



Stratford Mining Complex Annual Biodiversity Report 2021

FOR THE YEAR ENDING 31 DECEMBER 2021

CONTENTS

1	Introduction.....	3
1.1	Scope	3
2	Status of BMP Performance Criteria.....	3
3	Vegetation Clearance Protocol.....	5
3.1	Vegetation Clearance Report	5
3.2	Salvaged and Reused Material for Habitat Enhancement	5
4	Managing Access, Fencing, Gates and Signage	6
5	Revegetation Management.....	7
5.1	Seed Collection and Propagation	7
5.2	Revegetation and Regeneration.....	7
6	Weed Control and Monitoring	10
7	Feral Animal Control and Monitoring.....	11
8	Bushfire Prevention and Risk Management.....	12
9	Nest Box Programme.....	13
10	Squirrel Glider Management Plan	14
10.1	Definition of the Squirrel Glider Colonies	15
10.2	Squirrel Glider Home Ranges	15
10.3	Tree Hollow Census	17
11	Biodiversity Offset Monitoring and Reporting	18
11.1	Habitat and Vegetation Condition Monitoring	19
11.2	Fauna Monitoring.....	20
12	Long Term Security and Conservation Bond	22
12.1	Long-term Security	22
12.2	Conservation Bond	22
13	Commonwealth EPBC Approval Compliance Reports	23
14	Appendices	24

List of Appendices

Appendix A: DPIE Approval of the BMP.

Appendix B: SMC Annual Review 2021 – Figure 4 Mining & Rehabilitation Areas

Appendix C: SMC Vegetation Clearance & Nest Box Replacement Requirements 2021

Appendix D: Kleinfelder - 2021 Autumn Stratford Biodiversity Offsets Planting Program Report

Appendix E: Kleinfelder - 2022 Biodiversity Offset Area – Proposed Revegetation Areas

Appendix F: Kleinfelder - 2021 Stratford Mining Complex Biodiversity Offset Strategy Flora Monitoring Report

Appendix G: AMBS Ecology & Heritage - Nest Box Installations within the Stratford Biodiversity Areas – February 2021

Appendix H: Kleinfelder - 2019 SMC Squirrel Glider Colony & Home Range Report

Appendix I: Kleinfelder – SMC Hollow-bearing Tree Census Report 2019

Appendix J: AMBS Ecology & Heritage - SMC Fauna Surveys of the Biodiversity Offset and Biodiversity Enhancement Areas 2019.

1 INTRODUCTION

The Stratford Mining Complex (**SMC**), located in the Northern part of the Gloucester Basin NSW, is approximately 10 kilometres south of Gloucester and is owned and operated by Stratford Coal Pty Ltd (**SCPL**), a fully owned subsidiary of Yancoal Australia Limited (**YAL**).

1.1 Scope

In accordance with the Stratford Extension Project Development Consent SSD-4966, the proponent (SCPL) is required in accordance with *Schedule 2, condition 39* to prepare and implement a Biodiversity Management Plan (BMP). This Plan must include:

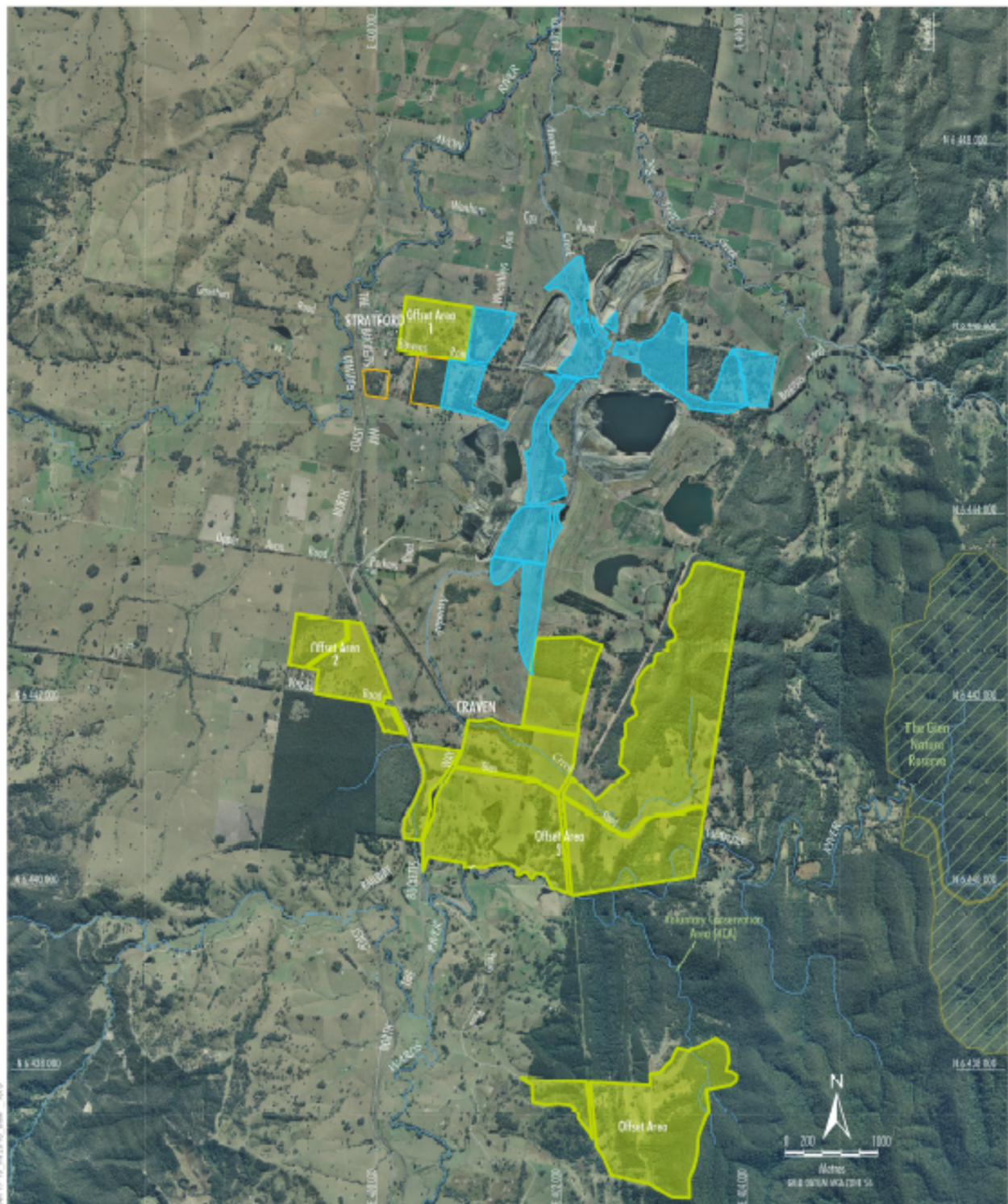
“a program to monitor and report on the effectiveness of the measures in the Biodiversity Management Plan, and progress against the detailed performance and completion criteria”.

