our Act: the Future for Waste and Resource Recovery* (DPIE 2020) identifies a critical need to plan and prepare early for all types of waste and resource recovery infrastructure. Direction 3 of the paper is to 'Plan for future infrastructure' and notes the challenges in finding appropriate lands for waste and resource recovery land.

The ARRC will be contributing to the realisation of a circular economy, consistent with Objective 5 of the draft Aerotropolis Plan. The ARRC will process a range of construction and demolition wastes, providing an environmentally beneficial means of dealing with construction and demolition waste (non-putrescible general solid), with recycled products turned into valuable sustainable products and sold back into the industry for use in a variety of applications.

The staged vision for the long-term development of the subject property will not only rehabilitate the subject property for future agribusiness land use.

8.9 Ecologically sustainable development

8.9.1 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 are defined in Clause 7(4) of Schedule 2 of the EP&A Regulation and include the following:

(a) the **precautionary principle,** namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by –

  (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

  (ii) an assessment of the risk-weighted consequences of various options

(b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) **improved valuation, pricing and incentive mechanisms**, namely; that environmental factors should be included in the valuation of assets and services, such as –

  (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

  (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanism, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to the environmental problems.

Consideration of the project against the four principles of ESD is provided below.

8.9.2 Precautionary principle

Consideration of the precautionary principle requires two things:

1. That the applicants properly assess all potential impacts using plausible worst-case assumptions and, either, avoids them in project planning or incorporates effective safeguards into the project design.

2. That the relevant authorities make a well-informed decision about the project based on sound knowledge of the project's implications and impacts, including any limitations on the accuracy of impact predictions.

The technical assessments prepared as part of this EIS generally use plausible worst-case assumptions in determining the potential impacts on the ARRC. There are no 'threats of serious or irreversible damage' from the proposed project, and the ARRC planning and design meets the first test above. Appendix C highlights the management measures that will be implemented to avoid, manage or mitigate predicted environmental impacts.

The second test will be satisfied by the comprehensive assessment and decision-making process to be followed by the government.

8.9.3 Inter-generational equity

The ARRC will be part of the circular economy, recycling waste materials that would otherwise be sent to landfill, extending the benefits provided by existing landfills for current and future generations. The recycled materials will largely be reused in construction projects that will benefit current and future generations. The substitution of recycled materials for new materials also reduces the impacts from the production of the new materials and retains resources for the use of future generations.

Without a practical and economically viable method of rehabilitating the quarry site, the void will remain unfilled and a liability to future generations. Leaving the void, which is adjacent to the WSA and within 250 m of Runway 05L/23R, will prevent the realisation of the draft Aerotropolis SEPP's long-term vision by the for the subject property as about half of the property would be sterilised from future land uses compatible with the WSA and proposed agribusiness land zoning. The project accordingly is an integral component in enabling the sustainable economic use of the site by future generations.

8.9.4 Conservation of biological diversity and maintenance of ecological integrity

The conservation of biological diversity and maintenance of ecological integrity principle holds that these measures should be a fundamental consideration for development proposals. The potential impacts of the project have been described in this EIS, including the potential impact of the project on biodiversity, and identifies measures to address residual impacts.

The project has been designed, where possible, to avoid sensitive biodiversity areas. The ARRC site footprint was sited to avoid potential impacts to the Oaky Creek riparian zone and impacts to Swamp Oak Floodplain Forest Endangered Ecological Community (EEC) within this zone.

Offsets will be provided to compensate the unavoidable clearing of areas of vegetation.

8.9.5 Improved valuation and pricing of environmental resources

The principle of improved valuation and pricing of environmental resources is based on environmental factors being included in the valuation of assets and services. The cost associated with impacting upon the environment or an environmental resource is seen as a cost incurred to use that resource.

The ARRC will use waste diverted from landfill to produce construction materials containing recycled material that have economic value. This will avoid and minimise the economic (and environmental) cost of disposing of the materials to landfill and, therefore, incorporates improved valuation, pricing and incentive mechanisms.

Opportunities for research and development into new technologies and processes will arises from the applicant's collaboration with NSW Circular and UNSW Material Sciences to drive best practices in the waste recycling industry, drawing ideas and inspiration from innovations worldwide.

8.10 Conclusion

This EIS considers the design of the ARRC, and the proposed mitigation, management and offsetting measures to be implemented during construction and operation of the ARRC to determine the potential impacts of the development.

