Centennial Coal

STATEMENT OF ENVIRONMENTAL EFFECTS

Western Coal Services Project

State Significant Development 5579

Modification 1

Volume 1 – Main Report

November 2016

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Centennial Coal
Springvale

Western Coal Services Project
SSD 5579 – Modification 1

STATEMENT OF ENVIRONMENTAL EFFECTS

Prepared for:

Springvale Coal Pty Limited

By:

Centennial Coal Company Limited

Level 18, BT Tower
1 Market St
Sydney NSW 2000

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STATEMENT OF VALIDITY

Submission of *Statement of Environmental Effects*
Under Section 96(2) of the *Environmental Planning and Assessment Act 1979*

Development Application

Applicant Name	Springvale Coal Pty Limited
Applicant Address	Level 18, BT Tower, 1 Market St, Sydney NSW 2000
Development	Western Coal Services Project
Development Description	Modification 1 to Western Coal Services Project's Consent SSD 5579 for activities described in **Section 1.3** and **Chapter 4.0** of this document.
Land to be Developed	Refer to Schedule of Lands (**Table 1, Appendix C**)
Environmental Impact Assessment	*Statement of Environmental Effects*

Document Preparation

Name	Nagindar Singh
Qualifications	BSc, MSc, PhD
Company	Centennial Coal Company Limited
Address	Level 18, BT Tower, 1 Market St, Sydney NSW 2000

Declaration

I certify I have prepared the *Statement of Environmental Effects*, and to the best of my knowledge:

- It contains all available information that is relevant to the environmental impact assessment of the development to which this statement relates.
- It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

18 November 2016

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EXECUTIVE SUMMARY

Background

The Western Coal Services Project (the Project) was granted State Significant Development consent SSD 5579 on 04 April 2014. The consent was granted by the Planning Assessment Commission of NSW, as delegate of the then Minister of Planning and Infrastructure, under Section 89E of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a project life of 25 years. SSD 5579 consent will lapse on 30 June 2039. Prior to the grant of SSD 5579, the majority of the components of the Project were constructed and / or operated under Springvale Mine's former consent DA 11/92 or Angus Place Colliery's current project approval PA 06_0021.

The consent SSD 5579 allows for the operation and construction of infrastructure to facilitate the receipt, handling and processing of coal from the Springvale Mine, Angus Place Colliery and other Centennial Coal operations, and the transportation of this coal to local power stations or the Lidsdale Rail Siding (PA 08_0223) operated by Centennial Coal.

The main components of the Project are:

- Springvale Coal Services Site (SCSS)
- Kerosene Vale Stockpile Area
- Overland conveyor system
- Mount Piper Haul Road
- Wallerawang Haul Road
- Link Haul Road.

The Project is owned by the Springvale unincorporated joint venture with participants Centennial Springvale Pty Limited (as to 50%) and Springvale SK Kores Pty Limited (as to 50%). Springvale Coal Pty Limited (Springvale Coal) is the operator of the Project on behalf of the joint venture.

Proposed Modification

Springvale Coal is seeking a modification (MOD 1) to SSD 5579 to address operational interactions with the proposed Springvale Water Treatment Project (Springvale WTP) (SSD 7592) to allow for:

- The receipt of residuals stream from the water treatment plant proposed in the Springvale WTP and emplacement within the existing reject emplacement area (REA) at the SCSS
- Changes to the decommissioning and rehabilitation strategy approved in SSD 5579.

The SSD 5579 consent boundary for the Project remains unchanged. There are no changes proposed to the surface infrastructure. No major changes are proposed with respect to the current surface operations. The majority of activities in the Project will continue to be undertaken as approved under SSD 5579. The emplacement of the residuals material stream from the Springvale WTP will be consistent with the existing reject emplacement and water management practices at the SCSS.

There is no proposal to reduce the life of the consent in this modification from the approved 25 years from the date of consent, and the consent expiry date (31 December 2028) will remain unchanged. Approved hours of operations at the Project components noted above are not proposed to change.

Environmental Impact Assessment

A *Statement of Environmental Effects* (SEE) has been prepared to support the proposed modification, to be submitted under Section 96(2) of the EP&A Act. The SEE describes the proposed modification, and assesses the potential environmental impacts of the emplacement of the residuals stream on the receiving water environment. Measures that will be required to mitigate and/or manage potential environmental impacts are also described in the SEE.

The SEE has been prepared to meet the requirements of Part 1 Clause 2(4) of Schedule 1 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and it contains information required under Clause 115 of the EP&A Regulation.

A *Water Resources Impact Assessment* (GHD, 2016a) was prepared to assess the impact of the residuals transfer, of up to 0.43 ML/day, on the local and regional surface water and groundwater environments.

Site Water and Salt Balance

The water management system for the SCSS was modelled for three scenarios:

- Existing conditions, which represent the current operations at the SCSS
- Future conditions, following the construction of clean water diversions at the SCSS (**Section 3.3.9**) to optimise clean and dirty water separation
- Proposed conditions, where the inputs from the transfer of residuals stream from the Springvale WTP to the new REA at the SCSS (**Section 4.2.7**), are accounted for in the site water and salt balance.

The impact assessments for the proposed conditions are compared against both the existing and future conditions. It is noted that the modelling of the existing conditions are based on monitoring data acquired to date at the SCSS whereas the future conditions are modelling predictions which will be validated in the future when the clean water diversions have been installed and monitoring data have been acquired.

Water and salt balance modelling indicated that, under the existing conditions, the average annual discharge from LDP006, the licensed discharge point at the SCSS, was 848 ML. This discharge accounts for approximately 831 ML of surface water that has migrated into the groundwater system via historical workings. Discharges via LDP006 contribute approximately 1517 tonnes of salt to Wangcol Creek per year under existing conditions.

For future conditions the water and salt balance modelling indicated that the average annual discharge from LDP006 reduced from existing conditions to 441 ML (approximately 48% reduction in flow volume). Salt load also reduced due to the diversion of clean water away from LDP006 with a reduction from existing conditions down to 1107 tonnes per year (approximately 27% reduction in salt load via LDP006).

Water and salt balance modelling of the proposed conditions predicted that the annual input of 157 ML of Springvale WTP residuals material stream to the system would result in an average annual discharge from LDP006 of 570 ML, which is an increase from the modelled future conditions (29%), however is a decrease from the existing conditions by 278 ML/year or approximately 33%.

The proposed conditions also predicted an average annual salt output from the SCSS through LDP006 as 1444 tonnes per year which was accompanied by an increase in average electrical conductivity (EC) being discharged to the receiving environment due the modification. The salt load at LDP006 increases by approximately 30% when compared against the future conditions but represents a 5% decrease compared to the existing conditions. Increased EC noted was primarily due to increased flow volume load on Cooks Dam with the dam at capacity most days. The EC within Cooks Dam is elevated (median EC of 3273 µS/cm), and is dominant over the lower residuals material stream EC, assumed to be 2500 µS/cm, which itself is overly conservative (**Section 7.1.5.3**) discussed below.

