

Appendix V – Social impact assessment



NEWSTAN MINE EXTENSION PROJECT | MARCH 2020

SOCIAL IMPACT ASSESSMENT

Hansen Bailey

ENVIRONMENTAL CONSULTANTS



NEWSTAN MINE EXTENSION PROJECT

SOCIAL IMPACT ASSESSMENT

Prepared by:

HANSEN BAILEY

Level 15, 215 Adelaide Street
Brisbane QLD 4001

6 March 2020

For:

CENTENNIAL COAL COMPANY LIMITED

100 Miller Road
Fassifern NSW 2267

DECLARATION

This report has been prepared by Hansen Bailey Environmental Consultants Principal Social Planner Bronwyn Pressland. Bronwyn holds a Bachelor of the Built Environment (Urban and Regional Planning) and a Master of Environmental Management. Bronwyn has more than 20 years' professional experience, including 12 years with Hansen Bailey. Bronwyn has provided community engagement and social impact assessment (SIA) and management services for a diverse range of major projects in New South Wales (NSW), Queensland and the Northern Territory. For the past 12 years Bronwyn has worked almost exclusively on resource development projects, including coal, bauxite and manganese. A copy of Bronwyn's curriculum vitae is provided in Appendix A.

The SIA component of the Environmental Impact Statement (EIS) contains all information relevant to the SIA for the Newstan Mine Extension Project. The information provided is not of a false or misleading nature. The assessment was completed between July 2019 and January 2020. Hansen Bailey was engaged by Centennial Coal as an independent assessor. Hansen Bailey has provided an impartial assessment of the anticipated social impacts of the Newstan Mine Extension Project. There are no known conflicts of interest.

The consultation to inform the SIA was conducted in an ethical manner. Consultation included the full disclosure of the nature of the research and the participant's involvement. Participation in SIA discussion was verbally agreed to. Respect for participants throughout the consultation period was maintained, and interview and survey participation was voluntary. All participants had the right to withdraw from the interview process and the presumption and preservation of anonymity was upheld.

I, Bronwyn Pressland, confirm that the above statements and information given is true and correct to the best of my knowledge.



Signed:

Date: 6 March 2020

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ABBREVIATIONS LIST

ABS	Australian Bureau of Statistics
ACSS	Awaba Colliery Surface Site
B	Billion
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
CCC	Community Consultative Committee
Centennial	Centennial Coal Company Limited
Centennial Newstan	Centennial Newstan Pty Ltd
Central Coast and Lake Macquarie REDS	Central Coast and Lake Macquarie Regional Economic Development Strategy 2018-2022
Community Strategic Plan	Our Future in Focus
DA	Development Application
DPIE	Department of Planning, Industry and Environment
EAD	Eraring Ash Dam
EIS	Environmental Impact Statement
EMA	Extension of Mining Area
EP&A Act	<i>Environment Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
EPS	Eraring Power Station
ERP	Estimated Resident Population
FTE	Full-time Equivalent
GRP	Gross Regional Product
km	kilometres
kV	kilovolts
LEP	Local Environmental Plan
LDP	Licensed Discharge Points
LGA	Local Government Area
LM LGA	Lake Macquarie LGA
LM Strategic Plan	Imagine Lake Mac
m	metres
M	Million
Metropolitan Plan	Greater Newcastle Metropolitan Plan 2036
Mtpa	Million tonnes per annum
NCLP	Northern Coal Logistics Project
NCSS	Newstan Colliery Surface Site
NGO	Non-Government Organisation

NM SUA	Newcastle-Maitland Significant Urban Area
NSW	New South Wales
PA	Project Approval
PAA	Project Application Area
Regional Plan	Hunter Regional Plan 2036
ROM	Run-Of-Mine
SA2	Statistical Area Level 2
SEIFA	Socio-Economic Indices for Areas
SIA	Social Impact Assessment
SUA	Significant Urban Area
SSC	State Suburb
SSD	State Significant Development

NEWSTAN MINE EXTENSION PROJECT SOCIAL IMPACT ASSESSMENT

for
Centennial Coal Company Limited

1 INTRODUCTION

1.1 OVERVIEW

Newstan Colliery is an existing underground coal mine located in the Lake Macquarie (LM) Local Government Area (LGA), approximately 25 km south-west of Newcastle and 140 km north of Sydney, NSW (Figure 1). It is owned and operated by Centennial Newstan Pty Ltd (Centennial Newstan).

Centennial Newstan Pty Ltd (Centennial Newstan) a wholly owned subsidiary of Centennial Coal Company Limited (Centennial), is seeking development consent for the Newstan Mine Extension Project (the project). The project is State Significant Development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP). Accordingly, Centennial Newstan is seeking approval for the project under Part 4, Division 4.7 of the New South Wales (NSW) Environmental Planning and Assessment Act 1979 (EP&A Act). An Environmental Impact Statement (EIS) is a requirement of the approval process.

Centennial also owns and operates the adjacent Northern Coal Logistics Project (NCLP), and the underground mines at Myuna Colliery, Mandalong Mine and Awaba Colliery within the LM LGA (Figure 2 and Figure 3). Awaba Colliery ceased operation in 2012. Myuna Colliery, Mandalong Mine and Newstan Colliery provide coal to the nearby Eraring Power Station (EPS) (Figure 3). The NCLP provides the coal handling, processing and transport facilities to deliver coal from Newstan Colliery and Mandalong Mine to domestic and export markets.

1.2 PURPOSE

This SIA has been prepared by Hansen Bailey on behalf of Centennial Newstan. This SIA forms part of the EIS prepared in support of the application for SSD consent under the EP&A Act. The SIA considers the potential social impacts and benefits of the project, across the project life, including decommissioning and closure, and identifies appropriate strategies to avoid, mitigate or manage the negative impacts and to enhance the positive opportunities presented by the project. It has been prepared to the form and content requirements described in the *Social Impact Assessment Guideline for State significant mining, petroleum*

production, and extractive industry development (SIA Guideline) (Department of Planning and Environment, 2017).

The purpose of this document is to inform government agencies and other stakeholders about the project, its potential social impacts, and the measures that will be implemented to manage, mitigate and offset social impacts. It addresses the specific requirements set out in the Secretary's Environmental Assessment Requirements (SEARs) for the project, which were issued by the NSW Department of Planning, Industry and Environment (DPIE) on 3 September 2019. In addition to State matters, assessment requirements for Matters of National Environmental Significance, as required under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) were provided to Centennial Newstan (to be appended to the SEARs) on 23 December 2019.

1.3 DOCUMENT STRUCTURE

The SIA is structured as follows:

- **Section 1** – Introduction: provides an overview of the project and describes the purpose and scope of the SIA.
- **Section 2** – SIA Scope: describes the scope of the SIA with reference to the project context, and assessment requirements.
- **Section 3** – Project Description: describes the existing Newstan Colliery operations including interactions with other Centennial mining operations in the LM LGA, describes the project and characteristics relevant to the assessment of social impacts.
- **Section 4** – SIA Methodology: describes the SIA objectives, and provides an explanation of the SIA methodology.
- **Section 5** – Social Area of Influence: defines the project's social area of influence.
- **Section 6** – Describes the scope of the EIS consultation including tailored SIA consultation, and presents a summary of the findings of SIA consultation.
- **Section 7** – Social Baseline: presents a summary of the key socio-economic characteristics of the project's social area of influence.
- **Section 8** – Social Impact Assessment: describes the predicted social impacts and opportunities of the project and presents measures to avoid, mitigate or manage the identified impacts.
- **Section 9** – Monitoring and Reporting: outlines the performance framework for monitoring and reporting on the implementation of the management measures.
- **Section 10** – Conclusion.
- **Section 11** – References.
- **Appendix A** – Curriculum Vitae of SIA Specialists.
- **Appendix B** – SIA Guideline Core Principles.

- **Appendix C** – SIA Guideline Checklist.
- **Appendix D** – Scoping Assessment.
- **Appendix E** – Nearby Areas of Interest Summary (State Suburb Indicators).
- **Appendix F** – Supporting Baseline Information.

2 SIA SCOPE

This section presents a detailed description of the project. It presents the background to the project, rationale and objectives, and interactions with existing operations.

2.1 THE PROJECT

2.1.1 Project Background

Mining operations at Newstan Colliery began in 1887 and upon the introduction of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) operated pursuant to continuing use rights in accordance with Part 4, Division 10 of the EP&A Act (continuing use rights). On 14 May 1999 the (then) Minister for Urban Affairs and Planning granted a Development Consent for Development Application (DA) 73-11-98 under Part 4 of the EP&A Act for the Newstan Colliery Life Extension Area. This approval enabled mining to continue within the existing mining areas as well as the expansion of mining into areas that had not previously been mined. Development Consent DA 73-11-98 has been modified on eight occasions, with the most recent modification approved on 17 January 2019.

In August 2014, the underground operations at Newstan Colliery were placed onto care and maintenance due to poor market conditions. In recent years, Centennial Newstan has commenced feasibility investigations into the recommencement of mining at Newstan Colliery. Centennial Newstan (the proponent) is now seeking approval for the continuation of mining within the West Borehole seam. The Newstan Mine Extension Project (the project) proposes the extraction up to 25.9 million tonnes (Mt) of Run of Mine (ROM) coal over a fifteen year period.

This EIS has been prepared by GHD Pty Ltd to assess the environmental, social and economic impacts of the project and will accompany a SSD application under Divisions 4.7 of Part 4 of the EP&A Act.

2.1.2 Project Overview

The project seeks to extend underground mining operations at Newstan Colliery to the south (Figure 4). Bord and pillar mining is proposed using continuous miner methods that will include areas of first workings, partial extraction and total extraction. A mix of metallurgical and thermal coal is proposed to be extracted at a maximum rate of 4 Million tonnes per annum (Mtpa).

Coal extracted by the project will be delivered to the Newstan Colliery Surface Site (NCSS) via a series of existing underground conveyors. Once the coal reaches the NCSS it will be

handled in accordance with the approved operations for the NCLP (SSD-5145), managed by Centennial Coal's Northern Coal Services business unit.

Other key features of the project include:

- Utilisation of the NCSS to provide parking, bathhouse, administration and workshop facilities for the underground workforce. A small number of administrative, maintenance and monitoring personnel will also be located at Awaba Colliery Surface Site (ACSS).
- Transportation of personnel and materials to and from the underground mining area via the existing men and materials drift at NCSS.
- Continued operation of the two existing ventilation fans at NCSS and the installation and operation of three new ventilation fans at the existing ventilation shaft at ACSS.
- In-seam gas drainage, with gas transferred to a new gas flaring facility to be located within the existing disturbance footprint of ACSS.
- Extraction of underground water via the existing Fassifern Pump Station at NCSS and ongoing groundwater management.

The project site encompasses three distinct areas (Newstan Colliery, Extension of Mining Area (EMA), and Awaba Colliery) which collectively form the Project Application Area (PAA). The locations of these areas are described in the Section 2.3 and illustrated on Figure 2.

2.1.3 Project Rationale and Objectives

Rationale

The project proposes the continuation of underground mining within an established mining precinct that has been operating for over 130 years. The potential impacts of the project have been minimised by maximising the use of existing surface infrastructure and equipment, developing a lower-impact and flexible mine design, minimising surface disturbance for gas drainage and greenhouse gas abatement and proposing a complementary suite of mitigation measures and management strategies to be implemented during construction, operation and closure.

The combination of first workings only, partial extraction, and total extraction using bord and pillar mining methods has been adopted to minimise subsidence impacts to sensitive built and natural surface features and to mitigate multi-seam subsidence impacts associated with the Awaba workings in the overlying Great Northern seam.

Conservative buffers have been adopted in the mine design to minimise subsidence impact risks to overlying infrastructure such as the Main Northern Railway, EPS and Eraring Ash Dam (EAD) and sensitive surface water features such as Stockyard Creek, Kilaben Creek and Stony Creek.

There is also inherent flexibility in the proposed bord and pillar mining method as it provides Centennial Newstan with the ability to vary mining activities as required in response to unforeseen geological or environmental constraints.

The coal recovered from the PAA can produce both a semi-soft coking coal product for the export market and a thermal coal product for both the domestic and export markets. The project will enable supply of export coal products while meeting contractual coal supplies to the domestic markets. Over time, the project can potentially replace the coal product currently supplied to the domestic market by other Centennial Coal operations as these other resources become depleted. This will ensure ongoing security of supply for domestic electricity generation.

The project, if approved, will allow for the optimisation of resource recovery from within the PAA while provide ongoing direct and indirect employment opportunities. In addition, the project will provide a number of positive flow-on effects to the local, regional and state economies through additional wages and royalties.

Project Objectives

The key objectives of the project are to:

- Produce a semi-soft coking coal product for the export market and a thermal coal product for both the domestic and export markets.
- Help to ensure ongoing security of thermal coal supply for domestic electricity generation.
- Provide tangible social and economic benefits to the local community and positive flow-on effects to regional and State economies through additional wages and royalties.
- Design, construct, operate and close the project in an ecologically sustainable manner.
- Minimise the project's impacts on sensitive built and natural environmental features.
- Optimise resource recovery. The coal resource is a public asset owned by the State of NSW and it is therefore in the public interest to optimise resource recovery.

2.2 PROJECT SETTING

Newstan Colliery is located within the western portion of the LM LGA (Figure 1). The LM LGA had a population of 204,914 in 2018 (LMCC, 2019b), making it the largest city in the Lower Hunter and the seventh most populous in NSW (LMCC, 2017). The LM LGA is bordered to the east by the Pacific Ocean, to the north by the Newcastle City LGA, to the west by the Cessnock LGA and to the south by the Central Coast LGA. Lake Macquarie, the largest saltwater lake in the southern hemisphere (LMCC, 2017), is widely regarded as the centrepiece of the LM LGA.

Lake Macquarie and the surrounding residential suburbs of Toronto and Rathmines border the project to the east. To the south lie the suburbs of Dora Creek and Myuna Bay (Figure 5). To the west lies the M1 Pacific Motorway.

There is a long history of underground and open cut mining activity in western LM LGA. Operating coal mines and associated industry in western LM LGA include:

- Mandalong Mine – An underground coal mine owned and operated by Centennial Mandalong Pty Ltd (a subsidiary of Centennial Coal). The consolidated development consent boundary for the Mandalong Mine (approved under SSD 5144 for the Mandalong Southern Extension Project) abuts the southern boundary of the Project Application Area (PAA);
- Myuna Colliery – An underground coal mine owned and operated by Centennial Myuna Pty Ltd (a subsidiary of Centennial Coal). The consolidated development consent boundary for the Myuna Colliery (approved under Project Approval 10_0080) abuts the eastern boundary of the PAA; and
- Eraring Power Station (EPS) – The EPS is located at Eraring and is owned and operated by Origin Energy (Figure 3). EPS has been operating since 1982 and is Australia's largest power station with a generation capacity of 2,880 megawatts. The EPS is discussed further in Section 7.1.1.

The Wallarah 2 Coal Project, an approved (but not operational) underground coal mine project being developed by Wyong Coal Pty Limited is located to the south of the project (Figure 2). The development consent boundary for the Wallarah 2 Coal Project (approved under SSD 4974) is located approximately 15 km to the south of the PAA.

Other surrounding land uses are described in Section 7.1 and include a range of large-scale industrial activities related to underground mining and power generation.

2.3 PROJECT APPLICATION AREA

The PAA covers an area of approximately 6,762 hectares. The portion of the PAA within which mining is proposed is termed the EMA. It covers an area of approximately 1,256 hectares. The three component areas of the PAA are described in the following sections.

Newstan Colliery

Newstan Colliery pit top and NCSS is located at Fassifern, approximately 4 km north of Toronto (Figure 5). Access is via Miller Road, Fassifern. Fassifern Public School is located on Miller Road to the south of the site access (Figure 6). The nearest major population settlements to Newstan Colliery are Toronto, Blackalls Park and Fassifern to the east, Wakefield to the north, and Dora Creek to the south (Figure 5). Newstan Colliery is also bordered to the east by the Lake Macquarie foreshore, and the expanding urban areas of

Rathmines and Buttaba. Rural residential development is located along Miller Road to the immediate north of the site access.

Newstan Colliery also incorporates the existing underground mining areas within Great Northern, Fassifern, West Borehole, Borehole, Young Wallsend and Yard seams. The existing workings within the Fassifern, Great Northern and Borehole seams are utilised as underground water storages that integrate with the NCLP.

Parts of the NCSS also operate under SSD-5145 for the NCLP.

Extension of Mining Area

The majority of the proposed EMA is located under undulating, unpopulated bushland. Lake Macquarie and the surrounding residential suburbs of Toronto, Rathmines, Balmoral, Buttaba, Arcadia Vale, and Wangi Wangi are located to the east of the area (Figure 5). To the south lies the EPS and associated infrastructure including the Eraring Ash Dam (EAD). To the west lies the M1 Pacific Motorway. The Main Northern Railway traverses the area in a north-south direction. These features are shown in Figure 3.

The EMA is bordered by previous Newstan Colliery mine workings to the north and northwest, while the western portion of the proposed mining area is overlain with the Awaba Colliery mine workings in the Great Northern seam.

The EMA is also partially overlain by a biodiversity offset site known as the Awaba Biodiversity Conservation Area. The site is owned by Lake Macquarie City Council (LMCC) and managed for biodiversity conservation in accordance with the terms of an agreement established under the EPBC Act. The Awaba Biodiversity Conservation Area is shown in Figure 6.

The Awaba Waste Management Facility and Awabawac Park (an automobile park) are located to the immediate east of the EMA (Figure 6). Both facilities are accessed off Wilton Road.

Awaba Colliery

The ACSS is located approximately 1 km south of the Awaba village and 5.5 km south-west of Toronto, adjacent to the Newstan-Eraring private haul road. The site is accessed via Wilton Road, Awaba (Figure 6). Awaba Colliery also incorporates the existing underground mining area within the Great Northern seam, which is utilised for the storage of groundwater.

2.4 ASSESSMENT REQUIREMENTS

This section describes the key regulatory requirements relevant to the identification and management of social impacts arising from the project.

The project is subject to the following NSW regulatory requirements and guidelines relating to the conduct of the SIA:

- NSW DPIE SEARs for the project; and
- NSW SIA Guideline (Department of Planning and Environment, 2017).

The DPIE regulatory requirements are outlined in Section 2.4.1. The requirements of the NSW SIA Guideline and compliance with these requirements is discussed in Section 2.4.2.

2.4.1 Secretary's Environmental Assessment Requirements

The SEARs identify matters which must be addressed in the EIS for the project. Table 1 lists individual requirements relevant to the assessment of social impacts and where each requirement is addressed in this report.

Table 1
SIA Related SEARs

Requirement	Section Addressed
An assessment of the potential social impacts of the development that builds on the findings of the <i>Social Impact Assessment Scoping Report</i> , in accordance with the <i>Social impact assessment guideline for State significant mining, petroleum production and extractive industry development</i> , paying particular consideration to:	Section 8
• How the development might affect people's way of life, community, access to and use of infrastructure, services and facilities, culture, health and wellbeing, surroundings, personal and property rights, decision-making systems, and fears and aspirations;	Section 8
• The principles in Section 1.3 of the guideline; and	Appendix B
• The review questions in Appendix D of the guideline.	Appendix C

Source: Department of Planning, Industry and Environment (2019)

2.4.2 Government Agency Correspondence on SEARs

Government agency correspondence on the SEARs was also received. Correspondence from Lake Macquarie City Council (LMCC) included reference to the following summarised matters of relevance to the SIA:

- Management of conservation land and biodiversity offsets;
- Strategic rehabilitation planning and the transition to post mining land;
- Strategic land use planning issues, specifically:
 - Potential project impacts on the indicative very fast train corridor between Sydney and Newcastle; and

- The protection of the native vegetation and biodiversity in the Awaba area as a conservation reserve (Awaba Conservation Area).
- Existing and projected acoustic amenity in surrounding areas; and
- Assessment of the potential impact of the new infrastructure on the Awaba Colliery Surface Site.

2.4.3 SIA Assessment Requirements

The SIA Guideline documents the approach to the preparation of SIAs for State Significant resource projects. The SIA Guideline details the approach required for the identification and assessment of social impacts and opportunities.

The SIA addresses key requirements of the SIA Guideline, including:

- Consideration of all potential social impacts including cumulative impacts;
- Preparation of a social baseline, documenting conditions and trends in the social area of influence;
- Assessment of social impacts and opportunities with potential for a material effect on social values, including integration of EIS results with a bearing on the social environment;
- Development of adaptive management and monitoring strategies; and
- Significance assessment of identified social impacts and opportunities and determination of the mitigated social impact significance.

Compliance with the core principles of the SIA Guideline is demonstrated in Appendix B. The SIA Guideline review questions are addressed in Appendix C.

3 PROJECT DESCRIPTION

This section complements Section 2.1.3 and describes the project characteristics relevant to the assessment of social impacts. A complete project description is provided in the EIS.

3.1 EXISTING APPROVED OPERATIONS

The following section provides a summary of the activities approved at Awaba Colliery, Newstan Colliery and NCLP under existing development consents, and their relationship to the project. The EIS provides a comprehensive description of the approved operations at each site.

3.1.1 Newstan Colliery Operations

The Newstan Colliery comprises the underground workings and some associated surface facilities within the consolidated development consent boundary for DA 73-11-98 (Figure 3). The primary activities currently authorised under DA 73-11-98 are as follows:

- Extraction of up to 4 Mtpa of ROM coal from within the consolidated development consent boundary, which includes the Main West mining area and first workings within the West Borehole seam;
- Pumping water from underground workings to the NCSS for recycling, reuse and discharge;
- Operation of ventilation shafts, boreholes and associated overhead power lines;
- Operation of a men and materials drift to the underground workings from the NCSS;
- Personnel of up to 320 full-time employees; and
- Operating 24 hours per day, seven days a week.

The development consent for Newstan Colliery has been modified on eight occasions. The most recent modification to DA 73-11-98 (Mod 8) was approved in January 2019. Mod 8 permits first workings mining within the West Borehole seam in the southern portion of the Newstan Colliery mining lease area (Figure 3).

Relationship of Newstan Colliery to the project

The proponent proposes the ongoing use of the infrastructure and mining areas authorised under DA 73-11-98. It is proposed that this development consent will be surrendered subject to consent being granted for the project. Specifically, the project proposes the ongoing use of the following mine infrastructure located at the NCSS and approved under DA 73-11-98:

- The men and materials drift and winder; and
- The ventilation shaft and fans.

All other surface infrastructure at the NCSS, including bathhouse, administration buildings, coal handling infrastructure and car parking areas will remain 'as approved' under SSD-5145 for the NCLP (Section 3.1.3). The project will utilise this surface infrastructure.

3.1.2 Awaba Colliery Operations

Awaba Colliery legally operates under continuing use rights and Development Consent PA 10_0038 (Figure 3), which provides approval for:

- Bord and pillar development and pillar extraction using continuous miners within the 'Main South' and 'East B' underground mining areas;
- Production, handling and distribution of up to 880,000 Mtpa ROM coal using existing surface facilities;
- Use of existing ancillary surface facilities;
- Expansion of the existing Pollution Control Dam; and
- Delivery of coal to the NCSS and/or the EPS using the existing private haul road/transport facilities.

With coal reserves exhausted, Awaba Colliery ceased operating as a producing mine in March 2012. However, the surface infrastructure area will serve as a service facility for Newstan Colliery. The existing workings within the Great Northern seam also continue to be utilised for the storage of groundwater.

In 2018, Centennial Newstan also received approval under Part 4 of the EP&A Act (DA/477/2018) to construct and operate a 200 kW prefabricated photovoltaic solar farm within the confines of the existing parking facilities at the ACSS. Once constructed, the solar farm will provide power to onsite air compressors that supply compressed air to underground workings at Newstan Colliery.

Relationship of Awaba Colliery to the Project

The project proposes the ongoing use and upgrade of the surface infrastructure at the ACSS in addition to the construction and operation of several new facilities. The following activities are proposed at the ACSS as part of the project:

- Ongoing use of the administration offices and parking facilities, excluding the footprint of the Awaba photovoltaic solar farm.
- The construction and operation of a gas flaring facility within the existing disturbance footprint of the site.
- Installation of three new ventilation fans. The fans would be installed at the site of the existing ventilation shaft.

- Upgrade and ongoing use of the underground water supply and communications infrastructure.
- Drilling of boreholes into the workings for the supply of bulk materials, gas drainage infrastructure, electricity, compressed air, and water.

In addition to the proposed continued operation of the ACSS surface infrastructure, the project will continue to use the completed underground workings in the Great Northern seam for the storage of groundwater.

Coal handling and preparation will not be conducted at the ACSS.

Owing to the long history of activities at Awaba Colliery dating back to 1947, the site contains a number of previously disturbed areas. To minimise environmental impacts, Centennial Newstan proposes to make use of these existing disturbance areas for the siting of new infrastructure as part of the project.

3.1.3 Existing Community Consultative Arrangements

Newstan/Awaba Community Consultative Committee

The Newstan/Awaba Community Consultative Committee (CCC) is a combination of the two collieries' committees. The CCC has historically met quarterly but with mining completed at Awaba Colliery and with the Newstan Colliery underground operations being placed on care and maintenance in August 2014, the CCC agreed to meet three times per year and call an extraordinary meeting if and when required.

The CCC operates in accordance with the *2019 Community Consultative Committee Guidelines for State Significant Projects* (NSW Government, 2019a) and currently comprises:

- Four local community representatives;
- Two Lake Macquarie City Council (LMCC) elected representatives;
- Two Centennial representatives, with attendance from other personnel as required; and
- One independent Chairperson.

The CCC Annual Report (MacDonald-Hill, 2019) describes the committee members as

“diligent in their interest of all aspects of mining operations at site and the broader environment.... quite active within their respective local communities and passionate about the region. They are long term members and attendance numbers at meetings are static with occasional apologies because of other commitments.”

The CCC aims to facilitate a single channel of communication with Centennial regarding current and proposed Awaba and Newstan Colliery operations. Topics of discussion during 2018/2019 included:

- The project;
- Support for LMCC's application for dredging of LT Creek under the NSW State Government Resources for Regions Funding program;
- General environmental management and monitoring, including air quality, noise, surface water, groundwater and compliance for Awaba Colliery and Newstan Colliery;
- Committee input on the LT Creek Floodplain Risk Management Study and Plan Final Draft Report;
- Additional Council representation;
- Community complaints;
- Broader community engagement and community sponsorship;
- Awaba Colliery Post Mining Heritage Management Plan;
- Awaba photovoltaic solar farm;
- Vandalism on public property;
- Approvals and mining status updates; and
- 2017 Annual Review and Triennial Independent Audit.

At each meeting, the CCC is presented with full reports, including presentations and relevant updates on the matters mentioned above. Minutes from the CCC meetings are made available on the Centennial website.

Northern Holdings Aboriginal Cultural Heritage Committee

Centennial coordinates the Northern Holdings Aboriginal Cultural Heritage Committee. The committee generally meets twice a year to discuss matters relating to cultural heritage, including a review of any heritage related works carried out over the previous six months and any works proposed over the coming six months (including field surveys and site recording). The committee includes representatives from the various registered Aboriginal parties. The meetings are attended by representatives from each of Centennial's operations in the LM LGA.

3.1.4 Existing Complaints Management

Centennial maintains a comprehensive complaints management system for the Awaba and Newstan Colliery operations as well as the nearby operations of NCLP, Myuna Colliery and Mandalong Mine. All complaints received by Centennial are recorded in a monthly complaints report, called a Community Complaints Register. This monthly register is produced for each operating Centennial site. A copy of the Community Complaints register for the Awaba and Newstan Collieries is available on the Centennial website. A review of this complaints data (Centennial Coal (2014), (2017a), (2018c), (2019a)) for the period 2014-2019 shows a total

of four complaints recorded for the combined Awaba Colliery and Newstan Colliery operations. During this period Awaba and Newstan Colliery were placed on care and maintenance.

Centennial Newstan has continued to meet safety and environmental regulations during the care and maintenance period to enable the site to be appropriately maintained to facilitate future commencement of the proposed project activities.

Centennial Newstan has continued to meet safety and environmental regulations during the care and maintenance period to enable the site to be appropriately maintained to facilitate future reopening.

3.1.5 Existing voluntary contribution arrangements

Voluntary contributions made by Centennial Newstan are facilitated at a corporate (Centennial), rather than individual site level. Centennial's sponsorship programme demonstrates the value placed on the relationship with the community. Centennial actively participates and invests in many community networks and volunteering activities that are not directly mine related because they understand these activities are important to the communities where Centennial people live and work. In addition to any financial sponsorship, many groups receive in-kind contributions.

In 2019, Centennial provided the following contribution types to organisations throughout the LM LGA:

- **Charitable Donations (one-off or occasional support):** In 2019, Centennial provided a large number of donations to local organisations such as the Peninsula Rural Fire Service, the Awaba Oval Committee, and a number of local schools, including Cooranbong Public School and Teralba Public School.
- **Community Investments (long-term involvement in, and partnership with community organisations):** In 2019, Centennial partnered with a range of local sporting, recreation, and community health organisations such as NAIDOC Westlakes, the Toronto Awaba Stags, the Cooranbong Pony Club, and South Lakes Carers.
- **Commercial Initiatives (business related activities):** In 2019, Centennial assisted with Meals on Wheels (Morisset and Toronto), the Rathmines Catalina Association, and the Lake Macquarie Community Fund.

Contributions made by Centennial in 2019 towards Charitable Donations, Community Investments, and Commercial Initiatives were reviewed for the SIA. In 2019, Centennial contributed \$404,580 was contributed by Centennial across 119 organisations. Note that, whilst many of the contributions were made to organisations within the LM LGA and regional area, some contributions were also made to organisations in the Lithgow region as a result of Centennial activities in that area (e.g. Clarence Colliery, Angus Place Colliery, and Springvale

Mine). Some contributions were also made to national/international organisations such as Oxfam, the Immune Deficiencies Foundation, and the Westpac Rescue Helicopter Service.

Centennial also holds Voluntary Planning Agreements (VPAs) with the LMCC for operations within the LGA. Through these VPAs, Centennial has provided large monetary contributions to local communities. For example, Centennial has negotiated with the LMCC a donation of \$50,000 per annum to community projects in the Morisset and Mandalong areas, as a result of the Mandalong Mine VPA. Centennial will negotiate a VPA with the LM LGA for the project.

3.1.6 Existing Supplier and Customers

All supplier and customer relationships for Centennial Newstan and other Centennial operations in the LM LGA are managed at a corporate level. Centennial has established supplier and customer relationships within the LM LGA. Total spend (capital and non-capital) by Centennial for operations located in the LM LGA for the 2017 and 2018 calendar years was reviewed for the SIA. Centennial Newstan spent approximately:

- \$6.5 million (M) in supply, including \$536,048 within the LM LGA in 2017; and
- \$10.3 M in supply, including \$2,202,019 within the LM LGA in 2018.

The project enables the continuation of the existing Newstan Colliery supplier relationships and supports the continuation of NCLP supplier relationships.

3.2 EXISTING APPROVED INTERRELATED PROJECTS

3.2.1 Northern Coal Logistics Project

The NCLP provides the coal handling, processing and transport facilities to deliver coal from Mandalong Mine and Newstan Colliery to domestic and export markets. These activities are approved under Development Consent SSD-5145, with facilities comprising the NCSS, Cooranbong Entry Site, private haul roads and rail loading infrastructure. Once ROM coal from the Newstan Colliery underground workings reaches the surface at the NCSS, it forms part of the NCLP.

Activities that occur at the NCSS, as approved under SSD-5145 for the NCLP, include:

- Processing of 8 Mtpa ROM coal through the Newstan Coal Processing Plant.
- Exporting product coal through the Newstan Colliery rail loading facilities by train to the Port of Newcastle.
- Haulage of coal to the Vales Point Power Station.
- Receiving coal from the Cooranbong Entry Site and Awaba Colliery by truck utilising the Cooranbong and Newstan-Eraring private haul roads.

- Transporting reject material from the Newstan Colliery Coal Processing Plant to the Northern and Southern Reject Emplacement Areas and Hawkmount Quarry.
- Discharge of water from Licensed Discharge Points (LDP).

Relationship of Northern Coal Logistics Project to the Project

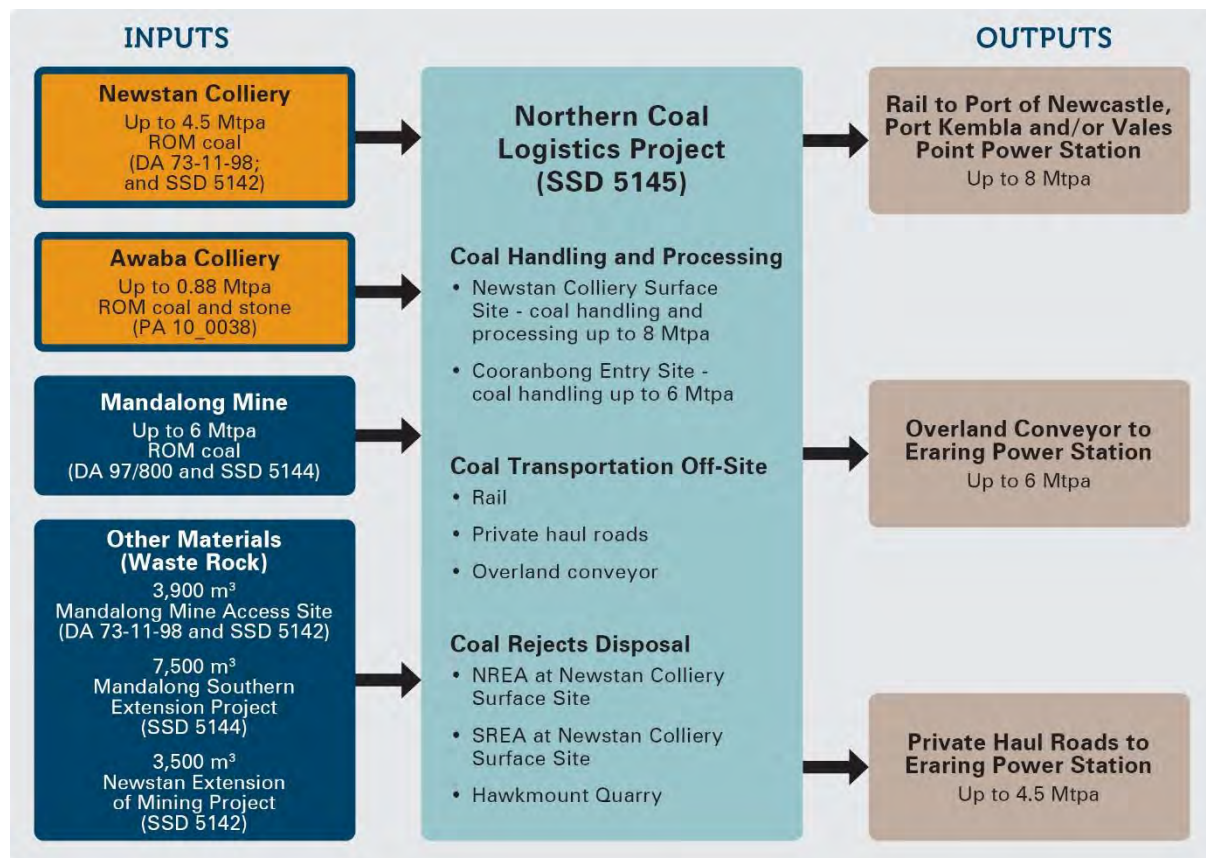
Diagram 1 illustrates the project interactions with NCLP.

Once ROM coal from the Newstan Colliery underground workings reaches the surface at the NCSS, it forms part of the NCLP. The NCLP is approved to receive, handle and process up to 8 Mtpa of ROM coal, of which up to 4.5 Mtpa may be received from Newstan Colliery. The NCLP is approved to operate until 31 December 2045. The 4 Mtpa of ROM coal proposed to be extracted as part of the project would be received, handled and processed at the NCSS in accordance with the approved operations under SSD-5145. At this production rate, the project would not exceed the approved processing capacity of the NCLP.

Underground water management and transfers between coal seams also form part of the project. All surface water management, including operation of licenced discharge points, form part of the NCLP (SSD-5415). Transfers of water between the Newstan Colliery underground workings and the NCSS were considered as part of the NCLP. These transfers and associated volumes have also been considered in this EIS.

The traffic impacts associated with the project workforce of 320 FTE persons were also considered as part of the NCLP.

Diagram 1
Project Interactions with Northern Coal Logistics Project



3.3 THE MINE EXTENSION PROJECT

3.3.1 Proposed Mining

Mining Method

Bord and pillar mining is proposed to be undertaken using continuous miners and will include first workings, partial extraction and total extraction. Mining will be designed to extract up to 4 Mtpa of ROM coal from within the EMA and a total of 25.9 Mt over a fifteen-year mine life. The conceptual mine layout is presented in Figure 4.

Mining will target the West Borehole seam, which is an agglomeration of the Borehole seam, the Young Wallsend seam and the Yard seam. A mix of metallurgical and thermal coal will be extracted. The depth of cover within the EMA ranges from 140 m in the north west to 320 m in the east. The target seam is overlain by the previous Awaba mine workings in parts of the EMA with the interburden between the two seams ranging from 100 m to 210 m.

The combination of first workings, partial and total extraction has been adopted to mitigate impacts on sensitive surface features (Figure 4). Total extraction, where all pillars in a panel are removed, is proposed to the south of the existing Awaba workings in areas that have not

been subject to mining previously (i.e. single-seam conditions) and in some areas beneath the existing workings (multi-seam conditions) where sensitive surface features are not present. The total extraction in the multi-seam areas will provide the additional benefit of reducing the long-term liability of pillar failure in the overlying Awaba workings in the Great Northern seam.

The proposed partial extraction will mine three of the four rows of pillars, leaving a spine pillar (i.e. one row of pillars) within each panel. This spine pillar will reduce the maximum mining span to 86 m, which will reduce subsidence effects. Partial extraction is proposed under the Ulan Rail Loop and under the sections of an existing 132 kilovolt (kV) transmission line that are subject to multi-seam conditions.

The development of first workings only (i.e. no secondary extraction) will occur beneath certain sensitive surface features in both single-seam and multi-seam conditions. This includes under second and third order streams, the Main Northern Railway, a 132 kV substation, the EPS, and the EAD (Section 7.1.3).

With the presence of the overlying Awaba mine workings and larger than previously encountered volume of gas within the West Borehole seam and overlying seams, which will be released by the mining process, this mining system allows for greater control of subsidence, particularly with regard to minimising multi-seam subsidence, improved gas management, and superior flexibility to deal with geological anomalies.

Coal Processing and Transport

ROM coal will be transported from the underground workings to the NCSS by a conveyor system at a rate of up to 4 Mtpa. Once the coal reaches the NCSS it will be handled in accordance with the approved operations for the NCLP (Development Consent SSD-5145), managed by Centennial Coal's Northern Coal Services Pty Ltd (Northern Coal Services) business unit.

The coal recovered from the PAA can produce both a semi-soft coking coal product for the export market and a thermal coal product for both the domestic and export markets. The project will enable supply of export coal products while meeting contractual coal supplies to the domestic markets.

All surface coal handling and transportation operations undertaken at Newstan Colliery will form part of SSD-5145 and as such do not form part of the project. The NCSS is integrated with the NCLP and is approved under SSD-5145. The NCLP has sufficient coal processing and transportation capacity to accommodate the project's maximum production rate (4 Mtpa) and total production over the mine life (25.9 Mt) without exceeding the throughput limits imposed under SSD-5145.

No coal handling operations at ACSS are proposed as part of the project.

Surface Facilities

The project will utilise the existing surface facilities of the Newstan Colliery and Awaba Colliery, excluding the use of the NCSS facilities for the activities approved under SSD-5145 (Section 3.1.3). The additional works described in the following subsections will also be undertaken as part of the project.

Parking, administration, bathhouse and workshop facilities

Upgrades to the existing administration buildings at the ACSS will be undertaken as part of the project. The existing parking, offices, bathhouse facilities and workshop at the NCSS will continue to be utilised as approved under SSD-5145 for the NCLP.

Ventilation Fans

Three new fans will be installed at the existing ventilation shaft at the ACSS. Once these fans become operational, the existing fans at NCSS will be decommissioned.

Gas Flaring Facility

A gas flaring facility will be established within the confines of the current disturbance area at the ACSS. This will involve the installation of one or multiple vertical enclosed elevated flare stacks. The gas captured from the in-seam drainage system, approximately 90 percent of which will be methane, will be burned and converted to carbon dioxide in the enclosed flare stacks.

Additional infrastructure for electrical reticulation, water reticulation, water management, communications and other services will also be required as part of the project.

3.3.2 Mine Life

Mining operations will commence immediately following the granting of approval. Mining operations will cease 31 December 2035, with mine closure and rehabilitation activities to continue beyond this date.

3.3.3 Construction and Operations Hours

It is anticipated that construction will be largely carried out during the following hours:

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

Operation activities will occur 24 hours a day, seven days a week.

3.3.4 Site Access and Parking

Access and parking will remain consistent with the current approved arrangements for the Newstan and Awaba Collieries. Awaba Colliery Surface Site will continue to be accessed via Wilton Road, Awaba. Newstan Colliery Surface Site will continue to be accessed via Miller Road, Fassifern. The existing parking facilities at both sites will also continue to be utilised as currently approved. All underground access will continue to be via the Newstan Colliery Surface Site.

3.3.5 Construction Activities

The construction phase will extend for an approximate 11 months. Construction activities will be undertaken within previously disturbed areas. Existing surface facilities will be utilised where practicable to minimise the need for additional construction. Should additional facilities, such as construction offices, parking areas, stores and laydown areas, equipment assembly areas, fuel facilities, power, communications or water services be required, they will be sited within previously disturbed areas.

Aggregate and other road building material may be imported to site for use in road and access upgrades, as required. Any excess or unsuitable material will be removed from site for beneficial reuse or disposal at an approved facility.

The Construction phase will involve the construction of the new and upgraded surface facilities at ACSS. Key works will include drilling and construction of services and gas drainage boreholes, enlargement of the existing Pollution Control Dam, and construction of the gas flaring facility and ventilation fan site.

Construction activities will be guided by a Construction Environmental Management Plan to ensure work is carried out in accordance with the project's environmental management obligations. Detailed work methodologies will be determined during detailed design and construction planning.

3.3.6 Workforce

The construction workforce is expected to peak at approximately 50 FTE personnel. The operational workforce is expected to peak at approximately 320 FTE personnel.

The majority of operational personnel, including the underground workforce, will be located at the NCSS. A small number of administrative and maintenance personnel (less than 10) will be located at ACSS.

Workforce Arrangements

The project will require an annual operations workforce of up to 320 FTE persons. This workforce is the same as that currently approved under SSD-5145. As shown in Table 2, the mine will have significantly more employees working on weekdays, when compared to weekends.

Table 2
Operations Phase Workforce and Shift Arrangements

Position	Weekday Shifts (Mon-Thurs)			Weekend Shifts (Fri-Sun)	
	Day	Afternoon	Night	Day	Night
	07:00-15:00	15:00-23:00	23:00-07:00	07:00-19:00	19:00-07:00
Mine Staff	85	75	75	20	20
Administration Staff	25	5	5	5	5
Total	110	80	80	25	25

Source: Centennial provided data, 2019

Workforce Recruitment

The project construction workforce is likely to consist of a combination of local hires i.e. residents of LM LGA, and non-local hires e.g. residents outside of the LM LGA. An estimated 65% (208 persons) of the operations workforce is anticipated to be recruited from within the LM LGA (local hires); however, the project is also expected to draw workforce from the broader Newcastle-Maitland Significant Urban Area (NM SUA) (non-local hires) which includes the Newcastle, Maitland, Cessnock LGAs. Labour may also be sourced from the Central Coast LGAs.

The required workforce will be sourced through a range of recruitment processes, including local and regional recruitment, apprenticeships, traineeships, graduate programs and contract labour. A definitive strategy for recruitment of the workforce will be developed following project determination and in line with detailed construction planning. Centennial's experience and assessment of local contractor and business capabilities in the LM LGA will be utilised in sourcing local labour wherever possible.

Given the staged approach and specialist nature of construction, the relatively short construction timeframe and the proximity of the project site to a number of different population centres i.e. Newcastle, Maitland, Cessnock and the Central Coast, it is anticipated that the majority of non-local hires will commute on a daily basis to the project. A small handful of non-local hires may relocate temporarily to the LM LGA, however they are unlikely to be accompanied by family.

The residential base of the incoming operations workforce is expected to show similar geographical distribution to that of the 2014 Newstan Colliery workforce, as described in the *Socioeconomic Profile Report for Newstan Colliery* (Aigis Group, 2018). Table 3 shows the expected residential locations for the workforce, assuming a FTE workforce of 320 people.

Table 3
Predicted Workforce Residential Locations

Residential Location	No. of Workforce	% of Workforce
Lake Macquarie LGA	208	65%
Newcastle LGA	48	15%
Maitland LGA	16	5%
Cessnock LGA	16	5%
Central Coast LGA	16	5%
Other	16	5%
Total	320	100%

Source: Centennial provided data, 2019

Workforce Accommodation

During construction all non-local construction workers will be accommodated in a combination of short-term accommodation, including hotels and motels, as well as private rental accommodation within the LM LGA. All locally employed workers will be accommodated in their existing homes.

During operations all workers are anticipated to remain in their existing residences either within or outside the LM LGA. There is unlikely to be any additional and direct demand generated by the operations workforce for housing in the LM LGA.

3.3.7 Mine Design

The long history of mining at the Newstan and Awaba Collieries, and the associated environmental monitoring and management activities that have been undertaken over many years, has provided Centennial Newstan with a large amount of baseline information to help guide the development of the project. Centennial Newstan has also undertaken extensive detailed project-specific geological, engineering, environmental, financial and other technical investigations over several years to develop and refine the project.

The potential impacts of the project have been minimised by maximising the use of existing surface infrastructure and equipment, developing a low-impact and flexible mine design, minimising surface disturbance for gas drainage and greenhouse gas abatement, and proposing a complementary suite of mitigation measures and management strategies to be implemented during construction, operation, and closure.

The combination of first workings only, partial extraction, and total extraction using bord and pillar mining methods has been adopted to minimise subsidence impacts to sensitive built and natural surface features and to mitigate multi-seam subsidence impacts associated with the Awaba workings in the overlying Great Northern seam.

Conservative buffers have been adopted in the mine design to minimise subsidence impact risks to overlying infrastructure such as the Main Northern Railway, Eraring Power Station and Eraring Ash Dam and sensitive surface water features such Stockyard Creek, Kilaben Creek, and Stony Creek.

4 SIA METHODOLOGY

This section presents a detailed description of the SIA methodology including scope and approach to SIA consultation. A description of the EIS consultation undertaken by Centennial Newstan is provided in the EIS.

4.1 OBJECTIVES

The objectives for this SIA were to:

- Identify the social area of influence of the project;
- Implement an inclusive stakeholder engagement process that informs the social baseline, the impact and opportunities assessment and the development of mitigation measures;
- Develop a comprehensive baseline of social conditions in the project's social area of influence based on research, analysis and stakeholder engagement;
- Undertake preliminary assessment (scoping) of the project's social impacts and opportunities for the social area of influence, in order to ensure the assessment is focused on material effects on the social environment;
- Identify potential direct, indirect and cumulative social impacts and opportunities of the project for the social area of influence;
- Provide a detailed assessment of the likely impacts and benefits, and their significance for each stage of the project (construction, operation and post-mining);
- Consider biophysical impacts and their interaction with social values; and
- Develop strategies to avoid and/or mitigate social impacts, and actions which would enhance social benefits.

4.2 SIA METHODOLOGY

4.2.1 Summary of SIA Methodology

A best practice approach has been adopted for the SIA, that integrates international and NSW social impact assessment guideline requirements e.g. Vanclay, Esteves, Aucamp & Franks (2015) and Department of Planning and Environment (2017). Table 4 provides a summary of the methodology against key phases in the SIA process, and outlines the assessment and engagement mechanisms utilised during these phases.

Table 4
SIA Approach and Methodology

Methodology	Description of Activities	Reference
Phase 1 – Preparation		
Stakeholder engagement plan	Initial stakeholder identification and analysis. Development of a tailored SIA stakeholder engagement strategy.	Section 6.2.2 and 6.3.2
Phase 2 – Scoping		
Scoping of stakeholder impacts and opportunities	Review of Centennial complaints register for Awaba Colliery and Newstan Colliery. Review of Centennial Annual Reports and CCC meeting minutes. Analysis of relevant media including coverage of the cessation of mining at Awaba and Newstan Collieries, the commencement of NCLP, and information on the EAD Mod 1 (Project Approval MP 07_0084). Review and analysis of the findings of Centennial EIS engagement. Review and analysis of the submissions received in response to the public exhibition of the: • NCLP EIS (2014); • Newstan Colliery Modification 8 (2019); and • EAD Mod 1 (2019). The following considerations formed part of the scoping process: • Identification of project components which may affect or change the social environment; • Key assumptions about the project, and the surrounding local environment; • Potential social impacts and opportunities; • Material effects of the social impacts and opportunities; • Preliminary assessment of the impacts and opportunities; and • Recommendations regarding the need for further assessment in the SIA or EIS.	Appendix D (Scoping Outcomes)
Identification of social area of influence	The social area of influence of the project consists of the people that will potentially be impacted (adversely or positively) by project activities. Identification of the social area of influence included analysis of the potential spatial and temporal dispersion of potential impacts and opportunities, including consideration of proximate communities, supply chains, and the movement of workers.	The social area of influence is defined in Section 5
Identification of material impacts	The scoping process identified the potential material social impacts for further consideration (Table 5).	Section 4.2.3
Phase 3 – Community Profiling of Social Area of Influence		
Socio-demographic analysis	Assessment and analysis of Australian Bureau of Statistics (ABS) Census data and other relevant social and community statistical data sets. Identification of	Section 7, and Appendix E and F

Methodology	Description of Activities	Reference
	areas of community vulnerability through analysis of particular demographic indicators.	
Historic and contemporary issues and opportunities	Literature review and analysis of historical accounts of the region and local media, to understand previous and emerging issues and opportunities within the community.	Activity conducted (Table 4)
Guidelines analysis	Review of corporate standards, policies and programs relevant to the SIA.	Section 7.2, and activity conducted (Table 4)
Aboriginal profile	Review of literature and data relevant to the Aboriginal community.	Section 7.3 and Appendix F
Phase 4 – Assessment of Impacts and Opportunities		
Analysis of impacts/opportunities	Stakeholder engagement (Section 6). Review and analysis of the findings of broader Centennial EIS engagement. Prediction of potential project social impacts and opportunities	Section 8
Phase 5 – Identification of Management and Enhancement Strategies		
Social impact management	Identification and development of strategies to address predicted project impacts and enhance opportunities.	Section 8
Impact significance assessment	Analysis of social impact significance using a risk matrix.	Section 8.15
Phase 6 – Monitoring and Reporting		
Performance monitoring	Preparation of performance framework for management and monitoring.	Section 9

4.2.2 SIA Links to Technical Report Findings

The SIA draws on the outcomes of the following EIS technical assessments:

- *Aboriginal Cultural Heritage Assessment* (Umwelt Environmental and Social Consultants, 2020a) (EIS Appendix Q);
- *Historical Heritage Assessment* for the project (Umwelt Environmental and Social Consultants, 2020b) (EIS Appendix R);
- *Economic Impact Assessment* (Aigis Group, 2020) (EIS Appendix V);
- *Air Quality Impact Assessment and Greenhouse Gas Assessment* (SLR, 2019) (EIS Appendix M);
- *Noise and Vibration Impact Assessment* (EMM, 2019b) (EIS Appendix N);
- *Traffic Impact Assessment* (EMM, 2019a) (EIS Appendix O);
- *Subsidence Predications and Impact Assessment*; (Mine Subsidence Engineering Consultants, 2019)(EIS Appendix G);

- *Surface Water Impact Assessment* (GHD, 2019a) (EIS Appendix J);
- *Groundwater Impact Assessment* (EIS Appendix I);
- Groundwater Modelling Report (included in EIS Appendix I);
- *Biodiversity Development Assessment* (RPS, 2019) (EIS Appendix K);
- *Visual Impact Assessment* (GHD, 2019b) (EIS Appendix S); and
- *Conceptual Rehabilitation and Closure Strategy Newstan Mine Extension Project* (Integrated Environment Management Australia, 2019) (EIS Appendix V).