The ARRC has been designed to be compatible with surrounding future Agribusiness land use with a focus on preventing impacts to WSA's operations. The ARRC has also been designed to minimise environmental impacts.

The ARRC is a 'stand-alone' development that will provide a range of direct and indirect socio-economic benefits including contributing an estimated $141 million in annual direct and indirect output or business turnover to the Western Sydney economy and 178 direct and indirect jobs and will provide environmental benefits through the recycling of up to 540,000 tpa of waste supporting NSW Government strategies to meet waste reduction targets and increase the recovery and reuse of material.

Subject to the approval of other developments on the subject site, development of the ARRC is integral in achieving the intended future commercial/industrial land use of the subject property as the project provides a commercially viable means to fill the quarry void (subject to separate development consent). This will support the Western Sydney Airport and ongoing development of the Western Sydney Aerotropolis.

This EIS finds that ARRC could be developed without any significant impacts on the local environment within the context of the Aerotropolis.

For all of these reasons, the proposed ARRC is considered to be in the public interest.

References and abbreviations

References

ABS 2016, *2016 Census Quick Stats,* Australian Bureau of Statistics, viewed 21 April 2020 https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC12419?opendocument

AEGIS 2015, *Australian Greenhouse Emissions Information* System, retrieved January 2019 from http://ageis.climatechange.gov.au/

ANZECC 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Volume 1, Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), October 2000.

ANZG 2018, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Governments and Australian state and territory governments, http://www.waterquality.gov.au/anz-guidelines/.

Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids.

Australian Standard 1596:2008 The Storage and Handling of LP Gas.

Australian Standard AS 4970-2009 Protection of trees on development sites.

Austroads 2016 *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis*.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I (Editors) (2019) *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geosciences Australia).

Commonwealth of Australia 2016, Western Sydney Airport: Airport Plan https://www.westernsydneyairport.gov.au/sites/default/files/Western_Sydney_Airport_Plan.pdf

Deloitte 2015, *Shaping Future Cities Designing Western Sydney: A blueprint for the economic transformation of Western Sydney*, viewed 27 February 2020 https://www2.deloitte.com/content/dam/Deloitte/au/Documents/future-of-cities/deloitte-au-foc-designing-western-sydney-290818.pdf

DEC 2005, *Liquid Chemical Storage, Handling and Spill Management: Review of Best Practice Regulation*, NSW Department of Environment and Conservation.

DECC 2007a, *NSW Floodplain Risk Management Guideline – Practical Considerations of Climate Change*, prepared by NSW Department of Environment and Climate Change.

DECC 2007b, *Storing and Handling Liquids: Environmental Protection: Participant's Manual*, NSW Department of Environment and Climate Change.

DECC 2008a, *Managing Urban Stormwater: Soils and Construction – Volume 2C – Unsealed Roads*.

DECC 2008b, *Managing Urban Stormwater: Soils and Construction – Volume 2D – Main Road Construction.*

DECC 2009, *The Interim Construction Noise Guideline* (ICNG), NSW Department of Environment, and Climate Change.

DECCW 2006, *NSW Water Quality and River Flow Objectives*, NSW Department of Environment, Climate Change and Water, http://www.environment.nsw.gov.au/ieo/

DECCW 2010a, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW.*

DECCW 2010b, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*.

DECCW, 2010c, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

DIRD 2016, *The Western Sydney Airport: Environmental impact statement*, Department of Infrastructure and Regional Development.

DIPNR 2005, *Floodplain Development Manual: The Management of Flood Liable Land*, prepared by NSW Department of Infrastructure, Planning and Natural Resources.

DoE 2013, *Matters of National Environmental Significance – Significance Impact Guidelines 1.1*, Department of Environment, Canberra.

DoEE 2019, *Air Quality Monitoring Data from Bringelly Air Quality Monitoring Station*. NSW Department of Planning, Industry and Environment.

DoP 2011a, *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33*, Department of Planning.

DoP 2011b, *Hazardous Industry Planning Advisory Paper No 4: Risk Criteria for Land Use Safety Planning Guidelines*, Department of Planning.

DPE 2018, *Western Sydney Aerotropolis, Land Use and Infrastructure Implementation Plan, Stage 1: Initial Precincts*, NSW Department of Planning and Environment.

DPE 2019, *Preparing an Environmental Impact Statement - Guidance for State Significant Projects,* NSW Department of Planning and Environment.

