Centennial Coal

Service Boreholes Management Plan

Mandalong Mine

MEMS-SIMP-8090-SBMP-8092

March 2020

Table of Contents

List of Figures

List of Tables

DOCUMENT CONTROL

DOCUMENT DETAILS	Name:	Service Boreholes Management Plan
	Author:	Nathan Archer (SLR)
	Number:	MEMS-SIMP-8090-SBMP-8092
	Revision No.:	1
	Document Status	Final

APPROVAL DETAILS

Revision No.	Date Sent	Details of Approval	Approved By	Approval Date
1				

CIRCULATION DETAILS

Name	Department	Circulation Date

1 BACKGROUND

1.1 Introduction

This Service Boreholes Management Plan (SBMP) details the measures that will be implemented by Centennial Mandalong to manage and mitigate potential impacts relating to the construction and use of future services boreholes at the Mandalong South Surface Site (MSSS), as part of the Mandalong Southern Extension Project (the Project). The location of the project is shown in **Figure 1** and the conceptual layout of the MSSS is presented in **Figure 2**.

1.2 Objectives and Targets

The objectives of this Service Boreholes Management Plan are to:

- Describe consultation and landholder agreement requirements for the construction and use of approved service boreholes;
- Describe the measures that would be implemented to manage potential impacts resulting from the construction and use of approved service boreholes;
- Describe how disturbed areas will be rehabilitated following completion of activities; and
- Satisfy the requirements of Schedule 3 Condition 35 of SSD-5144.

1.3 Proposed Service Boreholes

To support underground mining operations, a number of service boreholes are required to be drilled from the surface to the underground workings. Service boreholes are required to allow for the delivery of bulk materials, including stone dust, concrete and ballast, to the underground mine workings as well as to deliver essential services including electricity, water and compressed air.

All proposed services boreholes will be installed at the MSSS within the approved disturbance area presented in **Figure 2**.

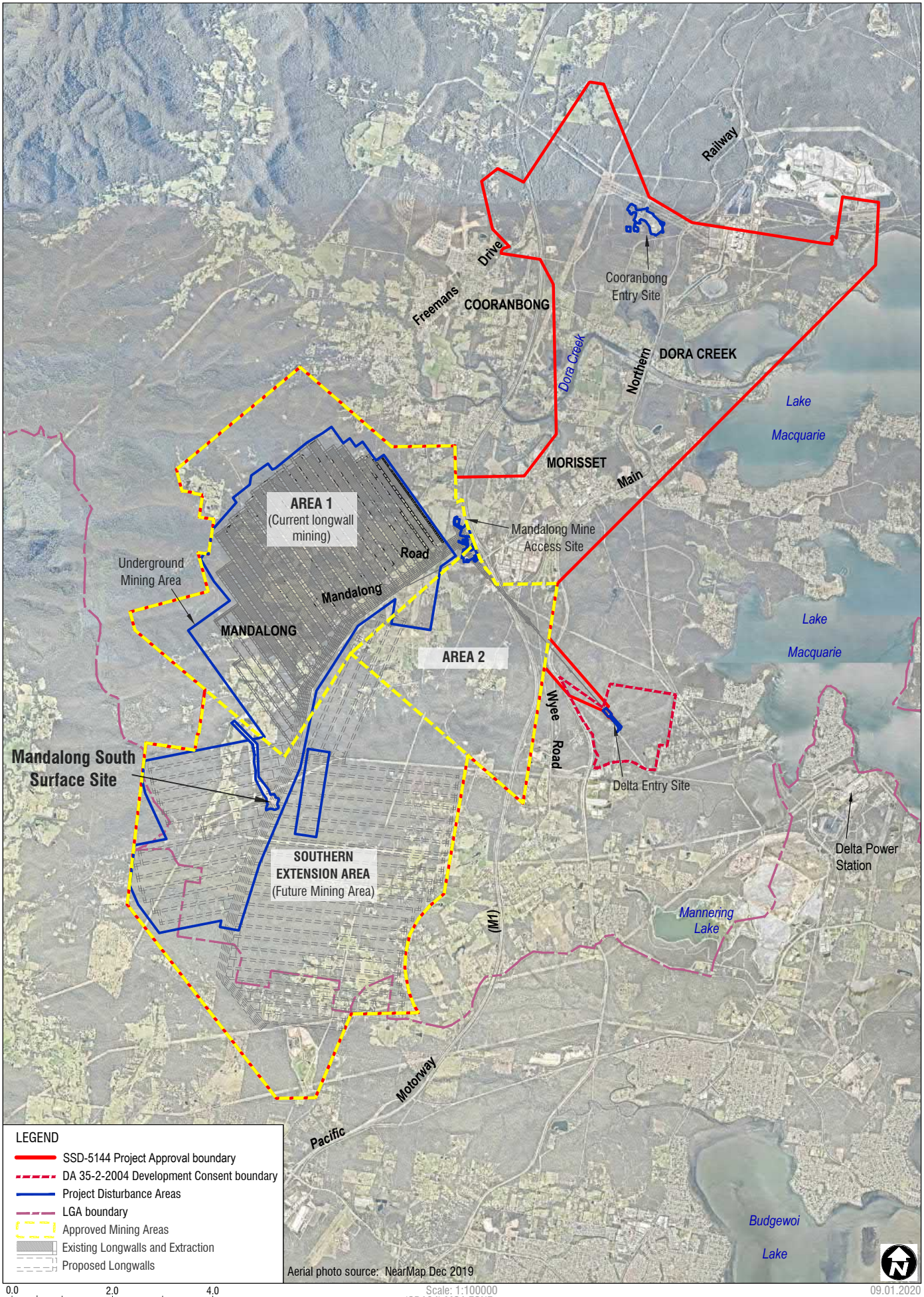
The drill sites will require a footprint of approximately 35 metres (m) x 25 m. This will be required to accommodate the drill rig, sumps (above-ground sumps or in-ground sumps, depending upon site suitability), a rod skid or truck. All proposed drill sites will be located within the existing disturbance area already cleared for the construction of the MSSS.

As required by Schedule 2 Condition 8 of SSD-5144, construction of the service boreholes will be undertaken during the following standard daytime hours:

- 7:00 am to 6:00 pm on Monday to Friday;
- 8:00 am to 1:00 pm on Saturday; and
- No construction activities will be undertaken on Sundays or on public holidays, except where carried out underground.

Construction is estimated to take approximately 2 months per borehole and is proposed to commence in early 2020.

Once installed no significant activities are associated with the ongoing operation and use of the service boreholes.