4.2.3 Focus Areas for Further Investigation

The scoping process (Phase 2) identified the material social impacts and opportunities for consideration in the SIA. Table 5 presents the potential material impacts and opportunities considered in the SIA, the scope of investigations and analysis conducted and the corresponding SIA section where each impact is addressed.

Table 5
Focus Impact Areas for Investigation

Potential Key Impact Areas	Summary Scope of Investigations and Analysis	SIA Section Reference
Impacts to residential amenity	• Findings of consultation with proximate residents. • Attendance at Newstan Awaba CCC. • SIA consultation survey findings. • Visit to Awaba, Wakefield and Fassifern communities and analysis of surrounding land use and topography. • Review of complaints data for Awaba and Newstan Collieries. • Review of community surveys from the Five Bays Sustainable Neighbourhood Group. • Review of relevant EIS technical studies and in particular: – Air Quality Impact Assessment and Greenhouse Gas Assessment; – Noise and Vibration Impact Assessment; and – Visual Impact Assessment.	Section 8.3
Impacts to valued environmental assets	• Findings of SIA consultation. • Review of media and LMCC documents to inform understanding of valued assets. • Attendance at Newstan Awaba CCC. • Review of relevant EIS technical reports: – Subsidence Predications and Impact Assessment; – Surface Water Impact Assessment; – Groundwater Impact Assessment;	Section 8.4

Potential Key Impact Areas	Summary Scope of Investigations and Analysis	SIA Section Reference
	– Groundwater Modelling Report; and – Biodiversity Development Assessment. • Review of community surveys from the Five Bays Sustainable Neighbourhood Group.	
Impacts to livelihood	• Findings of consultation with proximate residents. • Review of relevant EIS technical studies and in particular the: – Subsidence Predictions and Impact Assessment; – Groundwater Impact Assessment; and – Surface Water Impact Assessment.	Section 8.5
Employment and economic development	• Analysis of labour market and industry data for the LM LGA and NM SUA. • Analysis of employment data and procurement data for other Centennial operations in the LMCC i.e. Mandalong Mine and Myuna Mine.	Section 8.6
Culture (Indigenous and non-Indigenous)	• Participation in the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee meeting and face-to-face interviews with Aboriginal Cultural Heritage Management Plan Committee members. • Review of existing Northern Region Aboriginal Cultural Heritage Management Plan (Centennial Coal, 2016). • Literature review of historical information for the LM LGA, particularly settlement history for the PAA. • Review of relevant EIS technical reports – Aboriginal Cultural Heritage Assessment and Historical Heritage Assessment.	Section 8.8
Safety, Health and Wellbeing -	• Findings of consultation with nearby residents, community groups and organisations. • Review of Response to Submissions for the EAD Mod 1. • Review of project EIS technical reports relevant to EAD: – Subsidence Predictions and Impact Assessment; – Surface Water Impact Assessment; and – Groundwater Impact Assessment. • Review of recent media. • Discussions with service and facility providers located on Fassifern and Miller Road. • Review of Traffic Impact Assessment.	Section 8.9

Potential Key Impact Areas	Summary Scope of Investigations and Analysis	SIA Section Reference
Aspirations	- Consultation with LMCC. - Literature review of LMCC strategic planning documents. - Analysis of building and land development data.	Section 8.10

4.2.4 SIA Consultation Scope

This section describes the scope of stakeholder consultation undertaken by Hansen Bailey between October 2019 and January 2020 to inform the SIA. The findings of SIA engagement were supplemented by engagement undertaken by Centennial Newstan (described in the EIS). Table 6 describes the scope of SIA consultation.

The purpose of SIA consultation was to validate social baseline data, understand community values and aspirations, and inform an understanding of the different stakeholder perceptions of the project. A diverse range of engagement methods (i.e. interviews, face-to-face meetings, telephone discussions and community information sessions) were utilised to gain an understanding of the communities of interest.

SIA consultation included 17 face-to-face interviews with a total of 38 participants.

Table 6
SIA Consultation

Engagement Method	Description
Letterbox drop	An invitation seeking resident participation in SIA interviews and Centennial Community Open Days was letterbox dropped by Centennial to proximate neighbours in the Fassifern, Wakefield and Awaba area. The letter of invitation included details of the SIA and the name and contact details for Hansen Bailey SIA specialists.
Face-to-face interviews	- Nine interviews conducted with proximate landowners to the NCSS and/or ACSS and three interviews conducted with residents of nearby communities i.e. within and outside of the PAA. - One interview each with: - Vice Chair of the Five Bays Sustainable Neighbourhood Group; - Principal of Fassifern Public School; - Principal and Business Manager of Charlton Christian College; - Representatives of the Darkinjung Land Council and Registered Aboriginal Parties i.e. Northern Holdings Aboriginal Cultural Heritage Management Plan Committee; - Representative of Awaba Rural Fire Brigade; - Rathmines Progress Association representative; - LMCC representatives/employees; and - Newstan/Awaba CCC.

Engagement Method	Description
	SIA surveys were distributed during these meetings.
Telephone interviews	- One interview with proximate landowner. - One interview each with: - One LMCC Councillor; - One LMCC employee; and - One Compass Housing representative.
Community Open Days	- Centennial Newstan facilitated two community Open Days at the NCSS and the ACSS on Wednesday 20 and Saturday 23 November 2019. The purpose of these sessions was to share information about the project and to provide a forum for feedback. - The SIA project team attended both community Open Days. Structured SIA interviews were conducted with five attendees. - SIA Surveys were distributed during these sessions.
SIA Survey	19 completed SIA surveys with: - Open Day attendees; and - Face-to-face meeting attendees. - The purpose of the survey was to capture information about the project and to provide a forum for feedback. The survey included both open and closed questions.

5 SOCIAL AREA OF INFLUENCE

This section describes the local and regional social area of influence of the project.

5.1 LOCAL SOCIAL AREA OF INFLUENCE

The local social area of influence includes the three distinct areas (NCSS, EMA and ACSS) that form the project site. It encompasses those neighbours who are at risk of experiencing adverse impacts as a result of the project. The project's local social area of influence has been defined using the ABS geographic terminology - State Suburb (SSC). The project's local social area of influence consists of the SSCs of Awaba, Fassifern and Wakefield. The SSC boundaries of these communities are relatively large but consist of both residential and densely forested areas and comprise small resident populations (<700). The local social area of influence is illustrated in Figure 7.

The broader PAA incorporates 10 SSCs with a further seven SSCs adjoining the PAA (Figure 5), however the local social area of influence is defined by the combined boundary of a small subset of SSCs within the PAA. The remaining SSCs are considered "nearby areas of interest". Appendix E provides a brief description for the nearby areas of interest within the PAA, excluding Awaba, Fassifern and Wakefield SSCs (which are described in detail in Section 7).

The inclusion of Wakefield, Fassifern and Awaba SSCs in the project's local social area of influence reflects the potential for:

- Proximate neighbours to Newstan Colliery i.e. the communities of Awaba, Fassifern and Wakefield to experience a change in residential amenity due to the recommencement of mining at Newstan Colliery; and
- Residents of Awaba to experience a change in residential amenity due to the construction and operations of surface infrastructure at ACSS.

5.2 REGIONAL AREA OF INFLUENCE

The Newstan Colliery is located within the LM LGA (Figure 11). A significant portion of the urban footprint of the LM LGA is located within the larger NM SUA. The regional area of social influence is therefore defined as the NM SUA with a focus on the LM LGA. The economic benefits of the project are likely to accrue to the LM LGA and NM SUA.

Initial scoping suggests a low risk of social impacts accruing to the LM LGA due to the presence of:

- A skilled labour pool in LM LGA and a resulting low likelihood that the project will draw new residents to the LGA; and
- Existing supply arrangements with the NCLP, Newstan Colliery, Awaba Colliery, Myuna Colliery and Mandalong Mine.

The NM SUA comprises large urban centres i.e. Newcastle and Maitland, with a large labour pool and a strong and diverse economy. A portion of the operations workforce will also be drawn from these skilled areas. The economic impacts and benefits of the project such as State revenue and Gross Domestic Product are captured within the Economic Impact Assessment prepared by Aigis Group (2020) for the EIS.

The social impacts and benefits of the project may extend across NSW. The SIA acknowledges the potential for economic opportunities and development, as well as community wellbeing benefits for NSW. The Economic Impact Assessment provides a detailed description of the economic benefits to the local and regional areas. Detailed analysis of broader and State wide economic benefits is not a key focus for the SIA, however, recognition of these benefits and impacts is discussed.

5.3 STATISTICAL GEOGRAPHY

Table 7 summarises the ABS statistical geography which corresponds to the local and regional communities in the project's social area of influence¹.

Table 7
Study Area Statistical Geographies 2016

ABS Statistical Geography	Community
Local Government Area	Lake Macquarie (C) (LGA14650)
Significant Urban Area	Newcastle-Maitland Significant Urban Area (SUA1023)
State Suburbs	Awaba (SSC10118)
	Fassifern (SSC11495)
	Wakefield (SSC14088)

¹ ABS statistical geography data is also supplemented where necessary with available postcode data. Postcode data is provided for the postcode areas of Awaba (2283), Fassifern (2283), and Wakefield (2278). Toronto (2283) is occasionally coupled with available Awaba and/or Fassifern data.

6 STAKEHOLDER ENGAGEMENT

This section provides a description of the EIS and SIA stakeholder consultation undertaken to inform the SIA.

6.1 EIS AND SIA CONSULTATION

The consultation program for the preparation of the EIS consisted of a combination of consultation undertaken by Centennial Newstan with key stakeholders and the broader community, and tailored consultation undertaken by Hansen Bailey to inform the SIA. The EIS describes the scope and outcomes of the non-statutory and statutory consultation undertaken by Centennial Newstan in parallel with the preparation of the SIA. The findings of both sets of engagement have informed the SIA.

A stakeholder consultation log was maintained by Centennial Newstan as a record of the consultation activities undertaken in relation to the project. Hansen Bailey also maintained a consultation log for all engagement activities undertaken to inform the SIA.

6.2 EIS CONSULTATION

6.2.1 Objectives

EIS stakeholder consultation was designed to involve local community members and stakeholders representing the wider community and regional interests. Newstan Colliery has operated from its current site for over a century. The Newstan CCC has operated for almost 20 years. Centennial Newstan has established local community networks and relationships with landholders and other stakeholder groups neighbouring the NCLP, Newstan Colliery and Awaba Colliery over this time. The EIS engagement approach adopted for the project targeted existing relationships and built on established engagement activities.

The objectives of the EIS stakeholder consultation program were to:

- Adopt a proactive approach to engagement with the community;
- Engage in an open and transparent relationship with the community;
- Collect and validate quantitative and qualitative data for the social baseline;
- Provide stakeholders with relevant and meaningful information on the project;
- Give stakeholders an opportunity to provide feedback on the project via a number of communication forums;
- Understand the interests and perspectives of people who may be directly affected by project impacts and opportunities to inform project planning and the EIS;

- Ensure that the assessment and evaluation of impacts were informed by the knowledge and experience of local stakeholders;
- Ensure key stakeholders were informed about the project and had opportunities to provide input to the assessment and mitigation strategies; and
- Meet the consultation requirements of the SEARs for the project.

6.2.2 Scope of EIS Consultation

Stakeholder Identification

Key stakeholders were identified as those individuals, industries, groups or government agencies that are either directly impacted by the project or who have, or will have, an interest in the project as it progresses through the approval, construction, operations and closure phases.

Key project stakeholder groups identified included:

- Government (Federal, State and Local);
- Industry;
- Local community;
- Aboriginal groups; and
- Centennial Newstan employees.

A detailed list of project stakeholders is presented in the EIS.

Centennial Newstan has consulted with a number of community members, Aboriginal groups, infrastructure owners and government agencies to present the project and, where relevant, to seek feedback on key mine design considerations and areas for investigation during the EIS.

Centennial Newstan has sought and received recommendations for mine design parameters from government agencies to manage direct and indirect subsidence-related impacts to key infrastructure assets such as the Main Northern Railway, EPS and EAD. These recommendations formed an integral part of the mine design process. Centennial Newstan will continue consultations with government and non-government agencies during the construction, operations, and closure phases of the project.

Further information regarding the scope of consultation undertaken by Centennial Newstan to inform the EIS for the project is presented in the EIS.

6.3 TAILORED SIA CONSULTATION

Centennial Newstans' existing relationships with key stakeholders provided a platform for the conduct of SIA engagement.

6.3.1 Objectives

SIA stakeholder engagement was designed to involve local community members and stakeholders representing the wider community and regional interests. The objectives of SIA stakeholder engagement were to:

- Collect and validate quantitative and qualitative data for the social baseline;
- Ensure key stakeholders were informed about the SIA and had opportunities to provide input to the assessment and mitigation strategies;
- Understand the interests and perspectives of people who may be directly affected by project impacts and opportunities; and
- Ensure that the assessment and evaluation of impacts were informed by the knowledge and experience of local stakeholders.

6.3.2 Key Stakeholders in the SIA

Key stakeholders for SIA consultation were identified during Phase 1 of the SIA. These stakeholders were identified and engaged based on Centennial Newstan's long history within community. Table 8 lists the key stakeholders for SIA consultation.

Table 8
Key Stakeholders for SIA Consultation

Stakeholder Categories	Stakeholder Groups
Proximate landholders and residents	• Landholders and residents residing within proximity to the NCSS and ACSS in the ABS SSCs² of Fassifern, Wakefield and Awaba.
Local communities	• Newstan/Awaba CCC • Community stakeholders and residents (elected representatives, community groups, service providers, business) in the PAA nearby communities including: – Five Bays Sustainable Neighbourhood Group; – Fassifern Public School; – Awaba Rural Fire Brigade;

² State Suburbs (SSC) are an ABS approximation of Gazetted Localities, created by allocating one or more Mesh Blocks. State Suburbs are created to enable the release of ABS data on areas that, as closely as possible, approximate Gazetted Localities.

Stakeholder Categories	Stakeholder Groups
	– Charlton Christian College; and – Rathmines Progress Association.
Broader LGA	• Community stakeholders and residents in the wider LM LGA (local government, elected representatives, business, community groups and residents) including: – LMCC representatives; – Non-government organisations (NGOs) including environmental groups; and – Compass Housing.
Local Government	• LMCC elected representatives, and council employees.
Indigenous stakeholders	• Registered Aboriginal Parties attendees of the Northern Holdings Aboriginal Cultural Heritage Committee meeting.

6.3.3 Findings of SIA Consultation

This section provides a summary of stakeholder perceptions of the project with a focus on the findings of engagement undertaken by Hansen Bailey with local residents and key stakeholders over a four-month period (September to December 2019). The scope of SIA consultation undertaken during this period is described in Section 0. Consultation allowed stakeholder inputs on social baseline characteristics, experienced impacts, and perceptions of potential social impacts and benefits.

Face-to-face meetings with residents and other key stakeholders, including LMCC, Newstan Awaba CCC and the Northern Holdings Aboriginal Cultural Heritage Committee informed the SIA. A community survey supplemented the SIA engagement undertaken.

Table 9 presents the potential perceived project benefits as identified by participants (stakeholder groups) through SIA consultation.

Table 9
Perceived Project Benefits

Perceived Project Benefits	Stakeholder Group
Creation of direct and indirect employment opportunities within the LM LGA.	Proximate residents, nearby local communities and the broader LGA, Local Government, Indigenous stakeholders.
Creation of additional supply arrangements for local businesses and enhancement of existing supply arrangements.	Residents of the broader LGA.
Ongoing and possibly increased voluntary contributions from Centennial Newstan to the surrounding community through event attendance, sponsorship and donations, and the VPA with LMCC.	Residents of proximate communities, nearby local communities, Broader LGA and Local Government.

Perceived Project Benefits	Stakeholder Group
In-migration of new residents to LM LGA as people seek to capitalise on employment opportunities associated with the project.	Local Government.
Greater diversity in future land use opportunities for post mining land if - Centennial Newstan's rehabilitation and mine closure planning for the project is aligned with the strategic planning aspirations of LMCC; and/or - The project results in complete subsidence of the historic Awaba Colliery underground workings and leads to surface stabilisation.	Local Government.

Table 10 presents the potential perceived project impacts as identified by participants (stakeholder groups) through SIA consultation.

Table 10
Perceived Project Impacts

Perceived Project Impacts	Stakeholder Group
Changes in property values for proximate landholders, due to adverse changes in residential amenity i.e. the potential for noise and dust impacts of the project.	Proximate landholders and residents.
Adverse changes in valued environmental assets, including creek systems traversing the EMA, surface water quality and quantity, biodiversity due to the impacts of subsidence and related effects e.g. sinkholes.	Proximate landholders and residents and Interest groups.
Potential for sinkholes and their impact on safe access to bushland within the EMA.	Proximate landholders and residents and Interest groups.
Potential impacts to water quality in Lake Macquarie if the project results in adverse changes to surface water and groundwater quality.	Proximate landholders and residents, Interest groups, broader LGA.
Impacts to groundwater quality if the project results in leakage out of the EAD into underground workings.	Interest groups.
Social, economic and environmental implications of any changes in the permeability and stability of the geology underlying the EAD due to the project. These concerns have been exacerbated by the following recent (2019) events: - An application by Origin Energy to augment the EAD wall; and - A decision to close the nearby Myuna Bay Sport and Recreation Centre due to safety concerns in the event of EAD wall failure.	Broader LGA including residents, interest groups, industry representatives, Local and State Government agencies.
Changes in the residential amenity of Awaba from construction related activities. The majority of Awaba residents interviewed for the SIA anticipate tangible and adverse changes in amenity, due to experienced amenity impacts i.e. noise, associated with the sinking of the Newstan ventilation shaft at ACSS (July 2012 – September 2013).	Proximate landholders and residents – Awaba residents.
Potential adverse changes in residential amenity for residents located in Wakefield to the west of the NCSS due to changes in existing operations at NCLP resulting from increased production.	Proximate landholders and residents – Wakefield residents.

Perceived Project Impacts	Stakeholder Group
Increased vehicle traffic on Miller Road and connecting roads through Wakefield and Fassifern with resulting impacts on road safety and traffic delays, citing existing traffic jams at the viaduct on Fassifern Road during school drop off and pick up hours.	Proximate landholders and residents.
Potential cumulative change in residential amenity in Wakefield, to the west of the NCSS due to a combination of increased production at NCLP, and the development of the proposed Black Rock Motor Park (DA/1556/2017).	Proximate landholders and residents – Wakefield residents.
Impact of subsidence on local Indigenous cultural heritage values and artefacts within the EMA.	Indigenous stakeholders.

Community Survey Findings

A survey to inform the SIA was administered during the Community Open Days and face-to-face SIA interviews. A total of 19 surveys were completed³. The majority of survey participants resided in Awaba (7) and Wakefield (5). The survey comprised open and closed ended questions.

Perceptions of Experienced Impacts and Benefits

Survey participants were asked about the extent to which existing mining activities (not just Centennial activities) in the local area have had an impact on residential amenity. Approximately 40% of participants noted that they had previously experienced impacts and/or benefits of mining.

Respondents expressed the following perceptions of experienced impacts:

- Respondents noted that they have experienced amenity impacts from increased dust and noise levels from both the processing and the transport (truck and rail) of coal; and
- Respondents cited changes in the environmental values of LT Creek and attributed these changes to coal dust and historic mining discharges.

Respondents cited a number of experienced benefits including voluntary financial contributions in support of community events, infrastructure and services, employment opportunities and rehabilitation work conducted that had resulted in improvements to the natural environment.

Perceived Project Impacts and Benefits

Survey participants were asked the extent to which the project may have an effect on various aspects of their social, economic and natural environment (Graph 1). Graph 1 shows that the majority of respondents expect that the project will have no effect on their local social,

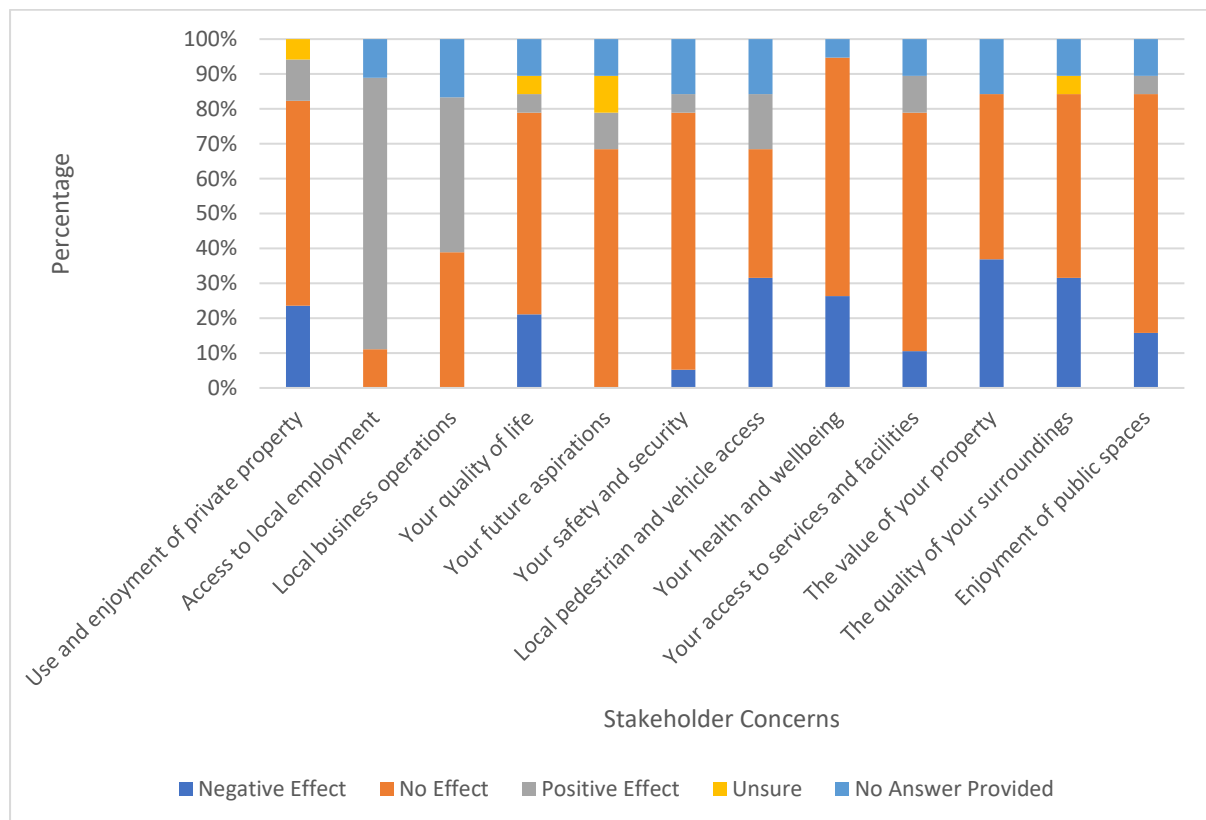
³ Not all participants answered all questions and therefore the number of total respondents to each question is different.

economic and natural environment, and a positive effect on access to employment and local business operations. A small number of respondents indicated potential negative effects:

- 24% (four participants) perceive the project will have a negative effective on the use and enjoyment of their private property and their quality of life;
- 38% (six participants) perceive the project will have a negative effect on local pedestrian and vehicle access to surrounding areas;
- 28% (five participants) perceive the project will have a negative effect on their health and wellbeing;
- 35% (six participants) perceive the project will have a negative effect on the quality of surroundings i.e. amenity of environment; and
- 44% (seven participants) perceive the project will have a negative effect on the value of their property.

A number of participants indicated uncertainty in relation to how the project may affect them.

Graph 1
Perceived Effects of the Project



Project Concerns

Survey participants were asked to identify how concerned they were about a number of different aspects of the project (Graph 2) i.e. not at all concerned, slightly concerned, somewhat concerned, moderately concerned and extremely concerned. The majority of participants demonstrated some concern (slightly concerned, somewhat concerned, moderately concerned and extremely concerned) for all identified project aspects, with the exception of noise from the ACSS; whereby 73% of all participants (11 participants) indicated that they were “not at all concerned”.

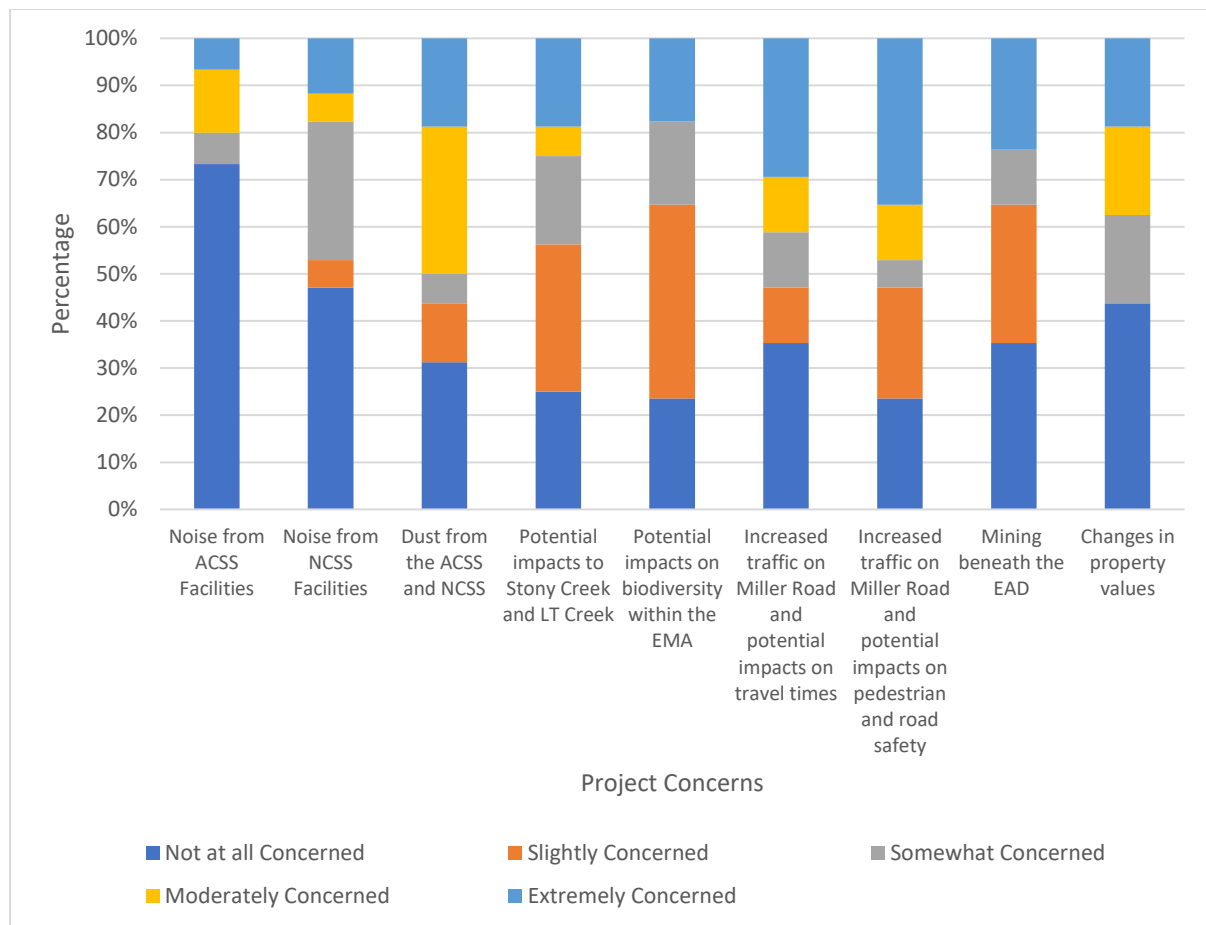
Graph 2 shows that participants are primarily concerned about the following aspects of the project:

- Dust from ACSS and NCSS. A combined 50% of participants (eight participants) were moderately and extremely concerned;
- Increased traffic on Miller Road and potential impacts on pedestrian and road safety. 47% of participants (eight participants) were moderately and extremely concerned;
- Increased traffic on Miller Road and potential impacts on travel time. A total of 41% of participants (seven participants) were moderately and extremely concerned; and
- Changes in property values. A total of 38% of participants (six participants) were moderately and extremely concerned.

Participants also expressed a level of concern in relation to:

- Biodiversity within the EMA. 41% of participants (seven participants) were slightly concerned; and
- Potential impacts on Stony Creek and LT Creek. 31% (five participants) were slightly concerned.

Graph 2
Extent of Stakeholder Concern



Newstan Awaba CCC

The Newstan Awaba Combined CCC meeting minutes were reviewed for references to Newstan Colliery, the NCLP and Awaba Colliery. Issues and concerns raised regarding the NCLP were considered due to the interactions between Newstan Colliery and NCLP activities. Key concerns raised in the November 2019 CCC meeting pertained to the potential impact on amenity and the creek systems.

Concerns in relation to the Awaba Colliery and recent activities at the ACSS site first workings associated with the project were also considered i.e. due to proximity and potential amenity changes. To date, a wide range of information, including project updates, have been presented through the CCC platform. Key concerns raised in CCC meetings from 2014 onwards include increased noise from coal handling processes at the NCLP, water quality impacts from discharged water into nearby waterways including LT Creek and Stony Creek (Figure 7), and environmental concerns in relation to subsidence and the number of wildlife present (Centennial Coal, 2018b).

Northern Holdings Aboriginal Cultural Heritage Management Plan Committee

Available desktop information on the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee was reviewed, including the existing *Northern Region Aboriginal Cultural Heritage Management Plan 2016* (Centennial Coal, 2016). . Concerns in relation to active mining were raised in the November 2019 Northern Holdings Aboriginal Cultural Heritage Management Plan Committee meeting in relation to the potential impact of the project on land within the EMA. Key concerns raised in this meeting stemmed from experienced mining impacts, particularly from subsidence and cleared disturbance footprints resulting in decreased surface water flows and a permanent loss of vegetation and wildlife. The majority of land within the PAA is a combination of Crown land and private freehold. The crown land is publicly accessible land. Access to country was also raised as a key concern by participants, noting that they perceived access to country to be limited from mining operations, resulting in decreased on-country activities including social gatherings and resource collection.

Participants of the meeting perceived that the project could support the realisation of several Indigenous opportunities. Participants suggested that the improved Indigenous participation across all aspects of mining i.e. underground workers, Indigenous businesses, is a significant benefit of the project, and so too is the opportunity for Indigenous involvement in mine closure and rehabilitation i.e. seeding.

7 SOCIAL BASELINE

This section describes the project context including land use setting, nearby communities, and local and regional planning context. It presents a socio-economic description of the communities of the social area of influence. Further supporting baseline information is included in Appendix F.

7.1 PROJECT SETTING

7.1.1 Local Setting

This section describes the setting of the PAA and EMA with reference to land ownership, key land use, sensitive receptors and proximate communities.

Land Ownership

Land ownership within and surrounding the PAA consists of Crown land, Crown roads and Crown reserves, privately owned land, land owned and managed by the Forestry Corporation of NSW and land managed by RailCorp, as well as land owned by LMCC and Origin Energy. Land within the EMA comprises a mix of Crown land, Crown roads, and privately owned Freehold land, with the majority Crown land or land owned by Origin Energy (the owner of EPS). The details of the land within and adjacent to the PAA are provided in the EIS.

Land Use

Land use within the PAA

Key land uses within the PAA include Newstan Colliery, NCLP, Awaba Colliery, part of the EPS and EAD. Quarrying activities (e.g. Hawkmount Quarry) and a number of LMCC facilities (e.g. Awaba Waste Management Facility) and recreational areas (e.g. Awabawac Park) are also located within the PAA. There are industrial areas 3 km to the north-east, on the outskirts of Toronto and denser urban development 6 km to the south-east, fringing Lake Macquarie.

Within the PAA, there are several creek systems, including LT Creek, Kilaben Creek, Stockyard Creek, Stony Creek, Palmers Creek, Lords Creek, Cockle Creek, Jigadee Creek and Crooked Creek. Only some of these creeks (Kilaben Creek, Stockyard Creek, Stony Creek, and Crooked Creek) traverse the EMA (Figure 7). The majority of the creeks are ephemeral with some sections of the lower reaches being perennial flowing into estuarine waters.

Land use within the Extension of Mining Area

The EMA occupies an area of 1,153 hectares. The land comprises a mix of Crown land, Crown roads, and privately-owned Freehold land. Land title descriptions and ownership details for all lots within the EMA are provided in Section 4 of the EIS.

Public and private infrastructure and utilities (non-Centennial owned) within the EMA, include:

- Electricity transmission lines and substations;
- Water and sewerage lines;
- Communication towers and cables;
- Paved and unsealed roads;
- The Main Northern Railway line; and
- Part of the EPS and EAD.

Key infrastructure features within the EMA are described in detail in the EIS.

The EMA also includes part of the Awaba Biodiversity Conservation Area (Section 7.4.1) (Figure 6).

The EMA is bordered by previous Newstan Colliery mine workings to the north and north-west while the western area of the proposed mining area is overlain with the old Awaba Colliery mine workings in the Great Northern seam.

Landuse in the vicinity of the Project Application Area

There are also a number of other operating coal mines and associated industry in the vicinity of the Project Application Area, including:

- Mandalong Mine, an underground coal mine owned and operated by Centennial Mandalong Pty Ltd (a subsidiary of Centennial Coal). The consolidated development consent boundary for the Mandalong Mine (approved under SSD 5144 for the Mandalong Southern Extension Project) abuts the southern boundary of the Project Application Area.
- Myuna Colliery, an underground coal mine owned and operated by Centennial Myuna Pty Ltd (a subsidiary of Centennial Coal). The consolidated development consent boundary for the Myuna Colliery (approved under Project Approval 10_0080) abuts the eastern boundary of the Project Application Area
- Wallarah 2 Coal Project, an approved (but not operational) underground coal mine project being developed by Wyong Coal Pty Limited. The development consent boundary for the Wallarah 2 Coal Project (approved under SSD 4974) is located approximately 15 km to the south of the Project Application Area.

The location of the project relative to other operating coal mines and associated industry is illustrated in Figure 2.

Nearby Sensitive Receptors

There are a number of sensitive rural residential and recreational receptors located within and nearby the PAA. The EIS *Air Quality Impact Assessment and Greenhouse Gas Assessment* report identified four sensitive receptors located within or in very close proximity to the ACSS. These sensitive receptors are representative of a large group of receptors in the area. The assessment does not consider any sensitive receptors for NCSS as impacts relative to that surface site are already approved under SSD-5145 and Newstan Mod 8.

A number of community facilities and services are located in close proximity to the ACSS, EMA and the NCSS. These are shown on Figure 6 and include:

- Fassifern Public School;
- Charlton Christian College;
- Awaba Public School;
- Robert 'Dutchy' Holland Oval;
- Awabawac Park;
- Newcastle Lake Macquarie Clay Target Club;
- Fassifern Oval (utilised for Archery);
- Wakefield School; and
- Awaba Waste Management Facility.

Nearby Communities

The closest communities to the NCSS are Fassifern and Wakefield. The closest community to ACSS and the EMA is Awaba.

Table 11 lists the approximate distances and commuting times from the nearest relevant surface site to the proximal townships and surrounding larger settlements in the LM LGA and adjoining LGAs.

Table 11
Distance and Commuting Time from the nearest Project Surface Site¹

Township	Distance	Commute Time	Route
Awaba (low side i.e. Olney Street)	1 km to ACSS	2 mins	Wilton Road.
Awaba (high side i.e. Gosford Street)	10 km to ACSS	10 mins	Cessnock Road, Awaba Road and Wilton Road.
Fassifern	2 km to NCSS	2 mins	Fassifern Road and Miller Road, or Macquarie Road and Miller Road.
Wakefield	3.5 km to NCSS	3 mins	Wakefield Road and Miller Road.
Blackalls Park	4 km to NCSS	5 mins	Fassifern Road and Miller Road.
Newcastle	27 km to NCSS	35 mins	Pacific Highway and Hillsborough Road.

Source: Google.com (2019)

Note:

1. The distance and commute time for this table is relevant to the closest surface site to the identified suburb, as this project recognises both the ACSS and the NCSS.

Awaba

The rural village of Awaba is a small and thriving rural community, with just over 400 residents (ABS, 2017a). The village comprises low-density residential areas, centered around a small train station (Awaba Station) and is surrounded by dense vegetation of typically 20 m high native trees. The location is a popular choice for families given a combination of factors including: housing affordability; the presence of Awaba Public School (2018 enrolment of 38 students); and the ready access to Newcastle, Central Coast and Sydney provided by the Main Northern Railway line which passes through the center of Awaba, dividing the community into two parts (Figure 6).

On the southern side of Awaba is a sizeable local sporting complex which includes Robert 'Duchy' Holland Oval and provides facilities for a number of organisations including junior and senior cricket clubs, a junior football club and the Toronto Pony Club. Awaba Public School and the Awaba Rural Fire Brigade are located on the northern side of the railway line. The nearest retail and commercial services to Fassifern are located in Toronto.

Awaba has a number of community organisations including the Awaba Public School P&C, Awaba Rural Fire Brigade and the Robert 'Dutchy' Holland Oval Committee. Several members are also past or present members of Centennial's Newstan/Awaba CCC.

Awaba residents value a range of local aspects including the:

- Rural setting and environmental attributes e.g. Stony Creek corridor;
- Peace and quiet of the isolated location;

- Accessibility to Toronto and key centres of Newcastle and Sydney;
- Awaba Public school; and
- Community connections through long-standing residents.

During SIA consultation a number of residents commented on the change in community dynamics in recent years, attributed to the number of new families moving into the location. Long-term residents described the community as friendly and safe but noted that there were *“not as many familiar faces in the village anymore”*.

Future planning directions for Awaba, articulated in the LM Strategic Plan include investigating opportunities to:

- Increase urban development close to the Awaba train station; and
- Create a new conservation area.

Fassifern

The suburb of Fassifern is located on the western side of Lake Macquarie proximate to the NCLP and Newstan Colliery operations (Figure 6). In 2016 the suburb had a population of 601 people (ABS, 2017a). Fassifern contains a mix of low to medium density residential development and includes residential areas that were previously housing commission. The suburb is home to many long-term residents (Section 7.5) who have experience living proximate to Newstan Colliery when it was fully operational. LT Creek, a relatively short but significant creek system, passes through Fassifern before it meets Lake Macquarie. LT Creek is a highly valued natural asset for many local residents.

Fassifern Railway Station, located on the Main Northern Railway, is a major station along the Sydney – Newcastle rail service. The station has a large commuter car park and is serviced by a connecting local bus network. The suburb has two schools: Fassifern Public School (2018 enrolment of 62 students), located on the western side of Miller Road to the south of the NCSS, and Charlton Christian College (2018 enrolment of 585 students) located on Fassifern Road. The nearest retail and commercial services to Fassifern are located in Toronto on the Lake Macquarie foreshore.

The LM Strategic Plan (LMCC, 2019c) describes the following future planning directions for Fassifern and in particular the Fassifern Railway Station area:

- New land uses are investigated, in coordination with a reduction of mining activities, with consideration of the nearby Fassifern train station, north-south rail loading loop and private haul road linking the colliery and EPS to the south;
- Disturbed areas are rehabilitated, decontaminated and reused; and
- Existing and future residential areas around the train station are changed to incorporate more medium density residential development.

Wakefield

Wakefield is a predominantly rural residential suburb, with lifestyle blocks scattered along Miller Road and Wakefield Road to the north of the NCSS. Miller Road provides access through to Fassifern and Wakefield Road provides direct access to the Pacific Motorway. The suburb supports a public behavioural school (Wakefield School with a 2018 enrolment of 31 students) and Wakefield Rural Fire Brigade.

Residential growth in Wakefield is limited due to the existing land use zonings under the Lake Macquarie Local Environmental Plan (LEP) 2014. Zone E1 National Parks and Nature reserves and Zone E2 Environmental conservation are the dominant land zonings in the Wakefield area. Residential development is confined to small pockets of land zoned RU2 Rural Landscape. The presence of multiple historic underground mine workings has also restricted growth. The old Rhondda Colliery site is located to the immediate west of Wakefield and to the north of the NCLP. A \$77 million motorsport complex has recently been approved for development on the former Rhondda Colliery site. Residents of Wakefield who participated in SIA consultation were particularly concerned about the potential impact of the motorsport complex development on rural residential amenity.

Recent subdivision of rural land in Wakefield has resulted in the in-migration of a number of new residents. Wakefield supports slightly higher rates of mobility (length of residency) than nearby Fassifern and Awaba (Section 7.5).

Under the provision of the LM Strategic Plan the Wakefield area is located within the proposed North West Growth Area (LMCC, 2019c). The majority of land within the Wakefield suburb, including land adjoining the NCSS and NCLP is designated as *green network* rather than as a *future growth investigation area* under the provisions of the LM Strategic Plan (LMCC, 2019c).

7.1.2 Regional setting

This section describes the regional area which is defined as the NM SUA and comprises includes the LM LGA.

Lake Macquarie LGA

The LM LGA is wholly located within the NM SUA and the broader Hunter Region. The LM LGA covers an area of approximately 649 km². The economic strength of the LM LGA is described in REMPLAN (2019):

“Lake Macquarie’s economic strength is built upon its diverse landscape and natural resource base, with key industries developing out of timber, agriculture, water and minerals. The city has developed into a major hub for small to medium size business with knowledge and technology-based industries exhibiting strong growth”.

A number of townships and centres within the LM LGA were established in response to high industry sector growth i.e. mining, power generation etc. Residential development across the LM LGA is concentrated around Lake Macquarie, likely due to desirable lifestyle factors, as well as proximity to major regional centres i.e. Newcastle. Further inland, several small rural townships (e.g. Awaba) and residential clusters exist amongst densely vegetated areas.

Lake Macquarie is widely recognised as a popular location for retirement and/or older families. The LM LGA is also well known for its large industry base in mining and power generation. The link between the key regional industries of health care, aged care, mining and manufacturing is discussed in detail in the *Central Coast and Lake Macquarie Regional Economic Development Strategy, 2018-2022* (NSW Government, 2018b) (Central Coast and Lake Macquarie REDS).

The area is also developing as an attractive area for younger families as it provides desirable residential values such as affordability, proximity to large centres with a range of employment opportunities and quality transport connections. The visitor economy is growing (Section 7.8.3) due to the LM LGAs strong environmental attributes (e.g. Lake Macquarie).

Newcastle-Maitland Significant Urban Area

The project is located within the Newcastle-Maitland Significant Urban Area⁴ (NM SUA) (Figure 1). The SUA structure represents significant towns and cities of 10,000 people or more. The NM SUA represents a cluster of related urban centres, including Newcastle which is located on the east coast and Maitland which is located to the north of the project. The NM SUA covers an area of approximately 1179.1 km² and covers a portion of the LM LGA. The NM SUA is situated in the Hunter Region of NSW.

In 2016, the NM SUA had an estimated resident population (ERP) of 463,052 people (ABS, 2017a). The City of Newcastle is forecast to grow from 166,984 people in 2019 to 202,049

⁴ The Significant Urban Area (SUA) structure of the Australian Statistical Geography Standard (ASGS) represents significant towns and cities of 10,000 people or more. They are based on the Urban Centres and Localities (UCLs) but are defined by the larger Statistical Areas Level 2 (SA2s).

people by 2041, representing a 21% increase (Forcast ID, 2019). In 2018, the City of Maitland had an ERP of 83,203 people (Maitland City Council, 2019). The population of Maitland is estimated to increase by 32.5% between 2016 and 2041 (NSW Government, 2018c). Maitland is anticipated to experience larger growth than Newcastle due to its desirable residential qualities i.e. less people, greater affordability, etc.

The NM SUA has a diverse economy based on manufacturing, mining and health care. Resource and mining exploration and operations are historical activities within the NM SUA. Newcastle is traditionally a manufacturing centre and is home to the Port of Newcastle, Australia's largest coal exporting port by tonnage. Despite a significant history and focus placed on manufacturing and mining, reliance on heavy industry in these centres has reduced in recent times.

7.1.3 Nearby Mining and Energy Operations

There are a number of historical and existing mining and power operations within the PAA. The operational infrastructure is primarily owned by Centennial or Origin Energy.

Eraring Power Station and Eraring Ash Dam

The EPS and associated EAD is owned and operated by Origin Energy. The EPS and EAD are located at Eraring, partially within the EMA (Figure 3). EPS has been operating since 1982 and is Australia's largest power station with a generation capacity of 2,880 megawatts. The power station is a coal-fired power station which uses black coal typically sourced from the nearby Centennial mines i.e. Myuna Colliery, Newstan Colliery and Mandalong Mine. The EPS is responsible for a considerable proportion of NSW's electricity. The EPS is scheduled to transition to closure by 2032 (Macdonald-Smith, 2019). The EPS and the EAD are located partially within the EMA and in proximity to the historic Awaba Colliery underground workings. The EAD is a declared dam under the *Dams Safety Act 2015*.

Interactions with the Eraring Power Station

First workings only are planned within a 35 degree angle of draw from EPS, in accordance with mining lease conditions.

Interactions with the Eraring Ash Dam

The EAD is located above the southern ends of the proposed workings in the West Borehole seam. The depth of cover above the West Borehole Seam, within the extents of the EAD and the proposed panels, varies between 250 m and 320 m.

Origin Energy is proposing to establish a new emplacement area for ash deposition (the Western Emplacement Area) within the EAD. The proposed emplacement area (as approved under MP 07_0084, Mod 1 (EAD-Mod1)) includes construction of a saddle embankment (the Western Saddle Embankment) along the western perimeter of the Western Emplacement Area. The Western Embankment Area is also partially located above the former Awaba

workings in the Great Northern seam. Origin Energy is proposing to undertake filling (with cement-stabilised fly ash) of some areas within these former workings to mitigate the risk of leachate from the deposited ash entering the former workings.

Centennial Newstan has consulted extensively with Origin Energy regarding the interaction of the project with the ongoing and proposed operations at EPS and EAD. The interaction of the project with these assets, and the outcomes of consultation with Origin Energy, have been key considerations during development and refinement of the project design.

Centennial Newstan proposes a number of strategies to mitigate the risk of subsidence-related impacts to the Western Saddle Embankment and the proposed grouting areas within the Western Emplacement Area. Firstly, no secondary extraction will be carried out within a 35 degree angle of draw of the Western Saddle Embankment. The area of any first workings within a 35 degree angle of draw of the Western Saddle Embankment will be determined following the completion of detailed designs by Origin Energy and subject to approval from the Dam Safety Committee.

Secondly, no secondary extraction will be carried out within a 26.5 degree angle of draw of any areas where grouting of the former Awaba workings in the Great Northern seam is proposed by Origin Energy. The area of any first workings within a 26.5 degree angle of draw of any proposed grouting areas will be determined following the completion of detailed designs by Origin Energy and subject to approval from the Dam Safety Committee.

Centennial Newstan understands there is significant community and government agency interest regarding the potential for leachate from EAD to enter the historic Awaba workings and then mobilise via groundwater aquifers into Lake Macquarie via Muddy Lake. EAD wall stability risks are also of interest to the community, despite the risk being negligible based on the outcomes of the subsidence and hydro-geotechnical assessments conducted for the EIS.

Centennial Newstan has placed considerable effort on understanding these risks as part of the mine planning process. Centennial Newstan will continue to focus on known constraints and interactions between the project and EAD with the objective of optimising resource recovery and minimise safety and environmental risks and impacts in the context of Origin Energy's approved project under Project Approval 07_0084.

Delta Electricity

The Vales Point Power Station is owned and operated by Sunset Power International and trades as Delta Electricity. Vales Point is located on the foreshore of southern Lake Macquarie in Mannering Park (Figure 2). Vales Point is a coal-fired power station that is co-fired with biomass to replace a proportion of coal with renewable fuel sources. Delta Electricity produce up to 4% of the electricity needed by consumers in the National Electricity Market, comprising all states and territories except WA and NT (Delta Electricity, 2017).

Mining Operations

There are a number of proposed and operating coal mines and associated industry in the vicinity of the PAA, including:

- Mandalong Mine, an underground coal mine owned and operated by Centennial Mandalong Pty Ltd (a subsidiary of Centennial). The consolidated development consent boundary for the Mandalong Mine (approved under SSD 5144 for the Mandalong Southern Extension Project) abuts the southern boundary of the PAA.
- Myuna Colliery, an underground coal mine owned and operated by Centennial Myuna Pty Ltd (a subsidiary of Centennial). The consolidated development consent boundary for the Myuna Colliery (approved under PA 10_0080) abuts the eastern boundary of the PAA.
- Wallarah 2 Coal Project, an approved (but not operational) underground coal mine project being developed by Wyong Coal Pty Limited. The development consent boundary for the Wallarah 2 Coal Project (approved under SSD 4974) is located approximately 15 km to the south of the PAA.

The location of the project relative to other operating or proposed coal mines and associated industry is illustrated in Figure 2.

Nearby Quarry Operations

The Teralba Quarry is located on Rhondda Road, to the north of the NCSS and NCLP and approximately 8 km east (by road) from the ACSS (Figure 2). Teralba Quarry is owned by Metromix Pty Ltd (Metromix). The facility supplies fine and coarse aggregates to the construction, concrete, and road making industries. Although operational since 1964, Metromix has owned the facility since 1986.

7.2 PLANNING CONTEXT

This section describes the regional and local planning context of the project.

7.2.1 Local Planning Context

Table 12 summarises the key local planning and community documents that provide strategic planning direction for the local social area of influence. Further information is provided in Appendix F.