The BMP was approved by the Department of Planning & Environment on 19 October 2018. This is the third Annual Biodiversity Report prepared for the Stratford Extension Project. This SMC Annual Biodiversity Report provides a review of the effectiveness of measures in the BMP for the annual year ending 31 December 2021 in accordance with Section 8.2.1 of the BMP. The scope of the review includes the Mining Lease areas, the Biodiversity Offset areas and the Biodiversity Enhancement area as indicated on Plan A.

This report (and associated Appendices) is included as an Appendix of the SMC Annual Review which is available on the Stratford Coal website www.stratfordcoal.com.au.

2 STATUS OF BMP PERFORMANCE CRITERIA

Performance criteria as prescribed in the BMP is presented in **Tables 1 to 9**. The performance criteria have been developed to meet the specific objectives for the areas described in Section 1.2 of the BMP. All performance criteria are linked to the management specifications listed in the BMP Section 4 and Section 5, and monitoring/reporting specifications in the BMP Section 7. The status of BMP performance criteria is provided in the subsequent sections of this report.



3 VEGETATION CLEARANCE PROTOCOL

3.1 Vegetation Clearance Report

Vegetation clearance is undertaken in accordance with the BMP Section 4.1 Vegetation Clearance Protocol. Prior to any clearance operations being undertaken a Clearing Plan is prepared, and pre-clearance surveys are undertaken.

During the 2021 reporting period, vegetation clearance was undertaken in advance of mining operations in the following areas:

- Avon North Open Cut 3 Extension
- Stratford East Open Cut Stage 3
- Stratford East Open Cut Stage 3 Haul Road Extension
- Roseville to BRN Haul Road

The area of disturbance at the end of 2021 is shown in the SMC Annual Review 2021 Figure 4 (Appendix B).

Information obtained during the preparation of the Clearing Plans and the vegetation clearance activities (i.e. habitat features, hollows cleared and fauna observed) is used to determine the requirements for nest box replacement in the Biodiversity Offset and Enhancement Areas (refer to Section 9). A summary of the vegetation cleared during the reporting period including habitat features and tree hollows is included in Appendix C.

A summary of the habitat features and tree hollows cleared since the commencement of the Stratford Extension Project is included below:

- 2018 – six (6) habitat features including zero (0) tree hollows.
- 2019 – forty-two (42) habitat features including nine (9) glider suitable tree hollows and five (5) other hollows.
- 2020 H1 – thirty-three (33) habitat features including nineteen (19) glider suitable tree hollows and eleven (11) other hollows.
- 2020 H2 – eighteen (18) habitat features including seven (7) glider suitable tree hollows and eleven (11) other hollows.
- 2021 – eighty-eight (88) habitat features including forty-four (44) glider suitable tree hollows and forty-four (44) other hollows.

**Note tree hollows are included in the total habitat features reported above.*

3.2 Salvaged and Reused Material for Habitat Enhancement

Section 4.1.4 of the BMP requires salvaged material from vegetation clearance activities to be used for habitat enhancement within the rehabilitation, Biodiversity Offset areas and Biodiversity Enhancement Areas. Habitat features such as trunks, logs, large rocks, branches, stumps and roots are salvaged and relocated where practicable.

The areas cleared in advance of mining in 2021 as described in Section 3.1 were a mixture of previously cleared pasture and medium density woodland with habitat material available for salvage. In these areas, the cleared vegetation was managed as follows:

- Suitable trees and stumps were salvaged and stockpiled adjacent to the Stratford East Open Cut Area for reuse.
- Suitable trees and stumps were salvaged and stockpiled adjacent to the Turkeys Nest area for reuse.

4 MANAGING ACCESS, FENCING, GATES AND SIGNAGE

Managing access, fencing, gates and signage is undertaken in accordance with the BMP Section 5.1 and 5.2.

Table 1: Fencing, Gate and Signage Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Review of fencing requirements for offset areas.	Review of fencing complete including development of mapping showing fence and gate types, redundant fences and fences to be retained.	-	-	-
Gate and fence installations	50% of gates and fences installed	Installation of gates and fences complete	-	Gate and fence installations complete. Livestock excluded.
Redundant fence removal	50% of redundant fencing removed	Redundant fences removed	-	No redundant fencing
Installation of signage	-	Installation of signage complete	-	Signage installed

Table 2: Access Track Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Operational review and mapping to facilitate site access for offset management activities.	Operational review developed. Mapping complete	-	-	Operational review and mapping completed
Access track enhancement and maintenance	Enhancement of access tracks undertaken as identified in operational review.	Maintenance of access tracks annually	Maintenance of access tracks annually	-

Legend	Not commenced	In progress	Completed
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The implementation of the BMP management measures continued in 2021. The BMP requires works to be undertaken to exclude livestock and control access to the Biodiversity Offset areas and Biodiversity Enhancement Areas.

Following the initial 2018 review of the existing fencing, gates and access tracks, contractors were engaged to implement the removal of redundant fencing and install new fencing where required. Contractors were also engaged to maintain access tracks required for the ongoing management of the Biodiversity Areas.

During the reporting period mapping of fencing and access tracks has been completed to assist with ongoing management of the Biodiversity Areas. During the reporting period the removal of redundant fencing has continued and maintenance of existing fencing has been undertaken as required. Access tracks have continued to be maintained.

The installation of signage was completed in 2018. All key points of access to the Biodiversity Areas were identified and had signage erected. During the reporting the need for further signage and locks on gates has been identified to restrict access to the Biodiversity Areas.

5 REVEGETATION MANAGEMENT

5.1 Seed Collection and Propagation

Seed collection and propagation is undertaken in accordance with the BMP Section 4.1.5 and 5.3.