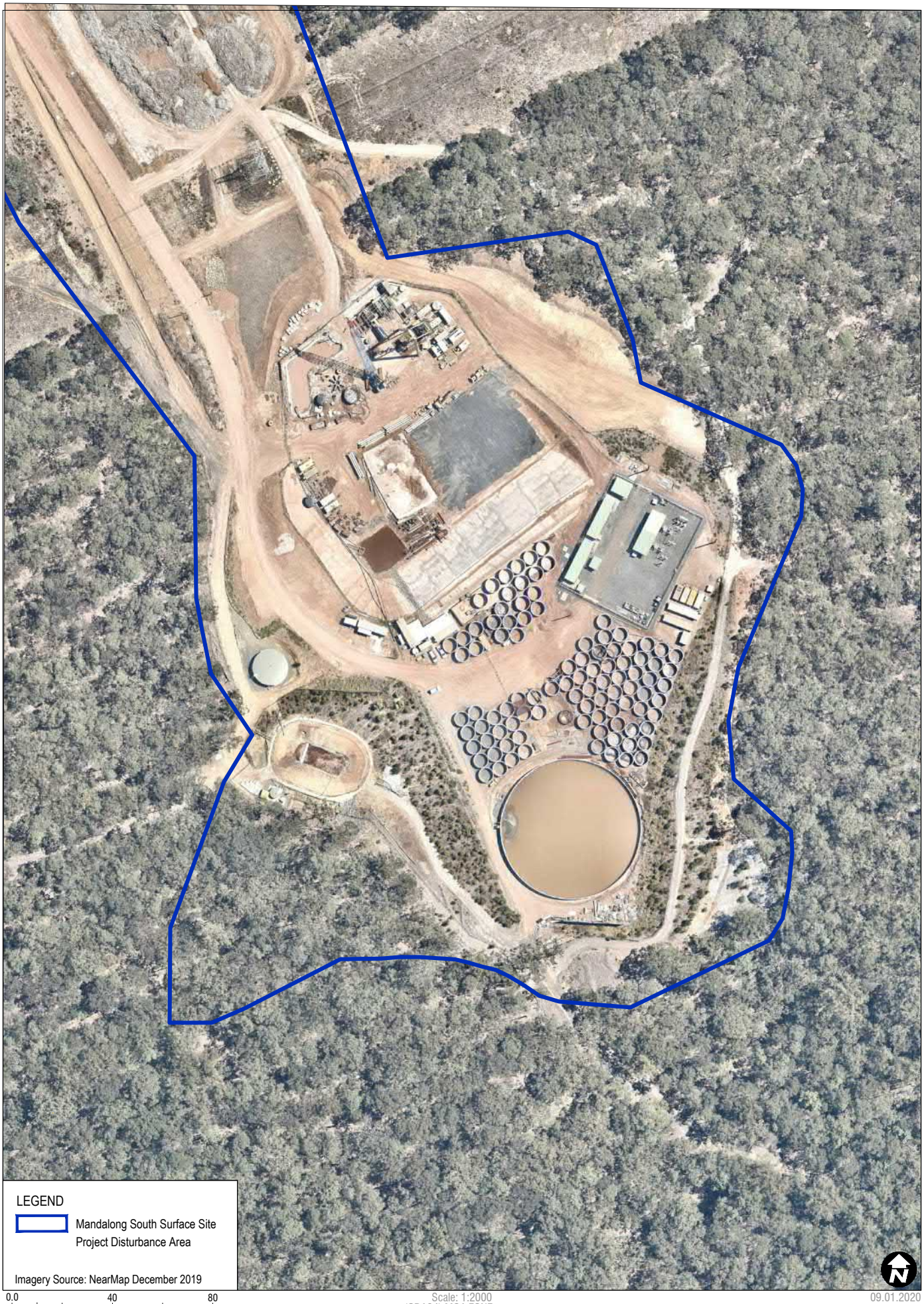


H:\Projects-SLR\630-Srv\NTL\630-NTL\630.13019 Mandalong Service Boreholes Management Plan\06 SLR Data\01 CADGIS\CAD\SLR630.13019_F1_ProjArea_01.dwg

PROJECT AREA

FIGURE 1

SLR
www.slrconsultingaustralia.com.au PH: 61 2 4037 3200



H:\Projects-SLR\630-SrvNTL\630-NTL\630.13019 Mandalong Service Boreholes Management Plan\06 SLR Data\01 CAD\GIS\CAD\SLR630.13019_F2_SiteLO_01.dwg

Scale: 1:2000
(GDA94) MGA ZONE

09.01.2020
630.13019

Sheet Size: A4

SLR
www.slrconsulting.com

PH: 02 4037 3200

MANDALONG SOUTH SURFACE SITE LAYOUT

FIGURE 2

2 REGULATORY REQUIREMENTS

2.1 Development Consent SSD-5144

This SBMP has been developed to comply with the requirements of Development Consent SSD-5144.

Schedule 3, Condition 35 of SSD-5144 details the requirements for the preparation of this Plan. These requirements are reproduced in **Table 1**, together with the section of this document in which each matter is addressed.

Table 1 – Relevant Development Consent Conditions

Condition	Condition Requirement	Section Addressed
Schedule 3, Condition 35	The Applicant must prepare a Gas Drainage Management Plan, a Service Boreholes Management Plan and a PED Communications Management Plan in respect of construction and use of future surface gas drainage and management infrastructure, future service boreholes and future PED communications infrastructure, respectively, to the satisfaction of the Secretary. Each of these plans must be submitted to the Secretary for approval prior to the construction of the relevant infrastructure and must include the Applicant's commitments regarding:	This Document[1]
	(a) community consultation;	Section 3
	(b) landholder agreements;	Section 3.3
	(c) assessment of noise, air quality, traffic, biodiversity, heritage, public safety and other impacts in accordance with approved methods;	Section 4
	(d) avoidance of significant impacts and minimisation of impacts generally;	Section 4
	(e) beneficial re-use or flaring of drained hydrocarbon gases, wherever practicable (in the case of the Gas Drainage Management Plan);	Not applicable to this Plan
	(f) achievement of applicable standards and goals;	Section 4
	(g) mitigation and/or compensation for significant noise, air quality and visual impacts; and	Section 4
	(h) rehabilitation of disturbed sites.	Section 4.10
	The Applicant must implement the approved management plan as approved from time to time by the Secretary.	Noted

In addition, Schedule 6 Condition 2 specifies the following requirements for management plans prepared under SSD-5144. These are reproduced in **Table 2**, together with the section of this document in which each matter is addressed.

[1] This document has been prepared to address the requirements for a Service Boreholes Management Plan. Separate plans will be prepared as required to address the requirements for Gas Drainage Management Plan and a PED Communications Management Plan.

Table 2 – Management Plan Requirements

Condition	Condition Requirement	Section Addressed
Schedule 6, Condition 2	The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	-
	(a) detailed baseline data;	Not applicable to this plan
	(b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 4
	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 4
	(d) a program to monitor and report on the: • impacts and environmental performance of the development; and • effectiveness of any management measures;	Section 5
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 5.3.3
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Not applicable to this Plan
	(g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and	Section 5.3 Section 5.2.3
	(h) a protocol for periodic review of the plan.	Section 6
	Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	Noted

3 STAKEHOLDER CONSULTATION

3.1 Land Ownership and Stakeholder Identification

The SSD-5144 Development Consent area comprises both privately owned freehold land (including residential and commercial areas) and land owned by the NSW State Government, as listed below:

- Centennial Fassifern Pty Limited (subsidiary company of Centennial Coal);
- The Crown, including:
    - Olney State Forest, under the care and control of the Forestry Corporation of NSW (FCNSW);
    - Jilliby State Conservation Area (SCA), under the care and control of the NSW Office of Environment and Heritage (OEH);
    - M1 Pacific Motorway corridor, under the care and control of the NSW Roads and Maritime Service (RMS); and
    - Great Northern Railway Line corridor, under the care and control of the Rail Corporation of NSW (Rail Corp);
- Lake Macquarie City Council (LMCC), including various public road reserves;
- Wyong Shire Council, including various public road reserves and the Buttonderry Waste Management Facility; and
- Eraring Energy.

The remaining properties are privately owned freehold land.

Land ownership within the bounds of the Project Application Area are shown on **Figure 3**.

Sensitive receivers surrounding the MSSS are presented in **Figure 4**.

3.2 Landholder and Community Consultation

Mandalong Mine conducts communication and consultation processes which will continue for the duration of mining activities. The Stakeholder Engagement Plan (SEP) has been developed to provide a consistent management framework to identify, inform, consult and involve landowners with an interest in the activities associated with the Mandalong Mine.