Table 12
Local Strategic Planning Guidance

Local Planning Guide	Intent
Lake Macquarie Local Environmental Plan 2014 (Lake Macquarie LEP)	The Lake Macquarie LEP specifies the planning and land use management aims for public and private land through zoning in accordance with the EP&A Act. The project and the adjoining land are located within the LM LGA and development is subject to the land use zoning provisions of the Lake Macquarie LEP.
Imagine Lake Mac (LMCC, 2019c) (LM Strategic Plan)	The LM Strategic Plan is the strategic plan for the Lake Macquarie area, developed in order to guide growth and change across the city over the next 30 years. The project is consistent with the vision for the future of the LM LGA and supports the realisation of several of the articulated aspirations. Further information is presented in Appendix F.
Our Future in Focus (LMCC, 2017) (Community Strategic Plan).	The Community Strategic Plan is for the Lake Macquarie City and is the LMCC's key community strategic planning document. The plan defines the main values of the community and the strategies developed to respond to these values. The Community Strategic Plan is based on the aspirations, knowledge and values expressed by residents of the LMCC during consultation to inform the document. Appendix F Table F-1 presents relevant community values and how the project supports the protection and enhancement of these values into the future.

7.2.2 Regional Planning and Economic Context

Table 13 summarises the key regional planning and economic documents that provide planning and economic direction for the regional social area of influence. Further information is provided in Appendix F.

Table 13
Regional Planning and Economic Development Guidance

Regional Planning Guide	Intent
<i>Hunter Regional Plan 2036</i> (Department of Planning and Environment, 2016) (the Regional Plan)	The Regional Plan and associated Implementation Plan provides an overarching framework for land use planning that will help guide more detailed land use plans, development proposals and infrastructure funding decisions for the Hunter region over the next 20 years.
<i>Lower Hunter Regional Strategy 2006 – 2031</i> (Department of Planning and Environment, 2006)	The Lower Hunter Regional Strategy represents an agreed NSW government position on the future of the Lower Hunter. It is the pre-eminent planning document for the Lower Hunter Region and has been prepared to complement and inform other relevant State planning instruments.
<i>Greater Newcastle Metropolitan Plan 2036</i> (Department of Planning and Environment, 2018) (the Metropolitan Plan)	The Metropolitan Plan presents strategies and actions that will drive sustainable growth across the Greater Newcastle Region; being the cities of Cessnock, Lake Macquarie, Maitland, Newcastle, and Port Stephens.

Regional Planning Guide	Intent
	The Metropolitan Plan was also developed to help achieve the goals set out in the Regional Plan.
<i>Central Coast and Lake Macquarie Regional Economic Development Strategy 2018-2022</i> (Central Coast Council and LMCC, 2018b) (REDS)	The REDS sets out a long-term economic vision and associated strategies for the Central Coast and LM LGAs.

7.3 HISTORY AND SETTLEMENT PATTERNS

This section provides a summary of the Aboriginal history and European settlement history of the LM LGA. The information is drawn from a number of different sources including the Aboriginal Cultural Heritage Assessment and the Historical Heritage Assessment for the project. Further information is provided in Appendix F.

7.3.1 Aboriginal History and Cultural Values

Historical records indicate several different clans occupied the regional area, with the Awabakal people being located in the Newcastle and Lake Macquarie area. There is limited information available regarding the Aboriginal occupation of the area given the impacts of European settlement. Abundant sources of marine and terrestrial resources were available in the Newcastle area. As such, the area was likely occupied both transiently, when ephemeral water sources were accessible, and more permanently where a continual water source, such as Lake Macquarie, was available. Both of these environments would have provided a variety of seasonal and annual floral and faunal resources (Umwelt Environmental and Social Consultants, 2020a).

The area is known to contain evidence of a rich aboriginal history, due to the presence of a range of middens, scarred trees or stone tools (artefacts), and grinding grooves left behind by ancestors (Centennial Coal, 2016). More than 500 archaeological sites and places have been found in the Lake Macquarie region (LMCC, n.d.a). The area is also of particular importance to the Awabakal people due to documented accounts of a common Ancestor; Mahrahkah (an Awabakal woman), and her two daughters living in and around the region before European settlement (Centennial Coal, 2016).

The cultural significance of the land within the PAA is described in the Aboriginal Cultural Heritage Assessment which includes a statement of Aboriginal Cultural Significance provided by the Awabakal Traditional Owners Aboriginal Corporation, Awabakal Descendants Traditional Owners Aboriginal Corporation and Awabakal & Guringai (formerly Guringai Tribal Link Aboriginal Corporation).

7.3.2 European Settlement History

The following historical analysis provides a brief insight into the European settlement history of the LM LGA. It highlights the significance of the mining, power, and timber industries in shaping the economy of the region. A more extensive account of European Settlement History is provided in the Historical Heritage Assessment for the project.

European Discovery and Settlement

The greater Newcastle region is believed to have been first discovered by Europeans in 1797, due to a source of coal being found at the entrance to the Hunter River. Other settlers soon followed, settling in the areas now known as Dora Creek, Wangi Wangi, Toronto, and Speers Point. The population of Lake Macquarie grew quickly in the 1830s as many settlers began moving down from Newcastle (Clouten, 1967).

Early Mining and Industry

The first coal mine in the area was established in LM LGA in the area now known as Toronto, in 1840. Coal loading and storage facilities were set up in Swansea Heads. The mine saw periods of operation and closure, finally closing permanently in the 1890s (Umwelt Environmental and Social Consultants, 2020b).

The coal mining industry expanded, particularly in the 1860s and 1870s and there was rapid growth and industrialization in the area. Prominent mining companies in the area included Northumberland Coal, the Newcastle-Wallsend Coal Company, Minmi Coal Company, West Wallsend Coal Company, Monkwearmouth Estate, and the Young Wallsend Coal Company. These companies began operating mines in western Lake Macquarie, including in the suburbs now known as Fassifern, Edgeworth and Killingworth (Umwelt Environmental and Social Consultants, 2020b).

Discovery of large quantities of rich Cedar and other timber in the ranges west of Lake Macquarie in the early 1830s allowed for the timber industry to flourish (Clouten, 1967). Sawmills were established in the 1870s, along with the first timber depot in 1885 (LMCC, n.d.b).

The Advent of Transportation

In 1889, Newcastle became linked to Sydney via the first railway line in the region (now known as the Main Northern Railway Line). The emergence of the railway was paramount to the development of the coal industry in the region, as it allowed for better transportation of coal to the port of Newcastle for export (LMCC, n.d.d). Heavy rail and road networks were also developed to service the Newcastle Port (Department of Planning and Environment, 2018).

Early Local Communities

The number of settlements in the Lake Macquarie region increased greatly in the late 1800s due to the advent of the railway industry as well as the progression of the timber and coal industries. The settlement of Awaba first established around a construction camp for the proposed railway line, which opened in 1887 (Saxon, 1988). The nearby settlement of Fassifern emerged as a result of a land grant given to the Northumberland Coal and Land Company in 1879 to mine coal on the western side of Fassifern (now Wakefield). The settlement also developed to facilitate the needs of the railway construction employees (Lake Macquarie City Council, n.d). Fassifern Station was one of the first railway stations in the region, becoming operational in 1887. In the 1900s, a number of other colliery's emerged in the settlement, including Blackalls Colliery, and South Pacific Colliery. Newstan Colliery was established in 1950, to take over the Northumberland Coal and Land Company site and has seen periods of operation ever since. Fassifern is now a popular residential suburb with over 600 residents (ABS, 2017a).

Wakefield emerged as a residential base for many of the families with men employed at the various coalmines in the western lake area. Wakefield School opened as a provisional school in January 1889 and later the same year became a public school. Wakefield School closed in 1982 and reopened in 2002.

Patterns of the 1900s

The local area of influence has a longstanding and continuing association with mining and power generation. Many of the key events that have shaped the modern development and social fabric of the communities within and adjoining the PAA relate to the power and coal industry and include:

- Establishment of State Coal Mine, Awaba (later Awaba State Coal Mine) in 1947;
- In 1949, the sale of Northumberland No 1 and No 2 Colliery, and Oldstan Colliery to the NSW Electricity Commission who reopened them as the Newstan Colliery in 1950;
- Establishment of Wangi Wangi Power Station in 1958. Until its decommissioning in 1986, the power station was the largest power producer in NSW (LMCC, n.d.e);
- The construction and operation of EPS. The power station began construction in the late 1970s and early 1980s and became operational in 1984. To date EPS has been predominantly fueled by coal from the surrounding mining operations, including Newstan Colliery, and therefore has assisted in the growth of mining in the region (Office of Environment and Heritage, n.d);
- Significant job losses following the closure of Awaba Colliery in 2012, after over 60 years of operations;
- In 2014, the commencement of care and maintenance at Newstan Colliery after almost 130 years of operation;

- Establishment of Myuna Colliery at Wangi Wangi in 2012, which has seen a number of expansions since;
- Commencement of operations at Mandalong Mine in 2005; and
- Approval of the Mandalong Mine Southern Extension Project in 2015, and commencement of construction in 2019.

7.4 NATURAL AND CULTURAL VALUES

7.4.1 Natural Heritage and Valued Natural Attributes

The natural assets of LM LGA are described in the LM Strategic Plan as a '*defining feature*' of the LM LGA. LMCC is committed to protecting and enhancing the health and amenity of the natural areas, waterways and coast through protecting and managing significant areas of biodiversity and reinforcing local and regional biodiversity corridors. A significant proportion of the LM LGA is designated for environmental protection either as State Forest, State Conservation Areas or National Parks.

The value attributed to the LGAs natural assets was evident during SIA consultation, which confirmed a number of valued natural attributes within and adjoining the PAA and the EMA. These natural attributes include:

- Lake Macquarie;
- A number of protected areas; and
- Creek systems, specifically LT Creek.

Lake Macquarie

Lake Macquarie is the largest coastal saltwater lake in Australia, covering an area of 110 km². The lake continues to underpin the identity of Lake Macquarie City, and its health is critical to the lifestyle and the future of the LGAs economy (LMCC, 2019c). The lake features a number of sheltered bays, creeks, and headlands, and is used for a wide range of recreational activities, including yachting, boating, swimming, kayaking and fishing. The lake is very highly valued by the residents of the area for this reason, as well as for the ecological and aesthetic values which the lake provides. Such values are the reason why many residents choose to live and recreate in the Lake Macquarie region, and why the area is a popular tourist destination.

The PAA extends partially into the waters of Lake Macquarie (in a small north-western portion) and is located, at the closest point, 500 m from the lake foreshore.

Protected Areas

Parts of the PAA are overlaid by the Awaba State Forest and the Awaba Biodiversity Conservation Area. There is strong support from the community and the LMCC for the

creation of a conservation area called the Awaba Conservation Area (ACA). The ACA would include the Awaba Biodiversity Conservation Area and other areas within the PAA. The ACA is an aspirational vision for a number of local stakeholder groups including the LMCC.

Awaba State Forest

The Awaba State Forest is managed by the Forestry Corporation of NSW and has previously been harvested (Forestry Corporation, 2019). The area is infrequently used by 4WDs and bushwalkers. A paintball ground is also located within the Awaba State Forest. The Awaba State Forest is legally available to “bow” hunters only (NSW Department of Primary Industries, 2019). In late 2019, the Awaba State Forest area was threatened and partially impacted by severe bushfires. None of the EMA is overlaid by the Awaba State Forest.

Awaba Biodiversity Conservation Area

The EMA is partially overlaid by the Awaba Biodiversity Conservation Area (Figure 6) which is owned by LMCC. The Awaba Biodiversity Conservation Area is a biodiversity offset site for the Awaba Waste Management Facility managed for the protection of biodiversity in accordance with the *Awaba Biodiversity Conservation Area – Plan of Management 2015* (LMCC, 2015).

The Awaba Biodiversity Conservation Area is located south of Wilton Road at Awaba. LMCC recognise the existing rights to mine under the offset land. The findings of SIA consultation indicate that the Awaba Biodiversity Conservation Area is not widely used or accessed which is consistent with its biodiversity status.

LT Creek

LT Creek traverses the PAA (Figure 7). SIA consultation suggests that LT Creek is significant to the local area and has intrinsic value for a number of local residents. During SIA consultation residents located along LT Creek spoke about the recreational values i.e. boating, fishing etc. and aesthetic values of LT Creek as well as its environmental value i.e. fish nursery. During SIA consultation a number of participants commented on the current condition of LT Creek. SIA consultation findings suggest that prior to the commencement of mining in the locality (many years prior to Centennial ownership of Newstan Colliery), LT Creek was a clear water, sandy bottomed creek. Local residents strongly believe that industry, particularly historical mining operations, have degraded the LT Creek system.

In 2019 the Awaba/Newstan CCC provided support for LMCC’s application for the LT Creek dredging under the NSW State Government Resources for Regions Funding program. The CCC has lobbied extensively for the remediation of LT Creek for over a decade, seeking the dredging of the creek to address the legacy issues caused from century old, historic mining and accumulated sediments. Although the application was short listed and subsequently unsuccessful, it is likely to remain an ongoing goal for the CCC.

7.4.2 Historic Heritage

A Historical Heritage Assessment has been conducted for the project. This included a search of the National Heritage Register database, State Heritage Register, S170 Heritage and Conservation Registers, and relevant Lake Macquarie LEPs, as well as a review of previous heritage and archaeological assessments. A targeted visual inspection of the area was also conducted. This assessment concluded that:

- There are no Commonwealth, National, State, or S170 Heritage and Conservation Register listed heritage items or places located within the project area;
- There are three locally listed heritage items located within or partially within the assessment study area, namely:
 - The EPS, located within the EMA;
 - The Great Northern Railway, located within the EMA; and
 - The Newstan Colliery, located within the PAA.
- There are two potential (unlisted) heritage items located within the PAA, namely:
 - The Awaba State Coal Mine, including the ACSS; and
 - The Awaba to Wangi Power Station Branch Railway line, located within the EMA.
- There is an additional potential (unlisted) heritage item located in close proximity to the PAA, being the Bridge over Main Northern Railway line, located in proximity to the EMA.

The historic heritage items identified in the assessment further reiterates the strong history of the mining and power industries in the area. The Awaba Colliery is particularly significant at a local level due to being the first colliery to be planned, constructed and operated by the NSW State Government via the State Mines Control Authority. It is representative of the significant expansion in colliery development in NSW by the State Government during the post-war period. Furthermore, the colliery's operation from 1947 to the present day marks a significant period of continuity in use (Centennial Coal, 2019b).

7.5 POPULATION CHARACTERISTICS

7.5.1 Population and Demography

The following section provides a demographic summary of both the local and regional social areas of influence.

Population and Population Growth

The local social area of influence of the project is defined by the boundary of the three SSCs of Awaba, Fassifern and Wakefield (Figure 7). In 2016 Awaba recorded an ERP of 402, Fassifern recorded a population of 601, and Wakefield recorded the smallest population of 144 (ABS, 2017a).

In 2016, the LM LGA recorded an ERP of 202,332 (ABS, 2017a) and in 2018, an ERP of 204,914 (ABS, 2019c). The largest population centres within the LM LGA (based on 2016 ABS data) are located within the suburbs of Charlestown (12,910), Cameron Park (7,995), Warners Bay (7,614), and Edgeworth (6,209) (ABS, 2017a). These suburbs are located outside and to the north-east of the PAA in the north-west section of the LM LGA. Charlestown also functions as the dominant commercial centre in the LM LGA (Figure 1), supporting a number of key services and facilities, and the largest concentration of employment in the LM LGA (REMPAN, 2018). This area is also noted as experiencing a high rate of residential development (McKinney, 2019) and is a key focus for future investment in jobs, housing and services, according to the LM Strategic Plan (LMCC, 2019c).

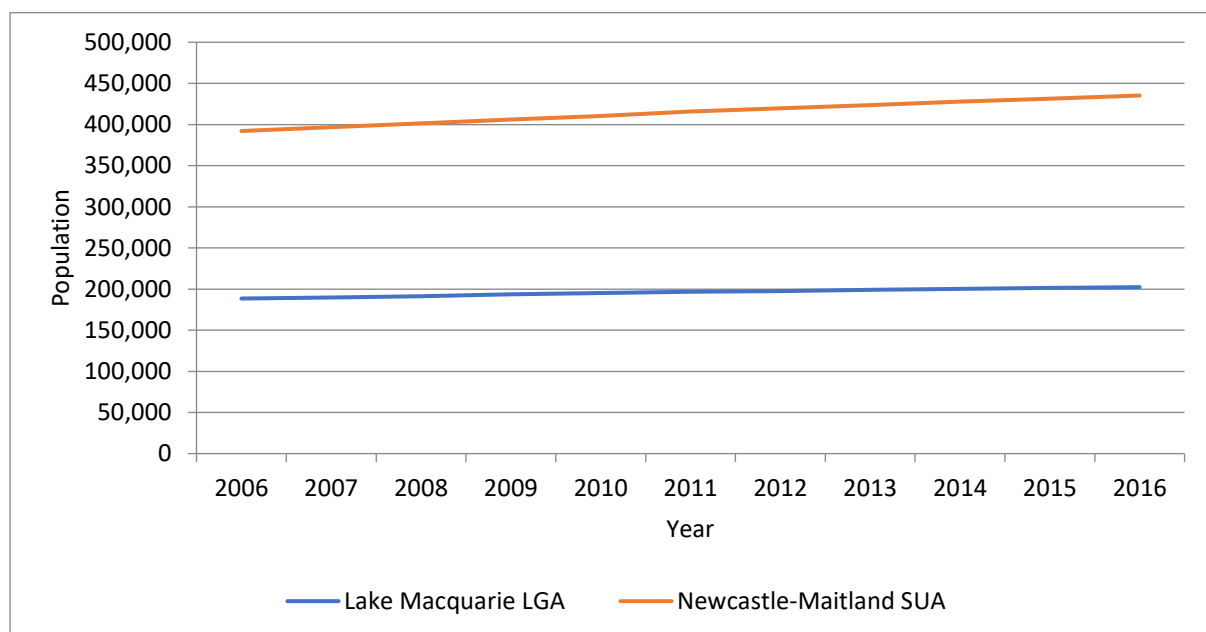
In 2016, the NM SUA, within which the LM LGA, is located had an ERP of 435,256 (ABS, 2019c).

Graph 3 presents annual population growth from 2006 to 2016 for the LM LGA and NM SUA.

Table 14 presents population change between this period for the LM LGA, NM SUA, and NSW.

Between 2006 and 2016, the population of the LM LGA increased by 7.3%, representing a small and slow population increase. The NM SUA experienced a higher growth rate of 11%, however, both the LM LGA and NM SUA experienced a smaller growth rate compared to NSW.

Graph 3
Population Growth – Lake Macquarie LGA



Source: ABS (2016)

Table 14
Population Growth – Lake Macquarie LGA

Geographical Area	Change 2006-2016	
	%	Number
Lake Macquarie LGA	7.3	13,829
Newcastle-Maitland SUA	11.0	43,150
NSW	14.7	990,168

Source: ABS (2016b) & ABS (2019a)

Future Population Trends

Table 15 presents the NSW Department of Planning and Environment population projections to 2041 for the LM LGA. Table 15 shows that the population of the LM LGA is likely to increase by a moderate amount (15%) with an annual average growth rate of 0.6%. The population change in the first ten years (2016-2026) is predicted to be smaller than the 10 years to 2016; 6% compared with 7.3%. The projected population increase in the LM LGA is also smaller than that projected for NSW (36.7%). The population change in LM LGA is predicted to be driven by migration into the LGA rather than natural change (births less deaths). The steady growth in population predicted within the LM LGA is likely attributable to the proximity of the LGA to the major cities of Newcastle and Sydney. Liveability pressures in such areas, along with the presence of strong transport links provided by the Main Northern Railway line (between Sydney and Newcastle) and major arterial road networks, facilitates future growth within the LM LGA (LMCC, 2019c). The NSW DPIE indicates that the predicted strong growth will be supported by the movement of people, particularly people around retirement age, to the LM LGA from the nearby centres of Newcastle and Central Coast (NSW Government, 2019b).

Table 15
Population Projections for the Lake Macquarie LGA and NSW

Geographic Area	2016	2021	2026	2031	2036	2041	Change 2016-41 (%)
Lake Macquarie LGA	202,332	210,005	214,506	220,912	225,184	232,689	15.0
NSW	7,732,858	8,414,978	9,011,010	9,560,567	10,077,964	10,572,696	36.7

Source: NSW Government (2019c)

Note: Population projections data was taken from the Population Projections Scenarios by LGA (ASGS 2019) data cube and uses the Common Planning Assumptions data.

Table 16 presents key population projection indicators for the LM LGA. Table 16 shows that the number of total households and dwellings is predicted to increase in line with population growth, however household size will decrease. In 2016, the top three household types in the LM LGA (couples with children, couples, and lone person households [Section 7.5.2]) made up 80% of household types in the LGA. The trends to 2036 for these household types show lone person and couple only family households are projected to exceed the number of households of couples with children. This has important implications as an increase in housing would be needed even if the population did not increase (LMCC, 2019e).

Table 16
Key Population Projection Indicators for the Lake Macquarie LGA

Indicators	2016	2021	2026	2031	2036	2041
Total Population	202,332	210,005	214,506	220,912	225,184	232,689
Total Households	79,250	83,200	85,800	89,250	91,900	95,650
Household Size ¹	2.52	2.49	2.46	2.43	2.40	2.38
Implied Dwelling Projection ²	86,650	90,950	93,800	97,550	100,500	104,600

Source: NSW Government (2019b)

Notes:

1. Average person's resident per occupied private dwellings
2. Dwellings required if the population forms households in the same way as in 2016

Age and Gender

Table 17 shows key age and gender indicators for the local and regional areas of influence, as well as NSW, and shows that all areas of interest have an older population than that of NSW. The suburb of Fassifern has the highest median age of the areas of interest, at 46 years. The LM LGA has the highest proportion of people aged over 65 years (20.6%) when compared with the other areas of interest, particularly NSW. NSW DPIE planning projections (NSW Government, 2019b) indicate that the number of people aged 65 and over in the LM LGA is estimated to increase from 40,050 in 2016 to 61,900 by 2041 – a change of 21,850 (54.5%). This will have significant implications for aged care, residential facilities, nursing homes, and extensive health and community services. The aging population also has implications for local labour supply.

The north-east area of Lake Macquarie is attractive to newer and younger families, whilst the western area of Lake Macquarie remains a popular location for people of retirement age (LMCC, 2019a) (pers. comm LMCC). This is consistent with the findings of SIA consultation with the broader community. This is likely attributable to greater housing diversity in this location, as well as its proximal location to Newcastle.

Of the three main communities of interest, the suburb of Awaba has the highest proportion of children aged 14 and younger (22.1%), with Fassifern having the lowest proportion (13.3%). However, the LM LGA and the NM SUA have similar proportions to that of NSW, suggesting that such differences are more localized and not reflective of the greater region. Furthermore, the findings of the SIA consultation indicated that these local demographic changes may be the result of a recent increase in the number of young families migrating to the local area. Awaba is described by existing residents as an affordable and attractive residential location for young families, particularly given the presence of the public school. Enrolments at Awaba Public School have increased by approximately 40% since 2011, from 27 enrolments to 38 enrolments in 2018 (ACARA, 2019). Enrolments at Fassifern Public School have increased by 10% from 2011 to 2018 with a current enrolment of 62 (ACARA, 2019).

Table 17
Age and Gender Indicators, 2016

Location	% Males	Median Age (persons) (#)	<15 years (persons) %	>65 years (persons) %
Awaba SSC	50.6	40	22.1	13.2
Fassifern SSC	49.7	46	13.3	19.8
Wakefield SSC	50.7	41	17.2	17.9
Lake Macquarie LGA	48.8	42	18.3	20.6
Newcastle-Maitland SUA	49.1	39	18.7	17.4
NSW	49.3	38	18.5	16.3

Source: ABS (2016a)

7.5.2 Family and Household Characteristics

Key characteristics of family and household composition within the local and regional areas of influence are discussed in the following sections.

Household Composition

Table 18 shows the 2016 household structure for the local and regional areas of influence. Relevant trends in the data include:

- All areas of interest have a relatively high proportion of family households, similar to NSW, with Wakefield showing a particularly high proportion;
- Wakefield and Awaba have a significantly lower proportion of lone person households than all other areas of interest, and, correspondingly the largest proportion of family households;

- Fassifern has a significantly high proportion of lone person households when compared to Awaba and Wakefield; possibly reflective of its high median age (lone person households are often associated with older people) and large number of long-term residents (see Mobility section below);
- Awaba, Fassifern and Wakefield as well as the LM LGA have a lower proportion of group households in comparison to the NM SUA and NSW; and
- Wakefield does not contain any group households, and also contains the least number of total households, reflective of the larger rural lifestyle blocks and small population size.

Table 18
Household Structure, 2016

Geographic Area	Households (%)			Total Households (No.)
	Family	Lone Person	Group	
Awaba SSC	80.8	16.2	3.1	130
Fassifern SSC	72.3	25.1	2.6	231
Wakefield SSC	86.0	14.0	0	43
Lake Macquarie LGA	73.5	24.1	2.4	73,072
Newcastle-Maitland SUA	70.2	25.8	4	172,231
NSW	72	23.8	4.2	2,604,306

Source: ABS (2017a)

Family Structure

Table 19 presents the percentage of families by family type for the local and regional areas of influence as well as NSW. Table 19 shows that the suburbs of Fassifern and Wakefield have a significantly higher proportion of couple families without children (42.4% and 44.2% respectively) than other areas of interest. In comparison, Awaba has the highest proportion of couple families with children (50.4%). However, overall, the LM LGA is comparatively similar to NSW in regards to family structure, with a higher proportion of one parent families and couple families without children. As discussed previously, the prevalence of couple families without children reflects the aging population.

Table 19
Families by Type, 2016

Geographic Area	Couple Family (%)			One Parent Family (%)	Other Family (%)	Total Families (No.)
	With Children	Without Children	Couple Family Total			
Awaba SSC	50.4	27.8	78.2	15.7	6.1	115
Fassifern SSC	36.6	42.4	79.0	19.2	1.7	172
Wakefield SSC	39.5	44.2	83.7	16.3	0.0	43
Lake Macquarie LGA	42.0	39.5	81.5	17.4	1.2	55,034
Newcastle-Maitland SUA	41.9	37.9	79.8	18.6	1.6	123,540
NSW	45.7	36.6	82.3	16.0	1.7	1,940,226

Source: ABS (2017a)

Note: The ABS defines family as two or more persons, one of whom is at least 15 years of age, who are related by blood, marriage, adoption, step or fostering, and who are usually resident in the same household. Each separately identified couple relationship, lone parent-child relationship or other blood relationship forms the basis of a family. Some households contain more than one family.

Mobility

Table 20 shows the mobility of residents in the local and regional areas of influence, as well as NSW. Table 20 indicates low levels of mobility in the local social area of influence compared with the LM LGA and the greater NM SUA and NSW. Awaba and Fassifern have particularly low mobility which aligns with the findings of SIA consultation with local residents. Wakefield shows slightly higher mobility, likely a result of the small population size and a recent increase in subdivision of land (i.e. a recent spike in population growth to the area). Given the low-level of mobility in the local social area of influence it is likely that residents have strong community ties and a connection to place, as is usually the case with long-term residents. This is also validated by the findings of SIA consultation during which participants, particularly those residing in Awaba, commented on community relationships and the presence of strong social connections.

Table 20
Mobility, 2016

Geographic Area	Lived at Same Address 1 Year Ago (%)	Lived at Same Address 5 Years Ago (%)	Change
Awaba SSC	84.1	66.9	17.2
Fassifern SSC	81.4	64.1	17.3
Wakefield SSC	79.2	59.7	19.5
Lake Macquarie LGA	80.3	56.3	24
Newcastle-Maitland SUA	77.6	52.2	25.4
NSW	76.5	50.5	26

Source: ABS (2017a)

7.5.3 Indigenous Population

Indigenous population data presented in this section was sourced from the Aboriginal and Torres Strait Islander Peoples (Indigenous) Profiles, available as part of the ABS Census Community Profiles (ABS, 2017a).

In 2016, the LM LGA had an Indigenous population of 8,032 people, equivalent to 4.1% of the total population (Table 21). The proportion of the population identifying as Indigenous in the LM LGA and NM SUA is much higher than NSW, with particularly high proportions in the suburbs of Awaba (7.5%) and Fassifern (6.3%). Between 2011 and 2016, the Indigenous population in the LM LGA increased by 43.6% compared with a total population increase in the LM LGA of 4.4% for the same period (ABS, 2013) (ABS, 2017a).

Table 21
Indigenous Persons, 2016

Geographic Area	Persons (No.)	% of Total Population
Awaba SSC	30	7.5
Fassifern SSC	38	6.3
Wakefield SSC	7	4.9
Lake Macquarie LGA	8,032	4.1
Newcastle-Maitland SUA	21,072	4.6
NSW	216176	2.9

Source: ABS (2017a)

Note: Data was sourced from the Aboriginal and Torres Strait Islander Peoples (Indigenous) Profiles

Table 22 presents key characteristics of the Indigenous population in the LM LGA compared to the non-Indigenous population, according to the 2016 ABS census. Analysis of these indicators shows that the Indigenous population within the LM LGA has:

- A far lower median age in comparison to the non-Indigenous population, with a median age of 21 compared to 43 respectively;
- A significantly lower rate of home ownership, with only 51% of Indigenous persons owning or buying their own home, in comparison to 75% in the non-Indigenous population;
- A significant gap in median weekly adult incomes, with pay gaps of \$133 between Indigenous and non-Indigenous populations; and
- A lower rate of employment, with only 32% of Indigenous adults employed, as opposed to 45% within the non-Indigenous adult population.

Table 22
Characteristics of Indigenous Persons – Lake Macquarie LGA, 2016

Indicator	2016		
	Indigenous	Non-Indigenous	Gap
Median age of persons	21	43	-22
% of households owning/buying their home	51	75	-23
Median weekly income of adults (15+) (\$/weekly)	480	613	-133
Median weekly income of households (\$/weekly)	1,296	1,314	-18
Average household size	3.2	2.5	0.7
% of infants under 5 in education	25	27	-2
% of adults with some type of post-school qualification	46	59	-13
Average school year completed	10.3 years	10.7 years	-0.3 years
% of people with a severe, long-term disability	8.5	6.6	+1.9
Employed adults as % of population	32	45	-13

Source: NSW Government (2017)

Further aboriginal history and cultural values are described in Section 7.3.1.

7.6 HOUSING AND ACCOMMODATION

This section provides a brief overview of housing and accommodation in the local and regional social area of influence. A detailed analysis of the housing market including housing affordability, building and development approvals and future residential land development is presented in Appendix F. Qualitative and quantitative information and data has been sourced from a combination of the following: 2016 ABS Census; various LMCC housing studies; Residex Pty Ltd; and Realestate.com.au.

7.6.1 Local Housing Policy and Strategy

In 2019 LMCC released *Lake Macquarie "Lets Thrive"* (LMCC, 2019e) (LM Housing Strategy). The LM Housing Strategy was informed through a number of housing studies including the *Lake Macquarie Housing Study 2018* (SGS Economics & Planning Pty Ltd, 2018)

A key finding of these studies was that Lake Macquarie LGA requires more housing to meet the needs of the future population. As the LGA population grows, the community and households are projected to change generating demand for housing diversification. The LM Housing Strategy "*supports a housing market that meets the diverse and changing needs of the Lake Macquarie community. It enables a sustainable supply of housing for everyone, at all income levels, that is close to jobs and services, and that respects Lake Macquarie's unique landscape*" (LMCC, 2019e).

7.6.2 Existing Housing Supply

In 2016 Lake Macquarie's population of 202,332 occupied 82,000 dwellings, of which 9% were unoccupied and less than 1% were non-private dwellings. Significant analysis of LM LGA housing supply was undertaken to inform the *Lake Macquarie Housing Study 2018* (SGS Economics & Planning Pty Ltd, 2018). Key findings of the *Lake Macquarie Housing Study 2018* and LM Housing Strategy relevant to housing supply were:

- The existing stock is predominantly detached (84%). In 2016, attached dwellings (semi-detached and row or terrace house, townhouse) accounted for 10% of total private dwellings; and
- Three and four-bedroom dwellings make up almost 70% of all private dwellings.

Housing market data available through Residex Pty Ltd and accessed 22 January 2020 shows that there were:

- No properties for sale in Awaba and no recorded sales in the last three months (Residex Pty Ltd, 2020a);
- Two properties for sale in Fassifern with no recorded property sales in the last three months (Residex Pty Ltd, 2020b); and
- No properties for sale in Wakefield with one recorded property sale in the last three months (Residex Pty Ltd, 2020c).

Analysis of available rental dwellings in the areas of interest (Table 23) shows a limited supply of rental accommodation in Wakefield and a small supply in Awaba/Fassifern (with the majority in Fassifern). Review of rental supply data for neighbouring areas shows a greater supply of properties than the areas of interest.

Table 23
Available Rental Stock and Rental Price – October 2019

Property Type and Location	Lowest Rent (\$p/w)	Highest Rent (\$/pw)	Number of Properties
	Awaba/Fassifern (Postcode 2283)		
All Properties	\$255	\$1,050	28
3-bedroom + houses	\$295	\$1,050	13
2 bedroom houses	\$265	\$360	9
2 bedroom + units/townhouses	\$255	\$350	2
	Wakefield (Postcode 2278)		
All Properties	\$640	\$640	1
3-bedroom + houses	\$640	\$640	1
2 bedroom houses			0
2 bedroom + units/townhouses			0

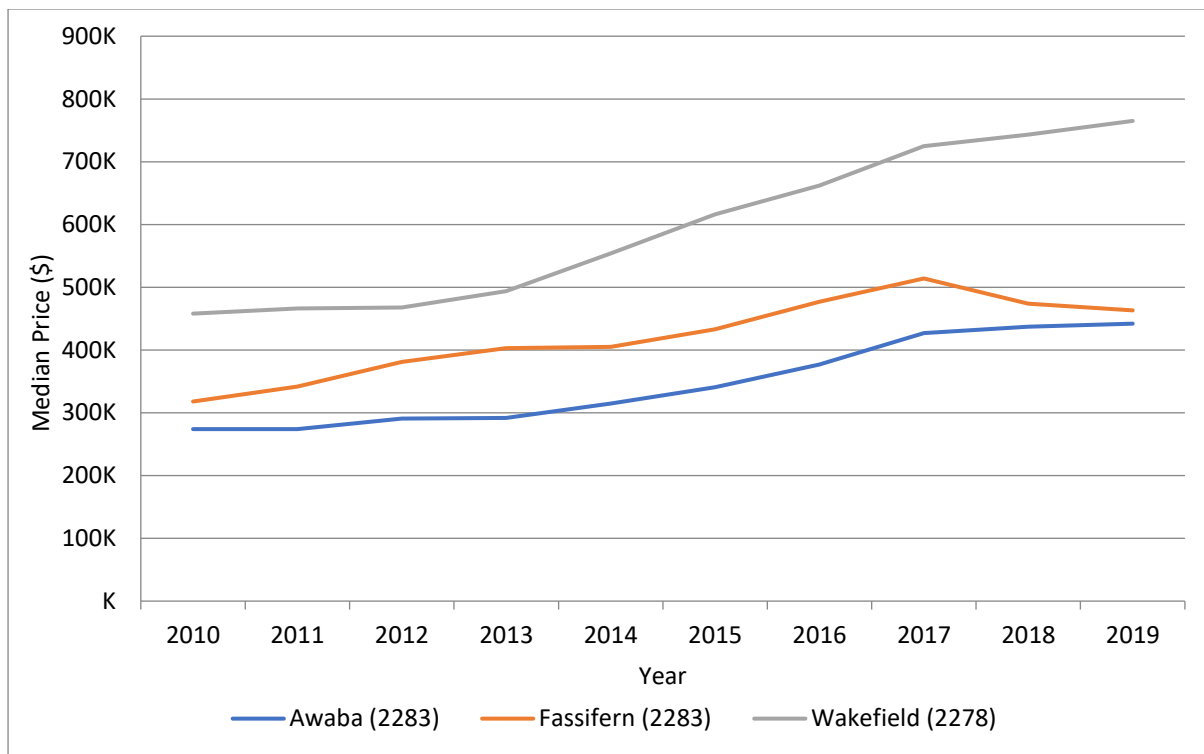
Source: REA Group Ltd (2019)

7.6.3 Housing Costs

Housing Market Prices

Graph 4 shows median dwelling prices for the Awaba, Fassifern and Wakefield areas (based on non-ABS suburb areas), between 2010 and 2019. The information is drawn from Residex Pty Ltd (2020a, 2020b, 2020c). Graph 4 indicates that median house prices are consistently much higher in the suburb of Wakefield, likely as a result of this suburb being more rural in nature and providing larger blocks of land, both of which increase housing value. Median house prices have steadily increased for all suburbs; however, Wakefield has seen the largest growth rate (67% increase between 2010 and 2019), with a particularly fast growth rate since 2013.

Graph 4
Median House Prices, 2010-2019

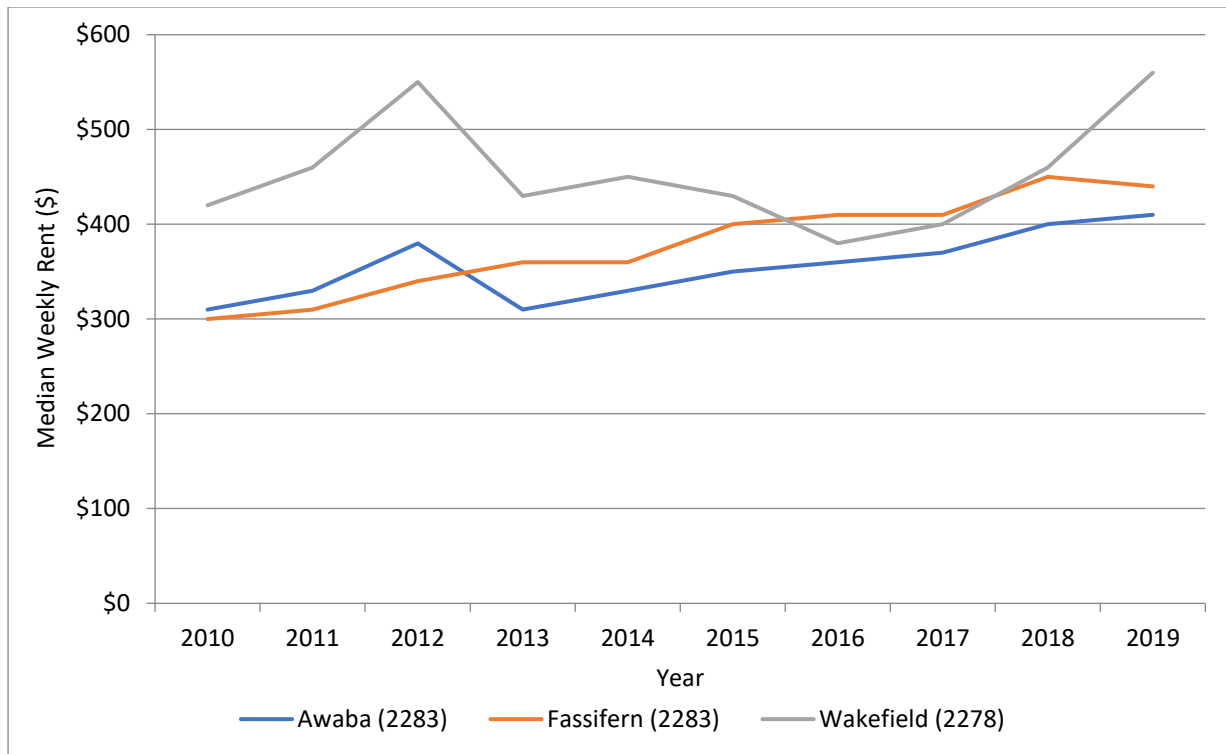


Source: Residex Pty Ltd (2020a); Residex Pty Ltd (2020b); Residex Pty Ltd (2020c)

Current Rental Prices

Graph 5 shows median weekly rental prices for residential dwellings in the Awaba, Fassifern and Wakefield areas (based on non-ABS suburb areas), between 2010 and 2019. The information is drawn from Residex Pty Ltd (2020a, 2020b, 2020c). Between 2010 and 2019, median rental prices have steadily increased for all suburbs, however, Awaba and Wakefield experienced a significant spike in median rental prices in 2012. Similar to trends in housing market prices, Wakefield experienced the highest median rental prices for the majority of the period between 2010-2019. Fassifern experienced the largest growth rate in median rental prices (47% increase between 2010 and 2019), implying that this suburb is attractive to renters, likely due to being more densely populated, with a greater number of facilities and services, including education options.

Graph 5
Median Weekly Rent, 2010-2019



Source: Residex Pty Ltd (2020a); Residex Pty Ltd (2020b); Residex Pty Ltd (2020c)

Housing Affordability

Housing affordability is a function of both housing costs and household income. Housing stress is a specific measure of the extent to which lower income households face unaffordable housing costs (rent or mortgage payments). The usual benchmark for affordability is that households paying more than 30% of their gross income for housing costs are in 'stress' (Housing Alliance, 2014).

Table 24 shows rates of mortgage and rental stress for the local and regional social areas of influence, as well as NSW.

Table 24
Median Mortgage Repayment and Rent, 2016

Geographic Area	Median mortgage repayment (\$/monthly)	Households experiencing mortgage stress (%)	Median rent (\$/weekly)	Households experiencing rental stress (%)
Awaba SSC	1,718	8.9	300	3.1
Fassifern SSC	1,600	5.1	300	10.4
Wakefield SSC	1,733	0	255	0
Lake Macquarie LGA	1,733	6.5	320	9.6
Newcastle-Maitland SUA	1,733	6	320	11.9
NSW	1,986	7.4	380	12.9

Source: ABS (2016a)

Table 24 shows that:

- All of the areas of interest experienced a lower rate of rental stress than NSW;
- Median mortgage and rent were consistently lower for all areas of interest than that of NSW;
- Fassifern experienced the highest rate of rental stress when compared to the other areas of interest, but a lower rate than NSW;
- Awaba experienced a much higher rate of mortgage stress than all other areas of interest, including NSW; and
- Wakefield did not experience any mortgage or rental stress.

Social Housing Provision

Table 25 shows the proportion of social housing in the local and regional social areas of influence as well as NSW for 2016. Although this data shows that the suburbs of Awaba, Fassifern and Wakefield have very limited social housing, the LM LGA and NM SUA have significantly higher proportions of social housing than that of NSW. Relatively low living costs, housing affordability and ready access to Newcastle and Sydney makes this region an attractive destination for low socio-economic households.

Table 25
Rented Dwellings by Selected Landlord Type, 2016

Geographic Area	Selected Landlord Type		Total (%)
	State or territory housing authority (%)	Housing co-operative/community /church group (%)	
Awaba SSC	0.0	0.0	0.0
Fassifern SSC	5.7	3.0	8.7
Wakefield SSC	0.0	0.0	0.0
Lake Macquarie LGA	19.1	2.5	21.6
Newcastle-Maitland SUA	18	1.8	19.8
NSW	12.7	2.1	15

Source: ABS (2017a)

Data from the NSW Department of Communities and Justice indicates that 922 general applicants and 44 priority applicants are waiting to be placed into social housing in the Lake Macquarie and Lake Macquarie East areas (Department of Communities and Justice, 2019). Expected wait times for all property types in these areas is up to five to ten years.

7.6.4 Short-term Accommodation

Short-term accommodation relates to those types of accommodation that are typically provided to visitors or tenants for a short period of time, for example, motels, serviced apartments, bed and breakfast, self-contained homes, caravan and camp sites. The length of tenancy in these forms of accommodation can often extend to lengthy stays, depending on accommodation availability, price and personal circumstances. Short-term accommodation providers in the LM LGA provide temporary accommodation to tourism visitors and industry personnel to the LGA.

There is a variety of short-term accommodation options available across the LM LGA, and significantly more in neighbouring LGAs i.e. Newcastle. Short-term accommodation within the LM LGA includes luxury B&Bs, hotels and motels and self-contained rental accommodation. The majority of accommodation within the LM LGA is situated around the lake itself, with a very small number of accommodation options in the more rural areas. Awaba, Fassifern, and Wakefield have limited short-term accommodation options. Toronto is the closest centre to the NCSS and ACSS that provides such services.

The ABS produce statistical information for accommodation establishments with 15 or more rooms. The majority of establishments in the LM LGA are not included in the ABS data due to the size of the establishments. Table 26 lists the number of accommodation establishments

with 15 or more rooms in the Toronto-Awaba Statistical Area Level 2 (SA2)⁵, as well as the LM LGA and NSW. The data presented is for the June quarter 2016 and shows that there are a limited number of establishments within the Toronto-Awaba SA2, with a greater number of establishments in the surrounding LM LGA. There are also a number of smaller establishments advertised on booking.com, Air BnB and Stayz.com. In Toronto's commercial centre on the foreshore of Lake Macquarie there are a number of holiday apartment complexes e.g. Brighton Apartments, and local pubs e.g. Toronto Pub that provide short-term accommodation. The Catalina Motel west of the Toronto commercial centre also provides a number of rooms for short-term accommodation

Table 26
Tourism Accommodation Statistics, 2016

Location	No. of Establishments	No. of Rooms	Room Occupancy Rate (%)	Room Nights Occupied	Room Nights Available
Toronto-Awaba SA2	2	NA	NA	NA	NA
Lake Macquarie LGA	18	264	63.5	61	97
NSW	1,424	75,235	68.3	18,573	27,212

Source: ABS (2017b) & Destination NSW (2017)

7.7 LABOUR MARKET CONDITIONS

This section describes the labour and employment characteristics of the LM LGA, in context with the NM SUA as well as NSW. Further information on labour market conditions including Employment Share, occupation and qualifications is provided in Appendix F and also in the Economic Impact Assessment (Aigis Group, 2020).

7.7.1 Current Employment and Unemployment

Labour Force Size

Table 27 shows the labour force size for the December Quarter between 2015-2018, for both the LM LGA and NSW. In December 2018, the LM LGA had a working age population of 102,060 people, representing an increase of approximately 4.5% since 2015. Comparatively, NSW experienced a 5.8% increase in labour force size in that time. This information is drawn from the ABS as well as the Department of Employment, Skills, Small and Family Business.

⁵ The Toronto-Awaba SA2 is a large area that includes a number of different SSCs including Awaba, part of Fassifern, Toronto, Kilaben Bay, Coal Point and Carey Bay.

Table 27
Labour Force Size for the December Quarter 2015-2018

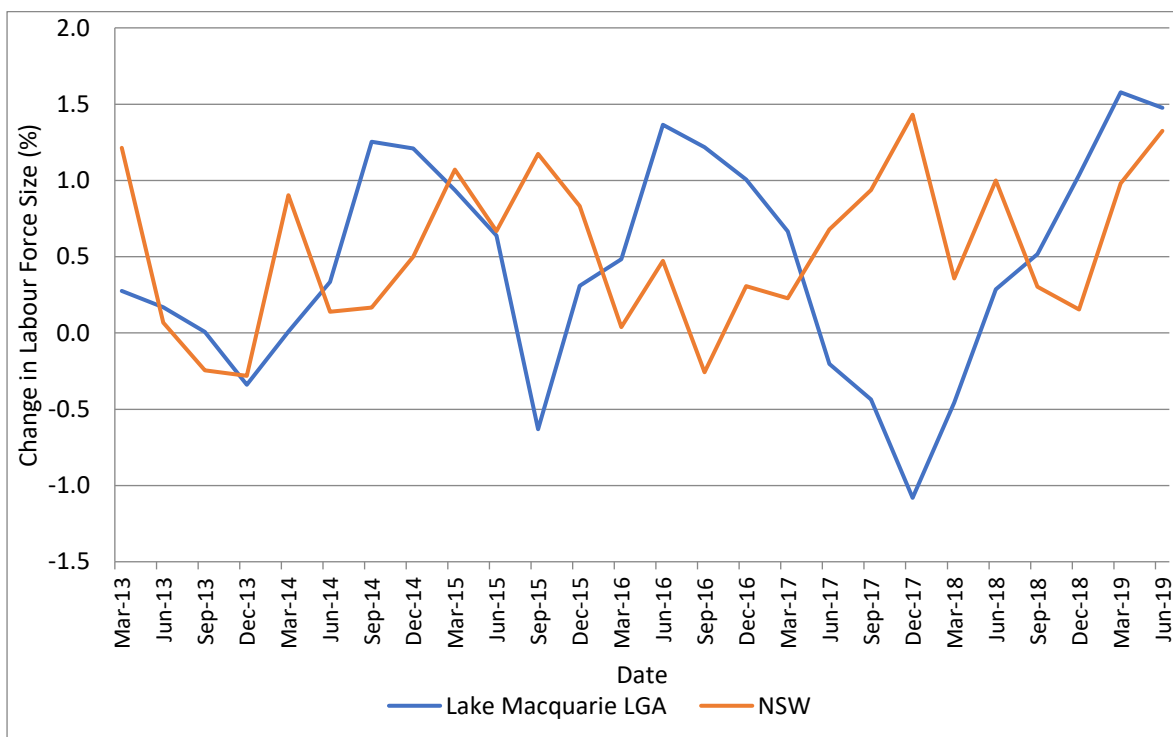
Location	Labour Force (Persons)			
	2015	2016	2017	2018
Lake Macquarie LGA	97,708	98,180	100,668	102,060
NSW	4,002,009	4,003,560	4,157,473	4,233,309

Source: ABS (2019b) & the Department of Employment, Skills, Small and Family Business (2019c)

Note: NSW data was derived from ABS and LM LGA data was collected from the Department of Employment, Skills, Small and Family Business.

Graph 6 shows the change in labour force size across the LM LGA relative to NSW, between June 2013 and June 2019. This data shows that the labour force size has fluctuated extensively over time, and such fluctuations have occurred over shorter periods of time than that of NSW. It is notable that in 2015 and 2017 LM LGA experienced a sharp reduction in labour force size (decline of approximately -0.5% and -1.0%) in parallel with significant increases in the NSW labour force (increase of approximately 1.0% and 1.5%). The change in labour force in LM LGA during 2015 aligns with a downturn in the mining industry at that time, and an increase in the LGA unemployment rate.