The transfer of residuals to the REA will result in an increased frequency of discharges from LDP006, and therefore an increase to the annual salt load discharged, as indicated by **Table ES1** and **Table ES2**. The assumed salinity of the residuals (2500 µS/cm), being lower than that of the overall groundwater environment at SCSS (which can be as high as 4460 µS/cm), should result in a decrease in salinity observed at LDP006 through dilution, however, this is not replicated in the water and salt balance modelling. Potential EC dilution from the residuals result is instead dominated by the EC of the Cooks Dam (median EC of 3273 µS/cm) where increased volumetric contribution to the dam via residuals transfer results in an increase in Cooks Dam discharges and hence an increase in predicted EC at LDP006. The EC increase is likely to result in receiving environment EC levels of 1010 µS/cm reducing to 920 µS/cm at the confluence of Wangcol Creek with Coxs River.

Regional Water Quality Impact Assessment

A regional water quality impact assessment, similar to that undertaken for the Springvale WTP (GHD, 2016b) and the Springvale Mine Extension Project (Jacobs, 2015), was undertaken to assess the effect of the local increases in flows and EC at LDP006 due the residuals transfer on the receiving environment on a regional scale, specifically the Coxs River catchment down to Lake Burragorang. A number of locations within the catchment were modelled with flow and EC data presented in **Table ES1** and **Table ES2**, respectively. It is noted that EC has been considered in **Table ES2** over salt load as this is more representative of the risk to the environment.

Summaries of potential impacts from the regional water quality assessment for the transfer of residuals material stream to the REA at SCSS are provided below.

- There will be an increase in flows along Wangcol Creek, with flows predicted to increase by approximately 5% if the proposed conditions are compared to the future conditions, and by approximately 3% when compared against the existing conditions.

- There will be an increase in the EC along Wangcol Creek by approximately 16% if the proposed conditions are compared against the future conditions, and by 1% when compared against the existing conditions.

- At Lake Wallace the effects of the proposed modification are significantly reduced as a result of catchment influences and the cessation of Springvale Mine's LDP009 discharges to be implemented as part of the proposed Springvale WTP:

    - Regional model predictions between proposed conditions and both future and existing conditions indicate a reduction in flow at Lake Wallace of 2%

    - Regional model predictions between proposed conditions and both future and existing conditions indicate a reduction in EC at Lake Wallace by 20%.

Table ES1 – Summary of Change in Water Volume Results from Regional Model at Modelled Locations

Modelled Location	Existing Conditions (ML/year)	Future Conditions (ML/year)	Proposed Conditions (ML/year)	Difference between		
				Existing and Future Conditions	Existing and Proposed Conditions	Future and Proposed Conditions
Wangcol Creek at confluence with discharge from SCSS	2720	2661	2791	-2%	3%	5%
Wangcol Creek at confluence with Coxs River	3028	2969	3099	-2%	2%	4%
Coxs River flow to Lake Wallace	46,960	46,754	45,994	Negligible	-2%	-2%
Coxs River flow to Lake Lyell	57,399	57,185	56,362	Negligible	-2%	-1%
Coxs River flow to Lake Burragorang	124,097	123,874	123,062	Negligible	-1%	-1%

Table ES2 – Summary of Change in Electrical Conductivity Results from Regional Model at Modelled Locations

Modelled Location	Existing Conditions (µS/cm)	Future Conditions (µS/cm)	Proposed Conditions (µS/cm)	Difference between		
				Existing and future Conditions	Existing and Proposed Conditions	Future and Proposed Conditions
Wangcol Creek at confluence with discharge from SCSS	1000	870	1010	-13%	1%	16%
Wangcol Creek at confluence with Coxs River	910	790	920	-13%	1%	16%
Coxs River flow to Lake Wallace	600	600	480	Negligible	-20%	-20%
Coxs River flow to Lake Lyell	520	520	420	Negligible	-19%	-19%
Coxs River to flow Lake Burragorang	170	170	160	Negligible	-6%	-6%

- Predictions at Lake Lyell indicate a reduction of flow by 2% when the proposed conditions are compared against future conditions and 1% when compared against existing conditions. There is a reduction in the EC of 19%.
- Predictions at Lake Burragorang indicate a reduction of flow of 1% and a reduction in EC of 6%.

As noted above, the improved water quality predictions at Lake Wallace and further downstream in the catchment is primarily contributable to the influence of ceasing Springvale Mine's LDP009 discharges as part of the Springvale WTP. Management of the residuals stream from the Springvale WTP is required as part of the implementation of the mine water treatment to achieve the overall improvement to the catchment and will result in a minor deterioration in the immediate receiving waters of Wangcol Creek

It is important to note that the water and salt balance modelling was performed assuming the maximum predicted EC of the residuals material (2500 µS/cm) provided by Hunter Water from their jar testing (**Section 7.5.2**). It is more likely, based on the results from the Newstan Colliery Water Treatment Plant case study also discussed in detail in **Section 7.5.2**, that the EC of the residuals to be emplaced at the SCSS REA is expected to be closer to the raw mine water feed to the Springvale WTP. The raw mine water feed from the LDP009 has a median EC of 1170 µS/cm. As a comparison, the EC of the raw mine water feed at Newstan Colliery Water Treatment Plant was measured at 2400 µS/cm on 23 September 2016 and the EC of the resulting residuals material from that water treatment plant was 2500 µS/cm, a less than 5% increase in salinity due to the pre-treatment or the clarification process. Therefore, the predicted impacts on the salt outputs from the SCSS can be seen as conservative, upper-limit estimates.

As part of Springvale WTP, the commissioning phase will undertake specific monitoring of the water treatment plant's performance which will be compared against predictions. The assessment of flow and quality of the residuals stream will be reviewed as part of the Springvale WTP and implemented at the SCSS as appropriate.

Surface Water Environment

The water balance modelling predicts an increase in the volume of water discharged through LDP006 as a result of the increased load on the SCSS water management system due the residuals transfer, when compared against future conditions.

PHREEQC modelling (Parkhurst and Appelo, 1999) was undertaken using the median LDP006 water quality data and the Newstan Colliery Water Treatment Plant residuals stream data (**Table 14**) in order to predict the effect of seepage from the REA on the LDP006 discharge. The modelling results predicted the following changes from the historical LDP006 discharge water quality as a result of the transfer of the residual stream to the REA:

- pH is predicted to increase as a result of the increased alkalinity of the residual stream
- Concentrations of the major ions sulfate, calcium, magnesium and potassium are predicted to decrease
- Dissolved boron, iron, manganese, nickel and zinc concentrations are predicted to decrease.

The PHREEQC modelling results are limited by the use of historical LDP006 data, which is not considered to be representative of discharge conditions following the construction of the clean water diversions at SCSS (future conditions). However, the modelling results provide a comparison against the existing conditions.