The SEP includes details of communication and consultation with all landowners and in particular those located in mining and exploration areas proposed over the life of the mine, in accordance with Development Consent and mining authority conditions.

The objectives of the SEP are to:

- Understand the characteristics of the local community and the impact of its operations (current and proposed);
- Set a process for consultation and engagement with stakeholders of interest;
- To openly communicate with stakeholders about Mandalong regarding current and potential future activities; and
- To provide a means of ongoing reporting and monitoring of activities.

Established communication and consultation methods utilised by Centennial Mandalong include:

- Participation on the Mandalong Mine Community Consultative Committee (CCC);
- Notifications and meetings with individual landowners;
- Notifications and meetings with individual stakeholders including community infrastructure providers and utilities;
- “Mandalong Mailbox” community newsletters;

- Publications in the local newspaper (the "Lakes Mail");
- Community information sheets dealing with specific Mine development issues;
- Community Open Days and Mine visits (surface and underground);
- Mandalong Community Information and Complaints Line (1800 730 919); and
- Centennial Coal website – Mandalong Mine community information page.

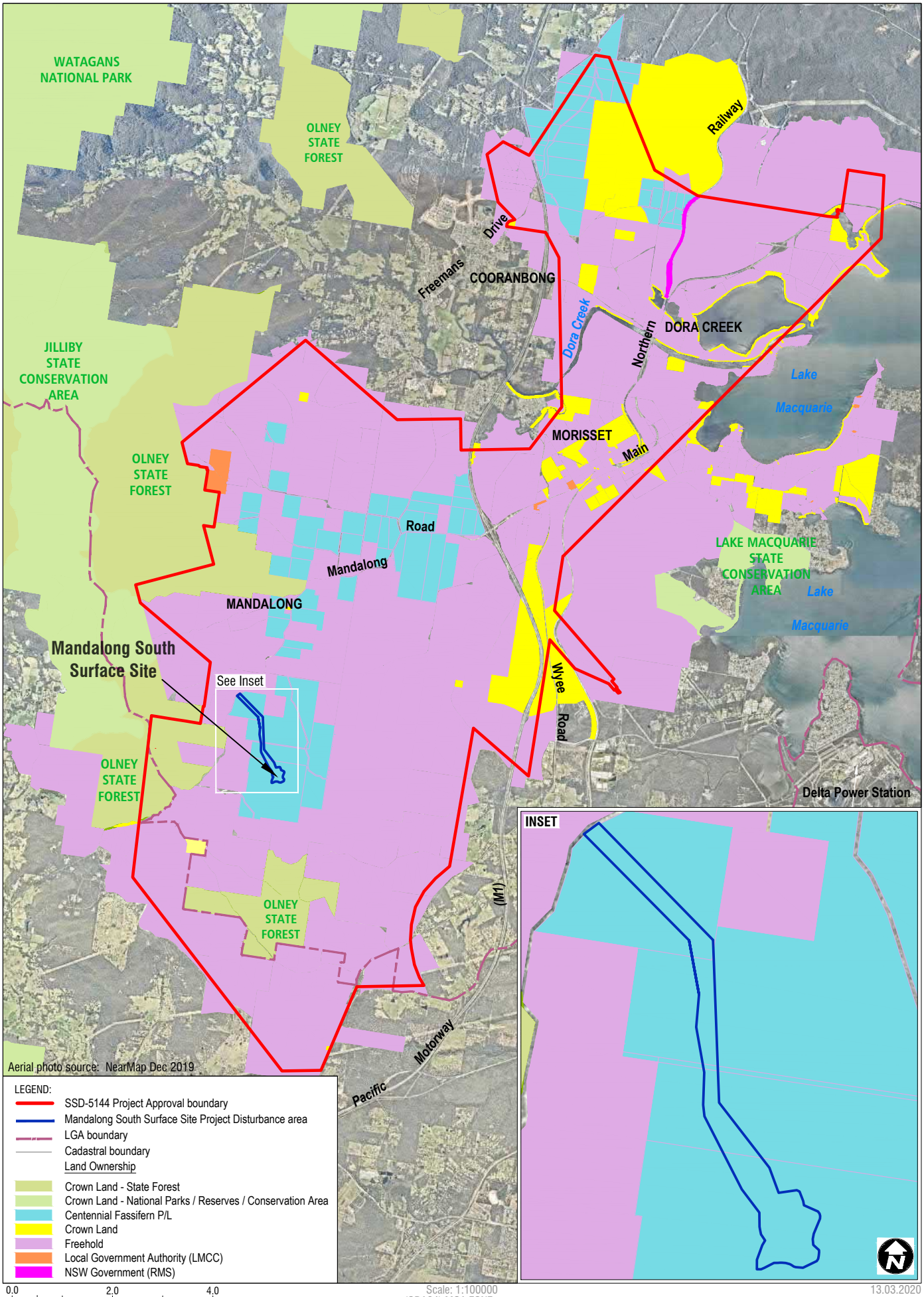
Landowners and local community members will be provided with information regarding drilling programmes for service boreholes prior to the commencement of drilling activities through the established consultation methods detailed above. The CCC and relevant landholders within the community will be provided with information in advance of drilling programmes and follow up consultation will be available on request from landowners.

3.3 Landowner Agreements

The entire footprint of the MSSS and the proposed service borehole locations are located upon land owned by Centennial Fassifern Pty Limited and as such landholder agreements are not required. Should future service boreholes be required to be constructed on privately owned land, face-to-face consultation with the landowner will occur to discuss the exploration site, obtain landowner consent and negotiate an "Access Agreement".

Access Agreements will be decided in consultation with landowners and any affected neighbouring landowner with sites located to minimise the impact on the environment and surrounding landowners. When drilling with an access agreement occurs neighbouring landowners with a principle place of residence within 450 m of a drill site will also be notified of the drilling (including timing, location and anticipated duration) and if requested will be further consulted regarding the works.

Access Agreements will identify any compensation for accessing a property, proposed activities and recognition of landowner time. Disturbance from any activities will be repaired by the Mine to satisfy the landowner and licence requirements.