Graph 6
Change in Labour Force Size, June 2013-June 2019



Source: ABS (2019b) (NSW data) the Department of Employment, Skills, Small and Family Business (2019c) (LM LGA data)

Note: NSW data was derived from ABS 2019 - Labour force status by Sex, State and Territory – Labour Force Total Persons - Seasonally adjusted

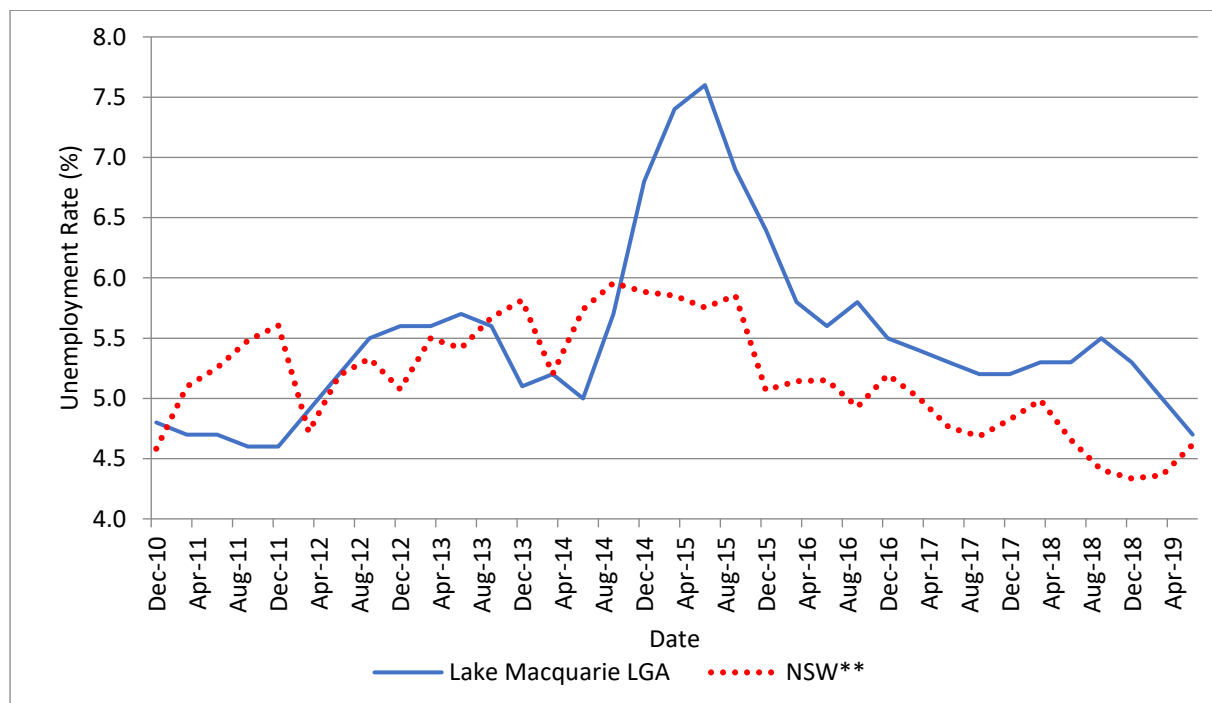
Census data indicates that there was a total of 61,061 people working within the LM LGA in 2016, which represents 21.93% of people working within the Hunter Region (280,855 people) (REMPPLAN, 2019). This represents an increase of 3,835 jobs (6.64%) since the 2011 census (57,766 jobs).

Unemployment

Graph 7 presents trends in unemployment for the LM LGA relative to NSW. This data shows that unemployment rates within the LM LGA have been consistently higher than NSW since late 2014. This may be attributed to the ageing population within the LM LGA, as older workforce participants lack the skills required in today's economy and may find themselves unemployed as a result (REMPPLAN, 2018).

The data also shows that there was a significant increase in unemployment rates within the LM LGA in 2015. This trend is likely to be partly due to the downturn of the mining industry in the region during that time. Note that Newstan Colliery was placed in care and maintenance in August of 2014, and Myuna Colliery underwent a restructure, both of which caused significant job losses in the region (Newcastle Herald, 2014; ABC, 2015).

Graph 7
Unemployment Rate, 2010-2019



Source: Department of Employment, Skills, Small and Family Business (2019c) & Department of Employment, Skills, Small and Family Business (2019a).

Note: **Unemployment rates for NSW are unsmoothed data.

7.7.2 Industry of Employment

Graph 8 shows the industry of employment for employed residents of the LM LGA during the 2006, 2011 and 2016 census periods. The industries of health care and social assistance, retail trade, and construction have continuously provided the largest proportions of employment for the LGA population. In 2016, of employed persons in the LM LGA, the:

- Health care and social assistance industry sector employed 14,336 people (16.8% of total employment across all industry sectors);
- Retail trade industry sector employed 8,861 people (10.4% of total employment across all industry sectors); and
- Construction industry sector employed 8,835 people (10.4% of total employment across all industry sectors).

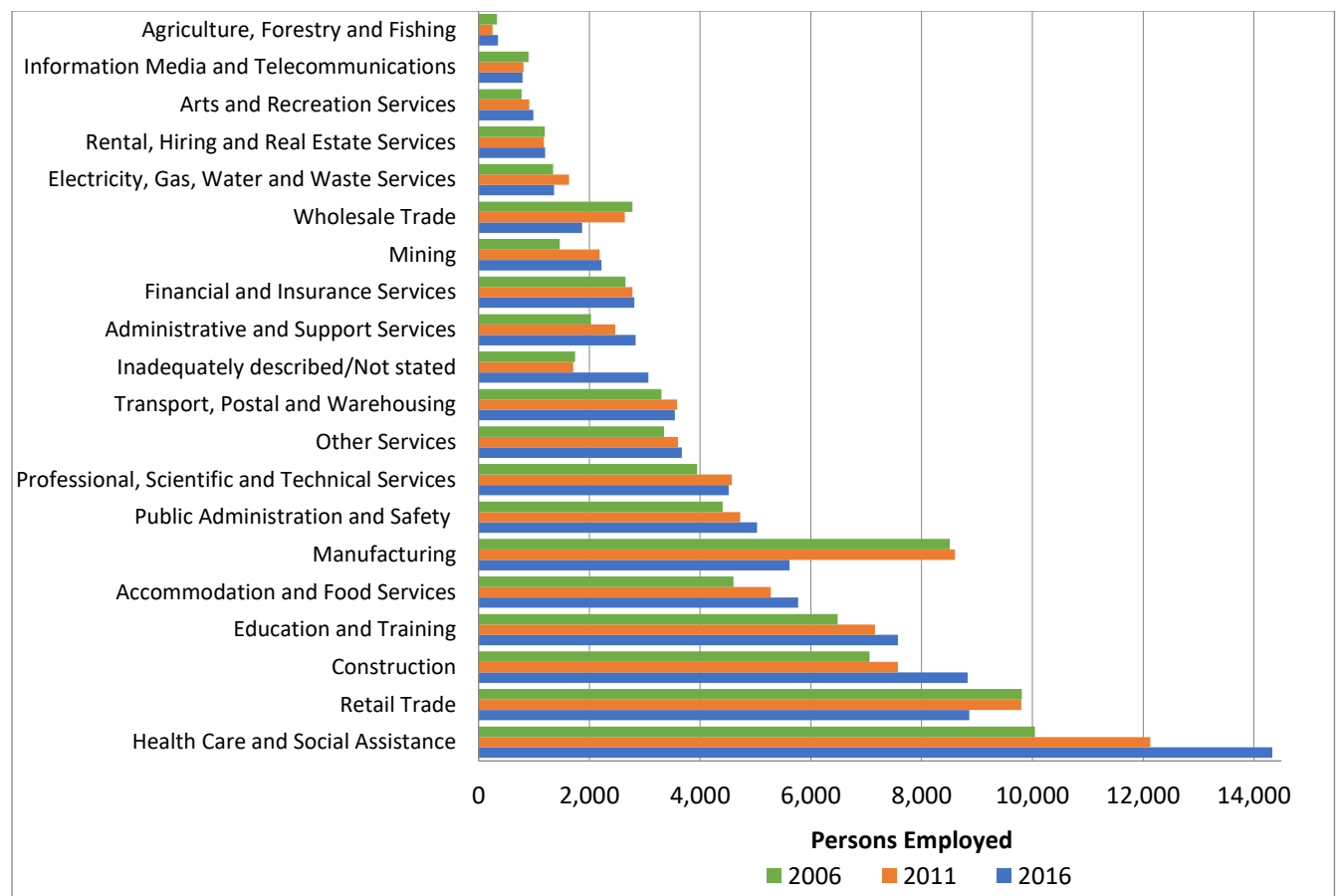
The prevalence of the health care and social assistance industry sector within the LM LGA is likely the result of a number of hospitals and aged care facilities being located within the greater region, including the John Hunter Hospital in Newcastle and Belmont Hospital in Carina Heights. See Section 7.10 for more information on services and facilities, including health care and social assistance.

Between 2006 and 2016 the number of LM LGA residents employed in the following industries increased significantly:

- Mining industry sector - an increase of 51%. However, note that mining is one of the lower industry sectors in regards to employment share (2,219 people, representing only 2.6% of employed residents in the LM LGA);
- Health care and social assistance industry sector - an increase of 43%; and
- Construction, accommodation and food services, and education and training industry sectors - an increase of 25%, 25% and 17% respectively.

However, a significant decline in employment was experienced in the manufacturing (34%) and wholesale (33%) industry sectors. This decline is consistent with the long-term trend of this industry, Australia wide (REMPPLAN, 2018).

Graph 8
Lake Macquarie LGA Industry of Employment



Source: ABS (2008; 2013; 2017a)

7.8 ECONOMIC STRENGTH

This section presents key economic measures for the LM LGA. Further detailed information on the economy of the LM LGA is presented in the Economic Impact Assessment.

7.8.1 Gross Regional Product

Table 28 shows the estimated Gross Regional Product (GRP) for the LM LGA in 2018. The GRP of the LM LGA regional economy in 2018 was 10.65 Billion (B), which represented approximately 0.58% of NSW Gross State Product and \$53,944 GRP per capita.

Table 28
Gross Regional Product – Lake Macquarie LGA

GRP Expenditure Method	Lake Macquarie LGA
Gross Regional Product (\$ B) (Nominal) ¹	10.65
Population (persons)	197,373
Per Capita GRP (\$)	53,944
Per Worker GRP (\$)	172,839

Source: REMPLAN (2019)

Note: Nominal GRP is a measurement that shows growth but is also affected by the change in prices (inflation or deflation).

7.8.2 Industry Sector Contribution

Industry Sector Output

Total output generated by the LM LGA for 2018 is estimated at approximately \$19.884 B (REMPAN, 2019) (Appendix F Graph F-5). In 2018 the construction sector was the largest producer of output in the LM LGA, accounting for 16.83% of all output. The locality generating the most output was Glendale - Cardiff - Hillsborough (SA2), and manufacturing was the largest industry in that locality. In 2018 the mining industry was within the top four industries generating output, despite making up a very small proportion of the employment share.

Industry Sector Value Added

The total value added by the LM LGA economy in 2018 was estimated at \$9.646 B (REMPAN, 2019) (Appendix F Graph F-6). This represents 18.75% of the value added within the Hunter Region, and 1.71% of the value added in NSW. The rental, hiring, and real estate services sector contributed the highest proportion of value added to the LM LGA (\$1.634 B), whilst the mining, construction, and health care & social assistance sectors also contributed a significant amount.

Exports and Imports

In 2018 the LM LGA was a net importer and exporter for all sectors. Exports from mining and manufacturing are significantly higher than other sectors in the LM LGA, with imports from manufacturing also being significantly higher than other sectors (Appendix F, Graph F-7).

7.8.3 Tourism Sector Contribution

The LM LGA is a popular tourist destination offering a range of recreational activities associated with the natural assets of the region. These assets include Lake Macquarie, Watagan National Park, numerous scenic beaches, a number of creeks and estuaries, and multiple state parks and mountain ranges. Furthermore, the calendar of events in the region is extensive, and includes regular markets, tours, music events, sport events, etc. The LM LGA is located in close proximity to Newcastle and Sydney, offering opportunities for tourists to spend weekends away in the region, in a more relaxed setting.

In 2018, the LM LGA tourism industry generated approximately \$532.972 Million (M) in output which constitutes 2.7% of total output (REMPPLAN, 2019). In comparison, the tourism industry in NSW generates approximately 3.6% of total output (REMPPLAN, 2019). Tourism supports an estimated 2,967 jobs, which is 7.8% of total employment in the LM LGA. In 2018, a total of 1,660 tourism businesses were operating in the LGA (Destination NSW, 2017). The average stay for domestic overnight visitors in the LM LGA is three days (Destination NSW, 2017).

Tourism campaigns for the region focus on the unique natural beauty of the lake and coastline, the large number of towns and villages to explore, as well as a number of walking trails, conservation areas and picnic facilities. The LMCC and Destination NSW also recently launched the “Love the Lake” tourism campaign, aimed at attracting under 45s to the adventurous and fun nature of the region (Lakes Mail, 2019).

Sports tourism is also prevalent in the LM LGA, with surfing, swimming and yachting being popular activities in the area.

Enhancing tourism is a key strategy identified within the LM Strategic Plan (LMCC, 2019c). The south-east growth area surrounding the suburb of Swansea is the main tourism hub, having the highest proportion of tourism operators and accommodation facilities due to its unique location (where the lake meets the ocean). The LM Strategic Plan identifies this area as being a focus for future tourism investment for the region.

The Lake Macquarie Economic Study (LMCC, 2018) states that the Lake Macquarie area, although containing a large number of natural assets important for tourism, is lacking in iconic man-made attractions which are found elsewhere in the hinterland or the major cities (i.e. no high profile wineries, resorts, convention facilities, or cultural institutions), and this may be an area that requires investment for future tourism. Sports tourism was also identified as a key growth industry. As surfing, swimming, yachting and football are all popular activities, some of which are supported by high quality facilities (such as the Hunter Sports Centre and the Regional Football Facility), this should be considered as a key area of growth, according to the study.

7.9 HEALTH AND VULNERABILITY

The following discussion provides a summary of key indicators of health and wellbeing in the LM LGA based on information available through ABS, the NSW Bureau of Crime Statistics and Research (BOCSAR), and the Australian Curriculum Assessment and Reporting Authority (ACARA).

7.9.1 Community Strength

Table 29 presents rates of volunteerism within the LM LGA and NSW. Volunteerism is one measure of wellbeing and resilience in a community. The LM LGA has a similar volunteering rate to that of NSW. Feedback received during SIA consultation with Awaba residents suggests a strong sense of community identity and ownership.

Table 29
Volunteerism, 2016

Location	People aged 15 years and over who participate in voluntary work	Population aged 15 years and over	% Volunteers
Lake Macquarie LGA	28,981	161,262	17.97
NSW	1,103,790	6,093,895	18.11

Source: ABS (2016a)

7.9.2 Crime and Community Safety

Selected crime statistics compiled by BOCSAR (NSW Bureau of Crime Statistics and Research, 2019) for the LM LGA for the period October 2017 to September 2019 were reviewed to inform the social baseline. The findings of the review indicate that for the reporting period:

- *Malicious damage to property* was the most reported crime amongst the categories reported in BOCSAR, however, the number of incidents has decreased between 2017 and 2019 by 20%;
- The rate of *other offences against the person* increased by 40%;
- The rate of *possession and/or use of other drugs* increased by 98%; and
- The rates of *trespass, abduction and kidnapping, indecent assault, and murder* are increasing.

No issues related to crime and community safety were raised during SIA consultation.

7.9.3 Cultural and Ethnic Composition

Table 30 shows the proportion of persons born overseas as well as the proportion of people who speak a language other than English, for the local and regional areas of influence. These indicators are measures of community vulnerability. Both indicators are significantly lower in all areas of influence when compared to NSW, indicating a lower level of cultural diversity than the State.

Table 30
Cultural and Ethnic Indicators, 2016

Geographical Location	People Born Overseas (%)	Language Other Than English (%)
Awaba SSC	7.5	3.2
Fassifern SSC	9.7	3.2
Wakefield SSC	4.9	0
Lake Macquarie LGA	10.0	4.4
Newcastle-Maitland SUA	10.4	5.9
NSW	27.7	25.2

Source: ABS (2017a)

7.9.4 Disability

Table 31 presents the proportion of people with a disability (those that need assistance) in the local and regional areas of influence. This indicator is an additional measure of community vulnerability. The data shows that, in all areas of interest, there are a higher proportion of people in need of assistance when compared with NSW, with the largest proportion shown in Awaba (7%). This may be partly due the older population residing in the LM LGA when compared to NSW (42 and 38, respectively) (REMPAN, 2018). It is also likely that the LM LGA provides an attractive lifestyle to those with a disability, given that there are a number of facilities for health care and social assistance in the region.

Table 31
Disability, 2016

Geographical Location	Disability (Need for Assistance) (%)
Awaba SSC	7.0
Fassifern SSC	6.3
Wakefield SSC	5.6
Lake Macquarie LGA	6.6
Newcastle-Maitland SUA	6.4
NSW	5.4

Source: ABS (2017a)

7.9.5 Disadvantage

Index of Relative Socio-Economic Advantage and Disadvantage

The ABS's Socio-Economic Indices for Areas (SEIFA) are composite indices of factors affecting socio-economic advantage and disadvantage, measured against an Australian benchmark index of 1,000. Factors within the Index of Relative Socio-Economic Advantage and Disadvantage such as unemployment, low income, educational attainment, overcrowded

living arrangements, rate of disability among people under the age of 70 and poor proficiency in English, affect access to information and health care.

Table 32 details the SEIFA scores for the local and regional areas of influence. A review of SEIFA scores indicates that:

- All areas, with the exception of Wakefield, in the local and regional areas of influence experienced relative disadvantage, albeit very low; and
- Wakefield experienced the least disadvantage, with a score above that of the Australian benchmark – indicating relative advantage. This is also reflected in the income indicators of this suburb (see Section 7.9.6).

Table 32
SEIFA Ratings, 2016 – IRSAD¹

Census Geographic Area	SEIFA Rating
Awaba SSC	948
Fassifern SSC	939
Wakefield SSC	1044
Lake Macquarie LGA	979

Source: ABS (2018)

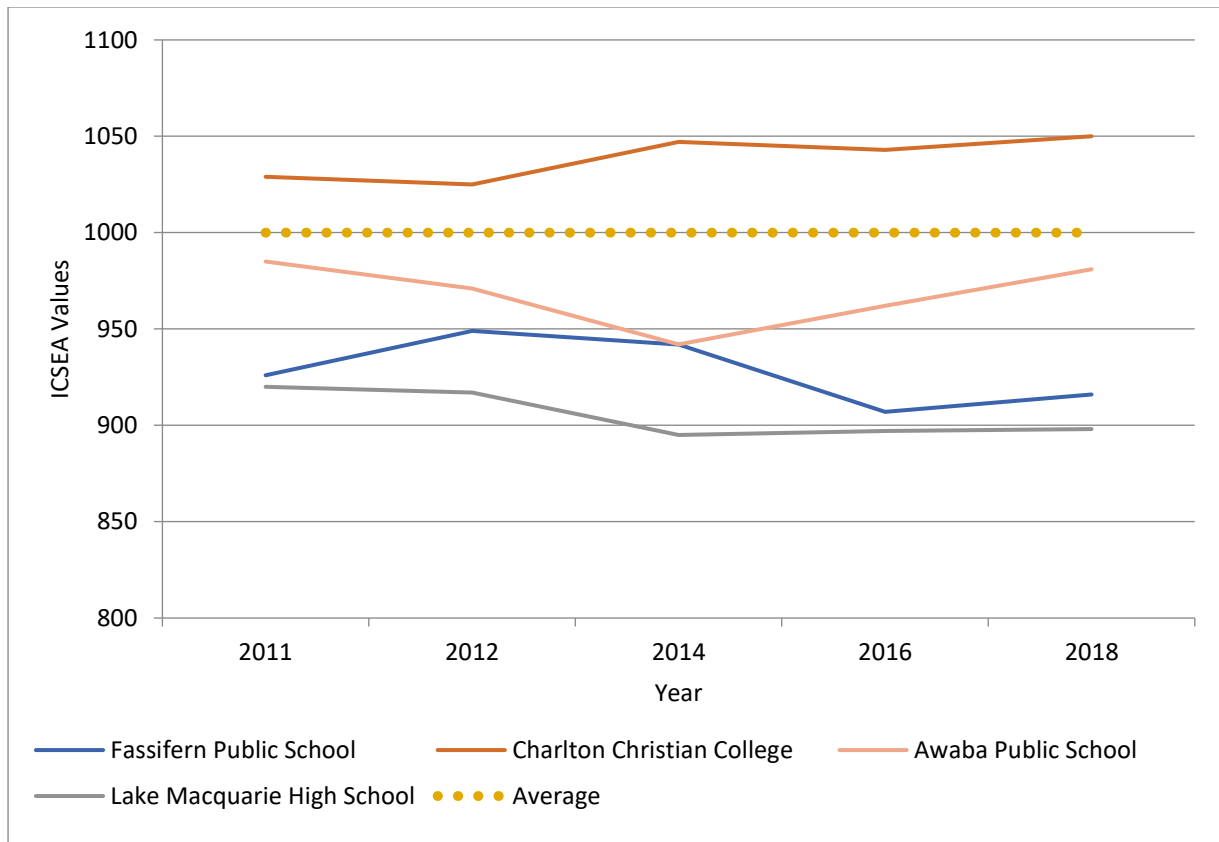
Note 1: IRSAD is defined by the ABS as the Index of Relative Socio-Economic Advantage and Disadvantage.

Index of Community Socio-Educational Advantage

Graph 9 presents the Index of Community Socio-Educational Advantage (ICSEA) for a number of schools located nearby to the PAA for the years 2011-2018. These schools are also shown on Figure 6. The ICSEA value provides an indication of the socio-educational backgrounds of students. The lower the ICSEA value, the lower the level of educational advantage of students who go to the school. ICSEA is set at an average of 1,000. The figure of 1,000 is used as an ICSEA benchmark.

Graph 9 shows that students at Fassifern Public School, Awaba Public School and Lake Macquarie High School have a lower level of educational advantage than the average, consistent with the 2016 SEIFA findings for the LM LGA. Students at Charlton Christian College have a slightly higher level of educational advantage than the average. The ICSEA score for Charlton Christian College has slowly increased since 2011.

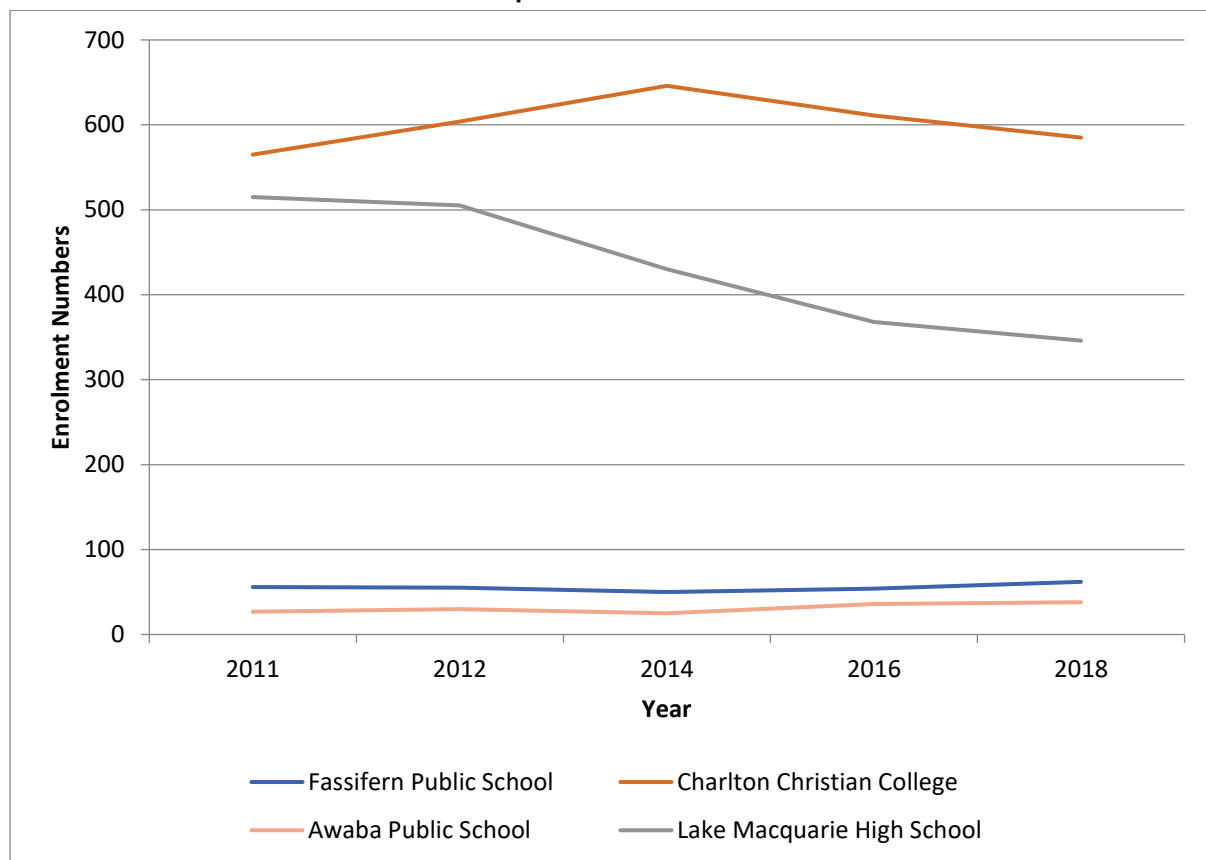
Graph 9
Lake Macquarie Schools ICSEA Values



Source: ACARA (2019)

Graph 10 shows the number of enrolments for schools located nearby to the PAA. This data indicates that Fassifern Public School and Awaba Public School have a very small number of enrolments, consistent with the more rural location in which these suburbs are based (Figure 6). Enrolments for both Charlton Christian College and Lake Macquarie High School have declined in recent years. Lake Macquarie High School enrolments have reduced from 515 to 346 since 2011. Such declines place pressure on schools to adequately resource school facilities (i.e. as student and staff numbers decline, so too does the number of programs and subjects).

Graph 10
Lake Macquarie School Enrolments



Source: ACARA (2019)

Wakefield School is also located nearby to the PAA (Figure 6). This school was established in 2002 and provides a small number of enrolments for students in years 5-8 that display emotional and behavioural issues in normal school settings. Enrolments at this school has slowly increased between 2011 (24 students) and 2018 (31 students). Due to low enrolments, ICSEA values have not been recorded for this school until 2018.

7.9.6 Weekly Family Income

Table 33 provides the 2016 census median weekly income of families located within the local and regional areas of influence, as well as NSW. Both Awaba and Wakefield SSCs have median weekly family income levels higher than the LM LGA, NM SUA and NSW. The LM LGA has a median weekly family income of \$1,610, which is \$170 below the NSW value. This may be due to the types of occupations and industries residents are employed in, as well as the ageing population (i.e. a larger number of retirees) (REMPLAN, 2019). Within the local social area of influence, Wakefield has the highest median weekly family income (\$1,968), consistent with the high SEIFA rating for this suburb (see Section 7.9.5).

Table 33
Median Weekly Family Income, 2016

Geographic Area	Median Weekly Family Income (\$)
Awaba SSC	1,800
Fassifern SSC	1,489
Wakefield SSC	1,968
Lake Macquarie LGA	1,610
Newcastle-Maitland SUA	1,641
NSW	1,780

Source: ABS (2017a)

7.10 SOCIAL INFRASTRUCTURE ACCESSIBILITY

A small range of services and facilities are available in the local social area of influence (Awaba, Fassifern and Wakefield). The range of services and facilities reflects the rural setting - in the case of Awaba and Wakefield, and proximity to the larger commercial centre of Toronto. Residents of these suburbs are able to access a diverse range of services and facilities within the greater LM LGA and Newcastle LGA. A summary of the key services and facilities within the LM LGA is presented below.

7.10.1 Health Services

The LM LGA is located within the Hunter New England Local Health District. John Hunter Hospital is the main referral hospital for the LGA, providing over 500 beds and a large number of services, including an emergency department. However, there are also a number of other hospitals and health service facilities in the LM LGA, including:

- Belmont Hospital;
- Lake Macquarie Private Hospital;
- Warners Bay Private Hospital;
- Charlestown Private Hospital/Hunter Eye Hospital; and
- Toronto Private Hospital.

The area is supplemented with a number of General Practitioner practices and also contains a significant number of aged care services and retirement villages, which provide services to the ageing LM LGA population.

7.10.2 Emergency Services

There are a large number of emergency services operating in the LM LGA. These include:

- Ambulance Services - the Metropolitan Central Coast Zone and Regional Hunter Zone 1 districts;
- Police Services – the Lake Macquarie Police District, with stations in Toronto, Belmont, Morisset, and Charlestown; and
- Fire Services:
 - NSW Fire and Rescue, with stations at Teralba, Toronto, Wangi Wangi, Belmont, Cardiff, Charlestown, Swansea, Morisset and Tingira.
 - Central Coast District NSW Rural Fire Service, with stations at Wyee, Dora Creek, Cooranbong, Martinsville, Wakefield, Mulbring, and Cameron Park.

7.10.3 Community Services and Organisations

Although no community services and organisations are located within the local social area of influence, there are a large number of facilities that can be accessed throughout the greater LM LGA area, offering assistance ranging from youth and family services, aged care and retirement villages, PCYCs, disability support, health care, and homeless services. Community service centres within the LM LGA in close proximity to the PAA include:

- Cooranbong Community Services Centre in Cooranbong – provides financial support, food and petrol vouchers, and furniture and households goods to low income residents;
- Lifeboat Community Services facility in Cooranbong – supports families in crisis;
- Meals on Wheels (Morisset) – delivers at-cost meals to frail aged and disabled persons;
- Community Activities Lake Macquarie – offers family support and youth services; and
- Southlake Community Service facility in Morisset – offers support services, volunteering opportunities, support groups, and activities within the south Lake Macquarie area.

7.10.4 Children's Services

There are a number of children's services in the LM LGA that provide child care, after school care and preschool services. Data available from CareforKids and accessed 20 September 2019 indicated that there were:

- Eight child care services available in the Awaba/Fassifern area (postcode 2283);
- Two child care services available in the Wakefield area (postcode 2278); and
- Five child care services available in the Mandalong/Morisset/Eraring area (postcode 2264).

At the time of writing, 13 of the 15 child care services had vacancies.

7.10.5 Education Services

The LM LGA is well serviced with a number of public and private schools. These include:

- Within the local social area of influence (Figure 6):
 - Fassifern Public School;
 - Charlton Christian College;
 - Awaba Public School;
- In the nearby communities of interest:
 - Blackalls Park Public School;
 - Rathmines Public School;
 - Dora Creek Public School;
 - Wakefield School;
 - Lake Macquarie High School;
 - Biraban Public School;
 - Toronto Adventist Primary School;
 - Toronto High School; and
 - Toronto Public School.

There are also a number of tertiary education institutions in the LM LGA, which include Avondale College (a private provider offering undergraduate, postgraduate and vocational courses in Cooranbong) and TAFE NSW campuses at Glendale and Belmont. The University of Newcastle is also located just outside the LM LGA, within the Newcastle LGA, and is a large and well ranked university, enrolling almost 40,000 students each year.

7.10.6 Recreation Services and Facilities

Within the LM LGA there are a large number of sporting facilities, including the Hunter Sports Centre located in Glendale (which provides Olympic-standard facilities) and the Lake Macquarie Regional Football Facility located in Speers Point. Leisure centres in the LM LGA include the Toronto and Speers Point Swim Centres. The LM LGA also includes a large number of sailing clubs.

Art and cultural centres include the Lake Macquarie City Art Gallery located on the foreshore at Booragul, the Lake Mac Centre of Performing Arts, located in Warners Bay, and SEEN@Swansea; a local exhibition centre that explores the history of Lake Macquarie, located in Swansea.

The LM LGA also includes a large number of significant natural/built parkland areas for recreation, including the popular Speers Point Park as well as the Pelican Foreshore Reserve, Rathmines Park, Dora Creek Park, and Wyee Point. Events in the LM LGA are typically held at the Morisset Showground.

The LM LGA is used for various recreational activities, including swimming, surfing, yachting, boating, kayaking, camping, hiking, mountain biking, and motorsports.

Within the local social area of influence, recreation services and facilities are shown on Figure 6 and include:

- Awabawac Park, an automobile club providing a range of courses for over 200 members, located in Awaba in close proximity to the EMA;
- Newcastle Lake Macquarie Clay Target Club located in Awaba;
- The Awaba State Forest, which is occasionally utilised for bushwalking, located within the PAA and to the north of the EMA. This state forest forms part of the greater Sugarloaf State Conservation Area, which is also popular for bushwalking and mountain biking; and
- A number of ovals and small park facilities including Fassifern Oval, located in close proximity to the NCSS, which provides facilities for local archery groups, and Robert 'Duchy' Holland Oval, located in Awaba.

7.10.7 Commercial and Retail Hubs

The LM LGA has a number of town centres for retail and commerce, the majority of which are in suburbs with direct foreshore access to Lake Macquarie. The main commercial centre of the LM LGA is located in Charlestown, north of Lake Macquarie (Figure 1). The suburb is home to the region's largest major regional shopping centre: Charlestown Square, as well as a large number of commercial and mixed-use developments (Dantia, n.d).

7.10.8 Transport

The LM LGA is located on the Main Northern Railway line which provides multiple train services from Sydney to Newcastle daily. This railway line passes directly through the suburbs of Awaba and Fassifern, in the local social area of influence, both of which are serviced by train stations (Figure 6).

Other transport is provided to and from, as well as within the LM LGA via the Hunter Valley Bus Services. Awaba and Fassifern include a number of bus stops and stations; however, Wakefield is not serviced, perhaps due to its small size. Hunter Valley Buses provide a range

of school bus services connecting communities within the LM LGA with local schools, and also schools located outside of the LGA (i.e. Newcastle and Maitland).

There is also a local taxi service – Newcastle Taxi. There are no Lake Macquarie ferry services.

8 SOCIAL IMPACT ASSESSMENT

This section describes the predicted material social impacts and opportunities of the project, and evaluates the significance of each impact and opportunity.

8.1 OVERVIEW

Social impacts have been identified and assessed for the project social area of influence (local and regional). The social impacts presented in the following sections reflect the outcomes of the scoping assessment (Appendix D).

The impact assessment shows that the majority of potential social impacts accrue to landholders in proximity to the ACSS and to people who value the environmental assets of the LM LGA. The potential opportunities of the project accrue to the nearby areas of interest and the broader LM LGA and relate principally to employment opportunities and economic stimulus.

8.2 SCOPE OF IMPACT ASSESSMENT

The impact assessment considers the potential social impacts associated with the direct project related activities (as discussed in the scoping assessment [Appendix D]). The impacts and opportunities presented in the following sections reflect the outcomes of the Scoping Phase (Appendix D). During SIA consultation a number of stakeholders expressed concern in relation to potential changes in residential amenity and impacts to valued environmental attributes as a result of project induced changes at the NCLP e.g. increased coal production rate, potential increase in the number of train movements, increased traffic volumes on the local road network and increased discharge into LT Creek. The project will not result in any changes at the NCLP that have not already been modelled and approved under the existing development consent for the NCLP (SSD-5145). Any impacts associated with changes to current operations approved under SSD-5145 are therefore not considered in the following discussion.

8.3 RESIDENTIAL AMENITY

This section considers the impact of the project on residential amenity.

The expansion of mining activity in close proximity to townships and residential properties across NSW has contributed to a range of social impacts, including a reduction in residential and rural amenity. The more common drivers of amenity change due to mining activities include noise and dust emissions and changing visual character. Despite the presence of some of these drivers in mining operations in the LM LGA and western Lake Macquarie, mining in the LM LGA remains a dominant industry. Further, the findings of SIA consultation

suggest that mining continues to co-exist relatively successfully with nearby residential communities. This is most evident around Awaba and Fassifern where mining has existed since the 1840s (Section 7.3.2). This evidence of coexistence can be attributed to the integration of mining and mining related activity in the area, the presence of underground mining operations rather than open-cut operations, the economic contribution of mining (i.e. employment and procurement), and the geographical location of a number of the mines (i.e. largely concealed by densely vegetated areas in the case of Awaba Colliery and Newstan Colliery). During SIA consultation, a number of stakeholders acknowledged the history, prevalence and importance of mining in the area.

The project is located within the existing boundary of Newstan Colliery. The project has the potential to adversely impact the residential amenity of residents proximate to the EMA and ACSS. Potential amenity impacts are associated with:

- Construction and operations phase activities at the ACSS; and
- Transport of materials, equipment and workers to the ACSS during the construction phase.

Decommissioning of the ventilation fans at the NCSS also has the potential to contribute to changes in residential amenity of neighbours proximate to the NCSS.

The findings of SIA consultation indicate that residents of Awaba anticipate some level of tangible and adverse changes to their existing amenity; specifically, acoustic amenity, air quality and visual amenity as a result of the project.

The following sections describe the magnitude and extent of predicted impacts to residential amenity based on the findings of the EIS technical studies for noise, traffic, air quality and visual.

8.3.1 Acoustic Amenity

The findings of SIA consultation indicate that residents of Awaba expect to experience a change in their current noise levels due to the project, regardless of other contributory noise sources i.e. Main Northern Railway line. Some residents expressed concern that a change in noise levels would change the rural atmosphere of the area and interrupt way of life i.e. sitting outside on their deck, or act as an annoyance. Several Awaba residents noted that the sinking of the existing Newstan ventilation shaft at the ACSS (July 2012 – September 2013) was audible and detracted from the “*peace and quiet*” (pers. comm) of the surrounds. Potential noise issues associated with the movement of construction materials by road to the ACSS were not raised during SIA consultation, and increased project related traffic on Wilton Road was of low concern to Awaba residents proximate to the ACSS.

Background noise monitoring conducted for the project identifies the noise environment at existing residential receivers in proximity to the ACSS as 'rural-residential'. As described in the Noise and Vibration Impact Assessment, the acoustic environment is dominated by "*natural sounds such as bird noise, wind in trees and dogs barking with local and distant road traffic as well as occasional rail noise*" (pers. comm, 2019).

The Noise and Vibration Impact Assessment notes that the nearest sensitive receptors to the ACSS are located in Awaba village. The Noise and Vibration Impact Assessment conducted a review of noise compliance monitoring reports undertaken from 2013-2014 to gain an understanding of noise emissions from ACSS prior to the closure of Awaba Colliery. These monitoring results demonstrated that noise emission levels at the ACSS were in compliance with relevant noise limits described in the Awaba Colliery Development Consent (Project Approval [PA] 10_0038) and Environmental Protection Licence (EPL) 443.

Predicted Construction Phase Impacts

The majority of construction activities for the project would occur at the ACSS. Minor construction activities (ventilation fan decommissioning) are proposed at the NCSS. The majority of construction related traffic will be to and from the ACSS. The ACSS and the NCSS are relatively remote from sensitive receptors.

Construction will be carried out between the hours of 7 am to 6 pm, Monday to Friday, and 8 am to 1 pm on Saturday. No construction work will occur on Sundays or public holidays. Construction-generated light vehicles will be in the order of 50 light vehicles, representing 100 light vehicle movements following the traffic distribution route described in the Traffic Impact Assessment (EMM, 2019a).

The findings of the Noise and Vibration Impact Assessment indicate that noise levels for construction activities at the ACSS are predicted to comply with the relevant noise criteria (referred to as 'noise management levels' in accordance with the NSW Environment Protection Agency's *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009)) at all receivers. Awaba township will experience an increase in noise levels between 1 decibel and 3 decibels. Despite the acceptable change in noise levels, residents may experience a change in their current background acoustic environment. It should be noted that the Awaba residents, particularly those residing in proximity to the Main Northern Railway line, already experience regular and short-term periods of noise from passenger and coal train movements on the Main Northern Railway line. Construction activities will be in accordance with NSW Environment Protection Agency's *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009). There is some potential that elevated noise levels during construction may be annoying for some Awaba residents, particularly if noise emissions from the site result in sleep disturbance (noting that construction activity is not proposed at night time) i.e. shift workers.

Construction related traffic will primarily be to and from the ACSS along Wilton Road via either Wangi Road, Cessnock Road or Awaba Road. The nearest potentially affected residential locations on Wilton Road are situated approximately 15 m from the road kerb/edge (EMM, 2019c) in the village of Awaba. Road traffic noise level predictions demonstrate a 0.1 decibel increase at the nearest potentially affected residence for night-time construction traffic (i.e. early morning arrivals between 6 am and 7 am) (EMM, 2019c). It is unlikely that this temporary (11 months) change in night time noise levels will be audible to nearby residents.

The findings of the Noise and Vibration Impact Assessment indicate no predicted increase in daytime traffic noise levels during the construction phase. Predictions also demonstrate that existing traffic noise levels on Wilton Road are already above NSW *Road Noise Policy* criteria for both daytime and night-time periods. This is likely due to a combination of the range of land uses located along the road and residential traffic from Awaba.

Predicted Operations Phase Impacts

Noise impacts associated with the operations phase will be considerably different to the construction phase. Potential noise generating operational activities relevant to this assessment include:

- Ventilation fan operation at the ACSS;
- Operation of the gas flaring facility at the ACSS; and
- Use of the man and materials drift at the ACSS.

Operation phase traffic movements at the ACSS are negligible as less than 10 personnel will be employed at the site during operations. It is therefore considered unlikely that residential amenity impacts will result from operational road traffic and any impacts are anticipated to be negligible.

Any change in acoustic amenity due to operations phase activities is likely to be experienced by Awaba residents, as the nearest sensitive receptors to the ACSS. The potential social impacts of any adverse change in the acoustic amenity of Awaba include disruption to the use and enjoyment of private property and sleep disturbance. These impacts are considered below.

Sleep disturbance was assessed as part of the Noise and Vibration Impact Assessment. The findings of the Noise and Vibration Impact Assessment indicate that predicted sleep disturbance noise levels from project operations are significantly below the noise criteria, thus sleep disturbance impacts from the project are unlikely to occur (EMM, 2019c).

The findings of the Noise and Vibration Impact Assessment indicate that operational noise emissions are predicted to satisfy the project noise trigger levels at all assessment locations. Further, the operational noise emissions are predicted to comply with the current noise limits

as per PA 10_0038. Given the predicted operational noise levels, there is no requirement to consider the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP) (NSW Government, 2018d) or additional noise mitigation measures.

Mitigation and Management

Noise emissions from the project will continue to be managed in accordance with the existing *Noise Management Plan - Northern Region June 2017* (Centennial Coal, 2017b). The Noise Management Plan will outline mitigation strategies. The Noise and Vibration Impact Assessment recommends that Centennial update the Noise Management Plan for Newstan Colliery if the project is approved (EMM, 2019c). Centennial will engage with Awaba residents prior to the commencement of construction to advise of the construction schedule at Awaba, construction hours, and the Centennial complaints and grievances process.

Centennial will also undertake noise monitoring at the ACSS when it becomes operational to validate predicted operational noise levels i.e. on-site and off-site noise emissions.

8.3.2 Air Quality

Predicted Construction and Operations Phase Impacts

The majority of the project activities (construction and operations) are proposed to occur in the vicinity of ACSS. Some intermittent project activities (construction and operation) are also proposed to occur in the vicinity of the NCSS. These intermittent activities include the continued operation of the existing mine ventilation fans currently approved under DA 73-11-98.

The two existing ventilation fans at the NCSS will be utilised during development of the first workings. During this development phase, the new fans will be installed at the existing ventilation shaft at the ACSS. Once these new fans at the ACSS become operational, the existing fans at the NCSS will be decommissioned.

With regards to the NCSS, the Air Quality Impact Assessment and Greenhouse Gas Assessment prepared for the NCLP (SSD-5145) by SLR Consulting Pty Ltd (SLR) in April 2014 concluded that the contribution of emissions from the Newstan Colliery ventilation fans to the total predicted incremental impacts, at the receptors around NCSS was less than 0.4%. The activities around the NCSS are only transitory in nature, and due to the large separation distance to sensitive receptors (refer SLR, 2019) and the minimal contribution of ventilation fans to total emissions, are unlikely to have any impact on nearby sensitive receptors.

The SIA therefore only considers the potential for project activities (construction and operations) at the ACSS to impact air quality and the implications of the change in air quality for residential amenity in Awaba.

During SIA consultation, a number of Awaba residents discussed their previous experience with historic mining operations in the area, noting historic coal haulage activities proximate to Awaba and the current coal haulage on the railway line through Awaba. These residents spoke about dust generated by previous coal haulage operations and the adverse impacts on residential amenity. The project will not generate as much dust as the previous coal haulage operations through Awaba. Residents acknowledged that the project does not involve coal being brought to the surface and stockpiled at ACSS, neither does it involve the haulage of coal proximate to residential areas and therefore impacts are unlikely to result in amenity impacts. Awaba residents did not raise any direct concerns in relation to the project and potential dust impacts.

With respect to residential amenity, the majority of Awaba residents interviewed for the SIA were most concerned about the existing impact of the Awaba Waste Management Facility on residential amenity. Awaba Waste Management Facility is located approximately 1.5 km east of the ACSS. The main air quality pollutant anticipated from the Awaba Waste Management Facility is odour and dust emissions from unloading and handling of waste materials (SLR, 2019). During SIA consultation Awaba residents cited frequent odour and air quality issues and attributed these issues to the community's proximity to the Awaba Waste Management Facility. The majority of Awaba residents consulted for the SIA expressed the opinion that any potential air quality and odour changes associated with the project would likely go unnoticed i.e. the amenity change created by the Awaba Waste Management Facility is perceived to be far greater than any potential air quality impacts resulting from the project.

The findings of the Air Quality Impact Assessment indicate that the construction and operation of the project is unlikely to result in any additional exceedances of the air quality criteria at the nearest sensitive receptors. The Air Quality Impact Assessment confirms that there is no requirement for the implementation of actions in accordance with the provisions of the VLAMP (SLR, 2019).

Air quality modelling indicates that the project's production of particulates (which contribute to dust) would be within air quality goals relevant to health and amenity, with the exception of particulate matter less than 10 micrometres in aerodynamic diameter (PM₁₀). The Air Quality Impact Assessment and Greenhouse Gas Assessment states that "the maximum 24-hour average cumulative PM₁₀ concentrations are predicted to exceed the criterion of 50 µg/m³ at all identified sensitive receptor locations [during both construction and operations phases of the project], however this is entirely due to the maximum background concentration of 136.5 µg/m³ recorded at Wallsend in November 2018 due to a dust storm" (SLR, 2019).

Mitigation and Management

Given the outcomes of the Air Quality Impact Assessment and the low level of concern expressed by proximate residents in relation to potential project dust emissions, no tailored social management measures are proposed beyond those related to communications and consultation.

A range of procedures and requirements are documented in the Air Quality Impact Assessment to minimise the impact of dust generated during both construction and operations. Centennial would implement these standard construction and operations management procedures and consult with proximate neighbours (Awaba, Fassifern and Wakefield) during construction activities to minimise potential dust impacts. Centennial will also continue to communicate with residents, particularly Awaba residents, about the measures currently undertaken at the NCLP and NCSS, and those proposed to be undertaken at the ACSS to control dust.

8.3.3 Visual Amenity

The ACSS is located in a valley, surrounded by dense vegetation – only the entrance gates and the administration buildings to the Awaba Colliery are visible to vehicles travelling along Wilton Road. During SIA consultation with Awaba residents, many residents noted that the Awaba Colliery does not detract from the bushland surroundings. A low level of concern was expressed by proximate neighbours and other stakeholders in relation to the potential visual impacts of the project.

Predicted Construction Phase Impacts

The Visual Impact Assessment assessed the potential visual impact of the project from a number of viewpoints including the Awaba Station, Awaba Oval, Awaba Waste Management Facility and the Nellinda Street Water Tower. The findings of the Visual Impact Assessment indicate that the project will have a negligible overall impact on surrounding residential amenity. According to the Visual Impact Assessment the additional project infrastructure at the ACSS would not be out of character for the surrounding landscape (GHD, 2019c) (refer to the Visual Impact Assessment for example images).

Mitigation and Management

Where practicable, Centennial will position surface infrastructure in locations where visual screening can be provided by the topography or existing vegetation. Building heights will also be limited to minimise visual impacts. This project is visually in keeping with the existing visual characteristics of the site.

8.4 ENVIRONMENTAL VALUES

This section describes the potential for changes to the local environment due to subsidence and related impacts e.g. sinkholes, loss of biodiversity, and groundwater and surface water changes which could affect community held environmental values.

Environmental attributes both within the local and regional area (i.e. LM LGA) are integral to community values. LMCC describe the natural assets of the LGA as ‘defining features’ of the landscape (LMCC, 2019c). These assets mostly relate to the rural setting of the LGA and

Lake Macquarie. The lake underpins “*the City’s identity, and its health is critical to [the] lifestyle and the future of [LM LGAs] economy*” (LMCC, 2019c).

One of the key findings of the SIA consultation with local residents is the value placed on the environmental attributes of their surroundings i.e. bushland, wildlife, presence of creek systems. Stakeholders acknowledged these attributes as a reason why they chose to live where they live and how greatly these attributes contribute to the quality of both their surroundings and way of life i.e. bushwalking, swimming. Benefits derived from the natural environment include enrichment, recreation and aesthetic experience. These benefits primarily related to the presence and diversity of fauna which are in turn attributed to the presence of water and natural vegetation communities.

During SIA consultation, several Awaba residents said that they value their surroundings, primarily the bushland, as it is an integral part of the residential area. Residents and representatives of the broader local community expressed concerns that the project would adversely impact the surrounding bushland and creek systems, as well as Lake Macquarie. A few residents in Awaba anticipate that project induced changes i.e. impacts of land disturbance, loss of vegetation, and change in systems, to the natural environment within the EMA, will degrade the cultural services they derive from the surrounding ecosystem.

The findings of consultation show some stakeholder concern in relation to the environmental impacts of subsidence. Several Awaba residents spoke about the effects of subsidence from previous mining activities in the local area, on the creek systems and biodiversity of the local area. These stakeholders expressed concern that the project would result in further subsidence which may in turn lead to adverse changes in valued environment assets e.g. biodiversity along Stony Creek. These stakeholders spoke about the emergence of sinkholes from historic mining activities and expressed concern in relation to the impacts of sinkholes on the natural environment.

A number of stakeholders expressed concern regarding the potential impacts of subsidence on water quantity and quality in the creek systems overlying the EMA and in adjoining areas. These concerns relate primarily to the potential for subsidence to change creek system hydrology and over time biodiversity along the creek systems. A few Awaba residents cited concerns that any adverse changes in the biodiversity value of Stony Creek and the broader EMA may detract from their enjoyment of the local area and reduce the intrinsic value of the local area.

A few stakeholders commented on potential changes in surface water quality due to project related discharges.

The LMCC and a number of other stakeholders expressed concern in relation to the potential impacts of subsidence on the biodiversity values of the Awaba Biodiversity Conservation Area. The Awaba Biodiversity Conservation Area is a biodiversity offset area established by the

LMCC (Section 7.4.1). The LMCC is keen to ensure that potential impacts to the biodiversity values of the Awaba Biodiversity Conservation Area are avoided and/or managed. During SIA consultation stakeholders indicated that the Awaba Biodiversity Conservation Area is not widely used or accessed for passive or active recreational purposes, which is consistent with its biodiversity status.

Stakeholders were also concerned about potential project impacts on groundwater quality and the potential for surface and groundwater connectivity. The findings of consultation indicate that several stakeholders are concerned about the potential for groundwater contamination due to seepage from the EAD and Awaba underground void to underlying water sources.

Predicted Impacts to Environmental Values

Changes in the natural environment (excluding changes in amenity) due to the project are associated primarily with the operations phase of the project, and specifically underground mining activities. A number of different EIS technical studies have assessed the potential environmental impacts of the project. The following section discusses the findings of these studies with reference to the issues raised by stakeholders during SIA consultation, and discussed above.