Table 3: Seed Collection and Propagation Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Develop seed collection species list	Species list developed over time.			-
Seed collection	Seed collection commenced	Seed collection to continue	Seed collection to continue	-
Seed propagation	-	Seed propagation commenced	Seed propagation to continue	-

Revegetation in the BMP Revegetation Areas (BMP Management Zone A) will continue via seed and tube-stock. Local endemic (adapted) species are preferentially used where a seed supply is available, however consideration will be given to the use of a high quality seed sourced further from the site as required. An indicative list of flora species proposed to be used in the Revegetation Area (BMP Management Zone A) is provided in the BMP Appendix A.

In preparation for revegetation works each year, SCPL has prepared a scope and schedule for the revegetation works to be implemented (further discussed in Section 5.2). The total volume of seed required was calculated based on the floral listings for the target communities in the BMP appendices.

Kleinfelder, Cumberland Seeds, Hunter Indigenous and Riverdene Nursery have been engaged to assist in the propagation of native plant species with tube-stock grown under controlled nursery conditions and delivered to site as required for revegetation works in the next reporting period.

5.2 Revegetation and Regeneration

Revegetation management is undertaken in accordance with the BMP Section 5.3 Revegetation Programme. The aim of revegetation is to establish a range of habitat niches including native canopy, and understorey. The Revegetation Area (Management Zone A) in the Biodiversity Areas will be revegetated to substantially increase the area of native vegetation in the area and maximise habitat diversity and a range of successional stages.

Table 4: Revegetation and Regeneration Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Site Planning	Site inspection complete and advice received.	-	-	-
Map Revegetation Areas (Management Zone A) and identify target vegetation communities to establish	Mapping complete and target vegetation communities identified	-	-	-
Develop a species list for each target vegetation community	Species list developed	-	-	-
Develop application rates for seeds as well as planting densities for tube stock	Application rates developed	-	-	-
Implement revegetation schedule	Develop revegetation schedule	Implement revegetation schedule	Implement revegetation schedule	-
Revegetation Area (Management Zone A)	Commence revegetation works within the Revegetation Area (Management Zone A) (Figures 12a to 12c)	Continue revegetation works within the Revegetation Area (Management Zone A) (Figures 12a to 12c)	Continue revegetation works within the Revegetation Area (Management Zone A) (Figures 12a to 12c)	Vegetation established and provides suitable habitat for use by native fauna species.
Squirrel Glider Vegetation Pathways (Management Zone A1)	Commence planting of <u>flora species which provide habitat for the Squirrel Glider</u> within designated revegetation zones (Figures 12a to 12c)	Continue plantings of <u>flora species which provide habitat for the Squirrel Glider</u>	Continue plantings of <u>flora species which provide habitat for the Squirrel Glider</u>	Squirrel Glider vegetation pathways planted within the indicative area shown on Figures 12a to 12c, and provide connective habitat for the Squirrel Glider.
<i>Allocasuarina</i> spp. Plantings (Management Zone A2)	-	Commence planting of <i>Allocasuarina</i> spp. within designated revegetation zones (Figures 12a to 12c)	Complete <i>Allocasuarina</i> spp. plantings within Offset Area 3	<i>Allocasuarina</i> spp. plantings within the indicative area shown on Figures 12a to 12c, and provide foraging habitat for the Glossy Black-cockatoo
Coastal Floodplain Forest Revegetation (Management Zone A3)	-	-	Re-establishment of flora species characteristic of the Cabbage Gum open forest vegetation community	Improvement in condition of the riparian habitat along Avondale Creek within the indicative area shown on Figures 12a to 12c, as evidenced by monitoring data
Existing Remnant Vegetation (Management Zone B)	Inspection to be undertaken to monitor regeneration.	Inspection to be undertaken to monitor regeneration.	Inspection to be undertaken to monitor regeneration.	-
Power Line Corridor (Management Zone C)*	-N/A	-	-	-

Site Planning & Schedule

During 2019 SCPL prepared a scope and schedule for the revegetation works to be implemented in the Biodiversity Areas. Kleinfelder have been engaged to assist with both the site planning and implementation of the revegetation works. The site planning included:

- Mapping of the priority revegetation areas and vegetation communities to be completed in the 2020.
- Calculation of seed and tube-stock requirements based on the indicative lists of flora species in the BMP appendices.

Plans showing the areas revegetated in the Biodiversity Areas in 2021 are included in Appendix D (*2021 Autumn Stratford Biodiversity Offsets Planting Program Report, Kleinfelder 2021*). These works were implemented during April and May of 2021.

Furthermore, a scope and schedule for the revegetation works to be implemented 2022 has been prepared during the second half of 2021. The proposed revegetation schedule for the Biodiversity Areas in 2021 is included in Appendix E.

Revegetation Implementation

The Autumn 2021 revegetation work was divided into four tubestock planting areas; Wenham Cox Rd Amenity Screen, Rogerson Property, Offsets Area 4 – Johnson/Foreman Properties and Offset Area 3 – Colinda Property.

Ground preparation work was undertaken prior to tubestock planting and involved slashing by tractor to reduce the biomass and then deep ripped to break the soil surface and provide a soil bed for easier tubestock installation. The total number of plants installed were 10,088 consisting of 4297 canopy plants across 11 different species and 5791 midstorey and shrub plants across 29 species. A summary of the revegetation work undertaken during 2021 is included in Appendix D (*2021 Stratford Biodiversity Offsets Planting Program Report, Kleinfelder 2022*).



Plate 1: Ground preparation of Offset Area 3 – Colinda Property 2021.



Plate 2: Ground preparation of Offset Area 4 – Rodgerson 2021.



Plate 3: Tubestock Delivery in April 2021.



Plate 4: Tubestock planting in the biodiversity areas.

The next round of tube-stock planting is scheduled to commence in April 2022. Details of the 2022 revegetation works will be included in the next annual biodiversity report.

Monitoring

Vegetation Monitoring commenced in 2019 to assess the effectiveness of revegetation in the Revegetation Area (Management Zone A) and to assess the natural regeneration in the Existing Remnant Vegetation Area (Management Zone B). The data gathered in 2019 serves as a baseline to assess the success of the revegetation efforts.