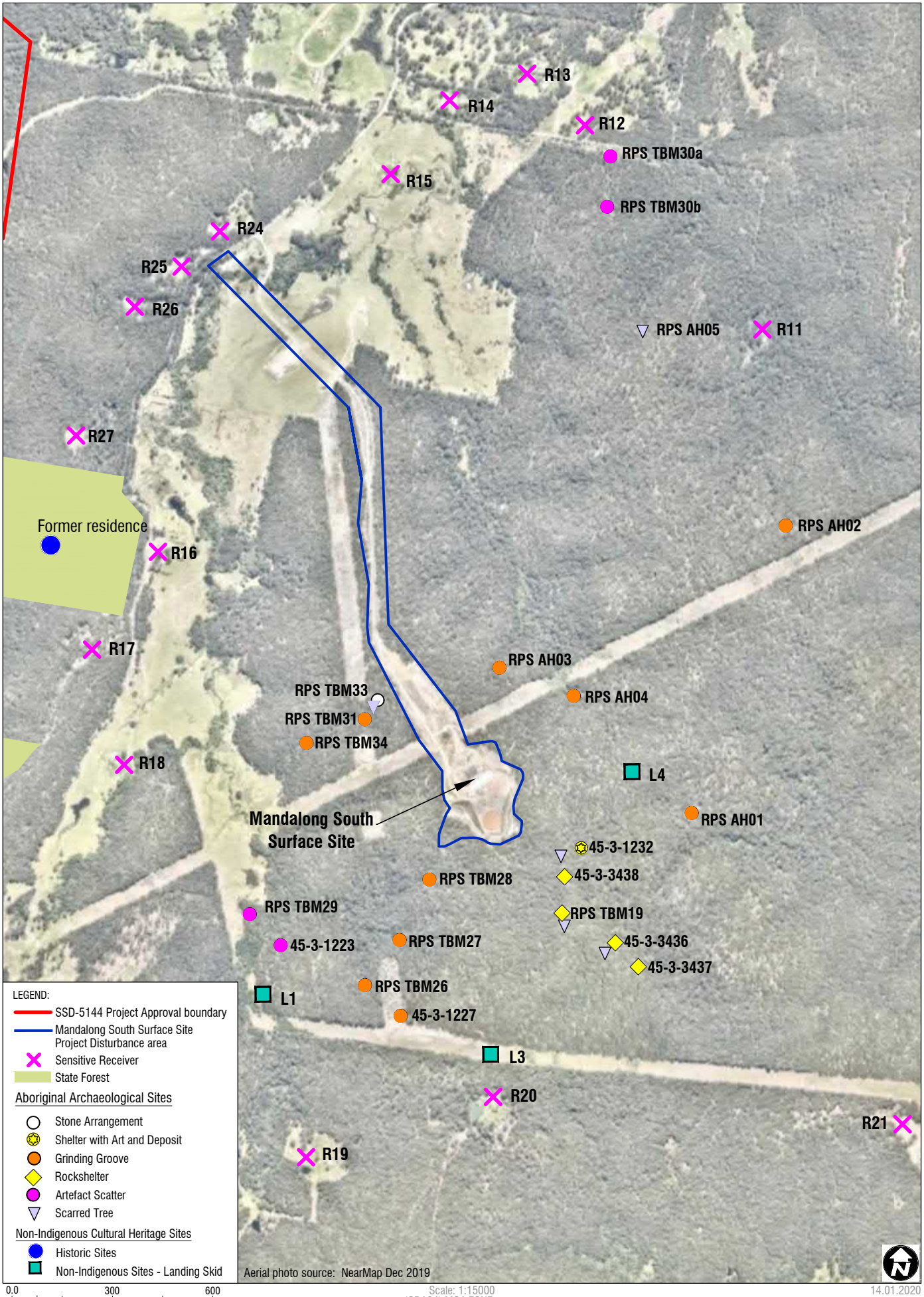


H:\Projects-SLR\630-SrvNTL\630-NTL\630.13019 Mandalong Service Boreholes Management Plan\06 SLR Data\01 CADGIS\CAD\SLR630.13019_F3_LandOwn_02.dwg

SLR
www.slrconsultingaustralia.com.au PH: 61 2 4037 3200

LAND OWNERSHIP

FIGURE 3



H:\Projects-SLR\630-Srv\NTL\630-NTL\630.13019 Mandalong Service Boreholes Management Plan\06 SLR Data\01 CAD\GIS\CAD\SLR630.13019_F4_SensRecep_02.dwg

Scale: 1:15000
(GDA94) MGA ZONE

14.01.2020
630.13019

Sheet Size: A4

SLR

www.slrconsultingaustralia.com.au PH: 61 2 4037 3200

SENSITIVE RECEIVER LOCATIONS

FIGURE 4

4 IMPLEMENTATION

4.1 Environmental Assessment

Assessment of potential environmental impacts associated with the construction and operation of the MSSS, including the proposed service boreholes, was undertaken as part of the *Mandalong Southern Extension Project Environmental Impact Statement (EIS)* (GSSE 2013a). The EIS included the following technical assessments relevant to this SBMP:

- Air Quality Impact Assessment (SLR 2013a);
- Decommissioning and Rehabilitation Strategy (GSSE 2013b);
- Flora and Fauna Assessment (RPS 2013a);
- Groundwater Impact Statement (GHD 2013);
- Heritage Impact Assessment (RPS 2013b);
- Noise Impact Assessment (SLR 2013b);
- Surface Water Assessment (Umwelt 2013);
- Traffic Impact Assessment (Intersect Traffic 2013); and
- Visual Impact Assessment (Green Bean Design 2013).

A summary of the predicted environmental impacts and recommended mitigation and management measures associated with the construction and operation of the proposed service boreholes at the MSSS is presented in **Section 4.2** to **Section 4.10**.

4.2 Noise

4.2.1 Noise Impact Assessment Summary

The *Noise Impact Assessment* (SLR 2013b) assessed the potential noise impacts from the construction and operation of the MSSS, including the proposed service boreholes. The results of the assessment indicated the following noise impacts from the construction and operation of the MSSS as a whole:

- Ventilation shaft sinking activity at the MSSS outside of standard recommended hours is likely to marginally exceed (by 1 dBA) the relevant "noise affected" level at R20 on Toepfers Road. However, with the inclusion of a temporary noise barrier, total noise emission from shaft sinking activity will be compliant with the relevant noise goal.
- The results of the operation noise modelling indicated that the relevant intrusive and amenity noise criteria will be achieved at all the nearest residential locations.

Noise associated with the construction of the service boreholes will predominantly be attributable to the drilling of the boreholes. As required by Schedule 2 Condition 8 of SSD-5144, construction of the service boreholes will be undertaken during the following standard daytime hours:

- 7:00 am to 6:00 pm on Monday to Friday;
- 8:00 am to 1:00 pm on Saturday; and
- No construction activities will be undertaken on Sundays or on public holidays, except where carried out underground.

No significant noise generating activities are associated with the operation of the service boreholes.

4.2.2 Noise Performance Standards

4.2.2.1 Construction Noise Goals

Schedule 3 Condition 1 SSD-5144 requires that the noise generated by construction activities (excluding shaft construction), is managed in accordance with the requirements of the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009), as may be updated from time to time.

Project-specific noise goals for construction activity (excluding shaft sinking) were established with reference to the ICNG and using the results of the ambient noise measurements completed for the *Noise Impact Assessment* (SLR, 2013). Construction noise goals for the Project are presented in **Table 2**.

Table 2 – Construction Noise Goals

Receiver (refer Figure 4)	Time of Day[1]	Noise Goals, LAeq(15 minute) (dBA)	
		Noise Affected	Highly Noise Affected
R1 to R4	Standard hours	50	75
	Outside standard hours	42	N/A
R5 to R10	Standard hours	62	75
	Outside standard hours	51	N/A
R11 to R15	Standard hours	41	75
	Outside standard hours	36	N/A
R16 to R18; R24 to R27	Standard hours	44	75
	Outside standard hours	38	N/A
R19 to R23; R28 and 29	Standard hours	40	75
	Outside standard hours	35	N/A

1 - Standard hours – Monday to Friday 7:00 am to 6:00 pm, Saturday 8:00 am to 1:00 pm (no work Sundays or Public Holidays).

4.2.2.2 Operation Noise Criteria

In accordance with Schedule 3 Condition 2 of Development Consent SSD-5144, Mandalong will ensure the operational noise generated by the development does not exceed the criteria in **Table 3**.

Table 3 – Operational Noise Criteria

Receiver (refer Figure 4)	Noise Limit (dBA)			
	Day LAeq(15minute)	Evening LAeq(15minute)	Night LAeq(15minute)	Night LA1(1minute)
R2	40	40	40	52
R3	42	42	42	52
R4	39	39	39	52
R5	41	41	41	61
R6	40	40	40	61
R7&8	43	43	43	61
R9	42	42	42	61
R10	39	39	39	61
All other receivers on privately-owned land	35	35	35	45

The noise limits outlined in **Table 3** do not apply if Centennial Mandalong has an agreement with the relevant landholder to exceed the criteria and the Department of Planning, Industry and Environment (DPIE) has been advised in writing of the terms of this agreement.