Impact of Subsidence on Creek Systems

There are four named streams within the EMA; Stony Creek, Stockyard Creek, Kilaben Creek and Crooked Creek. First workings only are proposed directly beneath the second order sections of Stony and Stockyard Creeks where they are located above the EMA. The partial and total extraction areas within the proposed panels have been set back from Stony, Kilaben, and Stockyard Creeks and some of their tributaries based on a 26.5° angle of draw. The secondary extraction areas within the proposed panels are therefore located at minimum distances ranging between 100 m and 150 m from these named creeks.

The Subsidence Predictions and Impact Assessment and the Surface Water Impact Assessment consider the impacts of subsidence on the creek systems overlying the EMA. Subsidence, cracking and sinkholes along riparian zones, can lead to changed waterflow conditions.

The Surface Water Impact Assessment indicates that:

- Changes to the alignment and longitudinal profiles of watercourses are expected to be minor and generally comparable to existing conditions;
- There will be no measurable impact to remnant ponding;
- Any minor changes in catchment areas will result in no measurable impact to stream flows; and
- The project will not result in any increase in the potential for bedrock fracturing in streambeds or sinkholes to develop compared to existing conditions (GHD, 2019a).

The mine extraction plan (use of a combination of first workings, partial and full extraction) will significantly reduce the magnitude of subsidence impacts likely in Stony Creek and Stockyard Creek.

The Surface Water Impact Assessment identified six third-order or above water courses within the vicinity of the project, four of which are located above the proposed panels to be extracted. Sinkholes have previously developed along some streams that are located above the existing Awaba Colliery underground workings where depths of cover were less than 30 m (GHD, 2019a). First workings only are proposed beneath the second order sections of Stony Creek and Stockyard Creek where they are located above the mining area.

Impacts on Surface Water Quality

The ACSS is located in the catchment of the middle to upper reaches of Stony Creek, which contributes to Lake Macquarie. The water management system at the ACSS is described in the Surface Water Impact Assessment. Surface water impacts associated with catchment and drainage modifications from construction of infrastructure at the ACSS are mitigated as surface infrastructure for the project is located within pre-existing disturbed areas at the ACSS and are generally managed in accordance with the existing water management system.

Operations phase surface water discharges are discussed in the Surface Water Impact Assessment. The findings of the Surface Water Impact Assessment indicate that project operations will result in:

- Increased volume and frequency of discharge via Newstan LDP001 and Awaba LDP009.
- Discharges via Newstan LDP001 will continue to meet the water quality requirements of EPL 395.
- Discharges via Newstan LDP017 will occur in response to heavy rainfall, and as such will result in temporary impacts to water quality in the receiving environment of Stony Creek.
- Similar exceedances of the water quality default guideline values to those observed under existing conditions are expected (GHD, 2019a).

Impacts on Groundwater Quantity and Quality

The groundwater sources in the vicinity of the PAA, which includes the EMA, include the Quaternary alluvium and the weathered and/or fractured sandstone and coal seams. They are classified as 'less productive' in accordance with the criteria specified in the *NSW Aquifer Interference Policy*.

Based on the existing groundwater monitoring program, there is no evidence of impact from existing mining activities at Newstan on alluvial groundwater (or groundwater dependent ecosystems). Groundwater inflows from the porous and fractured rock groundwater source to

the existing West Borehole seam workings are relatively low (in the order of 1 ML/day) and there is no evidence of direct hydraulic connection between the existing West Borehole seam workings and the Awaba underground void. Groundwater quality monitoring has been undertaken at Newstan since 2005. Monitoring data does not show impacts on groundwater quality or beneficial use of groundwater due to mining over this period.

Groundwater flow modelling undertaken to inform the EIS assessed the change in flow from the EAD to underlying groundwater and from Awaba underground void to underlying groundwater as a result of the EMA.

The management of groundwater at Newstan Colliery is described in detail in the Groundwater Modelling Report and Groundwater Impact Assessment. In summary, the underground water management features at Newstan Colliery are the Fassifern Underground Storage and the underground workings in the West Borehole seam. The Fassifern Underground Storage is the void formed by previous mining activity in the Fassifern and Great Northern seams at Newstan Colliery and is used to manage water between Newstan Colliery and the NCSS. The Fassifern Underground Storage receives inflows as a result of infiltration from the surface catchment, groundwater inflows into active mining areas and injection transfers from the NCSS. Water levels within the storage are managed by extraction transfers to the Clean Water Plant, which commenced operation at the NCSS in late 2013. The Clean Water Plant employs coagulation, flocculation, sedimentation, filtration and ultra-violet treatment to reduce the concentrations of Total Suspended Solids (TSS) and total (unfiltered) metals.

During periods of above average rainfall when water within the Fassifern Underground Storage rises above 16.6 m below ground level (6.4 m AHD), the storage discharges water by gravity through two 600 mm diameter pipes into Stony Creek via Newstan LDP017. A water monitoring station at Newstan LDP017 was commissioned in 2013 to monitor emergency discharges required for the safety of personnel in the underground workings at Newstan Colliery. The water monitoring station allows for the continuous monitoring of discharge water quality. In the event of poor water quality, water may be contained within the monitoring station and treated or extracted as required in a controlled manner. Since 2013, only one discharge has occurred, which was over 39 days in May 2015 with a total volume of 1289 ML and an average discharge of 3.5 ML/day.

The predictive simulations presented in the Groundwater Modelling Report and relative to the consideration of social impacts, indicate proposed mining at Newstan Colliery will have no impact on leakage out of the Eraring Ash Dam. Additionally, the modelling results indicate the proposed mining will have no impact on the flooded Fassifern workings at Newstan Colliery.

The findings of the Groundwater Impact Assessment indicate impacts due to the proposed mine workings do not extend to the alluvium. This means there will be no impact to the alluvial water table or base flow to creek lines attributable to the proposed workings.

The findings of the Groundwater Impact Assessment also indicate there will be no impact on groundwater levels or quality in the vicinity of the Awaba Biodiversity Conservation Area.

Based on previous groundwater quality data and modelling predictions regarding leakage from EAD and Awaba Colliery underground void, it is considered that groundwater quality impacts attributable to the project will be less than the Level 1 minimal impact considerations under the NSW Aquifer Interference Policy and are therefore considered to be acceptable.

Impacts on Biodiversity

The potential impacts of the project on biodiversity values is described in the Biodiversity Development Assessment report. The Biodiversity Development Assessment identified the presence of several prescribed biodiversity values within the EMA, these values include hydrological processes that sustain and interact with the rivers, streams and wetlands. The PAA drains via Stoney Creek (1st to 3rd order), Kilaben Creek (1st to 2nd order), Stockyard Creek (1st to 3rd order), Lords Creeks (1st to 4th order) and Crooked Creek (1st to 2nd order). These tributaries ultimately drain into Lake Macquarie

The mine extraction plan and mining method i.e. Bord-and-Pillar mining design avoids and minimises impacts on biodiversity values. Direct impacts to biodiversity are avoided by limiting surface infrastructure installation to pre-disturbed areas. No removal of native vegetation is proposed as part of the project. No additional access tracks are proposed to be constructed as part of the project, however, vehicle presence and movement is likely to increase.

The findings of the Biodiversity Development Assessment indicate that the biodiversity impacts related to the project are indirect and associated with subsidence, cracking and sinkholes. The Biodiversity Development Assessment suggests that the predicted minimal surface cracking is unlikely to have a significant impact on biodiversity as most species occupying these habitats can avoid those cracks. Based on the findings of the Biodiversity Development Assessment the project is unlikely to be significant for the local and bioregional persistence of the suite of any threatened species or community likely to use project areas as habitat.

The Biodiversity Development Assessment proposes that LIDAR could be utilised to detect any potential projects impacts e.g. sinkholes, subsidence and cracking and an adaptive management approach adopted. The Biodiversity Development Assessment suggests that a Biodiversity Management Plan be prepared following development consent, should it be granted.

Mitigation and Management

Given the findings of the EIS technical studies described above, with appropriate environmental management and monitoring strategies in place, it is unlikely that the project would result in long-term and significant impacts on environmental assets valued by the surrounding community. However, community concerns and anxiety about the potential impacts of the project on environmental values within the EMA will likely continue. This can

be attributed, in part, to a lack of understanding of the strategies currently implemented by Centennial to manage its environmental performance, and the difficulties interpreting relevant technical and scientific information. Centennial is proactive in ensuring the Newstan/Awaba CCC receives regular and transparent information on the performance of the NCLP, Newstan Colliery and Awaba Colliery.

Management of Subsidence Impacts

The Subsidence Predications Impact Assessment report recommends periodic visual monitoring is carried out along Stony, Kilaben, Stockyard and Crooked Creeks during active subsidence. Further, the report recommends the development of a Watercourse Impact Monitoring and Management Plan that includes monitoring and management of streams.

Potential biodiversity impacts are proposed to be verified via a Before-After-Control-Impact (BACI) monitoring program, as well as through a Biodiversity Management Plan. Monitoring of identified threatened flora and ecological communities will be triggered following reported subsidence impacts which would be determined through LIDAR imagery. The Biodiversity Management Plan will detail the approach to implementing adaptive management. Preliminary triggers will be developed for the monitoring program outlined in the Biodiversity Management Plan with the aim of providing an early warning system prior to exceedance of performance indicators.

Sinkhole impacts will be managed through the existing Sinkhole Rehabilitation Plan for Awaba Colliery which includes revegetation actions to achieve long-term stability of the land surface. To date this plan has been progressively implemented, with successful rehabilitation of numerous sinkholes (Centennial Newstan, 2019). The Sinkhole Rehabilitation Plan will be updated should the project be approved. It is recommended that Centennial continue to invite the participation of Indigenous stakeholders in due diligence assessments of sinkholes prior to clearing.

Extraction plans will be developed and implemented for each extraction area prior to mining. Each extraction plan for the project will include a water management plan to manage potential subsidence related impacts to water resources (GHD, 2019a).

Surface Water Management

A Discharge Management Plan has been developed to outline the requirements for the control and management of mine water discharge from each of Centennial's northern operations. The Discharge Management Plan focuses primarily on the management of discharges of underground mine water from LDPs, including Newstan LDP001 and LDP017. The water management plans ensure that each operation, with respect to water, meets all relevant regulatory requirements. The regional and site-specific water management plans are reviewed every three years or as a result of any regulatory requirements, any significant changes to water management practices or the development of new mining areas.

Groundwater Monitoring

A groundwater monitoring network has been progressively established at Newstan Colliery since 2005 and consists of monitoring bores installed in alluvial and coal seam strata. The bores are generally monitored twice per year for groundwater level and groundwater quality (mainly pH and EC), although some alluvial bores also contain water level loggers. The Groundwater Modelling Report recommends additional monitoring in the vicinity of the proposed workings.

It is clear from SIA consultation that interest groups and residents in proximity to the ACSS and NCLP have an interest in the operations of Centennial and the project. The Newstan/Awaba CCC is interested in the outcomes of the EIS technical assessments, particularly those related to water and subsidence. The provision of accessible and transparent information to the broader community about the results of the technical EIS proposed management commitments and the outcomes of future monitoring activities is required. This should include:

- A return to frequent⁶ meetings (i.e. as per consent) of the Newstan/Awaba CCC should the project be approved, as a forum for Centennial to share and discuss its environmental performance;
- Provision of regular community updates to nearby communities, specifically Awaba, Fassifern and Wakefield on issues of interest such as subsidence monitoring, water quality monitoring etc. This could be achieved by advising the broader community that the minutes of the Newstan/Awaba CCC meetings are available on the Centennial website; and
- Explore opportunities to engage further with Awaba residents. Annual community open days to provide an opportunity for residents and interest groups to meet face-to-face with Centennial staff, ask questions and clarify project related technical information.

8.5 LIVELIHOOD IMPACTS

Predicted Impacts on Downstream Water Users

This section considers the potential for downstream water users and groundwater users proximate to the EMA to experience livelihood impacts as a result of the project.

Surface Water Users

Two surface water users were identified downstream of the project, both of which were downstream of the EMA. There were no surface water users identified downstream of the existing LDPs proposed to be utilised by the project.

⁶ The Newstan-Awaba CCC has generally met intermittently since Newstan Colliery was placed on care and maintenance.

According to the Surface Water Impact Assessment the EMA comprises less than 2% of the total catchment area of Jigadee Creek and therefore potential impacts on downstream water users on Jigadee Creek were considered negligible.

The project has the potential to reduce surface water flows and quality in Jigadee Creek, Kilaben Creek and Stockyard Creek, which may reduce the water available to downstream water users. However, with consideration of the proposed mining method, and the implementation of a range of proposed mitigation measures, neither additional surface water take nor a measurable decline in water quality is expected as a result of the project (GHD, 2019a).

Given the findings of the Surface Water Impact Assessment (GHD, 2019a) there is a low risk of the project adversely impacting the livelihood of existing downstream water users.

Groundwater Users

SIA consultation did not identify any concerns in relation to the potential impacts of the project on downstream groundwater users. The Groundwater Impact Assessment has identified 67 registered bores within approximately 2 km of the Newstan Colliery boundary. Of these bores, the majority (45 bores) were registered as monitoring bores or test bores. One bore was registered for waste disposal and two bores were registered for dewatering or mining purposes. The remaining bores (19 bores) were registered for a combination of stock, domestic, irrigation and farming purposes.

The findings of the Groundwater Impact Assessment indicate no known impacts on registered bores from existing mining activities at Newstan. Some groundwater drawdown in the West Borehole seam has been detected by vibrating wire piezometers. Otherwise, groundwater inflows from the porous and fractured rock groundwater source to the existing West Borehole seam workings are relatively low (in the order of 1 ML/day).

The findings of the Groundwater Modelling Report indicate incremental drawdown (drawdown due to proposed workings) at the general use bores is less than 0.1 m. Cumulative drawdown at the general use bore is 1.6 m. This cumulative drawdown is attributable to impacts from existing Newstan Colliery workings and surrounding mining such as Cooranbong workings.

Mitigation and Management

Based on the findings of the Groundwater Impact Assessment, the project is unlikely to result in discernible changes in water quantity or quality in any private groundwater bores and therefore no livelihood impacts are anticipated, and further mitigation and management is not required.

8.6 EMPLOYMENT AND ECONOMIC DEVELOPMENT

The economic impact of the project, including consideration of employment opportunities, is assessed through the Economic Impact Assessment (Aigis Group, 2020) and is consequently not replicated in full in the SIA. A summary is provided in the following sections. The Economic Impact Assessment has estimated the direct economic impacts of the project for the regional area. The region for the Economic Impact Assessment includes the LM LGA and the NM SUA, which is where the majority of workforce and project procurement will be drawn from.

8.6.1 Employment

Construction Employment Opportunities

Over the 11 month construction phase, indirect economic benefits will accrue to the LM LGA and the NM SUA. These benefits will primarily be accrued through supply arrangements with local businesses i.e. those required for construction materials/activities. It is however, acknowledged that the majority of the construction workforce will likely already reside in the LM LGA, so additional spend, income and demand on services will be unlikely.

Operations Employment Opportunities

If the project is approved, the majority of operational personnel, including the underground workforce, will be located at the NCSS. A small number of administrative and maintenance personnel (less than 10) will be located at the ACSS.

The LM LGA has a diverse industry sector and holds a significant skilled and capable workforce. Approximately 1,399 of LM LGA residents were employed in the mining industry in 2016. The mining industry is further supported by the construction, manufacturing and electricity, gas, water and waste services industries. The LM LGA is also in close proximity to the regional centres of Newcastle, Maitland and Singleton and is within driving distance to Sydney. Newcastle boasts a large number of industry workers and young families, and Singleton as part of the Hunter Region, holds a significant proportion of the States mining workforce.

The project presents an opportunity to draw back workers who currently commute outside of the LGA for mining jobs. The project also supports good livelihoods and income security, as well as training and career pathways for employees. When the project labour force resides in the LM LGA, it benefits the broader community financially, through local spend, and supports business sustainability. The creation of new jobs in the LM LGA will also provide financial stability for some families and enable them to stay settled in the LM LGA, and to continue their existing social contributions and maintain existing social connections.

Mitigation and Management

To support local employment preparation for the project would include:

- Prioritisation of employment within the LM LGA and the NM SUA;
- Advertising employment opportunities locally; and
- Seeking to provide apprenticeship and traineeship opportunities through the project, given the project life of 15 years provides continuity in employment.

8.6.2 Economic Development

Economic Benefits

The project will generate revenue at the federal, state and local level. The Economic Impact Assessment indicates that the project will contribute approximately \$80 M towards NSW Government royalties.

The Economic Impact Assessment acknowledges that the project will support the continuation of employment in mining in LM LGA for a portion of workers who already reside in the local area. Employment associated with the project will permit households to remain in the region, thus maintaining social contributions to the regional community and economy.

The LM LGA would likely benefit from a share of expenditure associated with the construction and operation of the project e.g. for construction services and supplies, scientific and technical services and food and accommodation services. During the care and maintenance of Newstan Colliery in 2017-2018, Newstan Colliery spent a total of \$16.8 M in capital and non-capital expenditure. During this period of time, Newstan Colliery employed workers on a care and maintenance basis and held local supply arrangements. Centennial has existing local supply arrangements that will likely benefit from continued expenditure due to the project. The Economic Impact Assessment indicates that approximately \$53 M per year in non-labour expenditure may be dispersed in the broader regional economy (NM SUA), with \$15 M spent in the LM LGA. The regional benefit relating to employee incomes is assessed as approximately \$15 M over the life of the project (as identified in the Economic Impact Assessment).

Local and Regional Business Opportunities

Current supply data for Centennial operations is discussed in Section 3.1.6. In 2017 the majority of Centennial Newstan total spend (capital and non-capital) was spent outside of the LM LGA. In 2018 approximately 25% of total spend was spent inside the LM LGA. An analysis of supplier origin (by postcode) for Centennial in 2018 shows suppliers are clustered principally in Sydney and Newcastle.

A number of stakeholders consulted for the SIA expected that the project would deliver a positive benefit to local business in the form of improved financial stability, opportunity to employ additional labour, and opportunity to diversify the types of service delivered.

Centennial's existing procurement processes seek to prioritise local supply. All procurement for the project will be in accordance with these processes.

8.7 ENERGY SECURITY

The project is aligned with the broader Centennial Coal business strategy in that it facilitates the development of a new semi-soft coking coal product stream and a thermal coal product for both the domestic and export markets. The project will enable supply of export coal products while meeting contractual coal supplies to the domestic markets. Over time, the project can potentially replace the coal product currently supplied to the domestic market i.e. to EPS, by other Centennial operations as these other resources become depleted. This will ensure ongoing security of supply for domestic electricity generation for NSW, specifically the Lake Macquarie region. The proximity of the Newstan Colliery to EPS permits delivery of coal to the power station by existing rail infrastructure. This is a significant advantage when compared to sourcing fuel from alternative suppliers, which would entail greater socio-economic and environmental costs in terms of alternative transport requirements.

8.8 CULTURE

This section describes the project's potential to adversely impact Aboriginal cultural values, broader community identity and connection to settlement history.

8.8.1 Impacts on Indigenous Cultural Landscape Values

The Aboriginal Cultural Heritage Assessment includes the following description of the significance of the Lake Macquarie area to the Awabakal and Guringai people:

"The Awabakal and Guringai people also have a continuing, contemporary history of trying to protect and preserve the Lake Macquarie Region. They maintain concerns over Development licences being approved in the region and the adverse impacts this has on their cultural values and landscape features and footprints of their ancestors which are being impacted through cumulative and overlapping development activity and unmonitored and unmanaged human recreational activity.

..... the mental, physical and spiritual wellbeing of the Awabakal and Guringai People and those Aboriginal Peoples that feel a connection to this landscape is a contemporary phenomenon and not just 'a thing of the past'. The Lake Macquarie Region contains a plethora of registered Aboriginal cultural heritage sites identified as having Aboriginal cultural value and significance. The sites and landscape features link contemporary Awabakal and Guringai People with generations of their ancestors and are extremely important teaching places and places of spiritual renewal" (Umwelt Environmental and Social Consultants, 2020a).

The Aboriginal Cultural Heritage Assessment describes the scope of consultation undertaken with the 15 Registered Aboriginal Parties to inform assessment. In addition to this consultation, tailored SIA consultation was undertaken with the current representatives of the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee. Committee representatives expressed concern in relation to the impact of mining on cultural landscape values within the PAA and EMA. Indigenous representatives expressed similar concerns as the broader community in relation to environmental values. Indigenous representatives expressed concern in relation to the impact of subsidence on hydrological structures and resulting adverse changes to creek systems and their associated biodiversity values (e.g. presence of wildlife). Indigenous stakeholders also expressed some concern and anxiety in relation to the corresponding reduction in traditional resources for collection.

Consultation with relevant Aboriginal parties indicates some use of land within the PAA (not specifically the EMA) for social or cultural purposes. During SIA Consultation, representatives of the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee perceived that mining activities in the PAA have reduced access for their people to different areas of the PAA, which has resulted in fewer on-country gatherings. SIA consultation with RAP representatives indicated that there was existing concern for the cumulative loss of land and artefacts resulting from local and regional changes in land use, including the continuation of mining.

Other issues of concern raised during SIA consultation with Indigenous stakeholders included the:

- Presence of sinkholes and fracturing in the PAA - attributable to subsidence; and
- Cleared vegetation associated with mining infrastructure. There is a perception that mining activities limit the resources available for collection/gathering, which in turn has resulted in a reduction in traditional activities taking place on country affected by mining.

Land disturbances from 1889 and the 1950s occurred within or in proximity of the ACSS and NCSS, and include the construction and operation of the former Awaba Colliery and Newstan Colliery, vegetation clearance, the deposition of fill and the establishment and ongoing use of access tracks, powerline easements and other infrastructure such as the railway. The portion of the EMA owned by Origin Energy includes areas of substantial disturbance associated with the EPS.

The impact of project induced subsidence on the biodiversity values of the EMA, particularly the creek systems, and the potential changes in hydrological systems has already been discussed in Section 8.4.

Mitigation and Management

Centennial Newstan will maintain engagement, as required in the Aboriginal Cultural Heritage Management Plan, with relevant Indigenous stakeholders to ensure relevant Indigenous parties:

- Are aware of the project schedule, and have ready access to information about potential environmental and cultural impacts; and
- Feedback about cultural heritage issues is considered in project planning and environmental management.

8.8.2 Aboriginal Cultural Heritage

Consultation with representatives of the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee identified concern that cultural heritage sites could be damaged as a result of subsidence within mining areas.

Impacts on Aboriginal Cultural Heritage

The findings of the Aboriginal Cultural Heritage Assessment indicate that the project will result in the potential disturbance of seven previously recorded Aboriginal cultural heritage sites and a further site located within a 300 m boundary of the EMA. These sites comprise three scarred trees and five isolated artefact/artefact scatter sites, with one site also containing shell material.

As indicated in the Subsidence Predications Impact Assessment:

“the recorded artefact scatters/isolated artefacts (with the exception of 45-7-0070) may be indirectly impacted as a result of surface cracking and subsequent remediation (if required)” (Mine Subsidence Engineering Consultants, 2019).

Monitoring of the sites will allow for the identification of the occurrence of cracking and potential mitigation of its impacts. The findings of the Aboriginal Cultural Heritage Assessment (Umwelt Environmental and Social Consultants, 2020a) indicate that the sites recorded as scarred trees are unlikely to be impacted unless depths of cover are less than 50 m (noting that none of these sites were recorded on steep slopes). Again, if impacts are to occur to these sites, monitoring of the sites will allow for the identification of these impacts and potential mitigation, if required.

Mitigation and Management

Centennial Newstan has adopted detailed avoidance, mitigation and management measures to reduce potential impacts of the project on Indigenous cultural heritage sites within the EMA. This includes updating the existing Aboriginal Cultural Heritage Management Plan for life of mine, and the participation of the local Aboriginal community, as integral participants in the update of the plan.

All Aboriginal heritage in the PAA will continue to be managed in consultation with the Registered Aboriginal Parties, in accordance with the existing Aboriginal Cultural Heritage Management Plan and any future updates. Centennial Newstan will seek to address any apprehension felt by Aboriginal stakeholders through transparent communication with representatives regarding any effects on cultural heritage sites identified through ongoing subsidence monitoring.

In addition, Centennial Newstan will seek to:

- Support relevant and appropriate initiatives of the relevant Local Aboriginal Land Council(s);
- Work with Registered Aboriginal Parties to:
 - Refine procedures for logging and monitoring of sensitive sites (i.e. log artefacts) using GPS systems, update site cards for accurate site locations;
 - Encourage Indigenous involvement in artefact collection and logging; and
- Communicate cultural heritage findings firstly to affected parties and then to broader interested parties.

Further information on the management of cultural heritage is provided in the Aboriginal Cultural Heritage Management Plan.

8.8.3 Non-Indigenous Heritage

Impacts to Non-Indigenous Heritage Values

Whilst SIA consultation did not identify any specific concerns in relation to the impact of the project on items of local or regional historic significance, a number of participants noted the presence of local items of historic interest in proximity to the EMA. Items noted during SIA consultation were the Awaba State Coal Mine and the EPS.

The following six listed and potential (unlisted) heritage items are known to be located within or in close proximity to the EMA:

- EPS;
- Great Northern Railway;
- Awaba to Wangi Power Station Branch Railway line;
- Awaba State Coal Mine/Colliery;
- Newstan Colliery; and
- Bridge over Main Northern Railway line (Umwelt Environmental and Social Consultants, 2020b).

The Historical Heritage Assessment concluded that five of the six heritage items may be subject to direct or indirect impacts as a result of the project, many of which relate to subsidence.

Mitigation and Management

A number of suitable management and mitigation strategies were identified as part of the assessment. The implementation of these management measures would significantly reduce any potential impacts to heritage items. The potential social impacts associated with any loss or damage to local non-Indigenous heritage values is considered to be minimal due to a lack of concern cited during SIA consultation.

8.9 SAFETY, HEALTH AND WELLBEING

This section describes the potential for the project to impact or benefit the safety, health and wellbeing of the surrounding community.

8.9.1 Impacts on Public Safety

Impacts of Sinkholes on Public Safety

During SIA consultation with the Awaba RFS, concerns were raised in relation to the creation of new sinkholes in bushland areas of the PAA, and the implications for the safety of RFS personnel. The RFS representative interviewed indicated that they generally confined activities in bushland to established access trails in order to avoid interactions with potential sinkholes. Similar issues were also raised by a few residents of Awaba. These residents cited examples of past interactions with historic sinkholes.

Management and Mitigation

As discussed in Section 8.4, sinkhole impacts will be managed through the existing Sinkhole Rehabilitation Plan for Awaba Colliery.

8.9.2 Stress and Anxiety

Impacts on Personal Wellbeing

A number of stakeholders engaged in SIA consultation expressed strong fears and a sense of anxiety in relation to the potential risks arising due to the interactions between the EAD and the project. This fear was associated with the risk of an adverse incident (i.e. ash dam wall failure), and the potential environmental, social and economic implications of the event.

During SIA consultation, a number of stakeholders expressed their existing concerns in relation to the stability of the EAD (in the absence of the project). The strength of these concerns is also evidenced in social media of the issues in 2019 (e.g. the Toronto and Westlakes Community Notice Board Facebook Page) and local and regional media coverage (e.g. Newcastle Herald, ABC News). The frequency with which this issue was raised during

SIA consultation and the strong concern expressed by stakeholders can be attributed in part to the closure of the Myuna Bay Sport and Recreation Centre by the NSW Office of Sport in early 2019. The Myuna Bay Sport and Recreation Centre is located south of the southern boundary of the EAD. The closure is alleged to be a response to the outcomes of a risk assessment conducted for the EAD. A review of media articles in September 2019 indicates that the issue was highly topical in isolation i.e. separate from the project. However, it was observed during SIA consultation that the following actions have further exacerbated the fear and anxiety that some people are experiencing regarding public safety and environmental harm:

- The Origin Energy EAD Mod 1 application for augmentation of the EAD; and
- Proposal by Centennial Newstan to mine under the EAD.

The EAD is located above the southern ends of the proposed workings in the West Borehole seam. The depth of cover above the West Borehole Seam, within the extents of the EAD and the proposed panels, varies between 250 m and 320 m.

Centennial Newstan acknowledges the concerns and fears of the broader community in relation to the stability of the EAD. Centennial has consulted with the Coal Ash Dam Alliance and the Newstan CCC have received a briefing and undertaken a site inspection of the Newstan Rejects Emplacement Area to understand the management of prescribed dams. Centennial also held two Open Days during the preparation of the EIS and presented key information about the project and potential interactions with the EAD to open day participants.

In response to stakeholder concerns Centennial Newstan undertook a risk assessment specific to the EAD. This risk assessment considered the risk of a crack and/or failure of the EAD wall due to project related impacts i.e. subsidence. The risk assessment indicates that there is no change in risk profile from the current state of the EAD to active mining.

Mitigation and Management

Centennial Newstan propose an adaptive management approach to mining, whereby workings underneath the EAD will be subject to revised assessments to ensure the stability of the ash dam and that the most appropriate mining methods are undertaken i.e. first workings, partial extraction or full extraction in that area.

Any mining beneath the EAD will be subject to approval from the Dam Safety NSW and any secondary extraction will require an Extraction Plan approval.

Centennial Newstan will ensure that key stakeholder concerns regarding the interaction between the EAD and project are responded to in a timely manner, and that all elements of the EAD stability that are within Centennial Newstan control will be communicated to

interested parties, noting that Origin Energy as the owner of the EAD and operator of the EPS has primary responsibility for EAD stability.

8.10 ASPIRATIONS

The findings of SIA consultation informed an understanding of the values and aspirations of residents in the communities of Awaba, Fassifern and Wakefield. No issues were raised during SIA consultation that would indicate concern in relation to the impacts of the project on resident aspirations. Some Wakefield residents (existing and new incoming residents) raised concern about the impact of the NCLP on the desirability of their private property as a long-term residence, however consideration of these issues is outside the scope of the SIA as they relate to the approved operations of the NCLP. The LMCC expressed a number of viewpoints in relation to the project's potential to support the delivery of the LMCC's future land use aspirations for the LGA.

In submission on the SEARs the LMCC highlighted that the indicative very fast train corridor between Sydney and Newcastle is intersected by the project area. LMCC expressed concern that the project has the potential to require relocation of this corridor and future transport infrastructure, with significant economic and public interest consequences.

The following section discusses the potential impacts and benefits of the project on land use aspirations of key stakeholders.

8.10.1 Fast Train Corridor

Centennial Newstan has reviewed NSW Government's fast rail network corridor (NSW Government, 2018a). The potential routes identified for investigation extend from Port Macquarie in the north to Canberra in the south. Due to the scale of the publicly available mapping, the specific location of the corridor relative to the EMA is indiscernible. However, based on the existing land uses, including underground mining and fly ash emplacement, it is considered unlikely that the EMA would be appropriate for any future use as a fast rail network corridor, with the exception of the areas occupied by the existing rail corridor for the Main Northern Railway. Notwithstanding, conservative buffers have been adopted in the mine design to minimise subsidence impact risks to the existing rail corridor for the Main Northern Railway. As such, the project is not expected to impact on the ability of NSW Government to establish a fast rail corridor.

8.10.2 Future Land Development Opportunities

The project presents an opportunity to support the realisation of the LMCC's future planning directions for the LM LGA. During SIA consultation LMCC representatives highlighted the opportunities presented by the project for future land use planning in the LM LGA. Large areas

of the LM LGA are designated for environmental conservation which means a limited supply of suitable degraded land exists for future industrial and commercial development initiatives.

The LM Strategic Plan provides a framework for investigating and planning for the “*growth and change of the city*” (LMCC, 2019c). The LM Strategic Plan recognises the constraints of growth for the LGA and identifies areas and new land uses for suitable development. The findings of the LM Strategic Plan, supplemented with the findings of SIA consultation with LMCC representative and councillors, indicate that as mining and quarrying ceases in the LGA, previously disturbed land will be investigated for preferred future uses. During SIA consultation LMCC representatives acknowledged the suitability of the existing cleared areas within the PAA i.e. NCSS and ACSS, for industry hubs i.e. manufacturing and construction, and co-working spaces.

Centennial Newstan has developed a *Conceptual Rehabilitation and Closure Strategy* (Integrated Environment Management Australia, 2019) (Closure Strategy) for the project. The Closure Strategy presents a final land use strategy for three specific closure ‘domains’ within the PAA:

- Domain 1: Infrastructure Areas i.e. the infrastructure at the ACSS and infrastructure associated with the underground workings of Newstan Colliery⁷;
- Domain 2: Land above the proposed underground mining areas and all other remaining lands within the EMA; and
- Domain 3: Areas within the PAA outside of the EMA that have been subject to previous undermining.

As described in the Closure Strategy the:

- Intended post mining land use for Domain 1 is the beneficial re-use of the project infrastructure areas, where possible, to generate employment in the area;
- Areas within the disturbance footprint of Domain 1 present an opportunity for a possible industrial/commercial land use due to its proximity to the existing internal haul roads (part of the NCLP), related infrastructure and transport access, and the M1 Pacific Motorway. An industrial/commercial post mining land use on site would also meet the long-term vision of the LM LGA as described in the Lifestyle LM Strategic Plan; and
- The preferred post mining land use for Domain 2 and Domain 3 is to return the land to native vegetation (woodland) due to the typology of surface disturbance i.e. subsidence impacts.

⁷ The NCSS whilst forming part of the project will be decommissioned and rehabilitated as part of closure activities for the approved NCLP in accordance with the requirements of SSD-5145. As such, the decommissioning and rehabilitation of the existing features of the NCSS do not form part of the Closure Strategy for the project.

The Closure Strategy supports the realisation of the future land use opportunities presented in the LM Strategic Plan.

Mitigation and Management

Centennial Newstan will continue to engage with key stakeholders in relation to mine closure planning. Centennial Newstan will also negotiate a VPA with LMCC for the project. Financial contributions made through the VPA will be available for LMCC to use for investing into future development.

8.11 INTERGENERATIONAL EQUITY

The principle of intergenerational equity requires *“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”* (NSW Government, 2000).

Intergenerational equity refers to equality among generations, and is based on the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The project design, determined through an examination of the alternatives, along with commitments to environmental mitigation and measures, will operate to ensure that there is no significant effect on the environment which would diminish the health, diversity and productivity of the environment for future generations.

This has been achieved through modifying the mine plan for the project to undertake first and second workings in selected ‘high risk’ areas, and developing environmental management and monitoring programs, mitigation measures and ecological management strategies.

The project would benefit current and future generations through the creation of employment opportunities. It would also provide significant stimulus to local and regional economies and provide NSW export earnings and royalties, thus contributing to current and future generations through social welfare, amenity and infrastructure.

The project incorporates a range of mitigation measures to minimise potential impacts on the environment and the costs of these measures would be met by Centennial Newstan and included in the Economic Impact Assessment. The potential benefits to current and future generations have therefore been calculated in the context of the assessed project.

8.12 CUMULATIVE IMPACTS

8.12.1 Other Projects

Cumulative impacts are those that result from “*the successive, incremental and/or combined effects of an action, project or activity when added to other existing, planned and or reasonably anticipated future ones*” (International Finance Corporation., World Bank, 2013). There are existing mining and power generation activities within and in proximity to the PAA as described in Section 7.1.3.

This section therefore considers the potential for cumulative social impacts from major projects proposed in the LM LGA. There is potential for project activities at the NCSS and ACSS to overlap with the construction and operations activities of other projects. The following new projects and modifications within and adjacent to the LM LGA have the potential to interact with the project:

- Origin Energy EAD Mod 1;
- Black Rock Motor Park on the Rhondda Colliery mine site at Wakefield assessed by LMCC (DA/1556/2017); and
- Wallarah 2 Project (located in the Central Coast LGA to the immediate south of the LM LGA).

The potential for significant cumulative social impacts is assessed as low for the following reasons:

- The project would have negligible additional impacts on population, social infrastructure or housing given the anticipated workforce sourcing arrangements, and as such there is low potential for cumulative impacts on these factors.
- In a scenario in which one other project of similar size was constructed in the same timeframe as the project, cumulative demand for construction workers is unlikely to result. This is because of the small construction workforce associated with the project.
- LM LGA residents currently experience the cumulative impacts of mine and power generation related activity i.e. traffic, housing/services and facilities demand, amenity impacts. The project would make a negligible contribution to the existing cumulative environment.
- The LM LGA community is experienced in managing the cumulative impacts of mining operations, so a degree of resilience to impacts is likely.

Any cumulative social impacts of the project are likely to relate to stress and anxiety as nearby residents remain uncertain about the potential impacts of the EAD and interactions with the project.

There is potential for cumulative traffic and amenity impacts associated with the intensification of activities at NCLP and other projects in the locality e.g. the Black Rock Motor Park, however consideration of these impacts is outside the scope of the SIA.

8.13 CONSEQUENCES OF THE PROJECT NOT PROCEEDING

Mining has a strong history in the LM LGA, and the LGA economy continues to be sustained in part by mining and power generation industries. During SIA consultation, a number of residents expressed the sentiment that mining activity remains a valued part of the LGA economy.

The potentially negative economic effects if the project were not to proceed include:

- All direct, contract and derived employment associated with operation of Newstan Colliery would cease i.e. 320 FTE during operations, with related negative effects in the local and regional economies;
- All commercial transactions with local, regional and NSW-based businesses would cease, depriving suppliers of goods and services to the mine of this source of business (valued at in excess of \$10 M in 2018);
- Future viability of the NCLP may be threatened as the coal from the project forms a component of the long-term strategic plan for operations at the NCLP;
- Mining of the coal resources within the approved mining areas would need to cease by 6 July 2021 upon expiry of the development consent for Newstan Colliery (DA 73-11-98). This would result in the sterilisation of a substantial coal resource within the mining lease area, as it is unlikely that this area would be extracted independently or as part of any other mining proposal; and
- Upon cessation of mining, Newstan Colliery would close and all economic and associated social benefits would cease to be realised beyond this time. The exception would be the benefits associated with a relatively brief period of decommissioning and rehabilitation activity.

Not proceeding with the project would also result in significant financial inefficiency due to the loss of the large investment already made by Centennial Newstan in exploration activities, mine planning, environmental investigations and contributions made to the local community. One of the objectives of the EP&A Act is to: ‘...promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources’. If the project were not to proceed, 25.7 million tonnes of coal would remain unrecovered, and the economic benefits that flow from the recovery of this resource would not be realised. The EIS impact assessments demonstrate that the resource can be recovered in an environmentally and socially responsible manner, whilst still providing economic benefits to the people of NSW. Not proceeding with the project would conflict with the objects of the EP&A Act.

8.14 IMPACTS OF MINE CLOSURE

This section considers the social implications of mine closure for the local communities and the broader LM LGA. The project has an estimated life of 15 years. The communities of the LM LGA have experience in managing and responding to the closure of major industry and economic contributors.

Mining projects have the potential to create social impacts across all project phases e.g. from exploration through to final decommissioning, as communities adapt to change. There is an increasing community and regulatory focus on the social, cultural and economic impacts of mine closure, largely resulting in increased awareness of potential negative social impacts (Owen, J. and D. Kemp, 2018). Early consideration and planning for mine closure can contribute to reducing negative social impacts associated with mine closure and in turn can contribute to increasing potential benefits. For example, excessive dependency on a mining operation by a local community can be minimised and managed through the design of mine infrastructure and the support of community investment programs.

The LM LGA has experience in managing and responding to mine closure. Mine closure will involve the withdrawal of sustained economic stimulus (i.e. jobs and supply arrangements). The withdrawal of these funds/VPA will have a flow-on effect to the capabilities of LMCC i.e. funding towards council owned services/facilities.

The current prevalence of mining in the LM LGA, in combination with LMCC's aspiration to expand into other industries, suggests that the local economy would not weaken in response to mine closure. Nonetheless there may be an impact to the local economy.

The broader potential socio-economic impacts and opportunities associated with project closure include:

- Job changes or job loss and subsequent impacts such as financial stress due to lack of income;
- Potential outmigration of labour to areas outside LM LGA as former employees seek roles in other mining operations in nearby LGAs. However, this is anticipated to be minor given the proximity of the LM LGA to nearby employment centres e.g. Newcastle;
- Potential de-skilling of the labour force if some employees withdraw from the labour force;
- Decreased economic activity in the LM LGA;
- Reduced local business diversity due to changes in local expenditure arising from a reduction in direct mine contributions and local spend from employees;

- A shift in available employment opportunities from mining to other industries such as tourism, services, government and agriculture; and
- Divestment from mine-owned and leased land and resulting impact on rates payable to LMCC.

8.14.1 Mine Closure Strategy

Centennial Newstan will undertake a mine closure SIA for the project approximately five years prior to the envisaged closure date. To assist in the mine closure process, it is recommended that Centennial Newstan investigate, develop and incorporate social closure goals and impact management strategies within the mine closure plan/mine closure SIA. It is suggested that the mine closure SIA and associated strategies involve engagement with LMCC and other key partners to support future land use opportunities for the LM LGA (as outlined in the Closure Strategy (Integrated Environment Management Australia, 2019)). Once decommissioning and closure is underway, closure planning strategies and programs should be monitored to provide opportunities for adaptive management.

8.15 EVALUATION OF SOCIAL IMPACT AND OPPORTUNITY SIGNIFICANCE

This section presents the outcomes of the significance evaluation of the social impacts and opportunities of the project identified and discussed above. The assessment of impact significance is based on the methodology described in the SIA Guideline (Department of Planning and Environment, 2017).

8.15.1 Social Impacts

Evaluating Negative Social Impacts

The Social Risk Matrix (Table 34) has been used to quantify the significance of each identified social impact.

Table 34
Risk Rating Matrix

			Consequence Level				
			1	2	3	4	5
			Minimal	Minor	Moderate	Major	Catastrophic
Likelihood Level	A	Almost Certain	A1	A2	A3	A4	A5
	B	Likely	B1	B2	B3	B4	B5
	C	Possible	C1	C2	C3	C4	C5
	D	Unlikely	D1	D2	D3	D4	D5
	E	Rare	E1	E2	E3	E4	E5
Social Risk Rating							
	Low		Moderate		High		Significant

Source: Department of Planning and Environment (2017).

An initial evaluation of social risk, using Table 34 was undertaken prior to consideration of management and mitigation measures. The outcomes of the initial risk assessment informed the need, or otherwise for the development of the project specific strategies.

Impact Significance Assessment Outcomes

The outcomes of the impact significance assessment are presented in Table 35. Table 35 summarises:

- Predicted social impacts for the social area of influence resulting from the project proceeding (Column 1);
- Stakeholders potentially affected (Column 2);
- Predicted duration of the impact (Column 3);
- Predicted project phase in which the impact will occur (Column 4);
- Level of stakeholder concern as identified during consultation in relation to the predicted impact and measured as either High (H), Medium (M) or Low (L) (Column 5);
- Evaluation of the risk associated with the potential social impact, in the absence of specific mitigation strategies other than those already incorporated into the design of the project (Unmitigated Risk) (Column 6); and
- Evaluation of residual risk (Mitigated Risk), in consideration of project-specific social management strategies (Column 7).

The outcomes of the significance evaluation indicate no significant social impacts are associated with the project once mitigation measures are applied.

Table 35
Project Significance Assessment – Social Impacts

SIA Ref	Social Impact	Stakeholder	Temporal	Project Phase	Concern	Unmitigated Risk	Mitigated Risk	Rationale for Residual Rating
8.3	Adverse changes to residential amenity.	Awaba residents.	Long-term	Construction Phase and Operations Phase	H	C3	C2	Access to EIS assessment findings and ongoing environmental monitoring data together with community engagement and reporting processes e.g. the CCC will reduce concerns.
8.3 and 8.9	Increased traffic volumes accessing ACSS impact local accessibility and public safety.	Awaba residents, users of Wilton Road.	Short-term	Construction Phase	L	C2	D1	Any impacts experienced will be temporary in nature, minor in consequence and overall of low significance.
8.4	Potential environmental impacts of the project affect community held environmental values e.g. biodiversity and habitat.	Non-government organisations, downstream water users, residents of the LM LGA.	Long-term	Operations Phase	M	B3	C2	Access to EIS assessment findings and ongoing community engagement and reporting processes e.g. CCC may reduce some concerns but are unlikely to fully alleviate or resolve all concerns. Mine planning allows for adaptive management of impacts.
8.5	Downstream landholders experience livelihood changes due to project impacts on groundwater quantity and quality.	Downstream landowners.	Long-term	Operations Phase	L	D2	D2	No livelihood concerns were raised by stakeholders.
8.6	Withdrawal of sustained economic stimulus (i.e. jobs, supply etc.) impacts the socio-	Residents of LM LGA, business operators,	Long-term	Mine closure	L	C4	C3	The future cessation of mining will almost certainly result in a withdrawal of economic stimulus. The significance of this impact can be reduced through

SIA Ref	Social Impact	Stakeholder	Temporal	Project Phase	Concern	Unmitigated Risk	Mitigated Risk	Rationale for Residual Rating
	economic baseline of Lake Macquarie LGA.	service and facility providers and LMCC.						forward economic planning by LMCC as illustrated in the LM Strategic Plan and the LM Community Plan.
8.8	Loss or damage to valued cultural assets.	Registered Aboriginal Parties, Indigenous Groups.	Intergenerational	Life of Mine	H	B3	D2	There are limited sites in the area and subsidence is not anticipated to be significant over the EMA due to the use of partial and full extraction.
8.8	Further impacts to cultural landscape including connection and access to country.	Registered Aboriginal Parties, Indigenous Groups.	Intergenerational	Life of Mine	H	C3	D2	Much of the land within the EMA is crown land and accessible to the public. The project is an underground mine and does not involve clearing of native vegetation or significant and widespread changes in the landscape.
8.8	Loss or damage to Non-Indigenous heritage items impacts cultural values.	Residents with historical connection to the area, local historians.	Long-term	Construction Phase	L	D2	D1	This impact was not raised as a concern during consultation. Further, the findings of the Historical Heritage Assessment do not indicate any significant impacts to identified existing and potential items of historic interest.
8.9	The project exacerbates existing anxiety in relation to the potential for failure of the EAD and resulting environmental, social and economic costs.	LM LGA residents and environmental organisations.	Long-term	Operations Phase	H	A3	C2	Special interest groups may not accept EIS findings and specialist reports. Concerns are likely to persist.

8.15.2 Social Opportunities

Evaluating Opportunities or Benefits

The Social Risk Matrix (Table 34) was also used to assess the significance of potential opportunities associated with the project. The same social risk rating was applied to opportunities, with the social risk rating related to the scale of improvement or benefit likely to be experienced i.e. 'red' for a significant improvement or benefit.

Opportunities Significance Assessment Outcomes

The outcome of the opportunities significance assessment is presented in Table 36. Table 36 summarises the:

- Predicted social opportunities for the social area of influence;
- Stakeholders potentially affected;
- Predicted duration of the opportunity;
- Predicted project phase in which the opportunity will be realised;
- Evaluation of the opportunity in the absence of specific enhancement strategies other than those already incorporated into the design of the project; and
- Evaluation of enhanced opportunity in consideration of project-specific social enhancement strategies.

The assessment also shows positive social outcomes associated with the project proceeding. These positive outcomes or opportunities relate primarily to employment and economic contributions to the LM LGA.

Table 36
Project Significance Assessment – Social Opportunities

SIA Ref	Social Opportunity	Stakeholder	Temporal	Project Phase	Opportunity	Enhanced Opportunity	Rationale for Rating
8.6	The creation of direct and indirect jobs in LM LGA.	Residents of LM LGA and business operators.	Long-term (Project Life)	Life of Mine	B3	A3	The project will create 50 FTE construction jobs and 320 FTE operations phase jobs in the LM LGA. Strategies proposed in Section 8.6 would support local access to these employment opportunities.
8.6	Continued benefit to local and regional businesses from continued (or new) supply arrangements.	Business owners and operators of LM LGA.	Long-term (Project Life)	Life of Mine	B3	A3	Construction and operation of the project will necessitate significant spend by Centennial Newstan. Existing procurement arrangements.
8.6	Economic benefit to the region i.e. increases in revenue.	LMCC and LM LGA.	Long-term (Project Life)	Life of Mine	B4	A4	Mining industry sector output in the LM LGA will increase when project operations commences. The LM LGA mining sector is the fourth highest revenue producing industry sector in the LM LGA.
8.7	Securing energy security for NSW.	NSW Government, NSW Residents, and Eraring Power Station.	Long-term (Project Life)	Life of Mine	C3	B3	The EPS is projected to closure in 2032 (12 years from now). EPS relies on black coal, principally sourced by a number of mines in the LM LGA. Newstan Colliery will produce black coal suitable for use at the EPS and export.
8.10	Future land use aspirations of LMCC supported by mine closure planning and final land use.	LMCC and LM LGA Residents.	Long-term	Life of Mine	C2	C3	The current Closure Strategy for Newstan Colliery aligns with LMCC's future planning intent for the area.

9 MONITORING AND REPORTING

9.1 INTRODUCTION

Section 8 presented the social impacts and proposed management strategies. This section:

- Presents a summary of stakeholder groups who would require specific consideration as part of Centennial Newstan's ongoing engagement process;
- Describes how Centennial Newstan will monitor and report on social impact mitigation for the project; and
- Describes the adaptive management process to support continuous improvement in social management outcomes over the life of the project.

9.2 COMMUNITY ENGAGEMENT

Centennial is committed to maintaining meaningful relationships across the communities in which it operates. Centennial consultation and engagement reflects the diversity of each community's characteristics, including their values and aspirations. Centennial also recognises that their communities of interest are not just located proximate to operations, but now reflect a broader network of attitudes and opinions about the coal mining industry. Centennial acknowledges and understands that open communication and listening to stakeholders' concerns is of great value. The frequency and nature of this engagement is adapted to the needs of various stakeholder groups. For example, the Newstan/Awaba CCC operates with a genuine two-way open dialogue to provide information about Centennial activities and provide a forum for stakeholder feedback on Centennial Newstan operations. Centennial also regularly engages with industry groups, interest groups, local committees and regulators on matters of importance to the business and stakeholders.

Key community engagement and community relations building activities include:

- Establish CCCs for each Centennial mine operating in the LM LGA. The Newstan/Awaba CCC also includes the NCLP;
- Community consultation and engagement strategies for projects and exploration activities;
- Sponsorship (financial and in-kind);
- Active participation and support of a broad range of community organisations, activities and events; and
- Dedicated phone line and community contact email at each site.

For existing operations at Newstan Colliery, community concerns are identified and addressed through a number of established procedures including the:

- Newstan/Awaba CCC;
- Centennial Complaints and Grievances procedure;
- Northern Holdings ACHM Committee;
- Periodic information days held at the NCSS; and
- Regular and informal discussions and correspondence between Centennial representatives (predominantly the Group Manager Stakeholder Engagement and the Environment and Community Coordinator) and external stakeholders including suppliers, residents, interest groups and facility and service providers.