Vegetation monitoring was undertaken again in February 2021. The full report is included in Appendix F (*2021 Stratford Mining Complex Biodiversity Offset Strategy Flora Monitoring Report, Kleinfelder 2021*). Habitat and vegetation monitoring is discussed further in Section 11. Habitat and vegetation condition monitoring will continue to be undertaken annually to quantitatively measure the change in habitat and vegetation condition over time and to inform any ongoing maintenance requirements.

6 WEED CONTROL AND MONITORING

Weed control is undertaken in accordance with the BMP Section 4.4 and Section 5.6. The weed control program aims to manage weeds to minimise their impact on native flora and fauna

Table 5: Weed Management Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Monitoring of weed location and density	Mapping of weed extent and density produced	-	-	-
Bi-annual weed inspections and recording	Inspections and records completed	Inspections and records completed	Inspections and records completed	-
Weed control/treatment program	Strategic weed control as required, recording on areas worked and implementation of recommendations			Priority weed infestations appropriately controlled and minimised as evidenced through monitoring data

The general procedure for controlling weed involves:

- Monitoring to identify locations and densities of priority weed;
- Identification of suitable control measures;
- Implementation of the selected control measure by a suitable qualified person;
- Follow-up inspections to evaluate effective of weed control.

Weed spraying activities are generally undertaken between the months of September and April each year. Physical management measures such as mechanical removal, slashing and/or back-burning can be undertaken at other times of the year as required.

Two contracting companies are engaged at the SMC to undertake weed management activities on an ongoing basis. Weed management during summer 2020/21 was continued following above average rainfall in December 2020. Following a flood event in March 2021 weed spraying re-commenced and continued through autumn. Summer 2021/22 Weed spraying programme commenced again during November 2021 and will continue through to Autumn 2022. The weed control activities in 2021 continued to target areas of known weed infestation. The key species targeted included blackberry, lantana, privet, wild tobacco and Giant Parramatta grass.

Weeds mapping is proposed to be undertaken during the next reporting period to assist in setting future management priorities and developing on-ground actions for weed control.

Weeds monitoring to evaluate the effectiveness of control measures is undertaken in conjunction with the annual vegetation monitoring and is documented in Appendix F (*2021 Stratford Mining Complex Biodiversity Offset Strategy Flora Monitoring Report, Kleinfelder 2021*).

7 FERAL ANIMAL CONTROL AND MONITORING

Feral animal control is undertaken in accordance with the BMP Section 4.5 and Section 5.7. The objective of the feral animal control program is to manage feral animals to minimise their impact on native flora and fauna in the Biodiversity Offset and Biodiversity Enhancement Areas and/or their impact on agricultural production in other surrounding areas.

Table 6: Feral Animal Management Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Abundance of feral animal species established	Initial study undertaken in the Biodiversity Offset Area and Biodiversity Enhancement Area.	-	-	-
Feral animal control and monitoring	-	Inspections and records completed	-	-
Feral animal control program	Feral animal control as required.			Feral animal numbers within offset areas minimised as evidenced through monitoring data

AMBS was commissioned to undertake the initial invasive animal survey in 2017, in accordance with Section 5.7 of the BMP. The objective of the study was to determine the range and abundance of invasive animals that occur or are likely to occur within the Stratford Mining Lease and Biodiversity Areas and provide recommendations for invasive animal control.

MDP Vertebrate Pest Management has been engaged by SCPL since 2016 to implement wild dog and fox control programs across property owned by SCPL including both the Stratford & Duralie Mining Leases and the Stratford & Duralie Biodiversity Offset Areas. During the reporting period one wild dog control programs was undertaken. The control program was conducted between **4 October 2021 to 5 November 2021**. The program was productive and successful with a total of 6 wild dogs and 3 foxes trapped and Shot over the 31-Day control program.

During the control programs no non-target species were trapped. Soft jaw wild dog traps were used to trap targeted pest animals. MDP Trap dog & trail camera monitoring was used to find and locate wild dog & fox signs in the program area for trap placement. The wild dog and fox numbers were moderate in the previous controlled areas of the Stratford/Duralie Mining Lease and Biodiversity Areas which demonstrates the control programs are being successful in having an impact and lowering the numbers and presence of wild dogs and foxes within that area. The program is showing positive results of reducing the impacts of wild dogs and foxes within the area to the native animals and reducing the impact of livestock attacks to the surrounding agricultural properties.

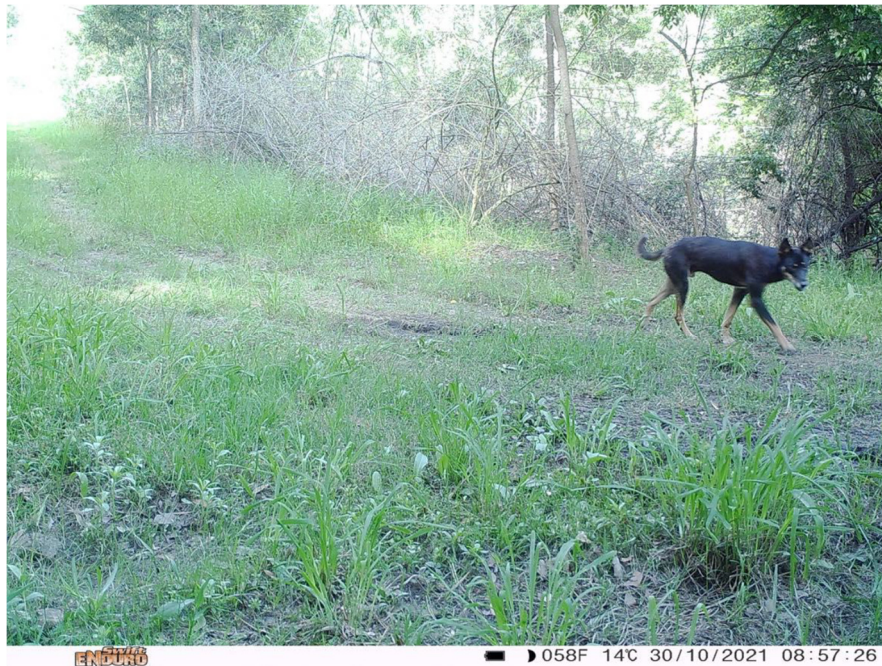


Plate 5 – Wild Dog captured on camera

In accordance with the BMP Section 5.7 follow-up feral animal monitoring surveys would be undertake every two years. A feral animal survey of the Biodiversity Offset Area and Biodiversity Enhancement Area was undertaken during the reporting period by AMBS to monitor the success of control programs and determine priorities for ongoing control measures. The 2021 Stratford Feral Animal Monitoring Report was not available for inclusion in this report at time of publishing. The 2021 Stratford Feral Animal Monitoring Report will be included in the 2022 Annual Biodiversity report.