Groundwater Environment

The results for the case study of residuals stream from Newstan Colliery Water Treatment Plant (**Section 7.5.2**) indicate that the increased transport of metals from the REA to the groundwater environment as a result of the proposed residual transfer is unlikely. The case study indicated that aluminium ion may be concentrated in the residuals stream when compared to the raw mine water supplied to the water treatment plant in the Springvale WTP, however the concentrations indicated by the Newstan Colliery case study and the Hunter Water jar testing (**Section 7.5.2**) are less than those of the majority of the groundwater monitoring bores at the SCSS.

No aquifer interference activities are predicted as a result of the modification, as the seepage of residual into the historical mine workings is not predicted to have an observable impact on the groundwater table outside of the SCSS. No pressure head decline would occur as a result of the modification, and no change in the groundwater quality, which would lower the beneficial use of the groundwater (as agricultural or industrial water), is predicted.

Environmental Consequences

The increased volume of discharges and frequency of discharges expected due to the proposed modification is not predicted to impact on the geomorphological Wangcol stream health given the creek channel has been found to be relatively stable.

The increased frequency of discharges has the effect of increasing the frequency of exposure of aquatic species in Wangcol Creek to potential toxicants (boron, iron, manganese, nickel and zinc), albeit at decreased concentrations. This is not predicted to impact on the existing instream habitat and macroinvertebrate diversity of Wangcol Creek as the creek in the vicinity of LDP006 has the most degraded habitat and the lowest level of macroinvertebrate diversity of the current four aquatic ecology monitoring sites within the creek. The lower toxicant concentrations predicted in the LDP006 discharge may result in increased macroinvertebrate diversities downstream of the discharge.

The predicted increase EC in Coxs River has the potential to impact one downstream surface water user located adjacent to both the Coxs River and Sawyers Swamp Creek on the downstream side of the Sawyers Swamp Creek. However, the predicted increase is unlikely to degrade the usage category (irrigation) of the water given a predicted EC of between approximately 800 and 1000 µS/cm.

Conclusion

The transfer of residuals is required to facilitate the implementation of the Springvale WTP, which will result in considerable environmental benefits achieved through the removal of Springvale Mine's groundwater discharges to Sawyers Swamp Creek in the Upper Coxs River Catchment.

There are predicted minor adverse environmental impacts along Wangcol Creek due to the proposed residuals material transfer. There is a minor increase in salt loads at the local level due to the proposed modification, however there will be a reduction in salt loads in the Coxs River catchment due to the cessation of mine water discharges from Springvale Mine. The environmental consequences on receiving waters is considered negligible and will only be realised upstream of the confluence of the Coxs River and Sawyers Swamp Creek. The impacts of the discharges (flow, EC) have limited influence at Lake Wallace, and further downstream to Lake Burragorang.

Overall, the impacts in Wangcol Creek are minor relative to the significant benefit observed at Lake Wallace and further downstream by the operation of the Springvale WTP.

Environmental Management System

The Project has a well-established Environmental Management System (EMS) developed in accordance with the Centennial Coal's EMS Framework to manage its operations in a sustainable manner. The EMS ensures the effective management of environmental issues and compliance with all regulatory requirements. The EMS incorporates a large number of Environmental Management Plans (EMPs) designed to assist in meeting community expectations and regulatory conditions, including the conditions of the Environment Protection Licence.

Following approval of the modification, the existing EMPs will be reviewed and updated for the modification, as appropriate, and will take into consideration the outcomes of the water resources impact assessment undertaken as part of this SEE, the commitments made and all relevant revised consent conditions in SSD 5579.

Consultation

Springvale Coal maintains an open two-way communication with the local community, consent authority and other government agencies. A dedicated *Western Coal Services Stakeholder Engagement Plan* is available and consultation with the identified stakeholders is undertaken in accordance with that plan. Consultation with the government agencies was undertaken for the proposed modification as described in **Chapter 6.0**. Consultation with the local community has also been undertaken and will be ongoing.

The broader community will be notified of the proposed modification through an advertisement placed in the local newspaper following lodgment of the modification application. The community will also be asked to take part in the modification assessment process through the public exhibition process, whereby the community will be invited to make formal submissions on the modification.

The Centennial Coal website will provide updates on the modification for all stakeholders while the internal stakeholders (Springvale Coal and other Centennial Coal employees) will be given information on the modification via information sessions and meetings.

Justification and Conclusion

The proposed transfer of the residuals material stream from the new water treatment plant at MPPS to the SCSS is required to facilitate the Springvale WTP, and the proposed modification seeks to modify SSD 5579 to allow receipt of the residuals material stream. The Springvale WTP will achieve improved environmental outcomes for the upper Coxs River catchment and meet the water quality performance measures for mine water discharges required under the Springvale Mine's consent SSD 5594. The Springvale WTP identified the transfer of residuals stream from the water treatment plant at MPPS to the neighboring SCSS as the most practical and cost-effective option with the least environmental impact due to the installation of a relatively short transfer pipeline required between the sites.

The residuals transfer will result in minor impacts (flow, water quality) on Wangcol Creek, which are mitigated further downstream from LDP006 through the cessation of discharges from Springvale Mine's LDP009 proposed in the Springvale WTP. The minor impacts of the discharges have limited influence at Lake Wallace relative to the significant benefit observed at Lake Wallace by the operation of the Springvale WTP. Overall, the significant benefits of the Springvale WTP far outweigh the minor residuals impact on the receiving environment. The benefits of the Springvale WTP can be achieved with little to no risk of adverse environmental impact or harm to the environment.

The modification is a minor alteration of the approved Western Coal Services Project and the Project as modified can be considered to be substantially the same development. The adverse environmental impacts of the proposed modification elements are minor and conservative. The impacts are predicted at local level in Wangcol Creek but are not predicted to result in harm to the environment. The impacts are mitigated downstream of discharges at Lake Wallace and further downstream in the Coxs River catchment.

The modification meets the relevant objects of the EP&A Act and is consistent with the four principles of the ecologically sustainable development. It meets the relevant government policies. On these bases, the modification will meet the environmental performance requirements to be considered for approval.

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1.0 INTRODUCTION

1.1 Overview

This *Statement of Environmental Effects* (SEE) relates to an application by Springvale Coal Pty Limited (Springvale Coal) to modify the State Significant Development (SSD) 5579 consent, which granted approval for the Western Coal Services Project (the Project). The consent was granted on 04 April 2014 by the Planning Assessment Commission of NSW, as delegate of the then Minister of Planning and Infrastructure. The SSD 5579 consent was granted under Section 89E of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a project life of 25 years, and allows operations until 30 June 2039 (**Appendix A**).