Stakeholder engagement is an integral component of Centennial's Environmental Management System Framework. Stakeholder engagement will be undertaken in a systematic manner consistent with the Environmental Management System Framework, taking into consideration government and community expectations. Stakeholder engagement is undertaken in accordance with the guidance provided in *Management Standard 014 Stakeholder Engagement* (Centennial Coal, 2012).

Section 8 presents a number of existing and new management strategies that focus on consultation and communications. These management strategies will be integrated into existing stakeholder engagement activities for Newstan Colliery.

9.3 PERFORMANCE MONITORING

The monitoring and evaluation of social impact management activities is important in understanding how programs are performing against expected outcomes and how successful these programs are at mitigating or managing identified impacts. Table 37 provides a summary of the recommended social management strategies and presents a framework for monitoring the implementation and outcomes of the management actions. Specifically, Table 37 presents the following monitoring information for each new social management strategy identified in Section 8:

- Timing for when the strategy is to be implemented;
- Accountability for strategy implementation;
- Desired outcomes or targets from the implementation of the management strategy;
- Performance indicators; and
- Monitoring and reporting actions.

Table 37
Performance Management and Monitoring

Recommended Mitigations	Timing	Accountability	Target/Outcomes	Performance Indicator	Monitoring and Reporting
Conduct a regular schedule of meetings for the Awaba/Newstan CCC.	Twice a year as per CCC guidelines.	Centennial Stakeholder Engagement Group.	CCC representatives remain informed of the progress of the project and any changes to the mine plan and are supported in their efforts to communicate this information to the broader community.	Minutes of CCC meetings are made available on the Centennial website within 2 weeks of the CCC meeting date.	CCC minutes recorded on the Centennial website. Annual report by the CCC Chair.
Engagement with residents of the PAA and interest groups in relation to the interactions of the project with the EAD and Centennial's actions to minimise potential risks.	Ongoing in parallel with project approvals and commencement of construction.	Centennial Stakeholder Engagement Group.	Interested stakeholders are aware of the measures to be implemented by Centennial to manage potential adverse impacts associated with the project and its interaction with the EAD.	Interested stakeholders are provided with information about the project and its interaction with the EAD, and measures proposed to manage potential adverse impacts.	Community information and management strategies would be planned and reviewed prior to the lodgement of the EIS. Centennial continually update the website and provide information to the public when requested.
Community information and engagement with residents of the PAA, Indigenous and non-Indigenous stakeholders and interest groups in relation to the findings of the EIS technical studies and proposed management measures.	Ongoing in parallel with project approvals and commencement of construction.	Centennial Stakeholder Engagement Group.	Residents and interest groups are informed of the predicted impacts and opportunities of the project and the measures to be implemented by Centennial to manage potential adverse impacts.	- Residents and interest groups: - Are provided with the EIS technical findings, and an opportunity to discuss the findings with Centennial. - Understand the scope of actions to be undertaken by	Community information and management strategies would be planned and reviewed annually. Prior to lodgement of EIS.

Recommended Mitigations	Timing	Accountability	Target/Outcomes	Performance Indicator	Monitoring and Reporting
				Centennial to manage any potential adverse impacts.	
Community information and engagement with residents of the PAA in relation to the interactions of the project with the EAD.	Ongoing from EIS lodgement.	Centennial Stakeholder Engagement Group, CCC.	Community members and interested parties, particularly Awaba residents are aware of the timing of the construction phase and anticipated changes in social environment.	Minimise complaints from the Awaba community during construction.	Centennial would monitor community views in relation to the project and interactions with the EAD through ongoing engagement.
Pre-construction briefing with potential construction companies and ongoing regular communication with suppliers.	Three months prior to construction commencing and then ongoing across the project life.	Centennial.	Maximise participation of LM LGA businesses in project supply. Suppliers are aware of opportunities and tendering requirements for all phases of the project.	Number of LM LGA businesses engaged in project supply. Total procurement spend in the LM LGA as a proportion of total spend.	Total procurement spend in the LM LGA would be reported in the Annual report or a similar document which is made available on Centennial's website.
Community information and engagement with Awaba residents in relation to the timing of construction activities.	Three months prior to construction commencing.	Centennial.	Awaba residents are aware of the timing of the construction phase and anticipated changes in social environment. Residents understand how to raise issues or concerns that arise in relation to construction activities.	Minimise complaints about amenity impacts from the Awaba community during construction.	The number of complaints would be monitored and reported as per established Centennial complaints management procures.
Community Open Day for residents of nearby communities.	As opportunities arise.	Centennial Stakeholder Engagement Group.	Community members remain informed of the progress of the project and any changes to the mine plan.	Nearby residents participate in Community Open Days as evidenced in attendance records.	Centennial would monitor community views in relation to the project through ongoing engagement.

Recommended Mitigations	Timing	Accountability	Target/Outcomes	Performance Indicator	Monitoring and Reporting
Communication with Fassifern Public School and Charlton Christian College families in relation to project activities.	In the lead up to the commencement of operations.	Centennial Stakeholder Engagement Group.	Families of students at Fassifern Public School and Charlton Christian College are informed of upcoming changes in operations at Newstan Colliery.	Number of complaints received from parents or school representatives in relation to pedestrian and road safety concerns in school zones on Miller Road and Fassifern Road. Feedback from informal discussions with school principals, families and Road Crossing Supervisors at each school.	The number of complaints would be monitored and reported as per established Centennial complaints management procures. Feedback from informal engagement would be reviewed.
Ongoing engagement with relevant Indigenous parties in relation to the management of cultural heritage, and access to traditional country.	Ongoing and generally aligned with meetings of the Northern Holdings ACHM Committee.	Centennial Stakeholder Engagement Group.	Relevant Indigenous representatives are informed of cultural heritage management issues and are provided with an opportunity to discuss key issues and concerns in relation to project operation. The involvement of relevant Indigenous parties in the cultural heritage management for the project is optimised.	Relevant Indigenous representatives are engaged in a manner consistent with NSW regulatory frameworks. Regular meetings of the Northern Holdings ACHM Committee and minutes of meetings. Relevant Indigenous representatives are satisfied with the approach to project related cultural heritage management.	Minutes of the Northern Holdings ACHM Committee are made available to all relevant parties.
Operations phase employment opportunities are promoted locally with both Indigenous and non-Indigenous residents	Three-six months prior to operations commencing and as	Centennial.	Local residents are aware of job opportunities on the project. Organisations assisting job seekers from disadvantaged or vulnerable groups (e.g. Indigenous people), are	Number of residents of the LM LGA employed on the project. Number of organisations actively engaged in seeking	The number of project employees residing in the LM LGA would be reported in the Annual report or a similar document which is

Recommended Mitigations	Timing	Accountability	Target/Outcomes	Performance Indicator	Monitoring and Reporting
encouraged to apply for roles.	operations continue.		aware of project employment opportunities.	employees for the project who are considered vulnerable e.g. Indigenous people. LMCC Business Chamber advised of roles available and the required qualifications.	made available on Centennial's website. Minutes of meetings with LMC Business Chamber.
Centennial will ensure that the operations workforce is made aware of a number of traffic related safety matters prior to commencement of their employment.	Prior to the commencement of operations and as new employees are recruited once operations commence.	Centennial.	Operations workforce is aware of: - Nearby schools and hours of school zone speed limit enforcement; - The level crossing location on Miller Road; - Varying speed limits along the assessed access routes; - General road safety rules; and - Fatigue management measures.	Number of community complaints made related to project traffic.	The number of traffic complaints would be monitored and reported as per established Centennial complaints management procures.
Mine Closure					
Preparation of a mine closure SIA in consultation with key stakeholders.	Five years prior to mine closure.	Centennial Stakeholder Engagement Group.	Potential social impacts and opportunities associated with mine closure are identified with adequate time to implement management strategies.	Mine Closure SIA completed with evidence of community engagement.	Mine closure SIA completed and implementation of management actions tracked through the Annual report or a similar document which is made available on Centennial's website.

9.4 SOCIAL BASELINE REVIEW

Centennial will undertake a social baseline review of all communities of interest for Centennial operations (including Newstan Colliery) in the LM LGA. Reviews will be aligned with the ABS census periods (i.e. every 5 years). These reviews will be informed through qualitative (consultation) and quantitative analysis (statistical data analysis). Social indicators for component suburbs of the PAA and the LM LGA would be monitored. Social indicators to be monitored may include:

- Labour market conditions;
- Demography and population;
- Indigenous population;
- Population mobility;
- Vulnerability; and
- Community strength.

9.5 ADAPTIVE MANAGEMENT

The mitigation strategies and associated performance monitoring presented in Table 37 form the basis for social impact management across all phases of the project. These strategies are also supported by the tailored management plans prepared for other technical areas e.g. Construction Phase Traffic Management Plan or Air Quality Management Plan.

To support adaptive management, the project's monitoring and reporting process would include:

- Collection, monitoring and reporting of the performance data described in Table 37 to ensure performance outcomes are being realised.
- Monitoring of baseline social indicators to identify any changes occurring in the communities of interest that may change how project impacts and benefits are experienced (Section 9.4).
- Ongoing and tailored engagement with stakeholders who should benefit from mitigations.
- In consultation with the Newstan/Awaba CCC, annual review of the delivery of the mitigation strategies and performance outcomes described in Table 37 and assessment of the extent to which the strategies have achieved the desired outcomes. This assessment would take into consideration any unexpected impacts or benefits and the status of social indicators.
- Identification and implementation of required changes to the management strategies included in Table 37.

10 CONCLUSION

The LM LGA has a long history of mining and power generation. The settlement history of the LM LGA is linked to these industries and the development of major transportation corridors (road and rail). Many residents have lived in the LM LGA, particularly areas to the west of Lake Macquarie over a number of generations. These long-term residents were once dependent on mining and supporting industries for employment. However, the findings of the SIA indicate that the LM LGA has transitioned away from mining as a major employment sector (although the sector still contributes significantly to GRP). SIA consultation also indicates a shift in composition of residents, particularly in communities proximate to the ACSS, EMA and NCSS. New residents with little to no connection to mining are moving into existing residential areas (e.g. Awaba and Wakefield) for lifestyle reasons. The LM LGA is a growing area and a combination of new residential land releases, relatively affordable housing, proximity to key centres (e.g. Newcastle) and a range of lifestyle opportunities e.g. Lake Macquarie is attracting new residents to the locality.

At a local level, the environmental qualities of the local area are of intrinsic value to Awaba residents. Existing residential and rural character, land use, natural and cultural values and visual amenity contribute to resident satisfaction with their locality and their enjoyment of the surrounds.

The SIA has considered the impacts of the project on the needs, issues, values and aspirations of the surrounding community. The SIA has adequately considered potential socio-economic impacts of the project consistent with the NSW SIA Guideline and best practice. Socio-economic impacts are generally associated with environmental impacts (i.e. increased noise and dust emissions, loss of biodiversity and visual amenity and reduced water quality). The project will have minimal to moderate social impact, noting that there would be:

- No requirement for property purchase as a means of managing impact on social amenity;
- No change to resident way of life, community and the social fabric of the area;
- Minimal impact to surrounding amenity;
- Some less desirable, but albeit temporary impacts to natural values in the EMA;
- No predicted notable change to the social and economic profile of the community except for the potential for economic benefits via localised spending as a result of construction related and operational employment; and
- No change to how residents or visitors utilise the area.

Approval of the project would create additional employment and commercial activity with suppliers of goods and services to Newstan Colliery. As the regional economy is relatively large, the potential for negative impacts is generally limited. Royalties returned to the state and employee benefit would be the major sources of public economic benefit generated by the project. These are valued at approximately \$80 million (royalties) and \$27 million (employee benefit) calculated as present values over the life of the project.

Appropriate mitigation measures are described in Section 8.

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for
HANSEN BAILEY

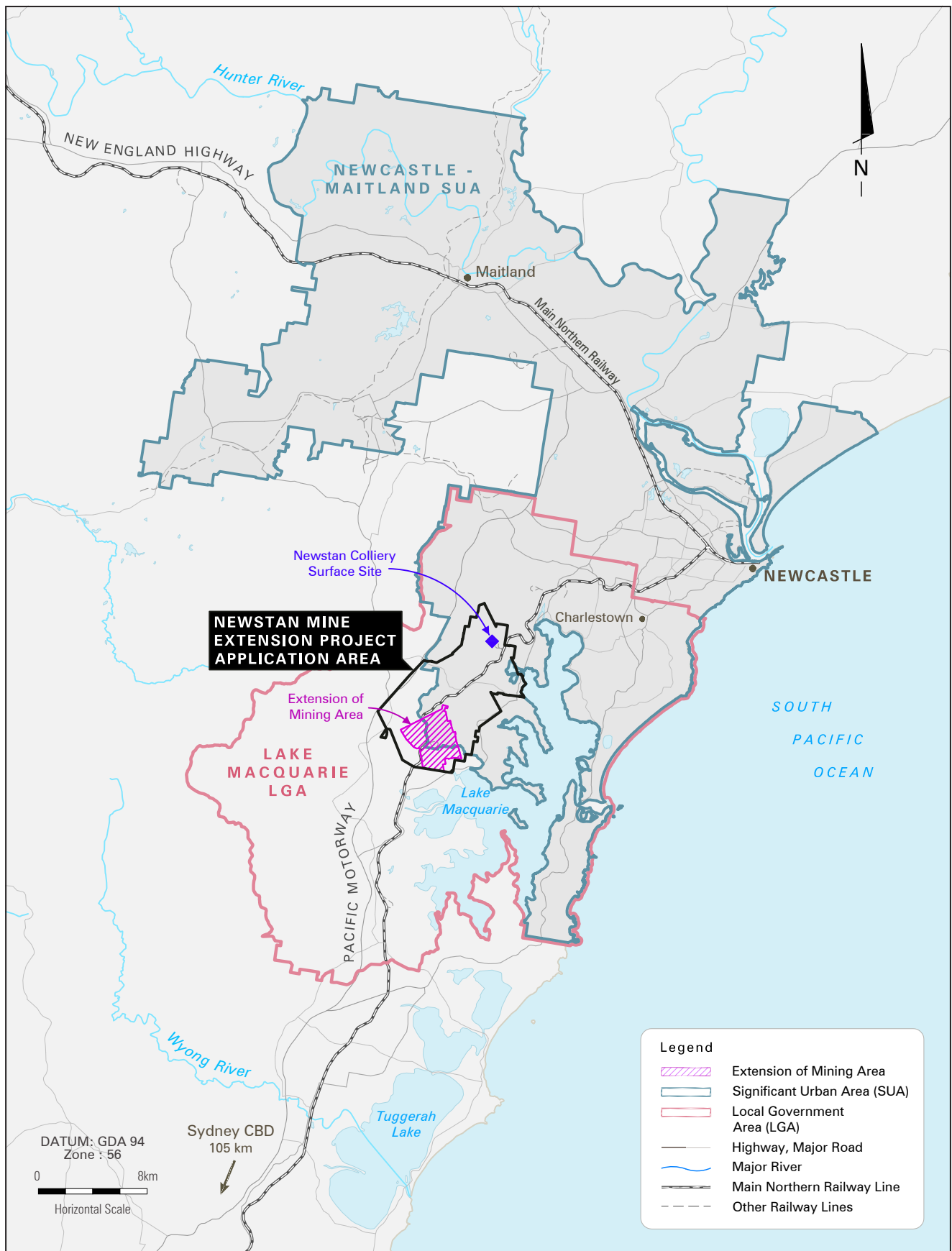


Bronwyn Pressland
Principal Social Planner

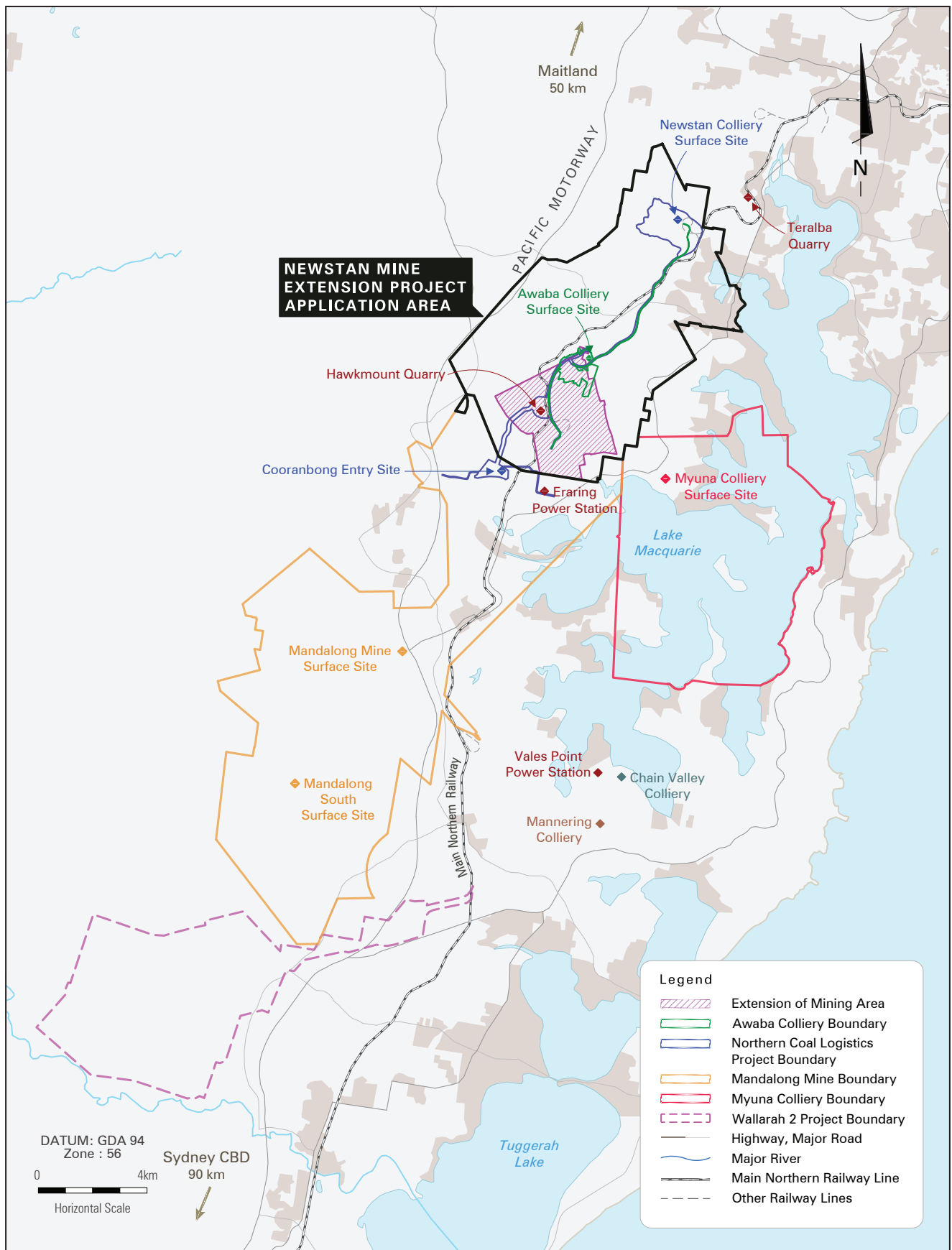


Peter Hansen
Director

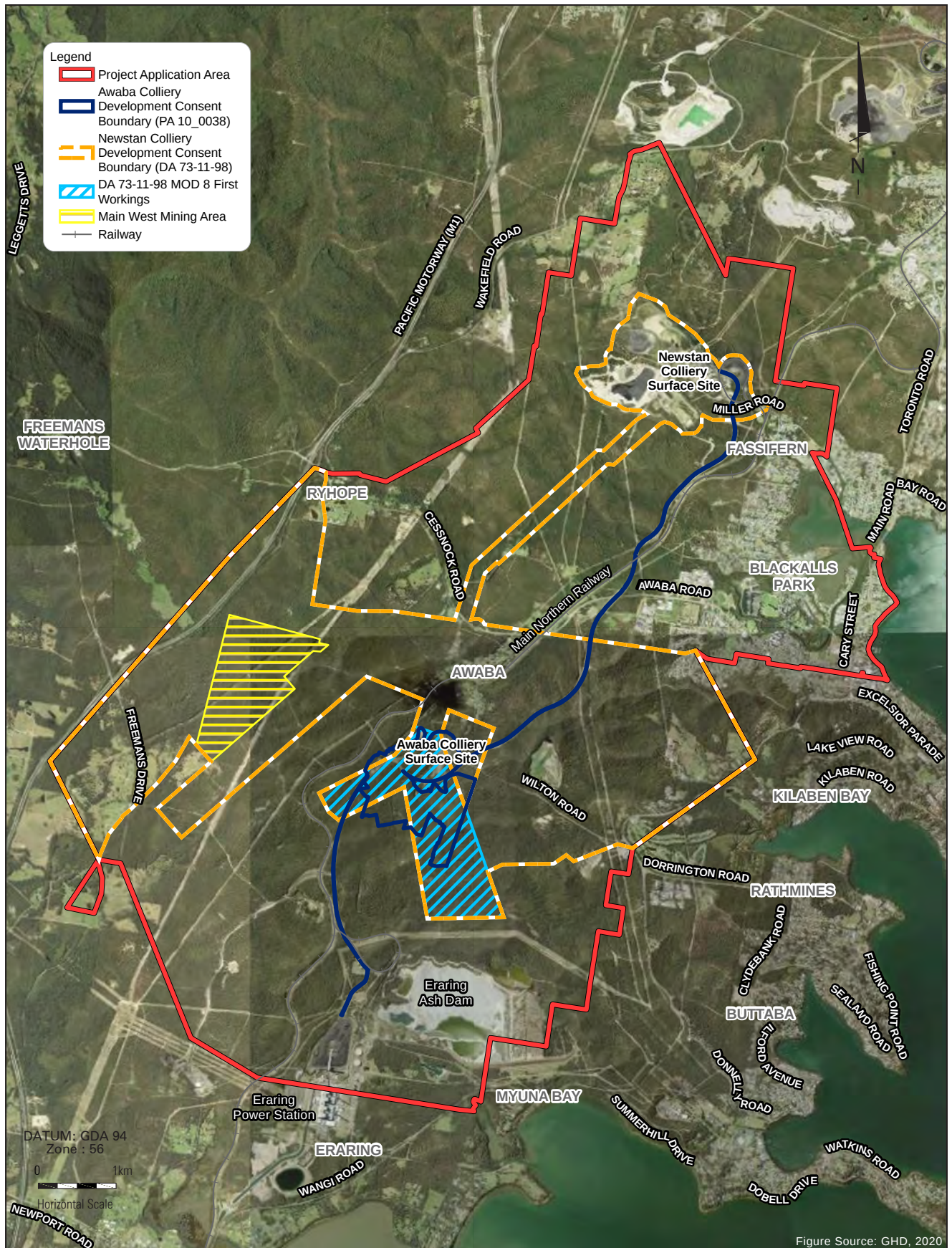
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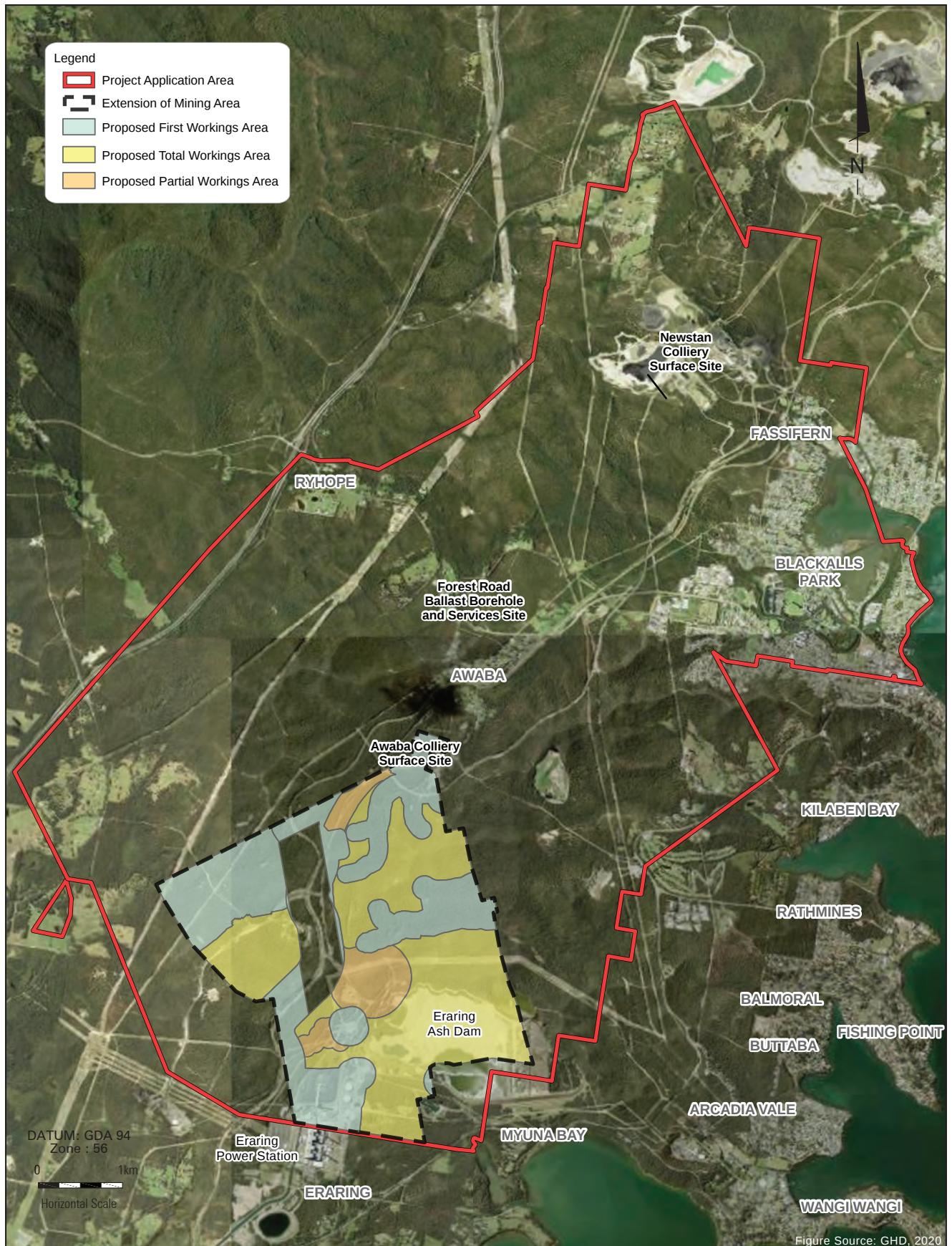
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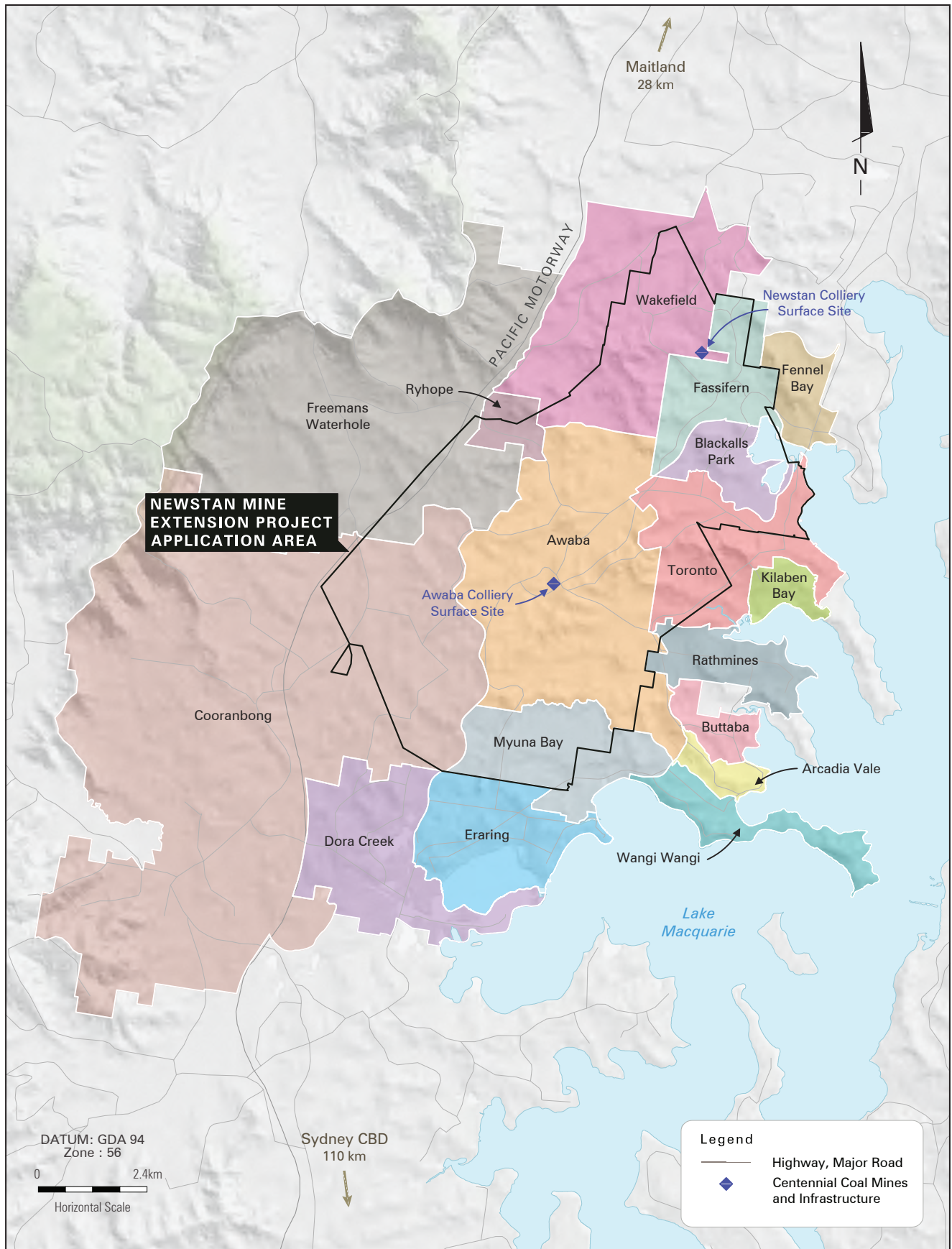
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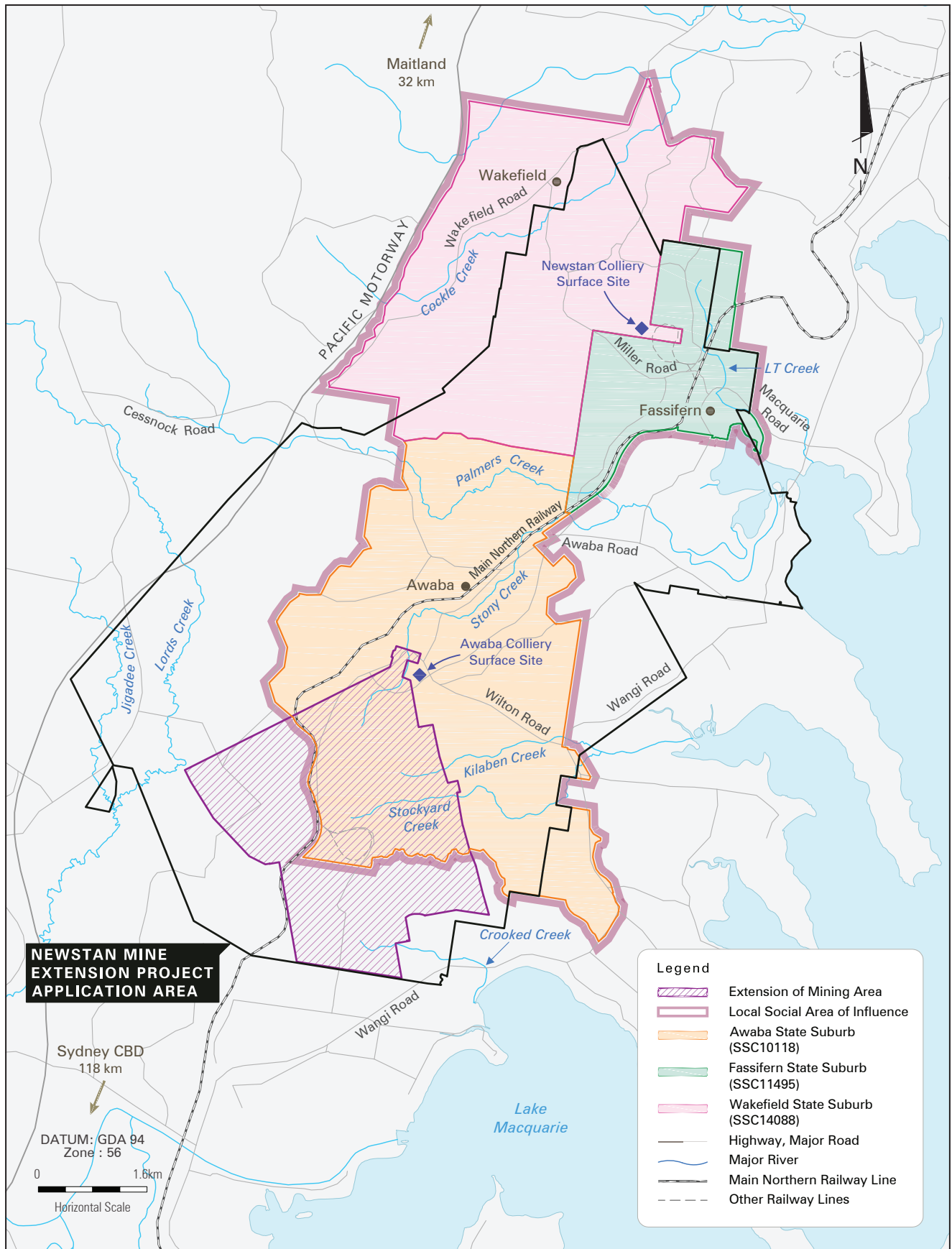
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NEWSTAN MINE EXTENSION PROJECT



NEWSTAN MINE EXTENSION PROJECT



NEWSTAN MINE EXTENSION PROJECT

APPENDIX A

Curriculum Vitae of SIA Specialists

Areas of Expertise

- Social Impact Assessment and Management;
- Quantitative and Qualitative Social Research;
- Social Risk Identification and Assessment;
- Indigenous Participation Planning;
- Local Content Planning and Management;
- Workforce Housing and Accommodation Management;
- Workforce Recruitment and Training Planning;
- Stakeholder Consultation;
- Social Performance Monitoring and Evaluation;
- World Bank and IFC Standards; and
- Environmental Impact Assessment and Approvals.

Qualifications

- Masters of Environmental Management, Griffith University 1999.
- BBE Urban and Regional Planning, Queensland University of Technology, 1992.

Career Highlights

Bronwyn is a Principal Social Planner with international experience specialising in social impact assessment, community development and community engagement. She has over 20 years of practical experience in social impact assessment with extensive experience in mining and resource development (coal, manganese, bauxite, copper and gold). Bronwyn has experience in the Philippines in social and health impact assessment, resettlement, Free and Prior Informed Consent (FPIC) in line with World Bank and International Finance Corporation Standards (IFC). Bronwyn also has experience in engagement with Traditional Owners and the assessment of significant social impacts on Indigenous communities.

Key project experience includes:

- *Social Impact Assessment – identification, analysis and management of social impacts associated with major developments including copper-gold mining in the Philippines, bauxite mining in Cape York, manganese mining within an Indigenous Protected Area (IPA) of Northern Australia, coal mining throughout Queensland (Qld) and New South Wales (NSW), gold mining activities in NSW, and port and shipping activities within Qld.*
- *Social Impact Management Plans – development of social impact management and monitoring plans for the resources sector across Australia.*
- *Workforce housing and accommodation management – development of tailored strategies for housing and accommodation of significant sized workforces, including the use of Temporary Worker Accommodation Facilities and in-town accommodation.*
- *Community Consultation – design and implementation of community consultation programs incorporating a range of consultation mechanisms for impact assessment, issue management, master planning and policy development.*
- *Local Content Planning and Management – analysis of local industry capability, preparation of local capability plans and advice on local content plans.*
- *Environmental Impact Assessment – extensive experience in the preparation and delivery of environmental impact statements for a range of complex multidiscipline projects.*

Employment History:

HANSEN BAILEY, Brisbane (2007 – present)

Principal Social Planner and Communications Consultant

PLACE Design Group, Brisbane (Feb 2007 – 2007)

Contracting Senior Environmental and Social Planner

JACOBS UK, Leeds (2005 – 2006)*Senior Environmental and Social Planner***Earth Tech Australia, Brisbane (2002 – 2004)***Senior Environmental and Social Planner***URS AUSTRALIA, Brisbane (1998 – 2002)***Senior Environmental and Social Planner***ERM Mitchell McCotter, Brisbane/Sydney (1996 – 1998)***Environmental Planner***Project
Experience****Social Impact Assessment (SIA), Community Consultation and
Environmental Impact Assessment**

- Provision of strategic stakeholder engagement advice to Idemitsu for a range of projects in Australia.
- Various projects for Centennial Coal (Central West NSW and Newcastle) (confidential) – Preparation of social impact assessment reports in compliance with the NSW Social Impact Assessment Guideline
- Boggabri Coal Mine (BCM) (Boggabri, NSW) (Idemitsu) (under preparation) **Social Impact Management Plan (SIMP)** – Preparation of a SIMP for the existing operations at BCM.
- Aurukun Bauxite Project (Aurukun, QLD) (Glencore) (under preparation) – **SIA**. Preparation of an SIA for a substantial greenfield bauxite mining operation nearby the town of Aurukun. Project involves bauxite mining and processing, barging and transshipment activities. Design of a community engagement program for Indigenous and non-Indigenous stakeholder engagement. The SIA will require assessment of the potential social and economic impacts of the project on the relevant Traditional Owners.
- McPhillamys Gold Project (Blayney, NSW) (Regis Resources) (under preparation) – **SIA**. Preparation of an SIA for a greenfield gold mine located outside the town of Blayney in NSW. The SIA is being prepared in accordance with the NSW SIA Guidelines (2017) and supports a development application to the NSW Department of Planning and Environment for a state significant development (SSD).
- McPhillamys Gold Project (Blayney, NSW) (Regis Resources) – **SIA Scoping Study**. Preparation of an SIA Scoping Study for a greenfield gold mine outside the town of Blayney in NSW. The SIA Scoping Study was prepared in accordance with the new NSW SIA Guidelines (2017) and supported an application to the NSW Department of Planning and Environment for Secretary's Environmental Assessment Requirements (SEARs).
- Tcharawopin Project (Aurukun, Qld) (Glencore) – **SIA and stakeholder engagement**. Preparation of an SIA for a greenfield bauxite mining operation nearby the town of Aurukun within the Aurukun Shire. Project includes bauxite mining, and barging activity in local river systems and coastal zone. Design of a community engagement program for Indigenous and non-Indigenous stakeholder engagement. The SIA will require assessment of the potential social and economic impacts of the project on the relevant Traditional Owners

- Bylong Coal Project (Hunter Valley) (KEPCO) – **Draft Social Impact Management Plan (SIMP)**. Preparation of a draft SIMP for the Bylong Coal Project, an underground and open cut mining project located nearby the small rural village of Bylong.
- Bylong Coal Project (Hunter Valley) (KEPCO) – **SIA and stakeholder engagement**. Preparation of a SIA for an underground and open cut mining project located nearby the small rural village of Bylong. The project involved extensive work around workforce accommodation and housing, including a detailed survey of housing and accommodation provision across the region. The SIA involved significant targeted consultation through focus groups with residents of the Bylong Valley, preparation of social impact management actions to address issues such as population decline, workforce housing and accommodation, rural land management. The Response to Submissions (RTS) process has also involved further baseline social surveys (tourism accommodation survey) and additional analysis of the local housing market.
- Groote Eylandt Mining Project (GEMCO) Eastern Leases Project (Groote Eylandt, NT) South 32 – **Assessment of the potential social and economic impacts of the project on the Traditional Owners of the Groote Eylandt Archipelago**. The SIA required consideration of a diverse range of issues including Indigenous use of the project land, spiritual associations with the land and water, long-term maintenance of Indigenous culture, employment and training, distribution of royalties, Commonwealth and Territory Indigenous legislation and regulations.
- Groote Eylandt Mining Project (GEMCO) Eastern Leases Project (Groote Eylandt, NT) South 32 – **Design and implementation of Indigenous consultation strategy** for the project approvals phase of the Eastern Leases Project. The consultation strategy included a significant field based component where Bronwyn conducted land use mapping with Traditional Owners. Consultation included a number of small focus groups with Indigenous women's groups and Indigenous Elders, participation in community events, meetings with education providers, health representatives, child services, emergency services etc. Bronwyn conducted significant consultation with the Indigenous Employees of South 32 on Groote Eylandt including engagement around rehabilitation practices, employment and training.
- Tampakan Copper-Gold Mine Project (Philippines) (Xstrata) – **Management of the Social Impact Assessment and Environmental Health Impact Assessment studies**. Bronwyn was responsible for managing and working closely with the locally appointed consultants for the conduct of the SIA, in particular the field surveys. Bronwyn contributed to the identification and analysis of social impacts, the drafting of the SIA report and was responsible for ensuring compliance with World Bank and IFC Standards.
- Tampakan Copper-Gold Mine Project (Philippines) (Xstrata) – **Assistance with design and implementation of the community consultation process for project approvals**. Bronwyn was involved in the design of consultation materials, key messages, issues questions and concerns. Preparation of Stakeholder Engagement Plan for the environmental approvals process. Assistance in analysis and response to the findings of significant community consultation such as public hearings. Preparation of the issue response management plan following the completion of the initial phases of stakeholder consultation

- **Tampakan Copper-Gold Project (Philippines) (Xstrata) – Preparation of Briefing Note on obtaining Free and Prior Informed Consent (FPIC) from Indigenous people.** Bronwyn assisted with the preparation of a FPIC briefing note for the project including analysis of World Bank and IFC standards. Bronwyn then assisted with the implementation of key actions around securing FPIC for the project
- **Project China Stone (Galilee Basin) (MacMines) SIA – Preparation of a SIA and design and implementation of a community engagement process for the development of a significant open cut and underground mining operation in the remote Galilee Basin.** The SIA involved an extensive community engagement process, labour force supply analysis, local content capability assessment and preparation of a social impact assessment management plan.
- **Anglo American (Moranbah, QLD) – Provision of strategic advice and assistance with the management of social impacts associated with mining operations in the Moranbah region.** This included the provision of assistance with the undertaking of a corporate review of operations using the Anglo American Socio-Economic Assessment Tool (SEAT), conduct of focus groups with residents of Moranbah, documentation of outcomes in the Annual Moranbah SEAT Report.
- **Boggabri Coal Project (Boggabri, NSW) – Preparation of SIA for a new open cut mine at Boggabri, NSW.**
- **Grosvenor Project (Moranbah, Qld) – Stakeholder Consultation Coordinator and SIA Manager. Design and implementation of a stakeholder consultation program for the preparation of an EIS for the Grosvenor underground mine.** Preparation of the SIA component of the EIS and SIMP. Assistance with the development of workforce accommodation strategy and the development of measures to manage associated potential social impacts.
- **Minyango Project (Blackwater, Qld) – Stakeholder Consultation Coordinator and SIA Manager.** Design and implementation of a stakeholder consultation program for the preparation of an EIS for the Minyango underground mine. Preparation of the SIA component of the EIS, including the design of the SIA methodology, conduct of focus group discussions with all sectors of the community and preparation of a SIMP.
- **Foxleigh Project (Middlemount, Qld) – Stakeholder Consultation Coordinator and SIA Manager.** Design and implementation of a stakeholder consultation program for the preparation of an EIS for the Minyango underground mine. Preparation of the SIA component of the EIS and SIMP.
- **Belvedere Project (Moura, Qld) – Stakeholder Consultation Coordinator and SIA Manager.** Design and implementation of a stakeholder consultation program for the preparation of an EIS for the Belvedere underground coal mine. Preparation of the SIA component of the EIS.
- **Innes Park South Quarry Project (Bundaberg, QLD) – Project Manager for the preparation of a Material Change of Use Application for the establishment of a new basalt quarry on rural land in Innes Park.** Completion of town planning report and design and implementation of a targeted community consultation process.
- **Eagle Downs Project (Moranbah, Qld) – Stakeholder Consultation Coordinator and SIA Manager.** Design and implementation of a stakeholder consultation program for the preparation of an EIS for the Peak Downs East underground mine. Preparation of the SIA component of the EIS.

- Mount Arthur North Coal Project (Hunter Valley, NSW) – Environmental Planner assisting with the compilation and final production of the EIS document.
- Darling Anabranch Pipeline and Environmental Flows EIS (Murray Darling Basin Commission) – Project Coordinator for planning and environmental approvals/specialist consultation advisor and social impact assessor.
- QNI Yabulu Nickel Refinery Extension Project EIS (QNI Pty Ltd), (Townsville, Qld) – Consultation/Social/Planning Manager for the preparation of an EIS for the refinery extension.
- Dalrymple Bay Coal Terminal Stages 6 & 7 Expansion EIS, (Ports Corporation of Queensland) – **Assistant Project Manager/Land Use Planner/Social Impact Assessor/Consultation Manager**. These roles involved management of multiple stakeholders as well as leading and developing a multidisciplinary design and implementation team.
- Bribie Island Road Upgrade (Main Roads) (Bribie Island, Qld) – Design and implementation of a community consultation program for the identification of a preferred option for road upgrade.
- Lincoln Southern Bypass (Lincolnshire County Council) – Design and implementation of a community consultation program for the conceptual and detailed design of a Southern Bypass road.
- Alcan Gove Alumina Refinery Expansion Project (Gove, NT) – Design of indigenous and non-indigenous stakeholder consultation program for the EIS. Development of the SIA methodology for the preparation of the EIS.
- Naturelink Cableway EIS – Project Manager/Land Use Impact Assessor/Consultation advisor and Social Impact Assessor.
- Interconnection to the National Grid EIS (Powerlink) – Coordination of land-use and Social Impact Assessment.
- Banyo Defence Land Disposal Study and Masterplan (Department of Defence) – Project Manager for the preparation of a land use concept plan, site constraints and analysis investigation.

Social Planning Studies

- Social Sustainability Assessment of Northern England Coalfield Communities (Northern England Economic Development Board) – Project involved a detailed sustainability assessment of 20 coalfield communities, prioritisation of communities for social infrastructure investment and development of investment programs for high priority communities.
- Preparation of Community Housing and Environmental Health Plans (CHEHP) NSW DAA/DPWS – Social Planner/Community Adviser
- Toomelah/Boggabilla Community Housing and Environmental Health Plan (CHEHP).
- Lightning Ridge/Collarenebri Housing and Environmental Health Plan.
- Gulargambone/Coonamble Aboriginal Community Development Program Early Works Implementation National Aboriginal Health Strategy.

These projects role involved assessment of community environmental health encompassing housing provision and condition as well as access to services and facilities. The role encompassed extensive consultation and negotiations with the Indigenous Community including the management of an Ingenious Working Party. Recommendations were made for the provision of additional facilities and services.

Funding mechanisms were identified for the provision of additional housing and services and facilities. Implementation plan for community servicing developed.

Strategic Environmental and Planning Studies

- Regional Monitoring Report (Yorkshire and Humber Assembly UK) – Development of a new monitoring framework for monitoring the environmental economic, built and social development aspects of the Regional Spatial Strategy.
- Yorkshire and Humber Regional Spatial Strategy (Yorkshire and Humber Assembly) – Drafting of ‘outcome statements’ and background reports for the preparation of the regional planning framework.

**Countries
Worked In**

- Australia (QLD, NSW, NT, VIC), UK, Philippines.
- UK residency visa.

Areas of Expertise

- Social Impact Assessment, Management and Reporting
- Quantitative and Qualitative Social Research
- Stakeholder Consultation

Qualifications

- Hon (Class I) Geographical Science, the University of Queensland, 2016
- Bachelor of Science, the University of Queensland, 2015

Career Highlights

Lauren is a Social Planner with experience in social impact assessment, community development and community engagement in Queensland, New South Wales, Victoria and Western Australia. She holds a Geographical Science degree which included the study of wider social impacts and demographics, an Honours degree of Geography specialising in Social Inclusion and Exclusion regarding large scale infrastructure and has had experience through working at GHD and Hansen Bailey. Currently, Lauren is assisting with social impact assessments and consultation to inform the EIS process for a proposed bauxite mine in the Cape York Peninsula and a proposed gold mine in New South Wales. Lauren also has experience in engaging with Traditional Owners and the assessment of significant social impacts on Indigenous communities.

Employment History

HANSEN BAILEY, Brisbane (June 2018 – Present)

Social Planner

GHD Pty Ltd, Brisbane (January 2017 – June 2018)

Stakeholder Engagement and Social Sustainability Consultant

Project Experience**Social Impact Assessment (SIA)/Community Consultation**

- Boggabri Coal Mine (BCM) (Boggabri, NSW) (Idemitsu) (under preparation) Social Impact Management Plan (SIMP) – Preparation of a SIMP for the existing operations at BCM.
- Aurukun Bauxite Project (Aurukun, QLD) (Glencore) (under preparation) – SIA. Providing assistance for the preparation of an SIA, including consultation, for a substantial greenfield bauxite mining operation nearby the town of Aurukun. Project involves bauxite mining and processing, barging and transshipment activities. The SIA will require assessment of the potential social and economic impacts of the project on the relevant Traditional Owners.
- Aurukun Bauxite Project (Aurukun, QLD) (Glencore) (under preparation) – EIS Consultation. Providing assistance for the preparation of EIS consultation, including stakeholder identification, distribution of project materials, provide support to Glencore when on-country, maintain a stakeholder database and consult with stakeholder regarding EIS approvals timeframes.

- Tcharawopin Project (Aurukun, Qld) (Glencore) (complete) – SIA and stakeholder engagement. Providing assistance for the preparation of an Scoping Study and SIA for a greenfield bauxite mining operation nearby the town of Aurukun within the Aurukun Shire. Project included assessing the feasibility of bauxite mining, and barging activities in local river systems and coastal zone. Design of a community engagement program for Indigenous and non-Indigenous stakeholder engagement. The project assessment found this project not feasible.
- McPhillamys Gold Project (Blayney, NSW) (Regis Resources Limited) (under preparation) – SIA and stakeholder engagement. Providing assistance for the preparation of an SIA, including consultation, for a greenfield open cut gold mine operation in Blayney LGA. Project involves gold mining and processing on site. The SIA will require assessment of the potential social and economic impacts of the project on the relevant communities and near neighbours.
- Moranbah North Extension Project (Moranbah, QLD) (AngloAmerican) (under preparation) – Project Coordinator. Providing assistance for the preparation of a Major Environmental Authority (EA), whilst offering assistance to the Project Manager. Project involves extending the existing section of underground longwall mining. Assist with project scheduling and the submission of an EPBC Act Referral and in documenting a response for a request for information.
- Dartbrook Project (Hunter Valley, NSW) (submitted) – Modification SIA desktop report preparation. Providing assistance for the existing Dartbrook Mine through the completion and submission of an SIA for the project modification. Report included updating the social baseline and compiling and assessing project impacts.