4.2.3 Noise Mitigation and Management

4.2.3.1 Construction

Noise management and mitigation during the drilling and construction of service boreholes will be undertaken in accordance with the *Construction Noise and Vibration Management Summary – Mandalong South Surface Site and Access Road*. Specific measures associated with the construction of service boreholes will include:

- Drilling will be undertaken during standard working hours (7:00 am and 6:00 pm, Monday to Friday and Saturday 8:00 am to 1:00 pm). No drilling will be undertaken on Sundays or Public Holidays;
- If needed temporary noise barriers will be established and maintained;
- Consultation with potentially-affected residences will be undertaken regarding the timing of excessive-noise generating activities and, where possible, construction during the most sensitive times of the day will be limited. All potentially affected residents will be informed of the following prior to the commencement of excessive noise-generating construction activities at the MSSS:
    - The nature and duration of the works to be carried out;
    - The expected noise levels; and
    - Relevant contact details for site personnel.
- All contractors will be required to ensure that only vehicles and machinery in good working condition are used;
- Machinery and vehicles will be required to be maintained during works;
- Onsite noise mitigation measures and plant operating procedures will be refined where practical (e.g. orient machinery so that noise emitting sources are facing away from receptors); and
- Community complaints relating to noise will be addressed in accordance with the Centennial Mandalong complaints process.

4.2.3.2 Operation

No specific noise impacts are anticipated from the use of service boreholes at the MSSS. Noise emissions from the Centennial Mandalong operations will be managed in accordance with the *Northern Region Noise Management Plan* (RNMP).

The RNMP outlines noise management and monitoring measures that will be implemented at all Centennial's Northern operations to measure compliance with statutory requirements.

4.3 Air Quality

4.3.1 Air Quality Impact Assessment Summary

The *Air Quality Impact Assessment* (SLR 2013a) assessed the potential air quality impacts from the construction and operation of the MSSS, including the proposed service boreholes. The results of the assessment indicated the following impacts from the construction and operation of the MSSS as a whole:

- Incremental and cumulative annual average dust deposition, total suspended particulates (TSP) and PM_{10} (particulate matter less than ten microns in diameter) concentrations, along with annual average $PM_{2.5}$ (particulate matter less than two and a half microns in diameter) concentrations, for the assessed construction and operation scenarios at all nominated residences/properties are predicted to be well below the relevant criteria.
- The predicted maximum 24-hour average $PM_{2.5}$ cumulative concentrations for the assessed construction and operation scenarios are predicted to exceed the advisory reporting standards at three nominated receptors (R6, R7 and R8) surrounding the existing Mandalong Mine Access Site.
- The adopted 99th percentile 1-hour average odour criterion is predicted to be exceeded at eight sensitive receptors (R1 to R3 and R6 to R10) in the vicinity of the Mandalong Mine Access Site for the assessed construction and operation scenarios.
- The nitrogen dioxide, carbon monoxide and sulphur dioxide concentrations are predicted to be below the project criteria at all sensitive receptors during the assessed operation scenarios.

4.3.1.1 Air Quality Performance Standards

In accordance with the requirements of Schedule 3, Condition 2 of SSD-5144, Centennial will ensure that all reasonable and feasible avoidance and mitigation measures are employed during construction and operation of the MSSS so that the particulate matter emissions generated by the development do not cause exceedances of the criteria in **Table 4** at any residence on privately-owned land.

Table 4 – Air Quality Criteria

Pollutant	Averaging Period	Criterion	
PM_{10}	Annual	[a,d]25 µg/m^3	
PM_{10}	24 hour	[b]50 µg/m^3	
TSP	Annual	[a,d]90 µg/m^3	
Deposited Dust[c]	Annual	2 g/m^2/month[b]	4 g/m^2/month[b]

Notes:

a) Cumulative impact (i.e. increase in concentrations due to the development plus background concentrations due to all other sources).
b) Incremental impact (i.e. increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development.
c) Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Method for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
d) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

4.3.2 Air Quality Mitigation and Management

4.3.2.1 Construction

Air quality impacts associated with the service borehole construction will be managed in accordance with the *MSSS Construction Air Quality Management Summary*, which includes emission controls to minimise the impact of the construction activities on nearby sensitive receivers. The following measures will be implemented:

- All machinery and vehicles with internal combustion engines will be maintained in good working order and made to comply with relevant exhaust standards;
- Regular inspections of plant and equipment will be undertaken and where maintenance issues are identified, the item will be taken out of service. Equipment will not be operated until it is maintained or repaired, where maintenance or repair would address the particulate matter issue identified;
- Any hired equipment that is causing excessive particulate matter (e.g. smoke) will be returned to the hire company and replaced with a cleaner alternative;
- Dust suppression equipment will be fitted to on-site material batching plant (if used);
- Loaded trucks leaving the construction site will be covered to minimise the transport of dust offsite;
- Water carts will be used to dampen exposed surfaces, trafficable areas and stockpiles to minimise windblown and traffic generated dust emissions;
- A designated route will be established for deliveries of materials and equipment to site during construction and details of this route will be provided to all delivery drivers to ensure trucks and other vehicles remain on-route and avoid any unnecessary impacts on sensitive receptors along local roads;
- Vegetation clearing and surface disturbance will be limited to the designated disturbance footprint required for construction;
- Working areas, disturbance areas and access roads will be revegetated and/or stabilised as soon as practicable to prevent or minimise windblown dust;

- Stockpiles and handling areas will be maintained in a damp condition that minimises windblown and traffic generated dust;
- Silt will be removed from behind sediment fences and other erosion control structures on a regular basis, so that collected silt does not become a source of dust;
- Any dust, soil or mud that has been tracked on to public roads by construction activities and vehicle movements will be removed as soon as practicable;
- Where possible, vehicles on site will be confined to designated roadways; and
- The drop height on plant and equipment will be minimised when loading and unloading earthworks material.

4.3.2.2 Operation

Air quality from the operation of the MSSS will be managed in accordance with the *Northern Region Air Quality and Greenhouse Gas Management Plan* (AQGHGMP) which was prepared to fulfil the requirements of Schedule 3 Condition 10 of SSD-5144.

The AQGHGMP includes emissions controls and standard work procedures which are implemented across all sites to manage and minimise emissions of dust and particulate matter.

No specific air quality management measures are required for the service boreholes when operational.

4.4 Traffic

4.4.1 Traffic Impact Assessment Summary

A *Traffic Impact Assessment* (Intersect 2013) was prepared to assess traffic and transport related issues associated with the Mandalong Southern Extension Project, including the construction of the MSSS. The Traffic Impact Assessment concluded that the construction and operation phases of the Project will not adversely impact the local road network.

4.4.2 Traffic Management

A *Construction Traffic Management Sub Plan* (CTMSP) has been prepared to detail the requirements for the management of traffic impacts during construction of the MSSS and Access Road. Traffic associated with the construction of service boreholes will be undertaken in accordance with the CTMSP.

The traffic management strategies adopted aim to minimise the impacts of the construction works on the local road network and ensure suitable safe conditions throughout the construction period. Measures include:

- The installation of temporary signage, a Variable Message Board and line marking;
- Regulated construction and delivery times and periods;
- Voluntary 60km/h speed limit zone; and
- Implementation of appropriate dust and noise mitigation measures.