The consent SSD 5579 allows for the operation and construction of infrastructure to facilitate the receipt, handling and processing of coal from the Springvale Mine, Angus Place Colliery and other Centennial Coal operations, and the transportation of this coal to local power stations or the Centennial Coal operated Lidsdale Rail Siding. In the future, the Project will support the Springvale Water Treatment Project (Springvale WTP), as proposed in this modification. The Springvale WTP's *Environmental Impact Assessment* (GHD, 2016c) supporting the State Significant Development SSD 7592 application has been submitted to Department of Planning and Environment (DPE) for assessment.

Springvale Coal is seeking to modify the development consent SSD 5579 (the modification) to allow for receipt of residuals material from the water treatment plant located at the neighbouring Mount Piper Power Station (MPPS), and the amendment of the decommissioning and rehabilitation commitments approved in SSD 5579. The proposed modification addresses the operational interactions (**Section 1.6**) between the Project and the proposed Springvale WTP. The modification elements are described in further detail in **Section 1.3** and **Chapter 4.0**.

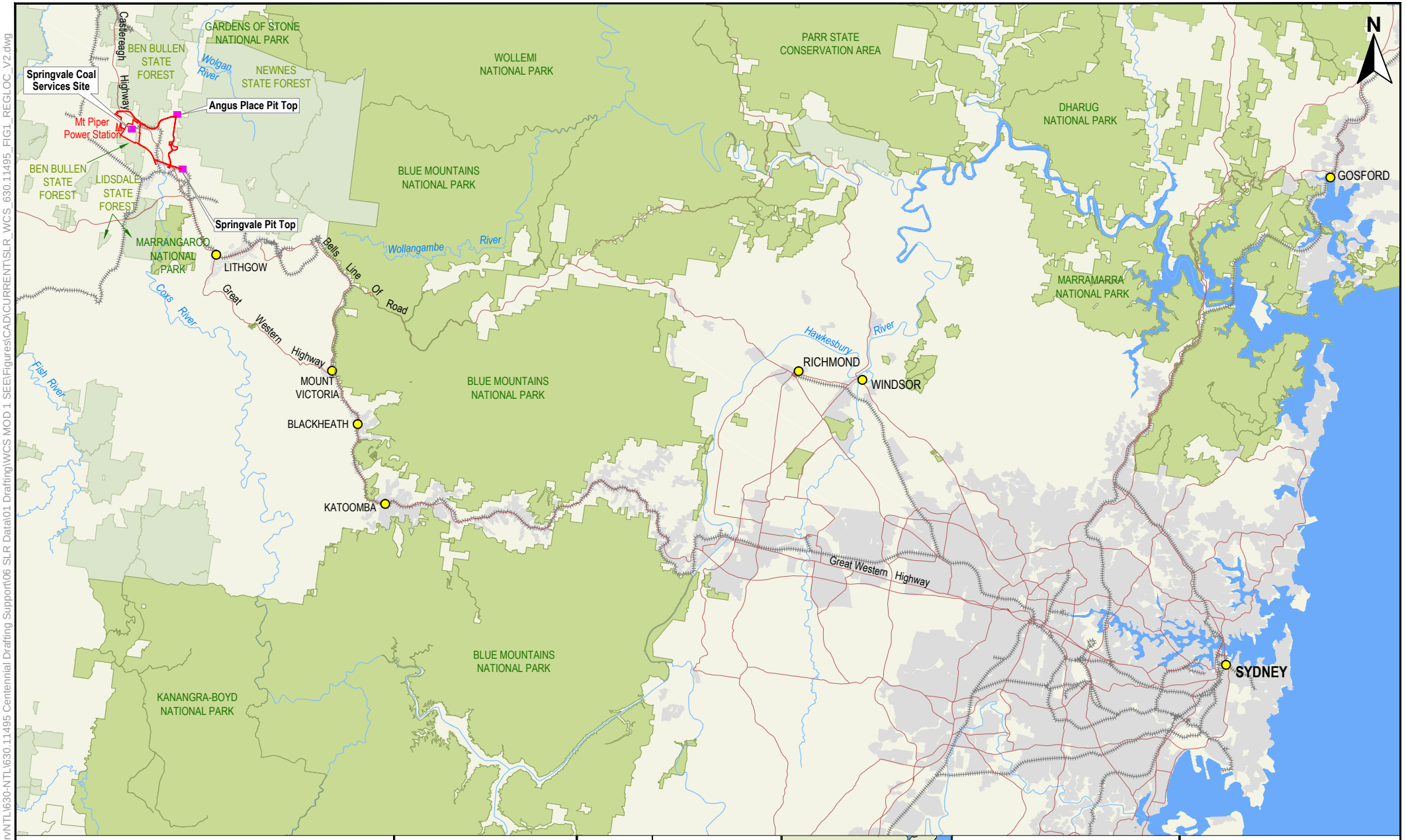
This SEE has been prepared to support the application to modify development consent SSD 5579 pursuant to Section 96(2) of the EP&A Act. The SEE assesses the potential environmental impacts of the proposed modification elements, and includes mitigation measures to minimise environmental impacts. The SEE has been prepared to a level of detail commensurate with the minor scale of the proposed modification and the legislative framework under which the modification will be considered.

1.2 Background

The Project is located in the Blue Mountains area of NSW (**Figure 1**) within the Lithgow Local Government Area (Lithgow LGA).

The Project was developed in response to Centennial Coal's long term strategy for its future operations in the Western Coalfields involving both domestic and export coal sales. The key elements of the Project are to:

- Provide infrastructure to enable flexibility of supply of coal to both domestic and export markets from Springvale Mine and Angus Place Colliery and other Centennial operations within the Western Coalfield
- Provide an upgraded Coal Handling and Preparation Plant (CHPP) at the Springvale Coal Services Site (SCSS) with the capacity to beneficiate run-of-mine (ROM) coal at 7 million tonne per annum (Mtpa)
- Integrate into one consent the processing and distribution of coal from Springvale Mine, Angus Place Colliery, SCSS and other Centennial Coal sources.



LEGEND:

- Project Application Area
- Major Roads
- Watercourse
- Railway
- Built-up areas
- Town / City
- State Forest
- National Park