GHD project experience includes:

- Business Impact Assessments (internal) – report diagnostics;
- Toowoomba Heritage Tunnel Upgrade Project – stakeholder engagement;
- Sydney Metro – SIA;
- North East Link (NEL) Tunnel – SIA and Options Analysis;
- Argyle Diamond Mine Closure – SIA;
- Moreton Bay Regional Council – community engagement toolbox development;
- Gold Coast Council Waste and Water Management – survey development and generate annual reports; and
- Riverside Drive Property Development – stakeholder engagement.

APPENDIX B

SIA Guideline Core Principles

Table B-1
Application of SIA Guideline Core Principles

SIA Core Principle	Application in the SIA
Action-oriented	Sections 8 demonstrates outcomes that are practical, achievable and effective.
Adaptive	The Social Impact Assessment (SIA) illustrates adaptive management and monitoring measures to support the projects continued improvement. Community feedback has informed the development of the preferred mine layout and contributed towards the development of mitigation measures.
Distributive Equity	The SIA describes how the impacts and benefits of the project are likely to be distributed across time, space (geography) and socially (amongst different groups within society). The Economic Impact Assessment (Aegis Group, 2020) describes the distribution of economic benefits of the project. Key strategies to manage the impacts of subsidence on private and public infrastructure were identified in consultation with relevant stakeholders. Existing social equity in the project's social area of influence is described in Section 8.
Impartial	The SIA is written in an impartial manner. The information provided in the SIA is objective and independent; it is supported through technical reports, as well as through consultation outcomes. It is not prejudice. The SIA reports community views and 'voices' faithfully, and these views have informed the consideration of impact significance. The SIA has been developed by Bronwyn Pressland and Lauren Jessup. A declaration of authorship and independence is included at the front of this report.
Inclusive	Consultation with affected and interested stakeholders, and near neighbours has informed this SIA. A variety of engagement mechanisms were employed for the SIA including Open Days, structured face to face meetings, presentations and community surveys. The scope of SIA engagement is described in Section 6.3.
Integrated	Where relevant and possible, this SIA references analyses from other assessments to avoid duplication and double counting of impacts in the Environmental Impact Assessment. The SIA references academic studies, as well as community minutes and data from other resource projects in the Region to identify any further potential community concerns and inform the assessment of likely impact significance.
Life Cycle Focus	The SIA examines the potential impacts of the project across the project life. The SIA examines the cumulative impacts of other industrial projects (i.e. mining, transport, quarry etc.) throughout the project life cycle.
Material	The SIA provides a clear and detailed breakdown of social impacts that matter the most to the impacted community. The significance of the identified project impacts is presented in Section 8.15. Mitigation and

SIA Core Principle	Application in the SIA
	management measures are applied to the predicted impacts and the significance of each impact is rated.
Precautionary	The SIA considers the precautionary principle and addresses uncertainty by identifying and taking into consideration a breadth of potential social impacts. The identification of social impacts has been informed by the experiences of communities located in proximity to existing mining areas.
Proportionate	The SIA includes a detailed social baseline based on relevant social indicators, and documents conditions and trends without the project (Section 7 and Appendix F).
Rigorous	Appropriate and robust evidence gathered from authoritative sources including consultation has been used to support information presented in the SIA. The SIA considers how social impacts are valued, experienced, and distributed between groups and or individuals in the community.
Transparent	All information and assumptions in this SIA are explained and justified. People engaged can clearly identify how their input has been considered throughout the report, including concerns raised and resulting management measures.

APPENDIX C

SIA Guideline Checklist

Table C-1
NSW SIA Guideline Review Questions, 2017⁸

No.	Question	Requirement Responses
General		
1	Has the applicant applied the principles in Section 1.3? How?	Yes. The Social Impact Assessment (SIA) principles have been applied in the SIA and are described in Table B-1 of Appendix B.
2	Does the lead author of the Scoping Report meet the qualification and skill requirements in Box 2?	Declaration (page i) in SIA. SIA Appendix A (SIA author curriculum vitae).
3	Does the lead author of the SIA component of the Environmental Impact Statement (EIS) meet the qualification and skill requirements in Box 4?	Declaration (page i) in SIA. SIA Appendix A (SIA author curriculum vitae). The author does not have membership with any professional organisations.
4	Has the lead author of the SIA component of the EIS provided a signed declaration certifying that the assessment does not contain false or misleading information?	Declaration (page i) in SIA.
Community engagement for social impact assessment		
5	Does the SIA include adequate explanations of how the engagement objectives have been applied? How?	Details of engagement methods and outcomes, including how engagement objectives have been applied are detailed in Section 4 and 6 of the SIA.
6	Does the SIA demonstrate that there has been a genuine attempt to identify and engage with a wide range of people, to inform them about the project, its implications and to invite their input? How?	Engagement for this SIA was undertaken and documented in accordance with the guideline and its principles. An attempt to identify and engage with a wide range of people was undertaken during SIA consultation. SIA methodology and SIA consultation are further described in Section 4 and 6. SIA Section 6.3.3 summarises the outcomes of this engagement.
7	Does the SIA demonstrate that an appropriate range of engagement techniques have been used to ensure inclusivity and to ensure the participation of vulnerable or marginalised groups? How?	A number of different engagement techniques were employed to gather input and information into the SIA. The method of engagement is described in the SIA Section 4 and 6. Inclusive participation in engagement was encouraged and vulnerable and marginalised groupings were contacted through non-government organisations and Traditional Owner representatives. The Aboriginal Cultural Heritage Assessment captures consultation with Aboriginal stakeholders.

⁸ These review questions are generally adapted from Vanclay, F. et. al. (2015).

Scoping – area of social influence		
8	Does the Scoping Report identify and describe all the different social groups that may be affected by the project?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
9	Does the Scoping Report identify and describe all the built or natural features located on or near the project site or in the surrounding region that have been identified as having social value or importance?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
10	Does the Scoping Report identify and describe current and expected social trends or social change processes being experienced by communities near the project site and within the surrounding region?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
11	Does the Scoping Report impartially describe the history of the proposed project, and how communities near the project site and within the surrounding region have experienced the project to date and others like it?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
Scoping – identifying social impacts		
12	Does the Scoping Report adequately describe and categorise the social impacts (negative and positive), and explain the supporting rationale, assumptions and evidence for those categories?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
13	How has feedback from potentially affected people and other interested parties been considered in determining those categories? Does the Scoping Report outline how they will be engaged to inform the preparation of the SIA component of the EIS?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
14	Does the Scoping Report identify potential cumulative social impacts?	Yes. The Scoping Report is adequately reflected in Section 2, Section 4 and Appendix D of the SIA. Scoping Phase outcomes are detailed in Appendix D of the SIA.
Social baselines study		
15	Does the SIA component of the EIS discuss the local and regional context in sufficient detail to demonstrate a reasonable understanding of current social trends, concerns and aspirations?	Yes. Section 7, Appendix E and Appendix F of the SIA demonstrates trends, concerns and aspirations both within the local and regional context.
16	Does the SIA component of the EIS include appropriate justification for each element in the social baseline study, and provide evidence that the elements reflect the full diversity of	Yes. The discussion in Section 7, Appendix E and Appendix F of the SIA is based on the full diversity of views expressed and potential experiences in the affected community, across a range of stakeholders.

	views and potential experiences in the affected community?	
17	Does the social baseline study include an appropriate mix of quantitative and qualitative analysis, and explain data gaps and limitations?	Yes. Section 7, Appendix E and Appendix F of the SIA present both quantitative and qualitative analysis and explains limitations in accordance with accepted social science research methods.
Prediction and analysis of impacts		
18	Does the SIA component of the EIS include an appropriate description of the potential impacts in terms of the nature and severity of the change and the location, number, sensitivity and vulnerability of the affected stakeholders?	Yes. Project impacts and opportunities have been captured and discussed in Section 8 in the SIA.
19	Does the SIA component of the EIS identify potential impacts at all stages of the project life cycle?	Yes. Project impacts and opportunities have been captured and discussed in Section 8 in the SIA. Section 8 in the SIA presents impacts and opportunities at both the local and regional area level, cumulative impacts and opportunities and potential mine closure impacts and opportunities. Section 8 also presents the Impact Significance Assessment Tables.
20	Does the SIA component of the EIS appropriately identify and justify any assumptions that have been made in relation to its predictions?	Yes. The local hire assumptions are supported by labour market analysis and analysis of the existing workforce and residential characteristics of surrounding Centennial mine operations.
21	Does the SIA component of the EIS include appropriate sensitivity analysis and multiple scenarios to allow for uncertainty and unforeseen consequences? If relevant, does it include comparisons with studies of similar projects elsewhere?	Scenario testing was not considered necessary for the SIA due to the labour market conditions and strong confidence in the robustness of the hiring patterns.
Evaluation of significance		
22	Does the SIA component of the EIS explain how impacts were evaluated and prioritised in terms of significance?	Section 8 and 8.15 of the SIA describe the methodology for the significance assessment. Project impacts and opportunities have been captured and discussed in Section 8 of the SIA. Section 8.15 of the SIA discusses the Impact Significance Assessment.
23	Does the evaluation of significance consider cumulative aspects where relevant?	Yes, where relevant the SIA considers cumulative impacts and opportunities. Project impacts and opportunities have been captured and discussed in Section 8.
24	Does the evaluation of significance consider the potentially uneven experience of impacts by different people and groups, especially vulnerable groups?	Project impacts and opportunities have been captured and discussed in Section 8 of the SIA.
Responses and monitoring and management framework		

25	Does the SIA identify appropriate measures to avoid, reduce, or otherwise mitigate any significant negative impacts of the project, and justify these measures?	Yes. Section 8 of the SIA details management measures, monitoring and reporting approaches.
26	Does the SIA explain and justify measures to secure and/or enhance positive social impacts?	Yes. Section 8 and Section 9 of the SIA details management measures, monitoring and reporting approaches.
27	Does the SIA component of the EIS impartially assess the acceptability, likelihood and significance of residual social impacts?	Yes. Section 8 and Section 9 in the SIA details management measures, monitoring and reporting approaches.
28	Does the SIA component of the EIS propose an effective monitoring and management framework?	Yes. Section 8 and Section 9 in the SIA details management measures, monitoring and reporting approaches.
Modifications (Introduction – application)		
29	Are the social impacts associated with the modification expected to be new or different (in terms of scale and/or intensity) to those that were approved under the original consent? If yes, apply the review questions above to the SIA component of the environmental assessment.	Not applicable.

APPENDIX D

Scoping Assessment

Table D-1 presents the outcomes of the Social Impact Assessment (SIA) scoping assessment including the preliminary significant assessment for each impact and whether the impact is to be considered further in the SIA. The scoping assessment takes into consideration the findings of SIA consultation but not the findings of the Environmental Impact Statement (EIS) technical studies.

Table D-1
SIA Scoping Outcomes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
1	Creation of job opportunities	The project would require up to 50 full-time equivalent (FTE) workers during construction and up to 320 FTE workers during Operations. These job opportunities will be generated in the Lake Macquarie Local Government Area (LM LGA). These job opportunities would be filled by current residents of the LM LGA and the broader Newcastle-Maitland Significant Urban Area (NM SUA).	The project will generate new job opportunities (direct and indirect) in the LM LGA. The project will generate employment opportunities for residents residing within an approximate 1 hr commute of the Project Application Area (PAA).	- Direct and indirect employment generation is almost certain. - The project would contribute to the maintenance of employment levels in the LM LGA. - The project may draw back existing residents who currently commute outside of the LM LGA for work. - The project may contribute to labour force growth in the LM LGA by attracting new workers to the LGA. - The project may result in an increase in the number of people employed in the mining sector in the LM LGA.	Impact: Positive Likelihood: Likely Duration: Project Life Extent: Broad Extent of Change: Moderate Sensitivity: Low Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
2	Business supply arrangements	- The project would require additional goods and services which would be drawn in part from suppliers located in the LM LGA. - During construction, contractors would be encouraged to engage local construction companies and other businesses. - Centennial has existing relationships with local suppliers for existing mining operations including care and maintenance activities.	- Local and regional businesses would benefit from new or continuing supply arrangements. - The project presents an opportunity for Centennial Newstan to increase engagement with businesses in the LM LGA.	- Continuation of existing supply arrangements is likely. - Potential for improved business confidence which may lead indirectly to the generation of additional employment opportunities.	Impact: Positive Likelihood: Likely Duration: Project Life Extent: Broad Extent of Change: Low Sensitivity: Low Further Consideration: Yes – consider local and regional supply in the Economic Impact Assessment.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
3	Introduction of a new workforce	- The majority of the construction and operations phase workforces will be drawn from the LM LGA and broader NM SUA. These areas have an existing pool of skilled and capable labour experienced in mining, and an available labour pool based on current unemployment rates. - The geographic distribution of the project operations workforce would be similar to that of the Newstan Colliery workforce prior to care and maintenance and similar to that of other Centennial mines in the local area i.e. Myuna and Mandalong Mines. - The majority of the operations phase workforce would remain in their current residential location and commute on a daily basis to Newstan Colliery. - A very small proportion of the operations workforce (less than 10%) is anticipated to relocate to the LM LGA and the broader NM SUA.	- Increased demand for housing and changes in housing market. - Increased demand for short-term accommodation during construction phase.	- Displacement of vulnerable groups/individuals from rental accommodation considered unlikely due to anticipated project induced housing demand. - Reduction in availability of short-term accommodation for visitors and service providers unlikely given size of the construction workforce (50 FTE) and anticipated origin of operations workforce. - Housing and rental market inflation unlikely given anticipated demand.	Impact: Neutral Likelihood: Unlikely Duration: Short-term and temporary Extent: Broad Severity: Low Sensitivity: Low Further Consideration: No – Given the size of the potential workforce moving into the LM LGA (less than 10%) and the geographical area in which these people could be accommodated, any demand generated by the new incoming residents could be easily absorbed by the existing housing market.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
4	Introduction of a new workforce	Majority of workforce will be drawn from the LM LGA and broader NM SUA. A very small proportion of the operations phase workforce is anticipated to move into the LM LGA and broader NM SUA.	Increased demand for local services and facilities during operations.	- Any additional demand for services and facilities is considered to be small and will help to stimulate supply of new services and facilities. - Considered unlikely that the project will result in any increased demand for children's services (childcare and school) that necessitates the provision of additional infrastructure or funded enrolment places. - Considered unlikely that the project will reduce access for existing residents to key services and facilities e.g. health services and childcare services. - Considered unlikely that the project will increase wait times and decrease appointment availabilities for local services due to more people needing access to services and facilities.	Impact: Neutral Likelihood: Unlikely Duration: Short-term Extent: Broad Severity: Low Sensitivity: Low Further Consideration: No – Given the size of the potential workforce moving into the LM LGA and the large geographical area in which they could relocate, any incoming residents are unlikely to generate any noticeable additional demand for services and facilities i.e. education, health, etc.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
5	Introduction of a new workforce	- Majority of workforce will be drawn from the LM LGA and broader NM SUA. - A very small proportion of operations phase workers is anticipated to move into the LM LGA and broader NM SUA.	Population growth in the LM LGA. This is anticipated to be minor with the introduction of a very small number of new households.	Strengthening of social fabric in local area due to addition of new people with skill sets, knowledge and interests. Increased volunteer base.	Impact: Positive Likelihood: Likely Duration: Long-term Extent: Broad Extent of Change: Low Sensitivity: Low Further Consideration: No – Given the size of the potential workforce moving into the LM LGA and the large geographical area.
6	Recommencement of mining	Recommencement of mining related activities in the locality.	Impacts to private property values.	- Adverse changes in property values. This is unlikely to occur due to the separation of operational activities from nearby residential areas and the history of mining land use in proximity to residential areas. - Property prices reflect the presence of mining activity. It is unlikely that continued mining would cause a sudden decline in property values.	Impact: Neutral Likelihood: Unlikely Duration: Medium-term Extent: Localised Severity: Low Sensitivity: Low Further Consideration: No

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
7	Recommencement of mining	The project will supply coal to the Eraring Power Station (EPS).	- Continued supply of coal to EPS. - Continued local supply of coal eliminates demand for coal to be imported from other non-local mines.	- Energy security. - The project will facilitate the continued supply of coal to Australia's largest power station, securing energy for the region. Reduction in emissions associated with transporting coal from out of the area. - Improved amenity for communities beyond LM LGA due to a reduction in coal train movements through these communities.	Impact: Positive Likelihood: Likely Duration: Project Life Extent: High Extent of Change: Moderate Sensitivity: High Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
8	Mine Closure	- The project will have a mine life of 15 years. Mine Closure planning will commence five years prior to proposed mine closure. The project is comprised of cleared areas i.e. surface sites, haul roads, suitable for other industry/development. - Subsidence from mining activity may result in the failure of the overlying historic Awaba workings. Full failure of the historic Awaba workings will provide surety of ground stability within the Extension of Mining Area (EMA).	- Implications for future urban growth in LM LGA and planning directions for communities neighbouring the PAA. - Alignment with future land development aspirations of LMCC for the Greater Newcastle - Lake Macquarie Area. - Long-term stability of the surface area within the EMA presents opportunities for LMCC future land development aspirations.	- Potential realisation of long-term land use aspirations for key stakeholders e.g. LMCC. - The findings of engagement with LMCC indicate that although the LMCC is looking towards industry diversification, mining remains a major economic contributor to the region. LMCC noted that they hoped Centennial would consider the potential opportunities presented by existing infrastructure i.e. haul roads etc. in mine closure and post mine land use planning. LMCC noted limited availability of degraded and cleared land in the LM LGA and indicated the surface areas of Awaba Colliery and Newstan post mining would be valuable to LMCC for development. - Given the land use within the proposed EMA, restrictions to possible growth aspirations are unlikely. Mining is proposed under previously mined seams (i.e. unstable workings) and infrastructure (power station), as well as conservation bushland. Thus, urban growth is unlikely in these areas.	Impact: Positive Likelihood: Likely Duration: Long-term Extent: Broad Extent of Change: High Sensitivity: Moderate Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
9	Mine Closure	Mine closure, cessation of local spend and loss of 320 FTE mining jobs.	Withdrawal of sustained economic stimulus (i.e. jobs, supply etc.) impacts the socio-economic baseline of Lake Macquarie LGA.	- Job loss and relocations due to redundancies may affect social networks. - Reduction in mining labour force in the LM LGA and NM SUA. - De-skilling of the LM LGA and NM SUA if mining labour leaves the mining industry.	Impact: Negative Likelihood: Likely Duration: Medium-term post mine closure Extent: Broad Severity: Uncertain Sensitivity: Moderate Further Consideration: Yes
10	Mine Closure	- Interruptions to or cessation of operations would see a reduction in traffic to and from the NCSS Facilities, a reduction in any noise or dust emissions associated with ACSS Facilities and NCLP. - Following the end of production, the facilities would be decommissioned and surface facilities at Awaba (with the exception of any heritage-protected items) would be demolished.	Reduction in noise and dust emissions.	Changes in use and enjoyment of private property.	Impact: Positive Likelihood: Likely Duration: Short-term Extent: Localised Extent of Change: Low Sensitivity: Low Further Consideration: No

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
11	Subsidence	- The project proposes extraction beneath Eraring Ash Dam (EAD). The project does not involve mining beneath the western saddle wall of the EAD. - Centennial proposes to adopt an adaptive approach to mining beneath the EAD in order to minimise risks and manage impacts. - Technical studies and continued monitoring will inform the approach closer to the time of mining. - Full and partial extraction will result in subsidence effects. A heightened level of concern currently exists in communities neighbouring the EAD due to the recent closure of Myuna Bay Sport and Recreation Centre and media coverage.	Resident health and wellbeing.	Stress and anxiety. The project exacerbates existing anxiety in relation to the potential for EAD failure and resulting environmental social and economic costs.	Impact: Negative Likelihood: Likely Duration: Project Life - until mining beneath the Ash Dam has concluded. Extent: Broad Severity: Moderate Sensitivity: High Further Consideration: Yes - The SIA will acknowledge the existing public concern in relation to the stability of the EAD wall and reflect on the potential of the project to further exacerbate existing stress and anxiety.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
12	Subsidence	The project proposes extraction beneath the EAD. Full and partial extraction will result in subsidence effects. Subsidence effects may include changes in permeability within the surface zone of the EAD. There is an existing interaction between the workings of Awaba Colliery and the EAD. Newstan and Awaba Collieries will become hydraulically connected to each other and to the EAD through mining induced fracture networks. The groundwater discharges from Awaba Colliery would report to either the artesian outflow in the south-west of Awaba Colliery or the discharge overflow point at Newstan Colliery.	Potential impacts to recognised environmental assets and values including surface water and groundwater and biodiversity.	- Broader community may experience anxiety and concern due to the perceived impacts of the mining beneath the EAD on recognised environmental assets and values (e.g. groundwater quality and Lake Macquarie). - Lake Macquarie is a significant regional asset. The community is likely to be significantly concerned about any action that may threaten passive and active use and enjoyment of Lake Macquarie.	Impact: Negative Likelihood: Likely Duration: Long-term Extent: Broad Severity: Moderate Sensitivity: High Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
13	Subsidence	- The project proposes extraction beneath a range of public and private infrastructure including the EPS, the EAD and the Main Northern Railway line. Centennial has engaged in discussions with the relevant infrastructure owners in relation to project acceptability. First workings only (i.e. no partial or full pillar extraction) are planned within a 35 degree angle of draw from EPS infrastructure, in accordance with existing approved mining lease conditions. - In relation to the Main Northern Railway, the proposed workings have been designed to incorporate a 165 m barrier, with a 26.5 degree angle of draw projected from the Awaba Great Northern seam workings to the West Borehole seam. This barrier is significantly larger than the 20 m offset and 35 degree angle of draw from the rails to the West Borehole seam that has been historically maintained around the Main Northern Railway and as prescribed in Centennial Newstan's mining lease conditions.	- Impacts to privately owned infrastructure. - Power generation and/or power failure due to subsidence impacts.	- Potential costs will accrue to the NSW public due to impacts to public infrastructure. - Potential impacts to way of life and livelihood resulting from power outages due to project induced damage to EPS infrastructure. - Impacts to infrastructure will be managed through mine design changes to minimise negative social outcomes. Centennial has initiated conversations with Origin Energy. Extraction underneath the EPS is unlikely to result in any impact to and/or changes to power generation.	Impact: Negative Likelihood: Unlikely due to safeguards already included in the mine design and findings of engagement with infrastructure owners. Duration: Short-term (if it occurs at all) Extent: Broad Severity: Low Sensitivity: Moderate Further Consideration: No - The issue is further considered in the subsidence assessment for the EIS.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
14	Subsidence	- Extraction is proposed beneath the Awaba Biodiversity Conservation Area, the majority of which is located in the first workings area. - Bord and pillar mining techniques will be used to mine beneath the Awaba Biodiversity Conservation Area to minimise the impacts to biodiversity. - There are other conservation areas in the LM LGA that have higher conservation values and offer greater variety of passive and active recreational opportunities than the Awaba Biodiversity Conservation Area. - The project is not proposing the removal of native vegetation, however, there is the potential for impacts to threatened plants and ecological communities from subsidence, cracking, sinkholes, plug-failures and ponding. Awaba Biodiversity Conservation Area is a valued natural asset in the locality. - Environmental qualities both in the local area and broader LM LGA are integral to community values. The Awaba Biodiversity Conservation Area is valued for	Impacts to valued natural and cultural attributes of Awaba Biodiversity Conservation Area.	Residents may feel anxiety about any transformation of the land through subsidence, or potential environmental impacts. Residents may experience a sense of loss if the Awaba Biodiversity Conservation Area is disturbed.	Impact: Negative Likelihood: Likely Duration: Medium-term Extent: Localised Severity: Low Sensitivity: Low Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
		conservation and preservation of biodiversity and wildlife.			
15	Subsidence	As above (14).	Limitations on public use and accessibility to the Awaba Biodiversity Conservation Area.	- Loss of access to valued passive and active recreational resources. - SIA consultation findings indicate limited public use and enjoyment of the Awaba Biodiversity Conservation Area. Some individuals and/or groups periodically walk in the area. There are other more accessible recreational areas with similar or higher natural value, in locations proximate to the Awaba Biodiversity Conservation Area. The area was found to be used on occasion by dirt bikes. Consultation also indicates that the Rural Fire Brigade access the Awaba Biodiversity Conservation Area for fire management when required.	Impact: Negative Likelihood: Unlikely Duration: Short-term Extent: Localised Severity: Low Sensitivity: Low Further Consideration: No - The Awaba Biodiversity Conservation Area will be described in the SIA.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
16	Subsidence	- Potential for subsidence of Kilaben Creek, Stockyard Creek, Stony Creek and Crooked Creek which overlie the EMA leading to changes in environmental integrity. - Portions of these creek systems are protected in the mine plan by only having first workings undertaken underneath and in vicinity of the creeks to prevent subsidence. - LT creek is located outside the EMA and will not be impacted by the project. - LT Creek has already experienced impacts due to historic mining activity in the locality. - Licensed discharges into LT Creek at Licenced Discharge Point 001 will increase as a result of the project, however discharge will be within the limits of the already approved 11 ML.	Impacts to valued environmental assets (creek systems and surface areas) within and adjoining the EMA.	- Residents may feel anxiety about any transformation of the land through subsidence, or potential environmental impacts. - Consultation findings indicate that the creek systems traversing in the PAA, in particular LT Creek and Stony Creek, are highly valued by the neighbouring community as natural assets that support biodiversity and contribute to way of life and the quality of surroundings for nearby residents. During consultation participants highlighted the importance of sustaining water flows in the creeks that traverse the EMA. - The creeks traversing the EMA form part of the Lake Macquarie catchment. Lake Macquarie is a valued community asset. Any potential impacts to Lake Macquarie will be of interest and concern to the communities surrounding Lake Macquarie.	Impact: Negative Likelihood: Unlikely Duration: Medium-term Extent: Localised Severity: Low Sensitivity: High Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
17	Subsidence	- Subsidence induced fracturing may result in impacts to groundwater quantity. - Limited demand for groundwater in the local area. Groundwater quantity previously impacted by old Awaba workings.	Reduction in the quantity or quality of groundwater in private bores.	Potential quality of life and livelihood impacts for nearby landowners with private bores.	Impact: Negative Likelihood: Unlikely Duration: Medium-term Extent: Unknown Severity: Unknown Sensitivity: Low Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
18	Subsidence	- Land within the PAA is significant to the Awabakal and Guringai Traditional Owners. - The recent history of the Lake Macquarie Region is characterised by the cultural resilience of Aboriginal Peoples, for both those who have retained connection to Country and those that are reconnecting to Country. Landscape, vegetation and watercourses of the Lake Macquarie LGA form part of an Aboriginal cultural landscape of traditional and contemporary cultural and spiritual value to many Aboriginal People. - There are seven previously recorded Aboriginal heritage sites located within the area surveyed for the Aboriginal Cultural Heritage Assessment, and a further site located within a 300 m boundary of the survey area. - Five of the Aboriginal heritage sites are located directly above the proposed mining area and two are located outside of direct impacts.	- Loss or damage to valued cultural assets. - Impacts to valued environmental assets.	- Erosion of Indigenous cultural values within the EMA. - Changes in access to country. - Reduction in natural resources for traditional collection. - Traditional owners may feel anxiety about any transformation of the land through subsidence, or potential environmental impacts. - SIA consultation with representatives of the Northern Holdings Aboriginal Cultural Heritage Management Plan Committee indicates some concern in relation to the management of artefacts on existing Centennial mining sites. These stakeholders expressed concerns in relation to the continued loss of access to traditional land.	Impact: Negative Likelihood: Likely Duration: Project Life Extent: Moderate Severity: Moderate Sensitivity: High Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
19	Subsidence	- There are no Commonwealth, National, State, or S170 Heritage and Conservation Register listed heritage items or places located within the project area. - There are three locally listed heritage items located within or partially within the assessment study area: - The EPS, located within the EMA; - The Great Northern Railway, located within the EMA; and - The Newstan Colliery located within the NCSS. - There are two potential (unlisted) heritage items located within the project area: - The Awaba State Coal Mine, located within the ACSS; and - The Awaba to Wangi Power Station Branch Railway line, located within the EMA. - There is an additional potential (unlisted) heritage item located outside but in close proximity to the project area: - The Bridge over Main Northern Railway line, located in proximity to the EMA.	Loss or damage to valued cultural assets.	- Loss or damage to valued historic community connections. - Loss or damage to community identity and sense of place through changes to valued historic elements. - Historic heritage concerns were not raised during SIA consultation.	Impact: Negative Likelihood: Possible Duration: Project Life Extent: Localised Severity: Unknown Sensitivity: Low Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
20	Construction and operation of new surface facilities at Awaba Colliery	Construction and operation of new gas flaring facility, and installation of three new fans at existing ventilation shafts at ACSS.	Changes in residential amenity (noise, air [odour], visual) for residents proximate to ACSS (Awaba Village) during both construction and operations.	- Impacts to way of life including use and enjoyment of private property. - Potential impacts to lifestyle aspirations. Potential impacts to private property values. - Potential health and wellbeing impacts associated with sleep disturbance. - During SIA consultation Awaba residents expressed concern regarding the potential for project related noise and dust to impact residential amenity. Consultation findings also suggest that the construction of the new shaft at the ACSS had an impact on the residential amenity of some nearby neighbours located in Awaba.	Impact: Negative Likelihood: Possible Duration: Short-term and temporary Extent: Localised Severity: Low Sensitivity: Moderate Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
21	Construction and operation of new surface facilities in Awaba Colliery	- Increase in vehicle traffic on entrance road to the ACSS during construction. An estimated project related 100 daily light vehicle movements are anticipated via Wilton Road during construction. The construction phase will last up to 11 months. - During operations less than 20 vehicles are anticipated to access the ACSS. - Wilton Road is a local road that provides access to Awaba township as well the Lake Macquarie - Awaba Community Recycling Centre (at the Awaba Waste Management Facility), the Awabawac Park and the Newcastle Lake Macquarie Clay Target Club. - Residences are concentrated in the Awaba township.	Change in existing residential amenity for residents due to introduction of additional traffic and associated vehicle noise and fumes.	- Impacts to way of life including use and enjoyment of private property. - Potential health and wellbeing impacts associated with sleep disturbance, vehicle fumes and public safety. - Impacts on local accessibility for existing residents and visitors. - Consultation findings suggest that increased traffic movements are not of concern, rather increased noise and the potential for traffic noise is of concern to Awaba residents.	Impact: Negative Likelihood: Unlikely Duration: Short-term Extent: Localised Severity: Low Sensitivity: Low Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
22	Underground mine workforce	- Project will have an operations workforce of 320 FTE. The majority of this workforce will be based at the NCSS. - Approximately 10% of the workforce is anticipated to carpool. - Shift changes are proposed for 7:00am, 3:00pm and 11:00pm. Weekday workforces will be larger than the weekend workforce. - During operations, the majority of project generated traffic will be distributed on Miller Road and Fassifern Road, and Miller Road and Macquarie Road. - The proposed operational workforce requiring access to the NCSS as part of the project will not exceed the approved 320 FTEs under the current Northern Coal Logistics Project (NCLP) consent (SSD-5145).	Increased traffic on the local road network.	- Reduced road safety. The potential for the project to increase traffic on local roads was a concern for stakeholders who participated in SIA consultation, particularly with respect to Miller Road and Fassifern St. Concerns were raised in relation to the impact of project related traffic on pedestrian and road safety outside Fassifern Public School and Charlton Christian College. - Traffic congestion and increased travel times. During consultation some residents commented on and expressed frustration at delays experienced at the viaduct on Fassifern Street. These stakeholders also expressed frustration that the project could exacerbate existing delays during peak periods.	Impact: Negative Likelihood: Possible Duration: Project Life Extent: Localised Severity: Unknown Sensitivity: Moderate Further Consideration: Yes - The SIA will discuss stakeholder perceptions of road safety, amenity and congestion due to the additional project traffic on the local road network.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
23	Infrastructure replacement at NCSS	- Utilisation of existing ventilation fans at the NCSS during first workings. - Newstan fan will be dismantled following the commencement of operation of the three new fans located at the ACSS. - The noise and air quality impacts associated with the use of the ventilation fans at the NCSS are approved under the current NCLP consent (SSD-5145).	Changes in residential amenity (noise, air [odour], visual) for residents proximate to Newstan Colliery Surface Site.	- Impacts to use and enjoyment of private property. - Sleep disturbance. - Minimal concerns were raised during SIA consultation in relation to the ventilation fans.	Impact: Negative Likelihood: Unlikely Duration: Short-term Extent: Low Severity: Low Sensitivity: Low - within approved limits Further Consideration: No

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
24	Coal processing and transport	- ROM coal will be transported from the underground workings to the NCSS by a conveyor system at a rate of up to 4 Mtpa. Once the coal reaches the NCSS it will be handled in accordance with the approved operations for NCLP (SSD-5145), managed by Centennial Coal's Northern Coal Services business unit. - NCLP has an approved capacity of 8 Mtpa. The NCLP has sufficient coal processing and transportation capacity to accommodate the project's maximum production rate (4 Mtpa) and total production over the mine life (25.9 Mt) without exceeding the throughput limits imposed under SSD-5145.	Cumulative impacts of multiple biophysical changes e.g. new noise from vent shafts at Newstan and potential additional noise/dust from increased throughput at the NCLP.	- Impacts to use and enjoyment of private property. - Sleep disturbance. - Several Wakefield residents expressed concern in relation to potential increases in noise and the frequency of noise due to the addition of Newstan coal into the NCLP processing operation. - Any impacts associated with an increase in throughput at NCLP (within the limits of the current consent) have already been assessed and approved through the NCLP consent (SSD-5145).	Impact: Negative Likelihood: Likely Duration: Project Life Extent: Localised Severity: Low - within approved limits Sensitivity: Low Further Consideration: No

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
25	Site water management	- Potential increases in discharge into Stony Creek. - Water discharged into Stony Creek is surface water captured above ground. It is not underground water that requires treatment.	Impacts to valued environmental assets (creek systems, water quality and quantity, aquatic ecology) within and outside the EMA.	- Broader community may experience anxiety and concern in relation to potential impacts on recognised environmental assets and values such as Stony Creek. - Further impacts to these creek systems will be considered unacceptable to some stakeholders. - People who feel strongly attached to these creek systems may feel a sense of loss if the environment is impacted by the project. - During SIA consultation a number of residents raised concerns in relation to the potential of the project to increase water discharges into Stony Creek. These stakeholders were concerned about the potential impacts to biodiversity and in particular wildlife.	Impact: Negative Likelihood: Possible Duration: Intermittent Extent: Localised Severity: Unknown Sensitivity: High Further Consideration: Yes

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
26	Site water management	- Potential increases in discharge into LT Creek. - There are four approved discharge points into LT Creek from NCLP. - Centennial operates within an approved daily discharge limit of 11 ML. - Water is treated by the Clean Water Plant prior to discharging.	Impacts to valued environmental assets (creek systems, water quality and quantity, aquatic ecology) within and outside the PAA.	- During SIA consultation a number of residents expressed significant attachment to LT Creek and conveyed a sense of responsibility towards the protection and management of LT Creek. These stakeholders may experience anxiety and concern in relation to the future of LT Creek and perceived threats posed by the project. - Further impact to LT creek will be considered unacceptable to some stakeholders. - People who feel strongly attached to LT Creek may feel a sense of loss if the environment is impacted by the project. - During SIA consultation some stakeholders expressed concern regarding the potential need to increase discharge into LT Creek. - It was noted that LT Creek experienced significant impacts from mining activity prior to Centennial operations, commencing in the locality.	Impact: Negative Likelihood: Possible Duration: Intermittent Extent: Localised Severity: Low Sensitivity: High Further Consideration: No - Impact will not be further considered as predicted discharge changes are approved under SSD-5145.

No.	Project Component	Assumptions	Potential Social Impacts/Opportunities	Potential Material Effects Considered	Preliminary Significance Assessment
27	Community benefits	- Financial contribution to LMCC. - Centennial will negotiate a Voluntary Planning Agreement with the LMCC.	Increased revenue for LMCC.	Opportunity for delivery of new services, programs and infrastructure for residents of the LM LGA.	Impact: Positive Likelihood: Likely Duration: Project Life Extent: Broad - LM LGA Extent of Change: Moderate Sensitivity: Low Likelihood: Likely Further Consideration: Yes

APPENDIX E

Nearby Areas of Interest Summary (State Suburb Indicators)

Table E-1
Summary Description of Areas of Interest

Area of Interest	Description
Arcadia Vale	• Located on the central western shore of Lake Macquarie, approximately 21 km (by road) south of Newstan Colliery. • A predominantly residential suburb with a public school, childhood centre and lakeside playground. • Population of 1,378 with a median age of 40. • A Socio-Economic Indexes for Areas (SEIFA) score of 981.
Blackalls Park	• Located on the north-western shore of Lake Macquarie, approximately 3 km (by road) south of Newstan Colliery. • A predominantly residential suburb with a preschool and public school, as well as a number of small businesses (fruit shop, pharmacy, pet shop, mechanic, and marine store), playgrounds, and a sewage treatment plant. The suburb also contains a train station and a large patch of bushland. • Population of 2,753 with a median age of 42. • SEIFA Score of 936.
Buttaba	• Located on the central western shore of Lake Macquarie, approximately 12 km (by road) south of Newstan Colliery. The majority of the suburb is fringed by bushland. • A residential suburb with various mechanical repair shops and a number of reserves. This suburb is predominantly bushland, with residences clustered beside the shore of Lake Macquarie. • Population of 1,101 with a median age of 42. • SEIFA Score of 1016.
Cooranbong	• Located to the west of Lake Macquarie, approximately 12 km (by road) south-west of Newstan Colliery. • A large, predominantly rural bushland suburb with a number of clustered communities. The suburb contains a number of childcare centres and churches as well as a rural fire brigade and community services centre. There are also a number of industrial shops as well as accommodation establishments and farms. This suburb is also located partly within Watagons National Park. • Population of 5,449 with a median age of 43. • SEIFA Score of 995.
Dora Creek	• Located on the central western shore of Lake Macquarie, approximately 19 km (by road) south-west of Newstan Colliery. • A rural/residential suburb with a public school, church, small strip of shops, a medical centre, and a number of small industries. Much of the suburb is bushland, with Dora Creek running through the centre of the suburb. • Population of 1,643 with a median age of 50. • SEIFA Score of 956.
Eraring	• Located on the central western shore of Lake Macquarie, approximately 16 km (by road) south-west of Newstan Colliery. • A small rural/residential suburb with a small number of large residential properties and no commercial facilities. The grounds of the Eraring Power Station (EPS) cover a large proportion of this suburb. • Population of 216 with a median age 52. • SEIFA Score of 1048.

Area of Interest	Description
Fennell Bay	- Located on the north-western shore of Lake Macquarie, approximately 2 km (by road) south-east of Newstan Colliery. - A small rural/residential suburb with a public school, a number of small shops and a veterinary clinic. The majority of the suburb is bushland and forms part of the significant Lake Macquarie Petrified Forest. - Population of 1,613 with a median age of 47. - SEIFA Score of 933.
Freemans Waterhole	- Located west of Lake Macquarie, approximately 16 km (by road) west of Newstan Colliery. - A very small rural suburb that is mostly bushland, with several farms and a petrol station. - Population of 99 with a median age of 45. - SEIFA Score – not applicable due to small suburb size.
Kilaben Bay	- Located on the central western shore of Lake Macquarie, approximately 7 km (by road) south-east of Newstan Colliery. - A rural/residential suburb with a cluster of residences on the shoreline of Lake Macquarie. There are a large number of retail shops as well as childcare centres, tourism facilities, churches and a playground. - Population of 1,431 with a median age of 45. - SEIFA Score of 1045.
Myuna Bay	- Located on the central western shore of Lake Macquarie, approximately 13 km (by road) south of Newstan Colliery. - A predominantly undeveloped bushland suburb. The grounds of the EPA (including the ash dam) cover a large proportion of this suburb. A recreation centre (Myuna Bay Sport and Recreation Centre) is located adjacent to the Lake Macquarie shoreline, with a small number of surrounding residences. - Population of 11. - SEIFA Score – not applicable due to small suburb size.
Rathmines	- Located on the central western shore of Lake Macquarie, approximately 13 km (by road) south of Newstan Colliery. - A large suburb made up of a significant urban area as well as bushland. Facilities include a number of schools, retail stores, sports clubs, eateries, playgrounds, golf courses and boating facilities. The suburb also includes a former Royal Australian Air Force base, and an industrial precinct. - Population of 1,905 with a median age of 46. - SEIFA Score of 986.
Ryhope	- Located to the west of Lake Macquarie, approximately 11 km (by road) west of Newstan Colliery. - A small rural suburb with a number of farm properties and a cemetery/crematorium. - Population of 24. - SEIFA Score – not applicable due to small suburb size.
Toronto	- Located to the south-west of Lake Macquarie, approximately 6 km (by road) south of Newstan Colliery. - A large suburb made up of a significant urban area as well as bushland. Facilities include public schools, childcare centres, parks, accommodation providers, sports clubs, churches, boating facilities, a retirement village, a

Area of Interest	Description
	Community Health Centre, and Toronto Private Hospital. The suburb also includes a large number of retail facilities, including eateries. • Population of 5,602 with a median age of 48. • SEIFA Score of 894.
Wangi Wangi	• Located on the central western shore of Lake Macquarie, approximately 16 km (by road) south of Newstan Colliery. • A residential/industrial suburb with a number of retail stores (including eateries), accommodation providers, churches, sports clubs, boating facilities, bowling club, retirement village, the Lake Macquarie State Conservation Area, and Myuna Colliery. The suburb also contains a preschool and primary school, as well as parks. • Population of 2,759 with a median age of 53. • SEIFA Score of 982.

Source: Population and median age data was sourced from ABS (2017a). SEIFA Scores were sourced from ABS (2018) and indicate the Index of Relative Socio-Economic Advantage and Disadvantage, as defined by the ABS.

Table E-2
Summary of Selected Demographic Indicators for the Nearby Areas of Interest – 2016 ABS Census

		Awaba	Arcadia Vale	Blackalls Park	Buttaba	Cooranbong	Dora Creek	Eraring	Fassifern	Fennell Bay	Freemans Waterhole	Kilaben Bay	Rathmines	Toronto	Wakefield	Wangi Wangi
Population																
Population		402	1,378	2,753	1,101	5,449	1,643	216	601	1,613	99	1,431	1,905	5,602	144	2,759
Median Age																
Median Age		40	44	42	42	43	50	52	46	47	45	45	46	48	41	53
Cultural Diversity																
Indigenous Persons	No.	30	61	152	47	183	86	0	38	67	6	44	68	395	7	115
	%	7.5%	4.4%	5.5%	4.3%	3.4%	5.2%	0.0%	6.3%	4.2%	6.1%	3.1%	3.6%	7.1%	4.9%	4.2%
Household Characteristics																
Family Households	No.	105	404	739	306	1,389	456	58	167	463	18	410	556	1,454	37	794
	%	80.8%	80.6%	71.1%	79.3%	74.1%	69.8%	79.5%	72.3%	74.1%	48.6%	80.6%	76.7%	67.1%	86.0%	71.7%
Average household size (number of persons)		2.8	2.6	2.5	2.6	2.6	2.3	2.6	2.5	2.4	2.3	2.6	2.5	2.3	2.9	2.3
Need for Assistance																
Need for Assistance	No.	28	68	198	55	364	131	9	38	117	12	46	127	622	8	155
	%	7.0%	4.9%	7.2%	5.0%	6.7%	8.0%	4.2%	6.3%	7.3%	12.1%	3.2%	6.7%	11.1%	5.6%	5.6%

		Awaba	Arcadia Vale	Blackalls Park	Buttaba	Cooranbong	Dora Creek	Eraring	Fassifern	Fennell Bay	Freemans Waterhole	Kilaben Bay	Rathmines	Toronto	Wakefield	Wangi Wangi
Dwellings																
Total occupied private dwellings	No.	134	507	1,038	385	1,868	664	77	230	626	43	509	724	2,166	42	1,108
	%	93.7%	86.1%	92.3%	88.5%	92.1%	85.5%	81.9%	92.4%	91.4%	93.5%	88.1%	90.2%	89.5%	100.0%	83.6%
Dwelling Type																
Separate House	No.	131	494	903	378	1,528	646	77	191	568	19	484	667	1,732	42	963
	%¹	91.6%	83.9%	80.3%	86.9%	75.3%	83.1%	81.9%	76.7%	82.9%	41.3%	83.7%	83.1%	71.6%	100.0%	72.6%
Tenure Type																
Fully owned	No.	49	188	411	159	626	288	47	98	246	6	226	312	772	16	467
	%	36.8%	36.6%	39.6%	41.5%	33.4%	43.6%	58.8%	42.6%	39.5%	16.7%	43.5%	43.4%	35.6%	41.0%	42.2%
Owned with a mortgage	No.	71	223	392	172	682	200	22	73	238	4	208	288	522	14	345
	%	53.4%	43.4%	37.8%	44.9%	36.4%	30.3%	27.5%	31.7%	38.3%	11.1%	40.1%	40.1%	24.1%	35.9%	31.2%
Rented (total)	No.	10	84	207	49	428	133	11	53	118	23	71	101	791	9	252
	%	7.5%	16.3%	20.0%	12.8%	22.9%	20.2%	13.8%	23.0%	19.0%	63.9%	13.7%	14.0%	36.5%	23.1%	22.8%
State or territory² housing authority	No.	0	0	30	0	7	0	0	13	27	0	0	0	283	0	0
	%	0.0%	0.0%	2.9%	0.0%	0.4%	0.0%	0.0%	5.7%	4.3%	0.0%	0.0%	0.0%	13.0%	0.0%	0.0%

		Awaba	Arcadia Vale	Blackalls Park	Buttaba	Cooranbong	Dora Creek	Eraring	Fassifern	Fennell Bay	Freemans Waterhole	Kilaben Bay	Rathmines	Toronto	Wakefield	Wangi Wangi
Housing co-operative/commu nity/church group ²	No.	0	0	0	0	60	0	0	7	6	0	0	0	13	0	4
	%	0.0%	0.0%	0.0%	0.0%	3.2%	0.0%	0.0%	3.0%	1.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.4%
Other Tenure Type/Not Stated	No.	3	19	27	3	137	39	0	6	20	3	14	18	84	0	42
	%	2.3%	3.7%	2.6%	0.8%	7.3%	5.9%	0.0%	2.6%	3.2%	8.3%	2.7%	2.5%	3.9%	0.0%	3.8%
Household Income																
Median Household income (\$/weekly)		1,597	1,366	1,139	1,435	1,232	1,154	1,312	1,238	1,204	634	1,798	1,287	1,018	1,875	1,174
Labour Force																
Labour force participation	No.	190	663	1,252	513	2,306	723	85	299	724	51	699	866	2,111	70	1,159
	%	60.7%	59.4%	55.5%	58.2%	51.2%	51.2%	47.5%	57.3%	52.5%	58.6%	60.4%	54.4%	44.6%	58.8%	49.1%
Total employed	No.	178	614	1,162	473	2,145	663	79	273	654	42	650	816	1,903	69	1,069
Unemployed persons	%	6.3%	7.2%	7.6%	6.2%	7.2%	8.3%	0.0%	8.0%	10.4%	19.6%	6.6%	5.8%	9.9%	4.3%	7.6%
Selected Key Industries																
Mining	%	6.8%	4.4%	2.0%	5.3%	2.1%	3.0%	4.5%	4.6%	2.6%	0.0%	2.6%	4.4%	2.6%	6.3%	4.3%
Manufacturing	%	12.6%	4.9%	8.0%	6.5%	10.5%	5.1%	4.5%	4.2%	8.2%	12.1%	5.0%	5.3%	6.7%	14.3%	6.6%

		Awaba	Arcadia Vale	Blackalls Park	Buttaba	Cooranbong	Dora Creek	Eraring	Fassifern	Fennell Bay	Freemans Waterhole	Kilaben Bay	Rathmines	Toronto	Wakefield	Wangi Wangi
Electricity, gas, water & waste services	%	4.2%	2.6%	2.6%	1.4%	1.4%	1.5%	0.0%	2.1%	1.4%	0.0%	1.8%	3.1%	1.1%	4.8%	2.6%
Mobility																
Lived at same address 1 year ago	%	84.1%	77.9%	80.5%	78.9%	75.8%	80.6%	82.9%	81.4%	82.8%	72.7%	78.8%	82.5%	74.4%	79.2%	78.9%
Lived at same address 5 years ago	%	66.9%	56.9%	56.4%	50.4%	46.6%	56.7%	61.1%	64.1%	59.7%	45.5%	57.7%	59.4%	51.1%	59.7%	55.5%

Source: ABS (2017a)

Notes:

Note that the ABS make small random adjustments to data to protect confidentiality of data. These adjustments cause the sum of rows or columns to differ by small amounts from totals.

Note that Myuna Bay and Ryhope have not been included in Table E-2 as these State suburbs have populations of 11 and 24, respectively (ABS, 2017a) and are therefore too small for accurate demographic data presentation.

1. The percentage of Separate Houses was calculated against Total Dwellings (i.e. the total of both occupied and unoccupied private dwellings)
2. Within ABS Community Profiles, "State or territory housing authority" and "Housing co-operative/community/church group" are subsets of Rented (total), however note that there are a number of other subsets of Rented (total) that have not been included in this table.

APPENDIX F

Supporting Baseline Information

1 SUPPORTING BASELINE INFORMATION

1.1 INTRODUCTION

This Appendix contains supplementary data and information to support Section 7 of the Social Impact Assessment (SIA).

1.2 PLANNING CONTEXT

1.2.1 Regional Planning and Economic Context

The following documents provide regional planning and economic direction for the local and regional social areas of influence:

- *Hunter Regional Plan 2036* (Department of Planning and Environment, 2016) (the Regional Plan);
- *Lower Hunter Regional Strategy 2006–2031* (Department of Planning and Environment, 2006);
- *Greater Newcastle Metropolitan Plan 2036* (Department of Planning and Environment, 2018) (the Metropolitan Plan); and
- *Central Coast and Lake Macquarie Regional Economic Development Strategy 2018-2022* (Central Coast Council and LMCC, 2018b) (REDS).

Hunter Regional Plan 2036

The Regional Plan and associated Implementation Plan provides an overarching framework for land use planning that will help guide more detailed land use plans, development proposals and infrastructure funding decisions for the Hunter region over the next 20 years. The Regional Plan includes a series of priority actions for the Hunter region, developed to coincide with population growth and economic change. The Regional Plan was also developed to coincide with the Metropolitan Plan discussed further in the next section.