8 BUSHFIRE PREVENTATION AND RISK MANAGEMENT

Bushfire management is undertaken in accordance with the BMP Section 4.7 and Section 5.9. The objective of bushfire management in the Biodiversity Areas is to prevent impacts from unplanned bushfire and to use fire to promote biodiversity.

Table 7: Bushfire Management Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (January – December 2018)	Year 2 (January – December 2019)	Year 3 (January – December 2020)	
Mapping of Fire Breaks and Trails	Mapping complete	-	-	-
Monitoring of Fuel Loads	Inspections and records completed	Inspections and records completed	Inspections and records completed	-

Controlled Burning	-	Implement (if required)	Implement (if required)	Controlled burns implemented (where required)
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Monitoring of fuel loads to evaluate bushfire risk and guide bushfire hazard reduction activities is undertaken in conjunction with the annual vegetation monitoring and was conducted in March 2021. Further detail is included in Section 11 and Appendix F.

Bushfire risk has continued to be mitigated through the maintenance of access tracks and fire breaks. Additionally, fuel loads have been reduced during 2021 by slashing were required in the Mining Leases and Biodiversity Areas. During 2021 no hazard reduction burning has been undertaken. Following the revegetation works, the aim is to exclude fire from the offset areas for at least 5 years to allow for tubestock and seedlings to establish.

Section 4.7 of the BMP states SCPL will:

- ensure that the development is suitably equipped to respond to any fires on site; and
- assist the Rural Fire Service (RFS), emergency services and National Parks and Wildlife Service as much as possible if there is a fire in the surrounding area.

9 NEST BOX PROGRAMME

Nest box management is undertaken in accordance with the BMP Section 5.10. Nest boxes will be installed to provide habitat opportunities in the short to medium-term for a number of arboreal fauna species including the Squirrel Glider.

Table 8: Nest Box Program Performance and Completion Criteria

Management Action	Performance Criteria			Completion Criteria
	Year 1 (2018)	Year 2 (2019)	Year 3 (2020)	
Nest Boxes – Installation	Nest boxes installed for clearing activities	Installation continued as clearing progresses	Installation continued as clearing progresses	Nest boxes installed as required.
Nest Boxes – Monitoring and Reporting	Quarterly inspections undertaken – undertaken in Year 2	Annual inspection and records completed	Annual inspection and records completed	-
Nest Boxes – Maintenance	-	Maintenance or replacement as required	Maintenance or replacement as required	Nest boxes functioning as designed

Implementation & Installation

The nest box programme described in the BMP Section 5.10, consists of two main components to replace any tree hollows cleared prior to mining activities as described in Section 3 of this report:

- Suitable nest boxes for the Squirrel Glider will be installed at a ratio of least 3:1 for each tree hollow cleared suitable for the Squirrel Glider. Squirrel Glider nest boxes will have a small entrance hole (45-50 millimetres diameter) to exclude larger possums and birds.
- For tree hollows that provide habitat to arboreal fauna species (other than the Squirrel Glider), nest boxes will be installed at a minimum ratio of 1:1 (i.e. one nest box of appropriate size to replace one hollow of similar size and properties). These nest boxes will be provided for birds, bats and arboreal mammals.

Nest boxes will be installed within the Biodiversity Offset Area and Biodiversity Enhancement Area in Existing Remnant Vegetation (Management Zone B) as well as the Revegetation Area (Management Zone A).

As described in Section 3.1, a summary of the habitat features and tree hollows cleared since the commencement of the Stratford Extension Project is included below. Full details of the vegetation clearance and nest box replacement Requirements are included in Appendix C.

- 2018 – six (6) habitat features including zero (0) tree hollows.
- 2019 – forty-two (42) habitat features including nine (9) glider suitable tree hollows and five (5) other hollows.
- 2020 H1 – thirty-three (33) habitat features including nineteen (19) glider suitable tree hollows and eleven (11) other hollows.
- 2020 H2 – eighteen (18) habitat features including seven (7) glider suitable tree hollows and eleven (11) other hollows.
- 2021 – eighty-eight (88) habitat features including eighty-three (44) glider suitable tree hollows and eighteen (44) other hollows.

The installation of nest boxes has occurred over four periods with the most recent installation in February and March 2021. During the reporting period 101 new nest boxes were installed in the Biodiversity Areas for additional habitat enhancement (Appendix G, AMBS 2021). The current nest box program involves:

- Five (5) nest boxes targeting Squirrel Glider (*Petaurus norfolcensis*), installed December 2018.
- Twenty-Five (25) nest boxes targeting Squirrel Glider (*Petaurus norfolcensis*), installed May 2019
- Fifty-four (54) nest boxes targeting Squirrel Glider (*Petaurus norfolcensis*) and Sixteen (16) nest boxes targeting a variety of hollow-dependent fauna, installed April 2020.
- Eighty-three (83) nest boxes targeting Squirrel Glider (*Petaurus norfolcensis*) and eighteen (18) nest boxes targeting a variety of hollow-dependent fauna, installed February and March 2021.

Monitoring

In Accordance with section 5.10 of the BMP nest boxes will be monitored by suitably qualified personnel with quarterly inspections during the first year followed by annual inspections in spring. Monitoring reports provide details of the nest box identification number, the tree species on which the box is installed, evidence of use and whether fauna was present. Details on each of the fauna species present within nest boxes is collected (sex, weight, length, breeding status and if it had been a new capture or recapture). Quarterly nest box monitoring was undertaken in February, May, and July 2021 by AMBS. Annual nest box monitoring was completed by AMBS in September 2021. The 2021 Stratford Annual nest box Monitoring Report was not available for inclusion in this report at time of publishing. The 2021 Stratford Annual nest box Monitoring Report will be included in the 2022 Annual Biodiversity report.

Quarterly monitoring is scheduled for January and April 2021. Annual monitoring will be completed following the April survey.