DATE	10.11.2016
SEAM	LITHGOW
REFERENCE	SLR_WCS_630.11495_FIG1_REGLOC_V2.dwg
SCALE	1 : 500000

Figure 1
Regional Location Map

0.0 10 20 KM

Centennial Coal
Western Coal Services

Prepared by: SLR

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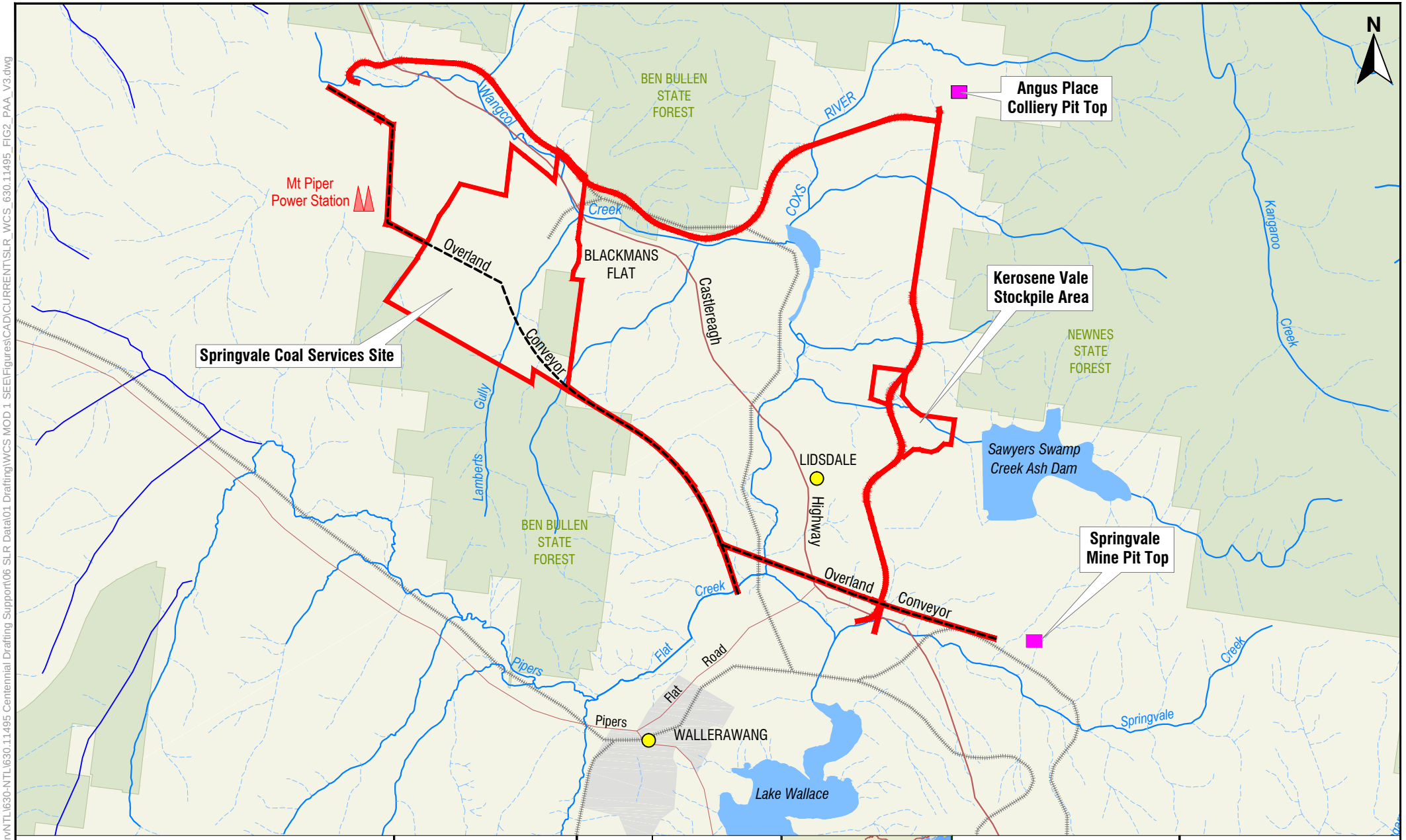
N
Angus Place Colliery Pit Top
Mt Piper Power Station
Springvale Coal Services Site
Kerosene Vale Stockpile Area
Springvale Mine Pit Top
Sawyers Swamp Creek Ash Dam
Lake Wallace
BEN BULLEN STATE FOREST
NEWNES STATE FOREST
BLACKMANS FLAT
LIDSDALE
WALLERAWANG
Pipers
Overland Conveyor
Overland Conveyor
Wangcol Creek
COXS RIVER
Kangaroo Creek
Castlereagh Highway
Gully
Lamberts
Creek
Pipers Flat Road
Springvale Creek
LEGEND:
Project Application Area
Major Roads
Watercourse
Railway
Overland Conveyor System
Built-up areas
Town / City
State Forest
National Park
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DATE 22.11.2016
SEAM LITHGOW
REFERENCE SLR_630.11701_FIG2_PROJAPPAREA_V3.dwg
SCALE 1:75000
Newcastle
Western Coal Services Project Site
Lithgow
Sydney
Figure 2
Project Application Area
0.0 1.0 2.0 KM
Centennial Coal
Western Coal Services
Prepared by:
SLR
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The main components included in the Project Application Area (**Figure 2**) are:

- The SCSS – for ROM coal handling and stockpiling, ROM coal beneficiation (washing) and reject material emplacement
- Kerosene Vale Stockpile Area – for stockpiling of excess coal
- Overland conveyor system – extending from Springvale Mine pit top to MPPS via the SCSS, and from SCSS to Lidsdale Rail Siding (PA08_0223)
- Mount Piper Haul Road – traversing between Angus Place Colliery pit top and MPPS
- Wallerawang Haul Road – traversing between Angus Place Colliery pit top and Wallerawang Power Station (WPS)
- A private Link Haul Road between Mount Piper Haul Road and the SCSS.

The SCSS is the largest land component of the Project Application Area (**Figure 2**) and is located off the Castlereagh Highway at Blackmans Flat, approximately 18 km north of the city of Lithgow. The site consists of a CHPP, emplacement facilities for coarse and fine reject materials (tailings), and a coal distribution network of conveyors from the existing Springvale Mine to both the Wallerawang and Mount Piper Power Stations, and from the SCSS to Lidsdale Rail Siding for export.

The Project's strategy centres on the transport and processing of ROM coal from Springvale Mine, Angus Place Colliery and other Centennial Coal sources. Maximum ROM coal that can be received by the Project is 9.5 Mtpa from all sources. The design of the Project enables up to 7.0 Mtpa of ROM coal to be beneficiated (washed), up to 6.3 Mtpa of product coal delivered to the Lidsdale Rail Siding, and up to 6.7 Mtpa of ROM coal delivered to the domestic power stations. An overview of the Project inputs and outputs is provided in **Figure 3**.