The Hunter Region is divided into the Lower Hunter, Upper Hunter, and Mid Coast, and incorporates 10 Local Government Areas (LGAs). The Lower Hunter Region includes the Lake Macquarie LGA (LM LGA), as well as the LGAs of Cessnock, Maitland, Newcastle, and Port Stephens. The Regional Plan supports the following key regional goals for the Hunter Region:

- The leading regional economy in Australia;
- A biodiversity-rich natural environment;

- Thriving communities; and
- Greater housing choice and jobs.

The Regional Plan also identifies the following regional priorities specific to the LM LGA:

- Revitalise existing suburbs and explore opportunities for new infill and greenfield release areas; and
- Develop Charlestown, Cardiff–Glendale and Morisset into well-connected strategic centres.

Lower Hunter Regional Strategy 2006-2031

The *Lower Hunter Regional Strategy 2006-2031* (Department of Planning and Environment, 2006) applies to the five local government areas of Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock. The document represents an agreed NSW government position on the future of the Lower Hunter. It is the pre-eminent planning document for the Lower Hunter Region and has been prepared to complement and inform other relevant State planning instruments.

The primary purpose of the Lower Hunter Regional Strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the Lower Hunter Region's population between 2006 and 2031. The Lower Hunter Regional Strategy plans for the provision of sufficient new urban and employment lands to meet expected strong demands for growth. The Lower Hunter Regional Strategy also refocuses development in the Lower Hunter towards the strengthening of vibrant centres that support the role of Newcastle City Centre as the regional city.

The key elements of the Lower Hunter Regional Strategy are to:

- Provide for up to 115,000 new dwellings by 2031 ensuring the potential to accommodate both the changing housing demands of smaller households and reduced occupancy rates of the existing population as well as meeting the housing demands for an additional 160,000 people;
- Identify and protect new green corridors between the Watagan Ranges and the Stockton Peninsula, across the Wallarah Peninsula and along the riverine environments of the Karuah River and the foreshores of Port Stephens;
- Promote Newcastle as the regional city of the Lower Hunter, supported by a hierarchy of major regional centres at Charlestown, Cessnock, Maitland and Raymond Terrace, emerging major regional centres at Morisset and Glendale-Cardiff as well as specialised centres and lower order centres;
- Boost the economic activity and housing capacity of key centres by refocusing a higher proportion of new housing in these centres. This will help to maintain the character of

existing suburbs, provide greater housing choice, maximise use of existing and future infrastructure, including public transport, and achieve a more sustainable balance of infill to greenfield development;

- Where development or rezoning increases the need for State infrastructure, the Minister for Planning may require a contribution to the infrastructure having regard to the State Infrastructure Strategy and equity considerations;
- Maintain or improve the Region's biodiversity through a Regional Conservation Plan, which will establish a framework for biodiversity protection; and
- Identify and protect environmental assets, rural land and natural resources, landscape and rural amenity, rural communities and the character of existing rural villages.

Greater Newcastle Metropolitan Plan 2036

The Metropolitan Plan presents strategies and actions that will drive sustainable growth across the Greater Newcastle Region; being the cities of Cessnock, Lake Macquarie, Maitland, Newcastle, and Port Stephens.

The Metropolitan Plan sets out the following outcomes (as well as specific strategies which will be used to achieve them) which are linked to the goals set out in the Regional Plan:

- Create a workforce skilled and ready for the new economy;
- Enhance environment, amenity and resilience for quality of life;
- Deliver housing close to jobs and services; and
- Improve connections to jobs, services and recreation.

The Metropolitan Plan also identifies a number of "catalyst" areas that are places of metropolitan significance which will be targeted for the development of new jobs and homes. North West Lake Macquarie, located to the north of Lake Macquarie, has been identified as one such catalyst area. The Metropolitan Plan sets out a range of priorities to assist this area in achieving an additional 1,800 jobs and 3,700 dwellings by 2036. Specifically, the plan seeks to encourage the generation of employment opportunities that support transition away from mining activities.

Regional Economic Development Strategy

The REDS sets out a long-term economic vision and associated strategies for the Central Coast and LM LGAs.

The economic vision articulated in the REDS is:

“To grow the population and economy of an attractive region that is an important dormitory area with high liveability by attracting in - movers including commuters – and to grow the visitor economy, while also building on the Region’s strengths and specialisations in the services sectors – especially health and age care – and in manufacturing and mining.”

The REDS articulates a framework for identifying actions crucial to achieving the regional vision. The aims of the REDS are to:

- Facilitate commercial, manufacturing and mining development;
- Grow new industries and employment opportunities through improved transport links;
- Realise economic opportunity in the health and aged – care sectors; and
- Be a highly liveable region that is attractive to both commuters and visitors.

The aims of the REDS present opportunities for Centennial Newstan to support the delivery of the project and enhance the distribution of benefits throughout the LM LGA.

1.2.2 Local Planning Context

This section describes the local planning context of the project with reference to the following key local planning documents:

- *Lake Macquarie LEP 2014* (Lake Macquarie LEP);
- *Imagine Lake Mac* (LMCC, 2019c) (LM Strategic Plan); and
- *Our Future in Focus* (LMCC, 2017) (Community Strategic Plan).

Lake Macquarie Local Environment Plan

Local Environmental Plans (LEPs) specify the planning and land use management aims for public and private land through zoning in accordance with the Environmental Planning and Assessment Act 1979 (EP&A Act). The project and the adjoining land is located within the LM LGA and development is subject to the land use zoning provisions of the Lake Macquarie LEP.

The Project Application Area (PAA) includes numerous different land zonings under the Lake Macquarie LEP. The land zonings within and proximate to the PAA reflect the long-term use of the local area for industrial land uses (mining and power generation) and natural values (Awaba State Forest). The land zonings are designed to minimise the potential for land use conflict. Land zoning within and adjoining the PAA is discussed in Section 4 of the Environmental Impact Statement (EIS).

Imagine Lake Mac

The LM Strategic Plan is the strategic plan for the Lake Macquarie area, developed in order to guide growth and change across the city over the next 30 years.

The following seven aspirations for the local area are presented in the LM Strategic Plan:

- A city of vibrant centres – where people live, work, visit and play;
- A city to call home – where diverse housing options cater to everyone's needs;
- A city of prosperity – that attracts investment, creates jobs, and fosters innovation;
- A city of close connections – where people, goods and services move efficiently;
- A city for progress and play – where people come together in natural and vibrant public spaces;
- A city with a vast natural environment – that is valued, protected and enhanced; and
- A city of resilience – where the people and places are responsive and proactive to change.

The project is consistent with the vision for the future of the LM LGA and supports the realisation of several of the articulated aspirations. Specifically:

- The project creates new employment opportunities for existing residents of the LM LGA which in turn:
 - May attract back to the LGA local residents who currently commute out of the LM LGA for mining related employment;
 - Sustains the viability of local infrastructure and services; and
 - Protects community vitality and strengthens social connections.
- The project enables continuity of supply opportunities for existing local businesses and supports the creation of new and/or enhanced supply opportunities; and
- The mine design and final mine closure and rehabilitation plan supports the aspirations of the Lake Macquarie City Council (LMCC) in relation to future land use options within and adjoining the PAA.

Lake Macquarie City Community Strategic Plan 2017-2027

Table F-1 presents relevant community values of the LM Community Strategic Plan (LMCC, 2017) and how the project supports the protection and enhancement of these values into the future.

Table F-1
Consistency of Project with Community Strategic Plan

Community Values	How will the project protect and enhance these values?
Unique Landscape	The project involves the development of an underground mining operation with minimal surface disturbance. New surface infrastructure is proposed to be co-located largely within the existing disturbance footprint at ACSS. The mine plan has been designed to avoid and minimise any potential impacts to valued environmental attributes within and outside the PAA. This includes creek systems traversing the PAA, and Lake Macquarie. Centennial has established environmental monitoring procedures (ground water, surface water and subsidence) designed to ensure regulatory compliance.
Lifestyle and Wellbeing	The project will support the continuation of employment in mining within the LM LGA, for the portion of workers who already reside in the LGA. Employment associated with the project will permit households to remain in the region, thus maintaining social contributions to the regional community and economy. Such contributions will likely facilitate spending on services and facilities in the LM LGA that help to ensure positive lifestyles and wellbeing.
a Diverse Economy	The LM LGA will likely benefit from a share of expenditure associated with the construction and operation of the project, particularly in the construction services and supplies, scientific and technical services, and food and accommodation service industries. Centennial has arrangements with a large number of suppliers located in the LM LGA, and the project will likely expand upon these existing arrangements. This support for local business may facilitate further employment and growth in a number of industries, facilitating a diverse economy. Furthermore, the contribution of mining within the LM LGA is considerable, and the project will enhance this contribution, thus allowing for an increase in the LM LGAs Gross Regional Product. The project may also increase the proportion of people that live and work within the LGA, ensuring that residents do not seek employment/living arrangements in other regions, and further driving economic growth in the region.
Connected Communities	Centennial will negotiate a Voluntary Planning Agreement (VPA) with the LM LGA for the project. Voluntary sponsorships and donations are already provided by Centennial to communities in proximity to Centennial operations in the LM LGA. The VPA together with existing agreements and voluntary activities will support the delivery of improved services and facilities to proximate communities. Each year Centennial hosts an internal Sustainability Conference, which brings together employees from across the Group and provides a platform to discuss concepts of sustainability. Centennial has also taken a number of recent actions to deliver improved environmental outcomes from its operations in the LM LGA. In particular Centennial has implemented a new water treatment plant (WTP) including an OSMOSIS.
Creativity, and Shared Decision Making	Centennial has provided opportunities for the broader community to provide input and feedback on the project and the EIS. The Newstan/Awaba CCC provides a regular forum for interested community members to engage with Centennial in relation to activities at the NCLP site and Newstan Colliery. Centennial has also commenced regular Environmental Group Stakeholder Meetings to provide interested stakeholders with the opportunity to discuss mining operations, including

Community Values	How will the project protect and enhance these values?
	planned modifications as well as hearing, and dealing with, any concerns. Key stakeholders and the broader community will have an opportunity to review and comment on the EIS for the project in accordance with the requirements of the NSW EP&A Act.

1.3 GOVERNANCE

1.3.1 Local Government

The LM LGA is represented by the LMCC. The LGA is split into three wards: North, West and East, with four councillors representing each ward. The West Ward encompasses the entirety of the Newstan Colliery local area.

The organisational structure of the LMCC as of October 2019 is shown in Table F-2.

Table F-2
Lake Macquarie City Council

Role	Councillors
Mayor	Mayor Kay Fraser (Australian Labour Party)
Deputy Mayor	Deputy Mayor Councillor Nick Jones (Australian Liberal Party)
Chief Executive Officer	Morven Cameron
Councillors	North Ward - Councillor Brian Adamthwaite (Australian Labour Party) - Councillor Kevin Baker (Liberal Party of Australia) - Councillor Barney Langford (Australian Labour Party) - Councillor Colin Grigg (Lake Mac Independents) West Ward - Deputy Major Councillor David Belcher (Australian Labour Party) - Councillor Jason Pauling (Liberal Party of Australia) - Councillor Wendy Harrison (Independent) - Councillor Luke Cubis (Lake Mac Independents) East Ward - Councillor Adam Shultz (Australian Labour Party) - Councillor Nick Jones (Liberal Party of Australia) - Councillor Christine Buckley (Australian Labour Party) - Councillor John Gilbert (Lake Mac Independents)

Source: Lake Macquarie City Council (2020)

The LMCC is represented on the Newstan/Awaba CCC by two Councillors.

Each year the LMCC produces an Annual Report that reflects on the LMCC's performance and activities for the preceding financial year. The 2018-2019 Annual Report (LMCC, 2019d)

reports against the Community Strategic Plan and demonstrates considerable progress in delivering the desired outcomes of the Community Strategic Plan.

In the 12 months to June 30, 2020, LMCC is forecast to spend \$102 million on capital works projects across the LM LGA, including:

- \$2.5 M for upgrading parks and playgrounds;
- \$3.5 M for upgrading library and cultural facilities;
- \$4 M for constructing new footpaths and cycleways;
- \$4.3 M for implementing recreation master plans and constructing local sporting facilities;
- \$5.3 M for improving stormwater drainage and enhancing ecosystems;
- \$17.4 M for upgrading City assets and preparing for future growth;
- \$19 M for upgrading community facilities; and
- \$42.8 M for resurfacing and upgrading roads, improving traffic and transport infrastructure.

1.3.2 State and Federal Government

The project is located within the boundaries of the Lake Macquarie State Electorate LM LGA. The Lake Macquarie State Electorate is represented by Independent Gregory Piper who has held the seat since 2007.

The Hon. Joel Fitzgibbon (Australian Labour Party) holds the Federal Electorate seat of Hunter within which the LM LGA is located.

1.3.3 Indigenous Governance

The LM LGA spans across multiple Local Aboriginal Land Council (LALC) areas, namely the Bahtabah, Biraban, Darkinjung, and Awabakal LALCs, with the PAA located almost entirely within the Biraban LALC. These LALCs provide services and assistance to the local Aboriginal community in the form of cultural and heritage activities, as well as training and employment opportunities.

The Biraban LALC is a Registered Aboriginal Party for the project.

1.4 NON-INDIGENOUS HISTORY AND SETTLEMENT PATTERNS

This section provides a summary of the non-Indigenous settlement history of the LM LGA and supplements information provided in Section 7.3.2. The information is drawn from a number of different sources including the Historical Heritage Assessment for the project (Umwelt

Environmental and Social Consultants, 2020b). A more extensive account of European Settlement History is provided in the Historical Heritage Assessment for the project.

1.4.1 Non-Indigenous Discovery and Settlement

The greater Newcastle region is believed to have been first discovered by Europeans in 1797, due to a source of coal being found at the entrance to the Hunter River. In 1800, whilst on a mission to retrieve such coal, Captain William Reid mistook the entrance to Lake Macquarie as the Hunter River, marking the first discovery of “Reid’s Mistake” (now Lake Macquarie). A convict penal settlement was subsequently established in “Kings Town” (now Newcastle), and in 1826, the first free settler (the Simpson family) was granted land on the edge of Lake Macquarie (in an area now known as Cooranbong), where cultivation of the land began. Other settlers soon followed, settling in the areas now known as Dora Creek, Wangi Wangi, Toronto, and Speers Point. The population of Lake Macquarie grew quickly in the 1830s as many settlers began moving down from Newcastle. Although settlers were quick to mark out early roadways, they often also utilized the lake as a means of access to other areas around Lake Macquarie. Newport was the first township established in the region in 1840 (before collapsing in the 1950s), and the first Aboriginal mission station began operating in 1841, in an area now known as Belmont Bay, on the eastern side of Lake Macquarie (Clouten, 1967).

Early Mining and Industry

During the 1800s, the Lake Macquarie region was found to contain two important resources: coal and timber. Cities around the country were rapidly expanding, and so to was their demand for coal and timber. The Lake Macquarie region developed considerably in the latter half of the 1800s due to being able to export such commodities (Clouten, 1967).

The first coal mine in the area was established in 1840 by Reverend Threlkeld in the area now known as Toronto. Coal loading and storage facilities were set up in Swansea Heads to allow the mined coal to be shipped by barge to the Lake Macquarie channel entrance. The mine saw periods of operation and closure, finally closing permanently in the 1890s (Umwelt Environmental and Social Consultants, 2020b).

The coal mining industry expanded, particularly in the 1860s and 1870s, with rapid growth and industrialization in the area. By the 1870s, most outcropping or surface coal had been mined in the area, leading to larger scale enterprises becoming established to exploit deeper coal seams. By the late 1880s, the coal industry was well established, with a number of larger companies becoming operational, including Northumberland Coal and Land Company, who purchased land in the parish of Awaba to establish a coal mine which would eventually become Newstan Colliery. Other prominent companies in the area included the Newcastle-Wallsend Coal Company, Minmi Coal Company, West Wallsend Coal Company, Monkwearmouth Estate, and the Young Wallsend Coal Company. These companies began

operating mines in western Lake Macquarie, including in the suburbs now known as Fassifern, Edgeworth and Killingworth (Centennial Coal, 2014).

The discovery of large quantities of rich Cedar and other timber in the ranges west of Lake Macquarie in the early 1830s allowed for the timber industry to flourish (Clouten, 1967). Sawmills were established in the 1870s, along with the first timber depot in 1885 (LMCC, n.d.b).

The Advent of Transportation

Until the 1880s, settlers of Lake Macquarie relied on a series of dray tracks to provide access to areas around the region, as well as boats. Boats were first utilized to transport resources such as timber and coal to outside markets; however, they also became a valuable source of transportation to the early settlements surrounding the lake (Clouten, 1967).

In 1889, Newcastle became linked to Sydney via the first railway line in the region (now known as the Main Northern Railway line). The railway was the direct result of a number of townships arising in the Lake Macquarie region, including Morisset, Awaba and Toronto, due to the development of railway stations, railway construction depots, and tramlines (Clouten, 1967). The railway also resulted in a major boom in employment for the region (LMCC, n.d.f). A number of further railway lines emerged in the late 1800s to service existing and emerging coal mines (Centennial Coal, 2014).

The emergence of the railway was paramount to the development of the coal industry in the region, as it allowed for better transportation of coal to the port of Newcastle for export (LMCC, n.d.d). Heavy rail and road networks were also developed to service the Newcastle Port (Department of Planning and Environment, 2018).

Early Local Communities

The number of settlements in the Lake Macquarie region increased greatly in the late 1800s due to the advent of the railway industry as well as the progression of the timber and coal industries. The settlement of Awaba first established around a construction camp for the proposed railway line, which opened in 1887 (Saxon, 1988). The settlement quickly flourished due to the railway contractors requiring housing and facilities. In the late 1890s, the first school, post office, general store and butcher shop was opened, and mining commenced in 1892 with the opening of Awaba Colliery. This colliery closed in 1929 during the Great Depression after only a brief period of operation. Prior to closure, the mine employed 52 men (LMCC, n.d.c). Mining recommenced nearby Awaba in 1948 with the establishment of the Awaba State Coal Mine (now known as Awaba Colliery) (LMCC, n.d.b). The Awaba State Coal Mine was established with the objective of providing coal for the Wangi Power Station located 5 miles away and connected by rail line (LMCC, n.d.c).

The nearby settlement of Fassifern emerged as a result of a land grant given to the Northumberland Coal and Land Company in 1879 to mine coal on the western side of Fassifern (now Wakefield). The settlement also developed to facilitate the needs of the railway construction employees (Lake Macquarie City Council, n.d). Fassifern Station was one of the first railway stations in the region, becoming operational in 1887. In the 1900s, a number of other colliery's emerged in the settlement, including Blackalls Colliery, and South Pacific Colliery. Newstan Colliery was established in 1950, to take over the Northumberland Coal and Land Company site and has seen periods of operation ever since. Fassifern is now a popular residential suburb with over 600 residents (ABS, 2017a).

Wakefield emerged as a residential base for many of the families with men employed at the various coalmines in the western lake area. Wakefield School opened as a provisional school in January 1889 and later the same year became a public school. Wakefield School closed in 1982 and reopened in 2002.

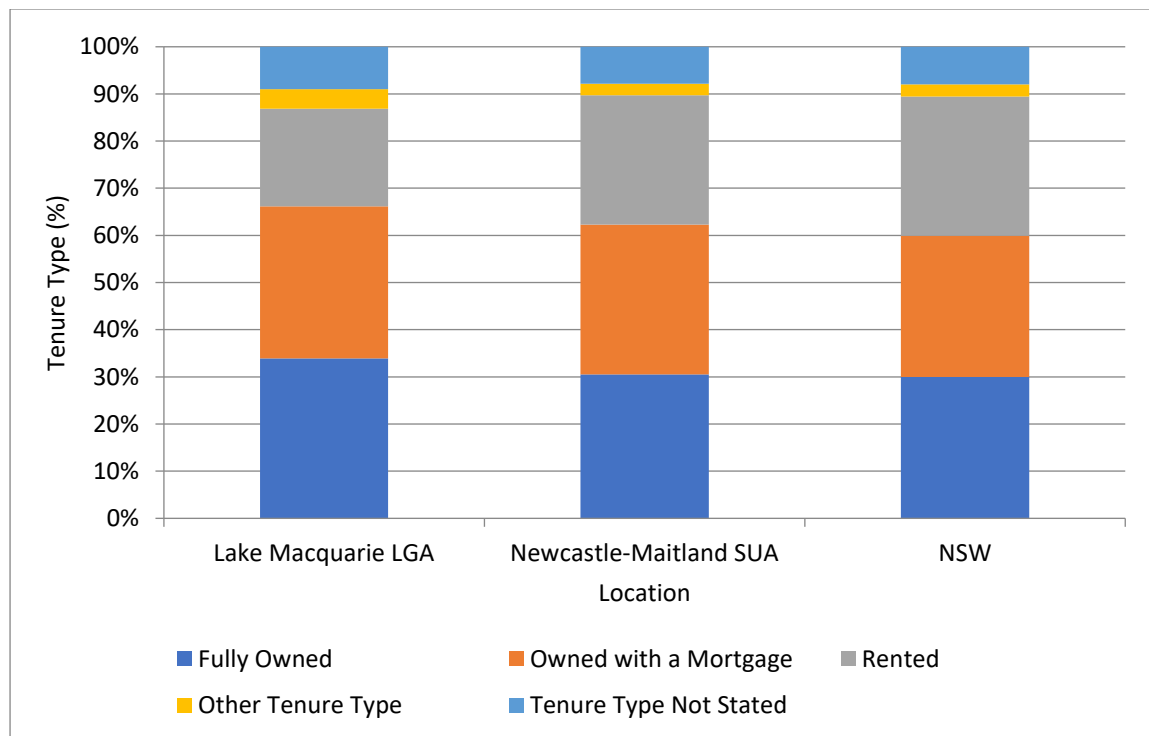
1.5 HOUSING AND ACCOMMODATION

This section focuses on housing stock and tenure, the housing market and social housing, as well as short-term accommodation in the LM LGA. Qualitative and quantitative information and data has been sourced from a combination of the following: 2016 ABS Census; various LMCC housing studies, Residex Pty Ltd and Realestate.com.au.

1.5.1 Housing Tenure

Graph F-1 shows housing tenure types in the LM LGA and Newcastle-Maitland Significant Urban Area (NM SUA), relative to NSW. The LM LGA and NM SUA share a common housing tenure profile with the majority of housing either owned outright or owned with a mortgage. The LM LGA has a slightly larger proportion of owned houses when compared with NSW. Correspondingly, the LM LGA has a lower proportion of rental tenure then that of the NM SUA and NSW, implying that there is less vulnerability to changing housing market conditions in the area.

**Graph F-1
Housing Tenure, 2016**



Source: ABS (2017a)

1.5.2 Housing Affordability

Housing affordability is a key concern of the LMCC. The LMCC Housing Strategy acknowledges the impact of declining housing affordability on the LGA:

“the decline in housing affordability in the LGA, and the inability for everyday people to access housing that is affordable, is having an increasingly detrimental impact on socio-economic diversity, which underpins the City’s rich social fabric. The ongoing loss of people who cannot afford to live close to where they need and want to be, whether it be close to family, employment or services, is also a concern” (LMCC, 2019e).

The findings of the LMCC Housing Strategy (LMCC, 2019e) indicate that:

- Rental affordability in LM LGA has declined in recent years with most parts of the LGA becoming ‘moderately unaffordable’.
- In the ten years to 2016, the number of low income renters in the LM LGA increased (6,000) in parallel with a declining supply of affordable rental housing stock.
- Rental vacancy rates are tight and there has been a reduction in the proportion of rental housing affordable for lower income households.

- Almost a quarter of households in Lake Macquarie rent in both private and public tenures.
- Rental residential vacancy rates are low and demand for rental accommodation is high. This increase in demand for rental accommodation is a challenge, placing pressure on price points in the rental market.

In 2018 Compass Housing Services released an affordable housing report based on the Affordable Housing Income Gap (AHIG). The AHIG Index is a score representing the percentage by which a household's income would need to increase to avoid housing stress (Compass Housing Services, 2018)⁹. Based on the 2018 report (Compass Housing Services), in 2018 the LM LGA had an AHIG Index of 4¹⁰ and LM LGA households would need to increase their annual income by \$2,617 to avoid housing stress. This equates to a moderate degree of housing stress based on the bands identified in Compass Housing Services (2018) as a reasonable measure of the relative degrees of housing stress. In comparison, Newcastle LGA and Maitland LGA had AHIG Indices of -7 and -4 respectively indicating housing affordability. Some LGAs within inner Sydney e.g. Waverley recorded an AHIG index of more than 30, indicating severe housing stress. The Upper Hunter LGA was identified as NSW's most affordable LGA for renters.

1.5.3 Social Housing Provision

Compass Housing, alongside the Department of Housing, manage the majority of social housing in the LM LGA. In consultation with Compass Housing, it was noted that there is a significant vulnerable population residing in LM LGA requiring housing support. Compass Housing manage a portfolio of 7,100 properties across NSW, with large proportions of their stock in Newcastle, the Hunter region and Lake Macquarie. Within the LM LGA it was noted that Toronto, Blackalls Park and Fassifern have sizeable social housing portfolios due to proximity to both services and public transport i.e. Fassifern railway station. Limited social housing is recognised in Awaba, and Wakefield does not hold any social housing properties.

Table F-3 shows the proportion of social housing in the local and regional social areas of influence as well as NSW for 2016. Although this data shows that the suburbs of Awaba, Fassifern and Wakefield have very limited social housing, the LM LGA and NM SUA have significantly higher proportions of social housing than that of NSW. Relatively low living costs, housing affordability and ready access to Newcastle and Sydney makes this region an attractive destination for low socio-economic households.

⁹ The AHIG is calculated by subtracting the median weekly household income of renting households in a particular area, from the weekly household income required to pay the median rent in that area without exceeding the 30% affordability threshold. The result is the amount of extra income a typical renting household would need to avoid housing stress (Compass Housing Services, 2018).

¹⁰ For all dwelling types. AHIG Index is presented for different house sizes (e.g. three bedrooms and three bedrooms) and also a combined index for all dwellings type.

Table F-3
Rented Dwellings by Selected Landlord Type, 2016

Geographic Area	Selected Landlord Type		Total (%)
	State or territory housing authority (%)	Housing co-operative/community /church group (%)	
Awaba SSC	0.0	0.0	0.0
Fassifern SSC	5.7	3.0	8.7
Wakefield SSC	0.0	0.0	0.0
Lake Macquarie LGA	19.1	2.5	21.6
Newcastle-Maitland SUA	18	1.8	19.8
NSW	12.7	2.1	15

Source: ABS (2017a)

Data from the NSW Department of Communities and Justice (2019) indicates that 922 general applicants and 44 priority applicants are waiting to be placed into social housing in the Lake Macquarie and Lake Macquarie East areas. Expected wait times for all property types in these areas is up to five to ten years.

According to LMCC, many of the housing commission houses purpose built for the power station and mine workers were passed over to Non-Government Organisations, such as Compass Housing, for social housing re-purpose. It must be noted that Compass Housing identified that a large proportion of housing commission stock was also allocated to the Social Housing Management Transfer (SHMT). The SHMT is the transfer of properties from the Department of Communities and Justice to community housing providers.

In consultation with Compass Housing, it was noted that Indigenous social housing is managed by the LALC.

1.5.4 Building and Development Approvals

Development Approvals

In the 2017-2018 financial year a total of 2017 development approvals (DAs) were granted and 441 DAs amended with a total estimated value of \$1,162,294,114. In 2018-2019 financial year a total of 1852 DAs were approved, and 437 DAs amended with a total estimated value of \$1,237,878,041 (LakeMac Today, 2019a).

In 2018-2019 financial year the most significant (based on dollar value) DAs approved included:

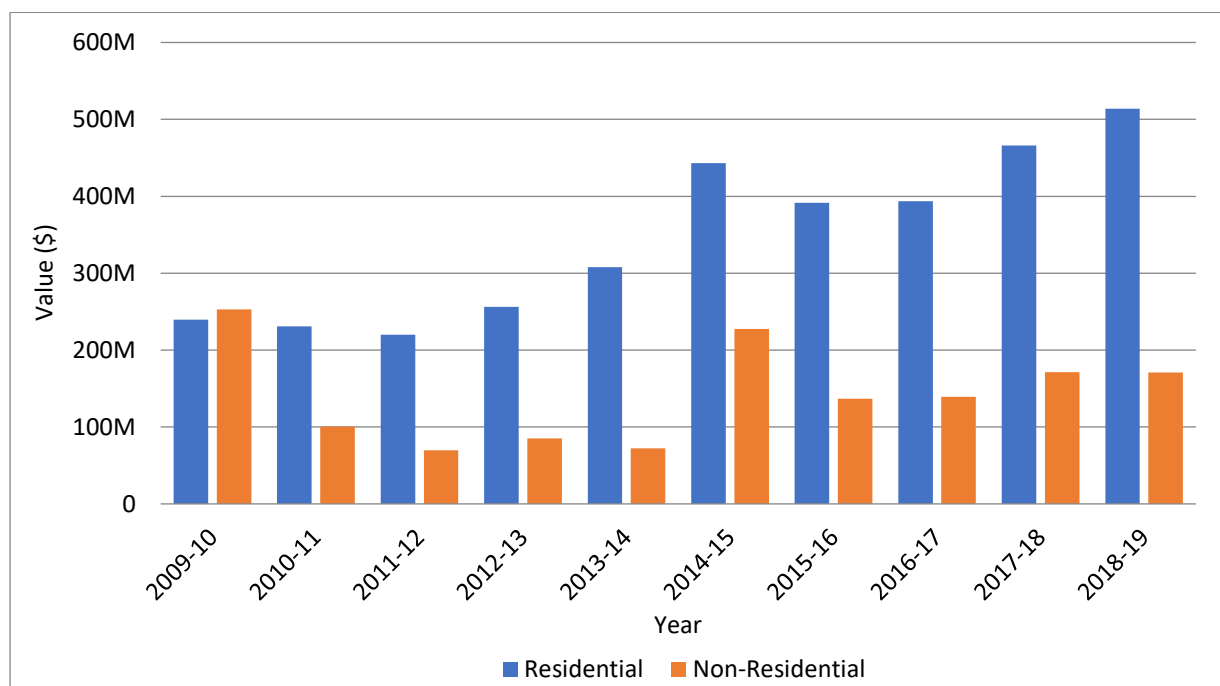
- A new motorsport complex (Black Rock Motor Park) in Wakefield – estimated value \$77 M;
- A new shopping centre in Cameron Park – estimated value \$26.1 M;
- Two aged care facilities in Cameron Park and Gateshead – estimated value of \$24.2 M and \$14.4 M respectively; and
- An apartment and mixed-use development in Toronto – estimated value of \$14.3 M (LakeMac Today, 2019a).

It is notable that the most significant DA approved in 2018-2019 is located within one of the key communities of interest for the project i.e. Wakefield.

Building Approvals

Graph F-2 shows the LM LGA approvals for both residential and non-residential buildings between 2009 and 2019. This data indicates that residential building approvals have increased greatly in this period (having more than doubled), which aligns with a significant period of residential growth in the region. However, non-residential approvals have shown a more inconsistent trend, seeing a decline between 2010-2013, and a steady increase since 2015. In 2018/2019, total building approvals amounted to around \$685 M (REMPPLAN, 2019).

Graph F-2
Lake Macquarie LGA Building Approvals



Source: REMPLAN (2019)

Future Land Development and Housing Capacity

In 2017 LMCC undertook an analysis of the capacity for new dwellings in Lake Macquarie's infill and greenfield areas. This analysis informed the LM Strategic Plan. The analysis estimates there is capacity for 17,000 new dwellings in greenfield areas and between 16,000 and 35,000 net new dwellings in established areas (LMCC, 2014). The range for established areas is based on the application of lower or higher density assumptions for new infill developments. The total capacity for new dwellings in both greenfield and infill locations is in the range of 33,000 to 52,000 additional dwellings (SGS Economics & Planning Pty Ltd, 2018). Infill capacity is highest in the northern and north-eastern suburbs of the LM LGA whereas greenfield capacity is highest in the southern and north-western suburbs of the LGA.

At the time the LM Housing Study was completed there were approximately 4,800 detached dwellings in the development pipeline (likely and possible developments) with the majority located in Cameron Park and Boolaroo located to the far north of the Newstan Colliery Surface Site and in Cooranbong in the south-west of the LGA. Both Boolaroo and Cameron Park will deliver 907 and 1,127 new detached dwellings respectively (SGS Economics & Planning Pty Ltd, 2018). These suburbs are new release areas at the northern boundary of the LGA, within proximity to the Stockland Glendale Shopping centre, the rail corridor (more so for Boolaroo) and services and facilities in Newcastle. This compares to Cooranbong, in the south-west pocket of the LGA which is more isolated from services and accessibility.

In consultation with LMCC, it was noted that an area in Fassifern proximate to LT Creek and Lake Macquarie has been identified for rezoning potential, including both environmental zoned land and small lot residential land, suitable for housing. This could facilitate small growth opportunities in Fassifern.

1.6 LABOUR MARKET CONDITIONS

1.6.1 Employment Share

The economic strength of a region can also be noted by the extent to which an area "imports" or "exports" labour and by comparing jobs within industry sectors in a region to the number of people employed in the same industry sector. This is important in an area that is expecting a major project as it can show, to some degree, the extent to which a region is likely to be able to supply the required labour in given industry sectors.

In 2016 there was an estimated:

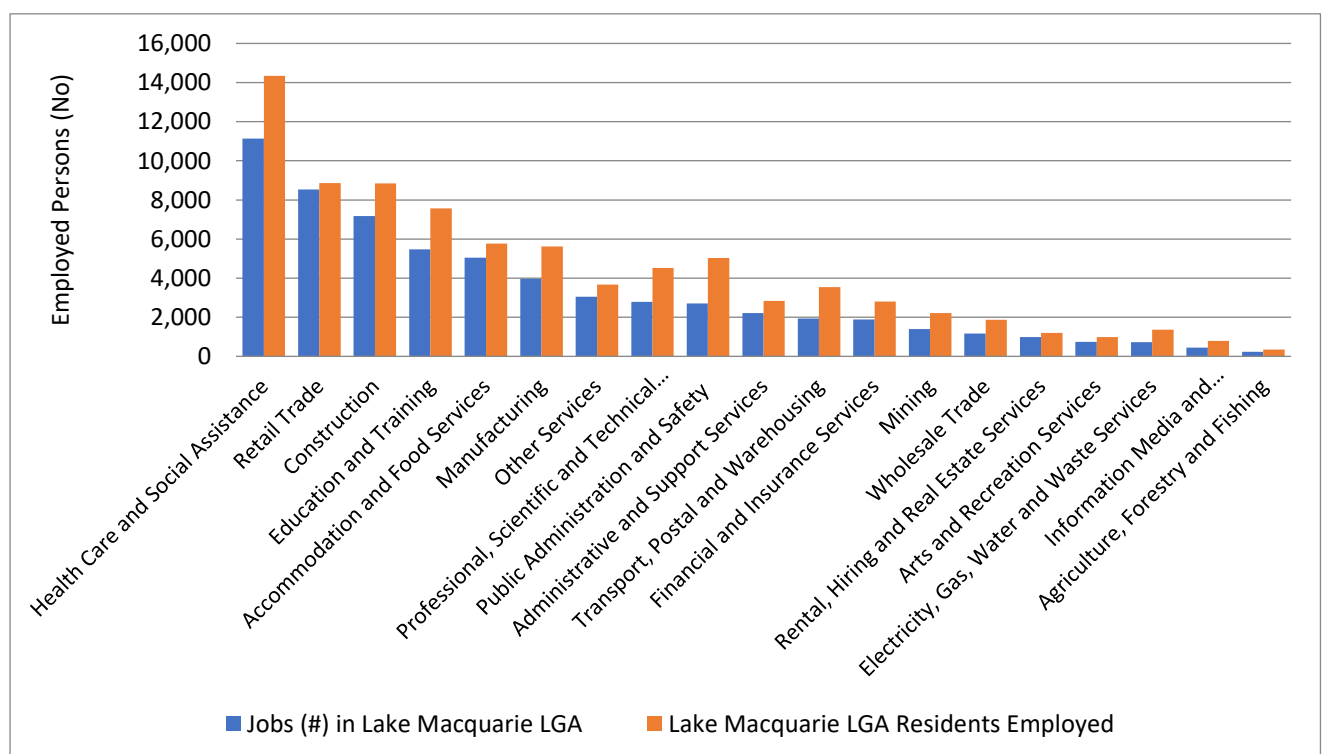
- 82,075 employed people residing in the LM LGA;
- 61,601 jobs located in the LM LGA; and
- 39,034 residents of the LM LGA (47.56%) who were employed in the LGA (REMPLAN, 2019).

This shows that the LM LGA is both an importer and exporter of labour.

Graph F-3 shows the import and export of labour within the LM LGA in 2016, across all industry sectors. This data shows that in all industry sectors, there were less jobs in the LM LGA than there were residents employed within them, indicating that many LM LGA residents work outside the area. The health care and social assistance industry sector is the largest exporter of labour within the LM LGA.

It is notable that in 2016 there were 1,399 jobs in mining in the LM LGA and a total of 2,219 residents employed in the mining sector. This suggests 820 residents of the LM LGA work outside the LM LGA, likely in the Hunter Valley given the proximity of the LGA to the mines in the Hunter Valley. This presents an opportunity for Centennial Newstan to draw back skilled mining industry sector labour for the project and an opportunity for existing residents to be employed within the LM LGA.

Graph F-3
Import and Export of Labour – Lake Macquarie LGA, 2016



Source: ABS (2017a) & REMPLAN (2019)

An analysis of journey to work patterns (Department of Employment, Skills, Small and Family Business, 2019b) shows that at the time of the 2016 population census of all LM LGA Residents:

- 45% (38,449) worked in Lake Macquarie LGA;
- 33% (27,942) commuted to Newcastle LGA;
- 5% (4,328) commuted to the Central Coast LGA;
- 5% (4,518) of residents had no fixed place of work; and
- 12% commuted to other nearby LGAs, including Maitland, Port Stephens, Cessnock, Sydney, Singleton, Muswellbrook, and the Mid-Coast.

The majority of imported workers to the LM LGA originated from Newcastle LGA (14.5% or 10,580 persons).

The analysis of journey to work data shows a pattern of considerable commuting arrangements between the LGAs to the north and west of the LM LGA. This commuting pattern supports the workforce sourcing assumptions for the project i.e. that the workforce will be drawn from within the LM LGA and the broader NM SUA including the centres of Newcastle and Maitland.

1.6.2 Occupation

Graph F-4 shows the occupation distribution across the LM LGA labour force for 2016. In comparison to NSW, in 2016, LM LGA had more technicians and trade workers (16.1% compared to 12.7%), clerical and administrative workers (14.3% compared to 13.8%), community and personal service workers (11.5% compared to 10.4%), sales workers (10.1% compared to 9.2%), labourers (9.8% compared to 8.8%), and machinery operators and drivers (9.8% compared to 8.8%). This reflects the strong employment in the health care and social assistance industry sector, as well as the retail trade and construction industries. All areas in the local and regional social areas of influence have a lower proportion of managers than NSW.

**Graph F-4
Occupation, 2016**



Source: ABS (2017a)

1.6.3 Qualifications

Post school qualification levels for the local and regional social areas of influence are shown in Table F-4. The proportion of people who have obtained a certificate level qualification in all areas of interest is significantly higher than the NSW proportion of people who completed a certificate level qualification. The proportion of people who have obtained a bachelor degree (or higher) in all areas of interest was much lower than the NSW proportion. These trends align with the dominant occupation areas described in Appendix F Section 1.5.2.

**Table F-4
Post School Qualifications, 2016**

Location	Certificate (%)	Graduate Diploma/Certificate (%)	Advanced Diploma and Diploma (%)	Bachelor Degree and Above (%)	Inadequately Described/ Not Stated (%)
Awaba SSC	44.10	0.00	17.39	21.73	12.42
Fassifern SSC	47.83	1.00	11.04	20.40	16.39
Wakefield SSC	52.11	4.23	8.45	8.45	14.08

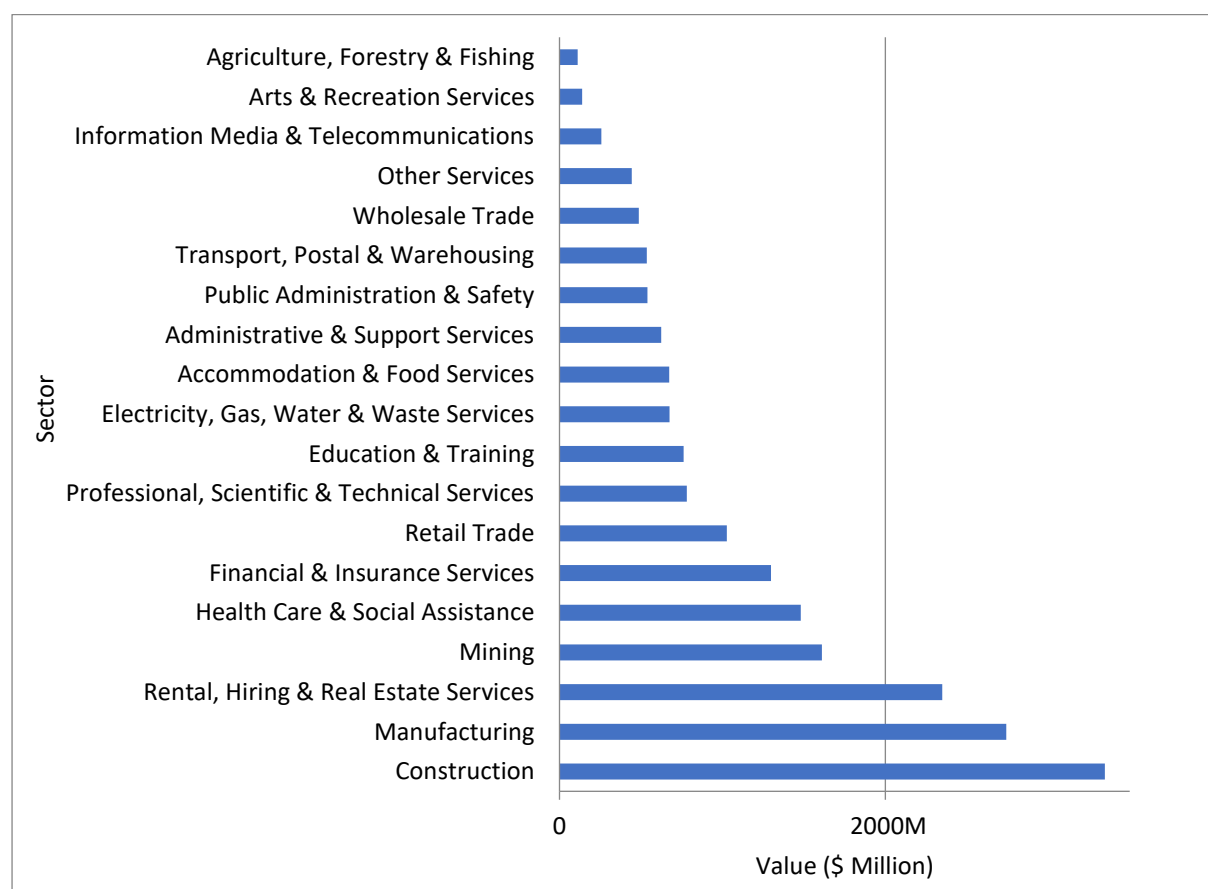
Location	Certificate (%)	Graduate Diploma/Certificate (%)	Advanced Diploma and Diploma (%)	Bachelor Degree and Above (%)	Inadequately Described/ Not Stated (%)
Lake Macquarie LGA	43.42	2.60	15.22	23.86	14.90
Newcastle-Maitland SUA	41.18	2.60	14.41	26.03	15.77
NSW	29.67	2.79	14.64	35.62	17.28

Source: ABS (2017a)

1.7 ECONOMIC STRENGTH

Graph F-5 shows the gross revenue generated by each sector in the LM LGA for 2018.

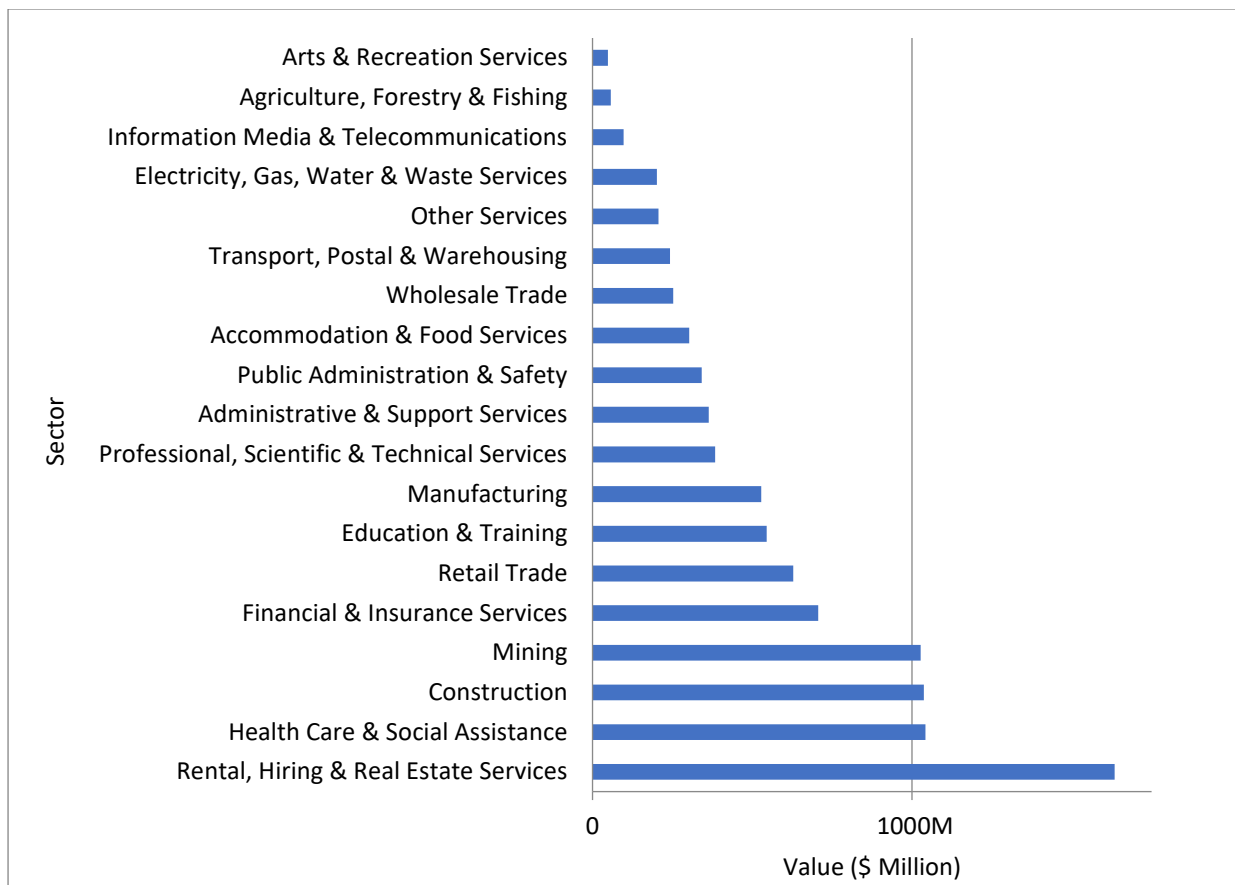
Graph F-5
Output by Industry, Lake Macquarie LGA, 2018



Source: REMPLAN (2019)

Graph F-6 shows the value added to the LM LGA by each industry sector in 2018 and illustrates the relative importance of each sector to the economy of the LM LGA.

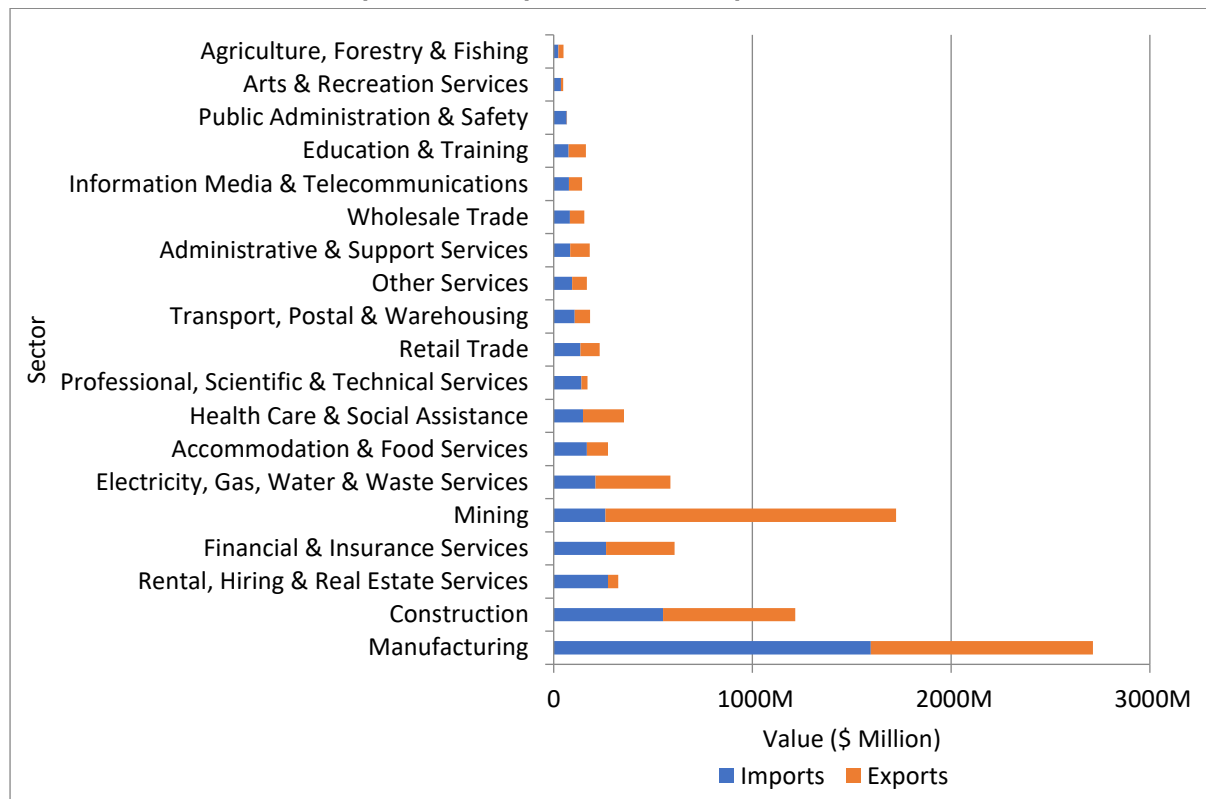
Graph F-6
Value Added by Industry Sector, Lake Macquarie LGA, 2018



Source: REMPLAN (2019)

Graph F-7 presents net imports and exports of each industry sector. Industry sectors with net exports are producing more output than demand within the LM LGA, while industries with net imports are producing fewer outputs than required by the LGA.

Graph F-7
Net Imports and Exports, Lake Macquarie LGA, 2018



Source: REMPLAN (2019)