10 SQUIRREL GLIDER MANAGEMENT PLAN

In accordance with Condition 38(a), Schedule 3 of the Development Consent SSD-4966 the management of Squirrel Glider populations is undertaken in accordance with the Squirrel Glider Management Plan (SQMP). The SQMP was approved by the DP&E on 19 October 2018 and includes specific management measures in addition to those in the BMP. The SGMP has

been prepared to facilitate the management of squirrel glider populations at the SMC, Biodiversity Enhancement Areas and Biodiversity Offset Areas.

Squirrel Glider management programs which have been commenced include:

- definition of the Squirrel Glider colonies (SQMP Section 4.1)
- identification of the Squirrel Glider colony home ranges (SQMP 4.2),
- tree hollow census within the home ranges (SQMP Section 7.1)
- nest box program (SQMP Section 7.2), in conjunction with BMP nest box program in Section 9.
- Squirrel Glider vegetation pathways (SQMP Section 8.1), in conjunction with BMP revegetation in Section 5.
- Squirrel Glider population monitoring (SQMP Section 10.1), in conjunction with BMP fauna monitoring in Section 11.2.

10.1 Definition of the Squirrel Glider Colonies

Kleinfelder was engaged to undertake an initial targeted Squirrel Glider survey to confirm the location of Squirrel Glider colonies within the potential habitat in the vicinity of the SMC Biodiversity Areas, including the previously identified Squirrel Glider colonies and any new colonies which have been established within the areas identified as potential habitat. The surveys will ensure that future monitoring requirements of the SQMP are being implemented at locations of known colony locations.

The initial surveys were undertaken during November to December 2018 and the results are provided in the *Initial Squirrel Glider survey as part of Stratford Coal's Squirrel Glider Management Plan (Kleinfelder, 2018)*. Squirrel gliders were identified at five locations out of the 37 locations surveyed. These locations provided the basis for ongoing survey efforts.



Plate 6 – Squirrel Glider photographed during initial camera trap surveys.

10.2 Squirrel Glider Home Ranges

Objectives outlined in Section 4 of the SGMP require measures to establish the home range size of known squirrel glider colonies near the SMC. This information will be used to guide the ongoing management of squirrel glider populations within the SMC Biodiversity Offset Areas and Biodiversity Enhancement Areas. This information will also define the study area for

further programs including the census of suitable tree hollows, food resources surveys and habitat enhancement including nest box installations.

Kleinfelder was commissioned by SCPL to conduct a radio tracking program to determine the Squirrel Glider home ranges of the local population based on the colony locations identified in the initial survey.

Two radio tracking programs were conducted between January - April 2019 and July - September 2019 during the 2019 reporting period. The 2019 radio tracking programs consisted of trapping of Squirrel Gliders, followed by processing and collaring. Generally, two gliders from each colony area were targeted for radio tracking. Radio tracking of the selected gliders was then conducted, followed by analyse of the data and estimating home ranges for each radio-tracked squirrel glider. The findings of the initial survey, radio tracking and home range estimations are provided in the Appendix H (2019 SMC Squirrel Glider Colony & Home Range Report, Kleinfelder 2019). The following is an extracted summary from the Squirrel Glider Colony & Home Range Report:

“An initial targeted squirrel glider survey was undertaken to establish the locations of any existing Squirrel Glider colonies within the potential habitat in the vicinity of SMC. The initial survey was undertaken from 26 November to 17 December 2018 consisting of a total of 692 trap nights over 37 locations. Squirrel glider presence was confirmed at five locations. Four of these locations were determined as suitable areas to conduct home range surveys using radio-tracking.

Radio-tracking was undertaken to examine spatial requirements and use, and den preferences. Radio-tracking was conducted in two periods of 40 nights and are subsequently referred to as seasons. A total of 36 squirrel gliders were captured, 19 gliders were fitted with radio collars and sufficient data points were obtained to allow home range estimates for 13 gliders.

Results of the radio-tracking study showed that the seasonal home range for squirrel gliders within the Stratford area in period 1 (Summer) was FK95% 3.9 ± 0.3 ha and MCP100% was 9.7 ± 1.6 ha. The FK95% for period 2 (Winter) was 3.6 ± 0.3 and the MCP100% was 12.8 ± 2.1 . There was no significant difference between periods ($P = 0.366$, $F_{7,5} = 1.407$). This study also identified areas within the impact area of the Avon North extension where squirrel gliders were denning and foraging.

Further studies in accordance with the Squirrel Glider Management Plan into the population dynamics of the squirrel glider within the Biodiversity Offset areas and Biodiversity Enhancement areas would be conducted to determine the impacts predators and habitat fragmentation are having on the local population. This will provide information on the effectiveness of the offset measures and habitat enhancement being implemented for the species.”



Plate 7 - Radio-transmitting collar fitted to squirrel glider



Plate 8 - Squirrel glider (Sharon) with young.

10.3 Tree Hollow Census

Condition 38(b), Schedule 3 of Development Consent SSD-4966 requires a census of suitable tree hollows in home ranges and offset areas suitable for Squirrel Gliders. A tree hollow census was undertaken within the home ranges identified by the radio tracking program (Section 10.2) to identify hollow bearing trees suitable for use as den sites by the Squirrel Glider. The results of the tree hollow census are provided in the Appendix I (2019 SMC Hollow-bearing Tree Census Report, Kleinfelder 2019).

An extracted summary is provided below:

“Radio-tracking and home range estimations was undertaken to comply with the requirement outlined in section 4.2 of the Squirrel Glider Management Plan (SGMP) (Stratford Coal 2018, Kleinfelder 2019). The areas identified to form part of a squirrel gliders home range were then used as study sites for the hollow-bearing tree census as required by Section 7.1 of the SGMP.

The hollow-bearing tree census identified and mapped 480 hollow-bearing trees which contained a combined total of 648 hollows. Attributes of available hollows and known den hollows were compared to investigate the hollow preferences of squirrel gliders. The results indicated that hollow entrance size (area and width of hollow opening) was the most important factors in determining whether a hollow would be selected as a den by a squirrel. Tree species was not a determining factor with seven species being used for dens. Stags and Eucalyptus siderophloia (Grey Ironbark) were the most commonly used den species.

Direct comparison of the density of hollow-bearing trees recorded in the biodiversity enhancement and offsets areas to vegetation community benchmark data for the relevant vegetation type shows that the two major vegetation communities at the SMC were found to contain significantly lower densities of hollow-bearing trees.