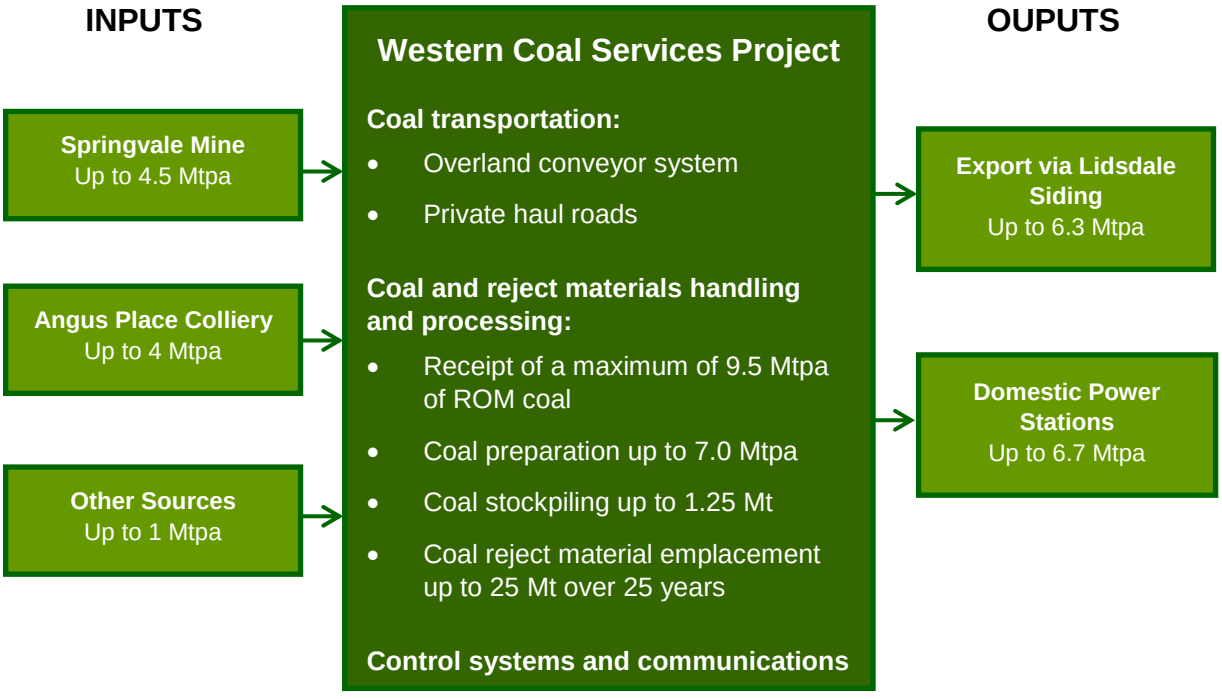


Figure 3 – Overview of the Western Coal Services Project

1.3 Proposed Modification

Springvale Coal is seeking a modification (MOD 1) to SSD 5579 to address interactions with the proposed Springvale WTP to allow for:

- The receipt of residuals material from the water treatment plant proposed in the Springvale WTP and emplacement within the existing reject emplacement area at the SCSS
- Changes to the decommissioning and rehabilitation strategy approved in SSD 5579.

The SSD 5579 consent boundary for the Project remains unchanged (**Figure 2**). There are no changes proposed to the surface infrastructure. No major changes are proposed with respect to the current surface operations. The majority of activities will continue to be undertaken as described in the Project's *Environmental Impact Statement* (WCS EIS) prepared by RPS Australia East Pty Ltd (RPS, 2013a). The emplacement of the residuals from the Springvale WTP will be undertaken as described in **Section 4.2.7**, and will be consistent with the existing reject emplacement and water management practices at the SCSS.

Progressive and life of mine rehabilitation will continue to be undertaken as described in the WCS EIS and further detailed in the WCS *Rehabilitation and Closure Plan* and the WCS *Mining Operations Plan*. Minor changes to the decommissioning strategy are proposed due to the proposal by the Springvale WTP to construct and operate raw water and residuals material transfer pipelines within the Project Application Area (**Section 4.4.1**).

There is no proposal to reduce the life of the consent in this modification from the approved 25 years from the date of consent, and the consent expiry date (30 June 2039) will remain unchanged. Approved hours of operations at the SCSS, overland conveyor system and the haul roads are not proposed to change.

1.4 The Applicant

Springvale Coal is the applicant of the proposed modification, and the operator of the Project on behalf of a joint venture comprising Centennial Springvale Pty Ltd and Springvale SK Kores Pty Ltd. The relevant postal address of Springvale Coal is:

Springvale Coal Pty Limited
Level 18
BT Tower, 1 Market St
Sydney NSW 2000

1.5 Modification Approval Pathway

The Project was approved as a State Significant Development (SSD 5579) under Section 89E of the EP&A Act on 04 April 2014.

SSD consents may be modified under Section 96 of the EP&A Act provided that the information stipulated in Clause 115 of the *Environmental and Planning Regulation 2000* (EP&A Regulation) is contained within the application, and that the development as modified will be substantially the same development as the development for which consent was originally granted.

The approval pathway was confirmed with DPE in a letter from them dated 11 October 2016, attached as **Appendix B.**

When assessing an application under Section 96 for modification to consent, the consent authority is required to take into consideration the relevant matters outlined in Section 79C of the EP&A Act, which include the provisions of any relevant environmental planning instruments. The proposed modification meets the relevant provisions of a number of planning instruments discussed in **Chapter 5.0**, including:

- *State Environmental Planning Policy (State and Regional Development) 2011* (**Section 5.4.1**)
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (**Section 5.4.2**)
- *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* (**Section 5.4.3**)
- *Lithgow Local Environmental Plan 2014* (**Section 5.5**).

Consideration has been given to other State and Commonwealth legislation relevant to the proposed modification, discussed in **Chapter 5.0**.

1.6 Modification Need

The proposed modification addresses the operational interactions between the Project and the proposed Springvale WTP (SSD 7592). Springvale Coal is seeking State Significant Development consent for the Springvale WTP to meet the water quality performance measures specified in Schedule 4 Condition 12 of Springvale Mine's consent SSD 5594. This condition requires the treatment of mine water transferred to the Springvale Delta Water Transfer Scheme (SDWTS) from Springvale Mine and Angus Place Colliery prior to discharge to the Coxs River catchment via Springvale Mine's LDP009 on Environment Protection Licence (EPL) 3607.

The Springvale WTP is proposing to construct and operate a raw water transfer pipeline and a water treatment plant to transfer mine water from the existing dewatering facilities on the Newnes Plateau for treatment and reuse within the cooling towers of MPPS as first priority. A number of ancillary pipelines for the transfer of treated water and by-products of the water treatment process will also be installed.

The Springvale WTP is proposing to transfer its residuals stream resulting from the pre-treatment phase in the water treatment plant for emplacement within the existing REA at the SCSS. Western Coal Services Project is not approved to receive residuals material from off-site locations for emplacement within its existing REA. Modification to consent SSD 5579 is being sought to allow receipt of the residuals stream by the Project from the proposed Springvale WTP.

The installation of the raw water and the residuals pipelines within the Project Application Area requires minor changes to the approved decommissioning and rehabilitation strategy in SSD 5579.

1.7 Environmental Assessment Considerations

No Secretary's Environmental Assessment Requirements were issued for the modification. Springvale Coal identified the potential impacts of the proposed modification elements in a letter to DPE dated 21 September 2016. The letter outlined the need for the modification (**Section 1.6**), the proposed modification elements, the technical assessments for the SEE, and sought DPE's agreement on the approval pathway and the adequacy of the technical assessments proposed.

A letter from DPE was received on 11 October 2016 (**Appendix B**) (i) to confirm that Section 96(2) of the EP&A Act was the applicable approval pathway for the proposed modification, and (ii) that the

Department considered the proposed assessment approaches were reasonable, however, noted that the modification application should also assess impacts on the surface water and discuss any changes to the rehabilitation strategy.