DPIE 2019a, *Vegetation Condition Benchmarks*, viewed 15 May 2020, Department of Planning, Industry and Environment https://www.environment.nsw.gov.au/topics/animals-and-plants/native-vegetation/vegetation-condition-benchmarks

DPIE 2020, *Cleaning Up Our Act: The Future for Waste and Resource Recovery in NSW*, Issues Paper, March 2020, NSW Department of Planning, Industry and Environment.

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.

EMM 2020a, *Luddenham Resource Recovery Centre Scoping Report*, prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020b, *Luddenham Quarry, DA 315-7-2003 MOD5 Modification Report,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020c, *Luddenham Resource Recovery Centre, Community and stakeholder engagement plan*, prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020d, *Luddenham Resource Recovery Centre, Air quality impact assessment*, prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020e, *Luddenham Resource Recovery Centre, Noise and vibration impact assessment,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020f, *Luddenham Resource Recovery Centre, Surface water assessment,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020g, *Luddenham Resource Recovery Centre, Traffic impact assessment,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020h, *Luddenham Resource Recovery Centre, Bushfire impact assessment,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020i, *Luddenham Resource Recovery Centre, Biodiversity development assessment report,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020j, *Luddenham Resource Recovery Centre, Environmental Impact Statement,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020k, *Luddenham Resource Recovery Centre, Land and soil assessment,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020l, *Luddenham Resource Recovery Centre, Preliminary site investigation,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

EMM 2020m, *Luddenham Quarry, DA 315-7-2003 MOD5 Scoping Report,* prepared for Coombes Property Group and KLF Holdings Pty Ltd, EMM Consulting Pty Ltd.

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

EPA 2009, *The Interim Construction Noise Guideline* (ICNG), NSW Environment Protection Authority.

EPA 2011, *NSW Road Noise Policy*, NSW Environment Protection Authority.

EPA 2014a, *Waste Classification Guidelines: Part1: Classifying waste,* NSW Environment Protection Authority.

EPA 2014b, *Waste Classification Guidelines: Part 2: Immobilisation of Waste,* NSW Environment Protection Authority.

EPA 2014b, *Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014, The recovered tyres exemption 2014,* NSW Environment Protection Authority.

EPA 2014c, *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The recovered tyres order 2014*, NSW Environment Protection Authority.

EPA 2014d, *NSW Waste Avoidance and Resource Recovery Strategy 2014–21*, NSW Environment Protection Authority.

EPA 2016a, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, minor revisions November 2016, published January 2017, NSW Environment Protection Authority.

EPA 2016b, *Environmental Guidelines: Solid Waste Landfills, Second Edition 2016*, NSW Environment Protection Authority.

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

EPA 2019, *Standards for Managing Construction Waste in NSW*, NSW Environment Protection Authority.

Epic Mining Pty Ltd 2016, *Environmental Assessment Report: Luddenham Clay & Shale Quarry, Epic Mining Pty Ltd, 245 Adams Road, Luddenham NSW*, 25 August 2016.

FRNSW 2019, *Fire Safety Guideline: Access for Fire Brigade Vehicles and Firefighters, Version 05*, Fire and Rescue NSW, Community Safety Directorate, Fire Safety Branch, issued 4 October 2020.

FRNSW 2020, *Fire Safety Guideline: Fire Safety in Waste Facilities, Version 02.02*, Fire and Rescue NSW, Community Safety Directorate, Fire Safety Branch, issued 27 February 2020.

Gillespie Economics 2020, *High-Level Economic Assessment of the Luddenham Resource Recovery Centre,* prepared for Coombes Property Group and KLF Holdings Pty Ltd.

Golder 2009, *Luddenham Quarry Air Quality Monitoring Program*, prepared for Epic Mining.

Greater Sydney Commission 2018a, *Greater Sydney Region Plan – A metropolis of Three Cities*.

Greater Sydney Commission 2018b, *Western City District Plan*.

Hibbs (2020) Stockpile A Waste Classification – 275 Adams Rd, Luddenham May 2020, prepared for Coombes Property Group and KLF Holdings Pty Ltd.

IECA 2018, Chemical Coagulants and Flocculants Fact Sheet, International Erosion Control Association (Australasian Chapter).

Indesco 2020, *Servicing strategy Report for 275 Adams Road, Luddenham* (ie Infrastructure staging plan).

Keith, DA & Pellow, BJ 2015, *Review of Australia's Major Vegetation classification and descriptions*. Centre for Ecosystem Science, UNSW, Sydney.

Landcom 2004, *Managing Urban Stormwater: Soils and Construction, Volume 1*, 4th Edition March. NSW Government.