Once the squirrel glider food resources have been mapped as outlined in section 6.1 of the SGMP, information provided in this report can be used to identify areas best suited for nest box installation. Nest boxes will be best situated in areas currently lacking tree hollows but have an adequate number of food resources.”



Plate 9 - Elsie denning in a termite nest on Grey Ironbark (*Eucalyptus siderophloia*).

11 BIODIVERSITY OFFSET MONITORING AND REPORTING

The Biodiversity Offset monitoring program is prescribed in the BMP Section 7. The program aims to monitor and report on the effectiveness of the BMP management measures and progress against the detailed performance and completion criteria.

Table 9: Monitoring Program – Biodiversity Offset Strategy

Monitoring Program	Relevant BMP Section	Frequency
Visual Monitoring	Section 7.1.1	Annual
Photo Monitoring	Section 7.1.2	Annually (spring)
Habitat and Vegetation Monitoring Program	Section 7.1.3	Annually (spring)
Fauna Monitoring Program	Section 7.1.4	Every three years
Weed Monitoring	Section 5.6	Biannually
Initial Feral Animal Study of the Biodiversity Offset Area and Biodiversity Enhancement Area	Section 5.7	Within 12 months of approval of the BMP
Feral Animal Monitoring	Section 5.7	Every two years
Nest Box Monitoring	Section 5.10	Quarterly for 12 months and then biannually

11.1 Habitat and Vegetation Condition Monitoring

Habitat and vegetation condition monitoring is undertaken to quantitatively measure the change in habitat and vegetation condition over time. The visual monitoring and photo monitoring programs are undertaken concurrently with the vegetation monitoring to provide additional information on the change of the Biodiversity Areas over time and inform maintenance requirements.

Vegetation Monitoring commenced in 2019 to assess the effectiveness of revegetation in the Revegetation Area (Management Zone A) and to assess the natural regeneration in the Existing Remnant Vegetation Area (Management Zone B). The data gathered in 2019 serves as a baseline to assess the success of the revegetation efforts and progress against the project specific performance and completion criteria. This survey was undertaken prior to the revegetation works commencing in the Biodiversity Offset areas.

Vegetation monitoring was undertaken again in March 2021. The full report is included in Appendix F (*2021 Stratford Mining Complex Biodiversity Offset Strategy Flora Monitoring Report, Kleinfelder 2021*). Habitat and vegetation condition monitoring will continue to be undertaken annually to quantitatively measure the change in habitat and vegetation condition over time and to inform any ongoing maintenance requirements.

An extracted summary of the survey results from the *2020 Stratford Mining Complex Biodiversity Offsets Flora Monitoring Report (Appendix F)* is provided below.

“Greening Australia estimated overstorey stem densities for the Duralie Coal Mine Offsets Revegetation program (Section 6.2, DCM BMP, 2018), of 100 stems/ha and 207 stems/ha for woodland and forest respectively. Using these figures, the revegetation effort is on target to produce woodland overstorey densities in most of the revegetation areas. Indeed, in some areas, e.g., Quadrat Q5 and Quadrat Q12, the density is well above these targets, and in due course consideration may have to be given to thinning as per the Table 21 of the Stratford Mining Complex – Biodiversity Management Plan, 2018. However, when compared to the reference sites much higher densities are required or possible to be planted. For instance, the Spotted Gum – Grey Ironbark quadrats recorded densities of 450 (Q1) and 400 (Q9) overstorey stems/ha. The Cabbage Gum Woodland reference quadrats recorded densities of 750 (Q6) and 975 (Q15) stems/ha. In comparison in the revegetation areas, only Quadrats Q5 with 450 stems/ha and Quadrat Q12 with 250 stems/ha recorded high densities.

Survival of other planted species from other strata appears to be lower than planted overstorey species. This is partially countered by the natural seedbank present in some of the areas, and species that have been observed to self-recruit from the seed bank include Pimelea linifolia and several species of Acacia. The lower density of shrub and midstorey species will affect the habitat value of these revegetated areas, especially the Squirrel Glider corridor which was specifically planted with a range of species outside the specific community to facilitate food resources. Future monitoring will determine whether in-fill planting would be required and what species should be targeted.

Priority weeds were relatively rare, with Quadrat Q6 recording three such species. This area requires weed treatment works which may be conducted as a walkover by suitably qualified professionals, or after a weed mapping exercise is conducted.

In summary, good progress has been made with the successful introduction of many target species in areas that have been replanted. The increased rainfall that has continued to be experienced since this survey was undertaken will contribute to good growth for the older rehabilitation and improve survival for the newer planted areas.”

11.2 Fauna Monitoring

Monitoring of fauna usage within the Biodiversity Areas is conducted every three years to document the fauna species response to improvement in vegetation and habitat in the Biodiversity Areas and assess the performance in providing habitat for a range of vertebrate fauna. The surveys include an assessment of habitat complexity, species richness and abundance.

During 2019 AMBS Ecology & Heritage (AMBS) were engaged to undertake a fauna survey within the SMC Biodiversity Offset areas and Biodiversity Enhancement Areas. The full report is included in Appendix K (*SMC Fauna Surveys of the Biodiversity Offset and Biodiversity Enhancement Areas 2019, AMBS 2019*). An extracted summary of the survey results are included below.

“Targeted fauna surveys were undertaken at eight sites. Six sites within the Stratford Offset Areas and two sites within the Biodiversity Enhancement Area. Field surveys occurred during two weeks, from 23 to 27 September 2019 and 28 October to 2 November 2019. At each site survey techniques included pitfall traps, funnel traps, Elliott A traps, harp traps, ultrasonic call recording, spotlighting, diurnal bird surveys and reptile searches. In addition, targeted frog surveys were undertaken at four water sources, one located in the Biodiversity Enhancement Area and three in the Biodiversity Offset Area. Opportunistic observations of signs of fauna were noted throughout the field survey period, including during transit between surveys sites.