Assessments undertaken to assess the impacts of the proposed modification elements comprised:

(i) Water resources impact assessment including:

a. Water and salt balance (including hydrogeological modelling outcomes)

b. Water quality assessment (including proposed quality of residuals material stream) including assessment of risks to groundwater environment due to emplacement of residuals material in the REA

c. Discussions of existing and proposed water management

d. Discussions of ecotoxicology testing in Wangcol Creek

e. Desktop assessments of aquatic ecology and stream health in Wangcol Creek

f. Water quality impact assessment on local and regional levels, and the potential impact on the downstream surface water users.

(ii) Changes to the WCS *Decommissioning and Rehabilitation Strategy* described in RPS (2013a).

1.8 Document Purpose

This SEE has been prepared on behalf of Springvale Coal to support an application for modification to Springvale Mine's consent under Section 96(2) of the EP&A Act.

The proposed modification elements are noted in **Section 1.3**, and discussed in detail in **Section 4.2**. The SEE has been prepared to meet the requirements of Part 1 Clause 2(4) of Schedule 1 of EP&A Act, and contains information required under Clause 115 of the EP&A Regulation (**Section 5.3.1**).

The SEE describes the proposed modification, provides an assessment of its potential impacts and details measures that will be implemented to minimize the identified impacts. The information will be used by DPE and relevant government agencies to assess the merits of the proposed modification, and make recommendations to the determining authority on whether the proposed modification should be approved.

1.9 Document Structure

The SEE is provided in two volumes, comprising the main SEE report (Volume 1) and Appendices A to D (Volume 2). The SEE sets out the proposed modification in the context of the existing and approved environment, planning considerations, key environmental issues, potential impacts, mitigation measures and residual impacts. The impact assessment component of the SEE is informed by the *Water Resources Impact Assessment* (GHD, 2016a) appended as **Appendix D**.

Chapter 1.0 provides an overview of the proposed modification.

Chapter 2.0 provides a brief site description.

Chapter 3.0 provides brief discussions of the approved operations under SSD 5579.

Chapter 4.0 provides details of the modification elements for which approval is sought, and compares the current approved operations with the proposed operations as modified.

Chapter 5.0 describes the regulatory framework relevant to the modification.

Chapter 6.0 describes the stakeholder consultation undertaken in respect of the modification.

Chapter 7.0 assesses the potential environment impacts on the water resources, and outlines management and mitigation measures as necessary to minimise impacts from the modification.

Chapter 8.0 provides the Statement of Commitments.

Chapter 9.0 provides modification justification and conclusion.

Chapter 10.0 provides the references used in the SEE.

2.0 SITE DESCRIPTION

2.1 Site Location

The Project is located to the west of the Blue Mountains in NSW, approximately 4 kilometres (km) northwest of the village of Lidsdale and approximately 15 km north of Lithgow (**Figure 1**) within the Lithgow LGA.

2.2 The Project Application Area

The Project Application Area is shown in **Figure 2**. The approved components are:

- SCSS
- Kerosene Vale Stockpile Area
- Overland conveyor system
- Mount Piper Haul Road
- Wallerawang Haul Road
- Link Haul Road.

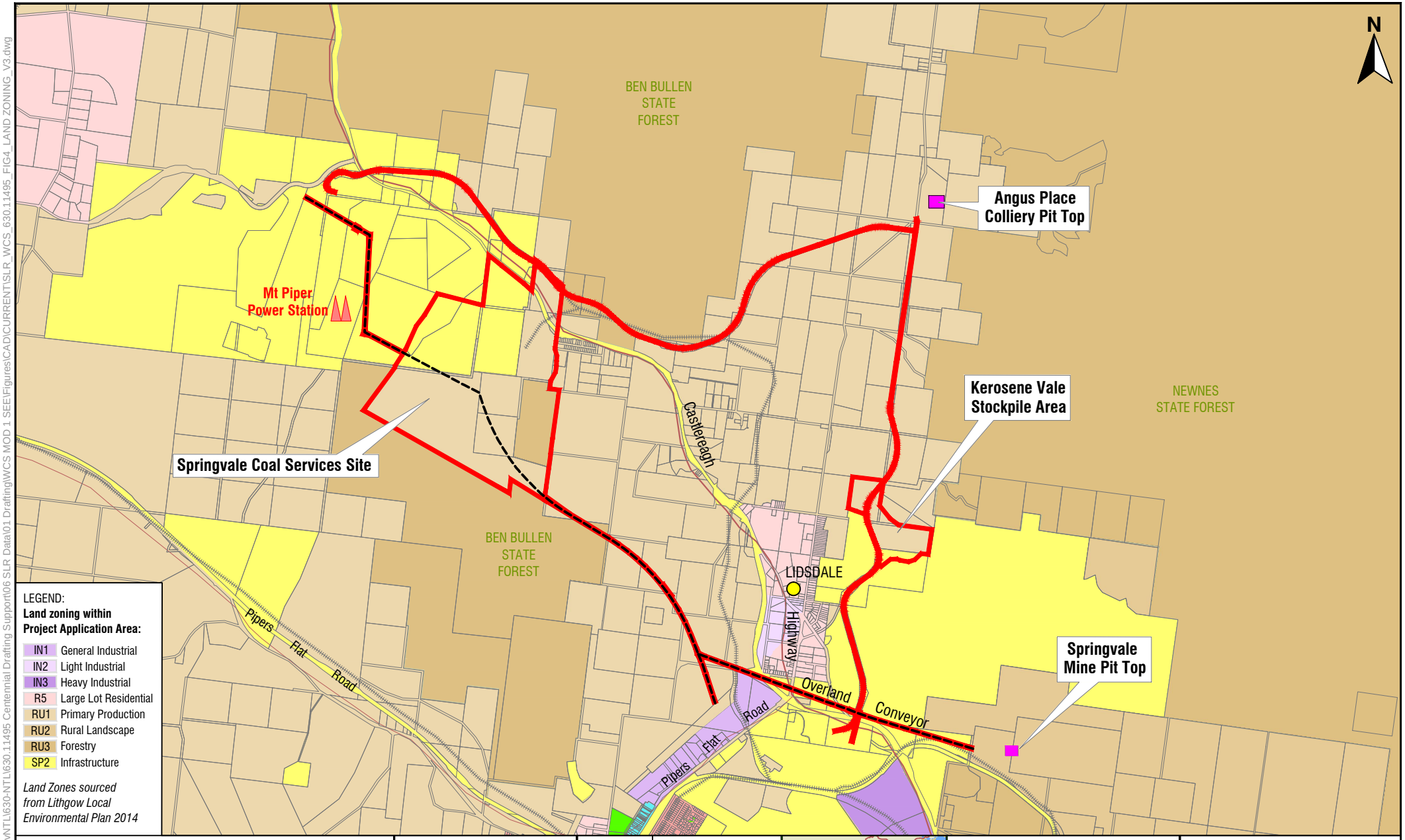
The Castlereagh Highway, a major arterial road in the region, traverses the SCSS.