4.5 Biodiversity

4.5.1 Flora and Fauna Impact Assessment Summary

The *Flora and Fauna Impact Assessment* (RPS 2013a) assessed the potential impacts from the construction and operation of the MSSS on flora and fauna in the project area. The assessment concluded the following:

- This disturbance assessment area comprised approximately 15.6 hectares of MU 15: Coastal Foothills Spotted Gum - Ironbark Forest, which is very common and widespread in the locality;
- The proposed works will remove a proportionally small area (less than 1 percent) of potential habitat within the wider context of the local native vegetation;
- The disturbance footprint will result in the removal of nine hollow-bearing trees; and
- No significant impact upon threatened species, populations or ecological communities listed under the Threatened Species Conservation Act 1995 (TSC Act) or Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is expected.

All proposed service boreholes will be constructed within the existing MSSS disturbance area. There will be no further disturbance associated with the construction of the service boreholes.

4.5.2 Flora and Fauna Management

4.5.2.1 Construction

A *Construction Flora and Fauna Management Sub-Plan* (CFFMSP) has been prepared to detail the requirements for the management of ecological impacts during construction of the MSSS (including service boreholes) and Access Road.

The CFFMSP provides a structured approach to the management of flora and fauna during construction of the Project. The CFFMSP:

- Describes mitigation measures and controls to be applied on-site to avoid or minimise impacts to flora and fauna during construction;
- Provides mechanisms for compliance with applicable policies, approvals, licences, permits, and legislation;
- Describes the flora and fauna management related roles and responsibilities of all Project personnel;
- States objectives and targets for the management of flora and fauna impacts during construction; and
- Outlines a monitoring and reporting regime to check the adequacy of flora and fauna management controls as they are implemented during construction.

All construction related activities including the drilling of the service boreholes will be managed in accordance with the CFFMSP. Management measures include:

- Vegetation Clearance Protocol;
- Pathogen Management;
- Weed and Pest Management; and
- Compensatory Nest Box Installation.

4.5.2.2 Operation

Biodiversity impacts from the operation of the MSSS will be managed in accordance with the *Northern Operations Regional Biodiversity Management Plan* (BMP) which was prepared to fulfil the requirements of Schedule 3 Condition 19 of SSD-5144.

The BMP includes controls and standard work procedures which are implemented across all sites to manage and minimise biodiversity impacts from Centennial's Northern operations.

No specific biodiversity management measures are required for the service boreholes once operational.

4.6 Cultural Heritage

4.6.1 Heritage Impact Assessment Summary

The *Heritage Impact Assessment* (RPS 2013b) assessed Aboriginal and non-Indigenous heritage issues associated with the Mandalong Southern Extension Project.

RPS (2013b) concluded that there were no previously identified Aboriginal heritage sites within the MSSS and Access Road disturbance footprint. However, the MSSS is in close proximity (between 65m and 200 m) to eight identified Aboriginal cultural heritage sites and the disturbance footprint crosses three areas identified as potential archaeological deposits (PADs).

Any activity which results in the disturbance of the surface has the potential to harm Aboriginal cultural heritage sites. The level of impact to Aboriginal cultural heritage sites depends on the nature of the disturbance works and the physical characteristics of the site.

RPS (2013b) did not identify any non-Indigenous heritage sites within the proposed MSSS and Access Road disturbance footprint; however, one low significance feature referred to as 'Landing Skid 2' has the potential to be impacted during construction. RPS (2013b) advised that if it is not possible to avoid harming the landing skid it should be recorded by a qualified historical archaeologist prior to impact.

4.6.2 Cultural Heritage Management

Cultural heritage management during the construction of the MSSS including the drilling of the service boreholes will be undertaken in accordance with the *Construction Heritage Management Summary* (CHMS) and the *Northern Holdings Aboriginal Cultural Heritage Management Plan* (ACHMP).

The management strategies detailed in the CHMS are consistent with those outlined in the Centennial Northern Holdings ACHMP. The CHMS is an adaptation of the ACHMP which has been developed for implementation during construction of the MSSS and Access Road. All other aspects of construction and operational activities at the Mandalong Mine will be managed in accordance with the requirements of the ACHMP. If there is any inconsistency between the management strategies outlined in these plans, then the ACHMP will take precedence.

The CHMS addresses each of the management controls applicable to the construction of the MSSS and Access Road as summarised below.

- If it is identified that an Aboriginal cultural heritage site is at a potential risk of harm as a result of construction activities, Centennial Mandalong will endeavour to protect the site from harm wherever practicable in consultation with the Registered Aboriginal Parties (RAPs) by using non-invasive measures.

- In any instance where Aboriginal artefacts are salvaged, an Aboriginal Site Impact Recording (ASIR) form will need to be completed and lodged with OEH. A care and control application will also be lodged for storage arrangements of artefacts. This should be considered as a last resort for management and mitigation of any Aboriginal cultural heritage site. In-situ preservation will be the preferred management option.
- Following the completion of any required salvages or pre-clearance surveys confirming an area is clear of artefacts, the Centennial Environmental Representative will be required to coordinate the completion of an Archaeological Clearance Confirmation Form for the area.
- A combination of silt and protective fencing will be installed prior to and/or during the construction of the MSSS and Access Road to ensure that run-off does not impact Aboriginal sites down slope of this area and that Aboriginal sites upslope are not inadvertently impacted by construction activities.
- Should any sites be identified during pre-construction heritage surveys, they will be fenced immediately and signposted as no-go-zones. If any areas containing Aboriginal heritage sites are within the proposed disturbance footprint, then site recording, assessment and salvages will be undertaken in accordance with the processes described above.
- If, during the course of construction works, an Aboriginal cultural heritage site(s) not previously identified is uncovered, on-site works must stop immediately in the vicinity of the site(s) and the area must be cordoned off as appropriate with high-visibility flagging tape. The on-site personnel must inform the Centennial Environmental Representative regarding the whereabouts of the site, the condition of the site (i.e. any harm caused to the site as a result of mining or development works) in addition to any other relevant information. The Centennial Environmental Representative will then contact the Heritage Branch of OEH following the process within the Centennial Incident Response Standard.
- If any skeletal remains are identified all work must halt in the immediate area to prevent any further harm to the remains. Centennial must contact the NSW Police Coroner immediately. No action is to be undertaken until police provide written notification to Centennial. If the skeletal remains are identified as Aboriginal, Centennial must contact OEH's Enviroline (131 555) and representatives of the local Aboriginal community. No works are to continue until OEH provides written notification to Centennial about the action plan for the management of the skeletal remains and formulated management plan, if required.

4.7 Public Safety

Public safety is a priority management aspect at Mandalong. Service borehole sites are all located within the existing disturbance area associated with the construction of the MSSS.

Mandalong will implement controls measures including providing fencing and warning signage. Caution will also be advised to road users for when access tracks will be used by increased numbers of heavy vehicles.

Public safety mitigation measures that will be undertaken are as follows:

- Signage will be installed to warn the public of the risks associated with unauthorised access and heavy vehicle traffic;
- Existing relevant plans will be checked and 'Dial Before You Dig' searches will be undertaken to avoid interception with utilities, including underground pipelines and power cables;
- Following the completion of drilling and associated activities, all drill holes that are not required for future activities will be sealed in accordance with relevant guidelines.

4.8 Visual Amenity

A *Visual Impact Assessment* (GBD 2013) was undertaken for the proposed Mandalong Southern Extension Project in order to determine the likely visual significance of the Project on people living and working in, or travelling through, the surrounding landscape. The assessment focussed on the proposed MSSS, as the most visible component of the Project, in terms of the extent and nature of the potential visual significance of the proposed surface infrastructure on surrounding areas.