*A total of 167 species of vertebrate were recorded, comprising 11 frogs, 16 reptiles, 97 birds and 43 mammals, most of which were native. Six introduced species were recorded during the surveys, including the Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*), Black Rat (*Rattus rattus*), European Rabbit (*Oryctolagus cuniculus*), European Brown Hare (*Lepus europaeus*) and Cattle (*Bos taurus*). This is a reasonable diversity of fauna considering extreme drought conditions throughout the year and the relatively short length of the survey.*

Twenty-two of the species detected are listed as threatened or migratory on the schedules of the BC Act and/or EPBC Act, including:

- *White-bellied Sea-eagle (*Haliaeetus leucogaster*)*
- *Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)*
- *Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*)*
- *Black-faced Monarch (*Monarcha melanopsis*)*
- *Spectacled Monarch (*Symposiachrus trivirgatus*)*
- *Varied Sittella (*Daphoenositta chrysoptera*)*
- *Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*)*
- *Black-necked Stork (*Ephippiorhynchus asiaticus*)*
- *Little Lorikeet (*Glossopsitta pusilla*)*
- *Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*)*
- *Little Bent-winged Bat (*Miniopterus australis*)*
- *Large Bent-winged Bat (*Miniopterus orianae oceanensis*)*
- *Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)*
- *Large-eared Pied Bat (*Chalinolobus dwyeri*)*
- *Southern Myotis (*Myotis macropus*)*
- *Greater Broad-nosed Bat (*Scoteanax rueppellii*)*
- *Brush-tailed Phascogale (*Phascogale tapoatafa*)*

- *Red-legged Pademelon (Thylogale stigmatica)*
- *Yellow-bellied Glider (Petaurus australis)*
- *Squirrel Glider (Petaurus norfolcensis)*
- *Koala (Phascolarctos cinereus)*
- *New Holland Mouse (Pseudomys novaehollandiae)*

The fauna surveys suggest the Stratford Offset and Biodiversity Enhancement Areas provide habitat for a range of native vertebrate fauna, including birds, mammals, reptiles and frogs. Two of the threatened species recorded, the Black-chinned Honeyeater and Red-legged Pademelon, have not previously been recorded at the Stratford Mining Complex."



Plate 10 - Brush-tailed Phascogale (*Phascogale tapoatafa*)



Plate 11 - Koala (*Phascolarctos cinereus*)



Plate 12 - Red-legged Pademelon (*Thylogale stigmatica*)



Plate 13 - Northern Brown Bandicoot (*Isodon macrourus*)

12 LONG TERM SECURITY AND CONSERVATION BOND

12.1 Long-term Security

In accordance with Condition 36, Schedule 3 of Development Consent SSD-4966, SCPL is required to make suitable arrangements for the long-term security of the Stratford Extension Project Biodiversity Offset Area. SCPL has pursued the mechanisms available under section 88E(3) of the NSW Conveyancing Act, 1919, namely:

- Registration of a Positive Covenant under section 88E(3) of the NSW Conveyancing Act, 1919; and
- Registration of a Restriction on the Use of Land by a Prescribed Authority under section 88E(3) of the NSW Conveyancing Act, 1919.

To finalise securing the offset areas, the following actions were conducted:

- confirmation that the completed instruments are to the satisfaction of the Secretary completed 15 April 2019;
- execution of the instruments by the prescribed authority (the DP&E);
- execution of the instruments by the three separate registered proprietors of the offset lands (i.e. Yancoal's subsidiary companies, CIM Stratford Pty Ltd; Stratford Coal Pty Ltd and Gloucester Coal Limited);
- lodgement of the executed instruments with NSW Land Registry Services (LRS) in accordance with LRS's dealing lodgement requirements;
- LRS assessment/review of the instruments to confirm the instruments are acceptable for registration; and
- registration of the instruments on the titles of the offset lands.

Public Positive Covenants and Restrictions on the Use of Land for the Biodiversity Offsets have been registered on title with NSW Land and Property Information (LPI) in **October 2019**. Copies of the executed Positive Covenants and notice of registration of the instruments was included in the 2019 SMC Annual Biodiversity Report.

12.2 Conservation Bond

In accordance with Condition 40, Schedule 3 of Development Consent SSD-4966, SCPL is required to lodge a Conservation Bond with the DP&E which covers the cost of implementing the Biodiversity Offset Strategy detailed in the BMP.

The conservation bond calculation was prepared by Kleinfelder and a verification of the costs was undertaken by Rider Levett Bucknall. The conservation bond calculation was submitted in January 2019 and subsequently approved by DP&E on 15 January 2019.

The Conservation Bond in the form of a bank guarantee was executed and lodged with DP&E on 8 February 2019.

13 COMMONWEALTH EPBC APPROVAL COMPLIANCE REPORTS

In accordance with Condition 10 of EPBC 2011/6176 for the Stratford Extension Project, by 31 March of each year after the commencement of the action, or as agreed with DoEE, SCPL is required to publish a report addressing compliance with the conditions of EPBC 2011/6176 during the previous calendar year, including implementation of any management documents as specified in the conditions of EPBC 2011/6176.

SCPL commenced the action approved under EPBC 2011/6176 on 4 April 2018. The first annual compliance report was submitted in March 2019. The *Stratford Extension Project (EPBC 2011/6176) Annual Compliance Report 2020*, was submitted on 29 March 2021.

Condition 10 also requires reporting on the implementation of the relevant management documents required in accordance with the conditions of EPBC 2011/6176. This SMC Annual Biodiversity Report provides a review of the implementation of the management measures in the BMP for the annual year ending 31 December 2021. This report is included as an Appendix of the SMC Annual Review.

14 APPENDICES

Appendix A: DPIE Approval of the BMP.

Appendix B: SMC Annual Review 2021 – Figure 4 Mining & Rehabilitation Areas

Appendix C: SMC Vegetation Clearance & Nest Box Replacement Requirements 2021

Appendix D: Kleinfelder - 2021 Autumn Stratford & Duralie Biodiversity Offsets Planting Program Report

Appendix E: Kleinfelder - 2022 Biodiversity Offset Area – Proposed Revegetation Areas

Appendix F: Kleinfelder - 2020 Stratford Mining Complex Biodiversity Offset Strategy Flora Monitoring Report

Appendix G: AMBS Ecology & Heritage - Nest Box Installations within the Stratford Biodiversity Areas – February 2021

Appendix H: Kleinfelder - 2019 SMC Squirrel Glider Colony & Home Range Report

Appendix I: Kleinfelder – SMC Hollow-bearing Tree Census Report 2019

Appendix J: AMBS Ecology & Heritage - SMC Fauna Surveys of the Biodiversity Offset and Biodiversity Enhancement

(Appendices available on request)