Landrum and Brown 2020, *Aeronautical Impact Assessment,* prepared by Landrum & Brown Worldwide (Aust) Pty Ltd for Coombes Property Group and EMM Consulting Pty Ltd.

LCC 2017, ePlanning portal: maps, viewed 14 April 2020, Liverpool City Council https://eplanning.liverpool.nsw.gov.au/Pages/XC.Home/info.aspx?sid=24547

LCC 2019, *Connected Liverpool 2050: Local Strategic Planning Statement – A land use vision to 2050*, Liverpool City Council.

Minesoils 2020, *Luddenham Quarry Mod5 Biophysical Strategic Agricultural Land (BSAL) Site Verification Report, Report Number: MS-03_Final*, Minesoils Pty Ltd.

MRA 2019, *275 Adams Road, Luddenham: Economic Needs Analysis*, prepared 8 October 2019 by MRA Consulting Group.

Navin Officer Heritage Consultants 2016, *Western Sydney Airport: Aboriginal Cultural Heritage Assessment*, prepared for GHD.

NEPC 2013, *National Environment Protection (Assessment of Site Contamination) Measure 2013*, initially dated 1999 and amended in 2013, NEPC National Environment Protection Council.

National Transport Commission 2007, Australian Code for the Transport of Dangerous Goods by Road and Rail.

NSW Government n.d, *Western Sydney Infrastructure Plan Portal*, viewed 27 February 2020 https://v2.communityanalytics.com.au/rms/wsip

NSW Government 2019, *NSW Circular Economy Policy Statement*, viewed 20 May 2020 https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/recycling/19p1379-circular-economy-policy-final.pdf?la=en&hash=F80151EA9C2C3E27BA889D15D18041CDF7A4D25A

NSW RFS 2019, *Planning for Bushfire Protection*. *A guide for Councils, planners, fire authorities and developers,* NSW Rural Fire Service, November 2019.

OEH 2012, *The Land and Soil Capability Assessment Scheme, Second Approximation: A General Rural Land Evaluation System for New South Wales*. Office of Environment & Heritage, NSW Government.

OEH 2017a, *Biodiversity Assessment Method (BAM*), NSW Office of Environment and Heritage, Sydney.

OEH 2017b, *Hydrologic Groups of Soils in NSW*, NSW Office of Environment and Heritage, Sydney.

OEH 2019, Floodplain Risk Management Guide: Incorporating 2016 Australian Rainfall and Runoff in Studies, prepared by NSW Office of Environment and Heritage.

OEH n.d, *Luddenham Road Alignment,* NSW Office of Environment and Heritage, viewed 10 June 2020 https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?id=2260843

Pam Dean-Jones Archaeological Services (Dean-Jones) 1991, *Proposed Clay/Shale Extraction, Lot 3 DP623799, Adams Road Luddenham Archaeological* Survey, report for R.A. Cole Town Planning Pty Ltd.

Rosewell CJ 1993, *SOILOSS – a Program to Assist in the Selection of Management Practices to Reduce Erosion. Technical Handbook No. 11*, Soil Conservation Services, Sydney, NSW.

RTA 2002 *Guide to Traffic Generating Developments*, Roads and Traffic Authority.

Safe Work Australia 2018, *Code of Practice: How to manage work health and safety risks.* https://www.safeworkaustralia.gov.au/book/model-code-practice-how-manage-work-health-and-safety-risks#41-the-hierarchy-of-control-measures

Stone Y, Ahern CR and Blunden B 1998, *Acid Sulfate Soils Manual 1998*. Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW.

Sullivan L, Ward N, Toppler N and Lancaster G 2018, *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Sampling and Identification Methods Manual*, Department of Agriculture and Water Resources, Canberra ACT.

Sustainability Victoria 2009, *Guide to Best Practice at Resource Recovery Centres*.

Wilkinson Murray 2015, Western Sydney Airport Environmental Impact Statement, Volume 4, Appendix E2, *Airport Ground-based Noise and Vibration - Western Sydney Airport EIS, Assessment of Ground-Based Operational Noise*, (Report No. 14168-1 Version F).

WSA Co 2018, *Western Sydney Airport Construction Plan – Stage 1 Development,* Western Sydney Airport Co.

WSPP 2019a, *Western Sydney Aerotropolis Plan Draft - for public comment,* NSW Western Sydney Planning Partnership.

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

EMM
creating opportunities

www.emmconsulting.com.au