The *Visual Impact Assessment* identified that the surface infrastructure at the MSSS will not be visible from any populated urban centres, or from the M1 Motorway, which is located approximately 4.5 km to the east of the proposed surface site. In addition, there are no formal public lookouts identified within the local landscape surrounding the MSSS.

As such service borehole construction activities are considered unlikely to have a visual impact upon the area or on the surrounding community.

4.9 Surface Water and Erosion and Sediment Control

4.9.1 Surface Water Impact Assessment Summary

A *Surface Water Assessment* (Umwelt 2013) was undertaken to assess the potential surface water impacts associated with the Mandalong Southern Extension Project.

The MSSS is a new site and under existing conditions only natural waterway flows are evident. In terms of hydrology, the most significant change will be as a result of changes to the ground surface that will increase impervious areas and establish drainage infrastructure. This change has the potential to increase the peak rate and volume of surface runoff.

A sedimentation dam has been constructed in the southwest part of the MSSS to collect surface runoff from the entire MSSS. Overflows from the proposed sedimentation dam will be limited through the installation of a pump station to transfer surface water to the Cooranbong underground workings to be then managed via the mine dewatering system. The pump will be sized such that no overflow from the dam occurs during the 20 year ARI rainfall event (using the critical storm duration which is equal to six hours).

In accordance with Schedule 3, Condition 17A of SSD-5144 Mandalong may discharge collected surface water from the MSSS Sediment Dam via Licenced Discharge Point LDP004 (EPL 365) until 30 June 2021.

4.9.2 Surface Water and Erosion and Sediment Control Management Summary

Surface water and erosion and sediment control measures for the service borehole sites will be implemented in accordance with the relevant plans for the overall construction and operation of the MSSS area. No specific impacts or mitigation and management measures are applicable to the construction and operation of the service boreholes.

4.10 Groundwater

4.10.1 Groundwater Impact Assessment Summary

The *Groundwater Impact Assessment* (GHD 2013) assessed groundwater issues associated with the Mandalong Southern Extension Project, in particular due to the construction of ventilation shafts and service bores.

The ventilation shafts and service boreholes proposed at the MSSS may intercept deep low yielding porous and fractured rock groundwater sources that may be present within the overburden. Localised drawdown may occur during boring of the shafts and boreholes until they are lined or cased. Based on the observed recovery of drawdown within the deeper groundwater monitoring bores within the Southern Extension Area, it is considered that any depressurisation of these groundwater sources will recover within a few months (GHD 2013).

As such GHD (2013) concluded that the potential groundwater impacts from the construction of the ventilation shafts and service boreholes will be less than the Level 1 minimal impact considerations from the Aquifer Interference Policy and are therefore considered to be acceptable.

4.10.2 Groundwater Management Summary

As recommended in the EIS (GSSE 2013a) and *Groundwater Impact Assessment* (GHD 2013), where blind boring techniques are employed to install the ventilation shafts and boreholes at the MSSS, groundwater loss will be minimised by minimising the construction time and minimising the time that the shafts and boreholes are unlined.

Non-hazardous polymer drilling muds will also be used during boring. With drilling fluid in the hole, the pressure loss between the groundwater source and the hole is reduced and the void space within the outer wall of the hole is temporarily reduced until the polymer breaks down over time, therefore reducing the flow of groundwater into the hole (GSSE 2013a).

4.11 Rehabilitation

Rehabilitation activities at Mandalong are undertaken in accordance with the *Mandalong Mine Mining Operations Plan* (MOP) which has been prepared to satisfy the requirements of Schedule 3 Condition 33 of SSD-5144 for a Rehabilitation Management Plan as well as relevant Mining Lease conditions.

The proposed service boreholes will be constructed within disturbed areas associated with the construction of the MSSS and will remain operational for the life of the MSSS. Rehabilitation of disturbed areas following construction will be undertaken progressively in accordance with the MOP.

4.11.1 Temporary Stabilisation

In accordance with the MOP, temporary stabilisation will be required at construction areas, including service borehole areas. Prior to the re-establishment of vegetation cover, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials. Consideration will be given to erosion and sediment control procedures for activities undertaken during the construction phase. These procedures may include restricted access during wet weather or to areas under rehabilitation, reporting of erosion and sediment hazards or incidents and regular checking and maintenance of structures.

Erosion and sediment controls will be implemented in accordance with the *Construction Erosion and Sediment Control Management Sub-Plan* (CESCMSP) which detail the requirements for management of erosion and sediment impacts during construction of the MSSS.

4.11.2 Borehole Sealing

Once they are no longer required for operational use, service boreholes will be sealed in accordance with relevant guidelines at the time. Records will be kept demonstrating the method used to seal each drill hole, volume and types of materials used and information on the drill hole such as depth, diameter and casing string(s) left in the hole.

Where non-grouted casing cannot be removed, grouting methods will be undertaken in accordance with relevant guidelines. All records relating to the sealing of drill holes will be provided together with a declaration confirming that the work was carried out according to the guidelines.

4.11.3 Rehabilitation and Revegetation

Disturbed areas will be rehabilitated and revegetated as soon as practicable following completion of construction and drilling activities. As detailed in the *Decommissioning and Rehabilitation Strategy* (GSSE 2013b) prepared as part of the EIS, following completion of activities, the MSSS will be rehabilitated to a native bushland final land use.

The *Decommissioning and Rehabilitation Strategy* outlines the key rehabilitation steps as follows:

- Topsoil will be stripped prior to significant surface disturbance, specifically prior to the construction of the MSSS and access road and conserved for later use in rehabilitation;
- Soil will be re-spread directly onto stripped areas where practical;
- Topsoil will be spread, treated with fertiliser and seeded in one consecutive operation, where possible, to reduce the potential for topsoil loss to wind and water erosion;
- Soil will be re-spread to the approximate depth from which it was stripped;
- Thorough seedbed preparation will be undertaken to ensure optimum establishment and growth of vegetation;
- All topsoiled areas will be lightly contour ripped (after topsoil spreading) and, where possible, will be ripped when the soil is moist and immediately prior to sowing;
- If required, the re-spread topsoil surface will be scarified prior to, or during seeding, to reduce run-off and increase infiltration;
- Species selection for areas to be rehabilitated to native bushland will focus on those species that will successfully establish on the available growth medium, bind the soil and result in a variety of structure and food/habitat resources. Whilst every attempt will be made to use species that existed prior to the commencement of mining, some additional species may be required to ensure suitable initial groundcover for site stabilisation. This may include the use of short-lived annual exotic non-invasive grass species.
- A combination of native and introduced pasture species may be used on the disturbance areas to ensure the quick establishment of a continuous groundcover, thereby reducing the risk of erosion. Legumes may also be selected to assist in the supply of bio-available nitrogen to the soil.

5 MONITORING AND RESPONSE

5.1 Environmental Monitoring

Centennial Mandalong will monitor the environmental performance associated with the construction and use of service boreholes in accordance with monitoring programs outlined within relevant environmental management plans, including the following:

- *Construction Environmental Management Plan* (and sub-Plans);
- *Northern Region Noise Management Plan*;
- *Air Quality and Greenhouse Gas Management Plan;*
- *Northern Operations Regional Biodiversity Management Plan;*
- *Northern Holdings Aboriginal Cultural Heritage Management Plan;* and
- *Mandalong Mine Mining Operations Plan.*

5.2 Environmental Inspections

5.2.1 Weekly and Post Rainfall Inspections

The Project Manager (or delegate) will undertake weekly and post-rainfall (after 20 mm of rainfall or where runoff has been generated) inspections of work sites to evaluate the effectiveness of environmental controls and specify required corrective actions. The Project Manager (or delegate) will record inspection findings on an inspection checklist form. If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

5.2.2 Worksite inspections

During each shift, an inspection will be carried out by the Principal Contractor's supervisor, which will include a check of relevant environmental controls and resources required to ensure effective operation and maintenance. Any required corrective actions are to be implemented as soon as practicable.

5.2.3 Non-Conformance and Corrective and Preventative Action

Centennial Mandalong will document in a report any case of non-conformance with this Plan. The Centennial Environmental Representative or the Centennial Project Manager (or their delegate) will investigate any such non-conformance by a contractor and/or subcontractor with the relevant contractor / subcontractor on a case by case basis.

5.3 Contacts, Complaints and Incidents

The contacts for environmental complaints and incidents are presented in **Table 7**.

Table 5 – Contact Details

Position	Contact Details
Centennial Mandalong Mine Manager	Richard Gelson T: (02) 4973 0911 E: Richard.Gelson@centennialcoal.com.au
Project Manager – Mandalong South	Peter Davidson T: (02) 4973 0922 E: Peter.Davidson@centennialcoal.com.au
Centennial Mandalong Environment and Community Coordinator	Jeffrey Dunwoodie T: (02) 4973 0947 E: Jeffrey.Dunwoodie@centennialcoal.com.au
Contractor Project Manager	TBC

5.3.1 Complaints Management

The Mandalong Community Information and Complaints Line (1800 730 919) is made available on the Centennial Coal website. All complaints will be maintained in a register and reported internally to the Environment and Community Coordinator for appropriate action. Any complaints will be reported externally in the Annual Review.

5.3.2 Incident Reporting

The Environment Protection Authority (EPA) will be notified of environmental incidents in accordance with the requirements of EPL 365. This requires Mandalong to contact the EPA's Pollution Line on 131 555 of any incidents causing or threatening material harm to the environment. The Mandalong *Environmental Management Strategy*, CEMP and *Pollution Incident Response Management Plan* will be consulted for any additional notification requirements such as internal incident reporting procedures and minor environmental impacts that are not threatening to cause material harm to the environment.

5.3.3 Contingency Planning

The Project Manager and Environment and Community Coordinator will be contacted in the event of unpredicted environmental impacts being identified to provide guidance on an appropriate course of action, including assessing whether the Mandalong incident procedure should be implemented.

Unpredicted impacts will be dealt with on a case by case basis. After appropriate action has been implemented, the need for review of this Plan, based on the unpredicted impact, will be assessed by the Project Manager and Environment and Community Coordinator.

5.4 Roles and Responsibilities

Each employee and contactor is responsible for adhering to the Centennial Coal Environmental Policy. Whilst the obligation of complying with the Environmental Policy lies with the entire workforce, further environmental management responsibilities that are considered as a part of the normal functioning of some positions relevant to this Plan are described as follows:-

Centennial Project Manager

The Centennial Project Manager (or their delegate) is responsible for overseeing the implementation of this Plan, consulting with the relevant government and public stakeholders as required and

providing the relevant information to stakeholders as necessary. The Centennial Project Manager (or their delegate) will be responsible for:

- The overall implementation of this document;
- Maintaining accountability for the management of the service borehole sites and all employees and contractors entering the sites;
- The conveyance of this Plan and its objectives to all contractors entering the service borehole sites;
- Maintaining accountability for the implementation, maintenance and monitoring of compliance with this Plan;
- Advising the Environment and Community Coordinator regarding potential environmental issues;
- Ensuring the Mine Manager is informed of all incidents and non-compliance and the corrective actions taken to mitigate any such incidents; and
- Ensuring the correct signage is appropriately located, where required.

Mine Manager

- Authorisation of this Plan;
- Reporting of significant environmental incidents to external stakeholders as required;
- Delegation of resources to ensure environmental risk mitigation strategies are implemented;
- Delegation of duties during the absence of the Environment and Community Coordinator; and
- Providing adequate resources to implement this Plan.

Environment and Community Coordinator

- Compliance with the Centennial Environmental Policy;
- Reporting of environmental incidents as required to external stakeholders;
- Maintenance of the complaints register, investigating complaints, and taking appropriate action to alleviate the impact of any complaints;
- Regulatory and community consultation;
- Registration of community complaints and regulatory liaison in the Environment and Community Database;
- Development and implementation of environmental work procedures;
- Development and implementation of environmental training and inductions;
- Auditing the effectiveness of the document;
- Assisting the Project Manager with the overall implementation of this Plan;
- Providing advice on environmental pollution issues;
- Investigating environmental incidents, exceedances, complaints and/or enquiries;
- Coordinating the required monitoring activities and undertaking additional monitoring as required;
- Coordinating training to employees and contractors regarding the requirements of this document;
- Assist the Project Manager to undertake inspections on a regular basis to monitor the environmental performance of the drilling programme; and
- Coordinating all reporting (both internally and externally) in relation to this document.

Employees and Contractors

- Compliance with the Centennial Environmental Policy, standards and procedures;
- Immediately reporting environmental incidents and community complaints or enquiries to the Environment and Community Coordinator;
- Conducting operations in compliance with the Centennial environmental management plans and procedures; and

- Identifying and implementing appropriate controls for environmental risks from any risk assessments and job safety analysis and communicating these with responsible staff.
- Undertake training in the content of this Plan during a site induction program; and
- During the drilling programme all contractors and employees will be responsible for carrying out actions as directed to ensure compliance with this document.

Delegation of roles or responsibilities may be determined by the Mine Manager at any time.

6 REVIEW AND IMPROVEMENT

In accordance with the requirements of Schedule 6, Condition 7 of Development Consent SSD-5144, Mandalong will review and, if necessary, revise this Plan within three months of the following:

a) Submission of an incident report;
b) Submission of an Annual Review;
c) Submission of an Independent Environmental Audit; or
d) Any modification to the conditions of SSD-5144.

In addition, review of this Plan may also be undertaken in response to:

- Changes to relevant legislation;
- Changes to construction methodologies, equipment or design; and
- Identification of additional required service borehole locations beyond the current disturbance footprint.

If required, the proposed management strategies and control measures will be modified to address evolving site conditions, latent conditions and/or changes to the proposed exploration sequence. Any changes to the Plan will then be communicated to the relevant site personnel via daily “toolbox talk” training and weekly project meetings.

This management plan is a controlled document and will be reviewed on an as needs basis.

Following amendments, a copy of the revised Plan will be provided to the DPIE for approval

Continual improvement shall be achieved through monitoring, internal and external communication with stakeholders, implementation of corrective and preventative actions and reviewing progress against performance objectives outlined within this Plan.

7 BIBLIOGRAPHY

Green Bean Design (2013) *Visual Impact Assessment.*

GHD (2013) *Groundwater Impact Statement.*

GSSE (2013a) *Mandalong Southern Extension Project Environmental Impact Statement*.

GSSE (2013b) *Decommissioning and Rehabilitation Strategy.*

Intersect Traffic (2013) *Traffic Impact Assessment.*

RPS (2013a) *Mandalong Southern Extension Flora and Fauna Assessment.*

RPS (2013b) *Mandalong Southern Extension Heritage Impact Assessment.*

SLR (2013a) *Air Quality Impact Assessment.*

SLR (2013b) *Noise Impact Assessment.*

Umwelt (2013) *Mandalong Southern Extension Project Surface Water Assessment*.