2.3 Land Zoning

The Project Application Area falls under the *Lithgow Local Environmental Plan 2014* (Lithgow LEP). The Lithgow LEP commenced on 19 December 2014 and is the principal planning instrument affecting land use in the Lithgow LGA. Under the Lithgow LEP the Project Application Area encompasses the following zones:

- RU1 Primary Production
- RU3 Forestry
- SP2 Infrastructure
- IN1 General Industrial.

The land zones are shown in **Figure 4**.


N
BEN BULLEN STATE FOREST
Angus Place Colliery Pit Top
Mt Piper Power Station
Springvale Coal Services Site
Kerosene Vale Stockpile Area
NEWNES STATE FOREST
Castlereagh
BEN BULLEN STATE FOREST
LIDSDALE
Highway
Springvale Mine Pit Top
Overland Conveyor
Pipers Flat Road
Pipers Flat Road
LEGEND:
Land zoning within Project Application Area:
IN1 General Industrial
IN2 Light Industrial
IN3 Heavy Industrial
R5 Large Lot Residential
RU1 Primary Production
RU2 Rural Landscape
RU3 Forestry
SP2 Infrastructure
Land Zones sourced from Lithgow Local Environmental Plan 2014
LEGEND:
Project Application Area
Major Roads
Watercourse
Railway
Overland Conveyor System
Cadastral boundary
Town / City
CENTENNIAL SPRINGVALE PTY. LTD. THIS DRAWING IS COPYRIGHT. NO PART OF IT IN ANY FORM OR BY ANY MEANS (ELECTRONIC, MECHANICAL, MICRO-COPYING, PHOTOCOPYING OR OTHERWISE) BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED WITHOUT PRIOR WRITTEN PERMISSION.
DATE 22.11.2016
SEAM LITHGOW
REFERENCE SLR_630.11701_FIG4_LANDZONING_V3.dwg
SCALE 1:60000
Newcastle
Western Coal Services Project Site
Lithgow
Sydney
0.0 1.25 2.5 KM
Figure 4
Land Zoning
Centennial Coal
Western Coal Services
Prepared by:
SLR
A4
H:\Projects-SLR\630-Srv\NTL\630-NTL\630.11495 Centennial Drafting Support\06 SLR Data\01 Drafting\WCS MOD 1 SEE\Figures\CAD\CURRENT\SLR_WCS_630.11495_FIG4_LAND ZONING_V3.dwg

2.4 Land Ownership

Land within the Project Application Area is owned by entities listed in **Table 1**, and also attached as **Appendix C**.

Table 1 – Land Ownership within the Project Application Area

Centennial Fassifern Pty Ltd		
Lots 2 and 4 DP 260621	Lots 32, 41, 57 and 351 DP 751636	Lot 20 DP 877752
Lot 1 DP 386554	Lot 51 DP 751 651	Lots 1 and 4 DP 1139982
Lot 3 DP 542432	Lots 20, 24 and 44 DP 827626	
Centennial Springvale Pty Ltd and Springvale Kores Pty Ltd		
Lot 1 DP 88503	Lot 13 and 357 DP 751651	Lot 2 DP 835651
Lots 1 and 2 DP 126483	Lot 501 DP 825541	
Coal Link>Pty Ltd		
Lot 1 DP 825887		
Council of the City of Lithgow		
Lot 42 DP 751636	Lot 1 DP 1127043	Lot 1 DP 1049809
Delta Electricity		
Lot 191 DP 629212	Lot 1 DP 825124	Lot 228 DP 1131953
Lots 1, 2 DP 702619	Lot 101 DP 829410	Lots 10, 11 DP 1139978
Lot 67 DP 751636	Lot 16 DP 855844	Lots 2, 3 DP 1139982
Lot 1 DP 803655	Lot 2 DP 1018958	Lot 103 DP 1164619
Lots 9, 15 DP 804929	Lots 1, 5 DP 1087684	Lots 3, 5 DP 829137
Lots 40, 47, 49, 51, 52 DP 827626		
Enhance Place Pty Ltd		
Lots 32, 35, 36, 37, 38, 39 DP 827626	Lot 29 DP 1096381	Lot 10 DP 877753
State of NSW / Ben Bullen State Forest		
Lot 70 DP 751636	Lot 7005 DP 1026541	Lot 502 DP 822541
Ivanhoe Coal Pty Ltd		
Lot 2 DP 567915	Lot 101 DP 1137972	Lots 16, 174, 375, 385 DP 751651
Private Owner (Janette Winifred Hunt)		
Lot 371 DP 751651		
Lidsdale Holdings Pty Ltd		
Lot 28 DP 827626		
State Rail Authority		
Lots 1 and 8 DP 252472		

2.5 Land Uses

Land uses within and surrounding the Project Application Area vary, and include industrial, mining, power generation, residential, agricultural and forestry uses. MPPS is situated on land immediately west of the SCSS, whilst the locality of Blackmans Flat is located east of the SCSS. Pine Dale Coal Mine is located north of the SCSS on the northern side of the Castlereagh Highway.

Compartments of the Ben Bullen State Forest are located within the Project Application Area, to the south and the northeast of the SCSS. A large section of land within the SCSS includes an area owned by EnergyAustralia that is subject to an approval for ash emplacement. The SCSS also includes land owned by Lithgow City Council (LCC) which is subject to an approval for municipal waste emplacement.

Land between the SCSS and the village of Lidsdale may be described as generally cleared grazing land with scattered trees and rural dwellings.

Historically, the SCSS was a site of open cut mining prior to being converted to its current use. Open cut mining operations (Lamberts Gully Open Cut Mine) within the SCSS commenced in 1940, extracting coal from the Lidsdale and Lithgow seams. Underground operations commenced in 1942 with the Western Main underground entries located opposite the existing CHPP, and the Eastern Main Mine entries located where the current tailings dams are located, near the main entrance to the SCSS. The mines mined the Lithgow seam until the 1990s.

Between 1980 and 1994, three separate open cut mines were developed which extracted the remaining coal south of the Castlereagh Highway, from MPPS to the SCSS entrance. The Lamberts Gully Open Cut Mine was operational from 1994 to 2010 and extracted coal from both north and south of the section of the overland conveyor system traversing through the SCSS.

2.6 Topography and Soils

The Project Application Area is situated within the Coxs River Valley. Dominant landforms include the forested hills and slopes of the Ben Bullen State Forest. The terrain within the SCSS is described as an active mine site, predominantly open and undulating, located on the valley floor with the elevation ranging from 960 m Australian Height Datum (AHD) to 920 m AHD. The site lies mid slope between the rising hills to the south and the Wangcol Creek valley to the north. Terrain to the south rises to 1050 m AHD with the overall terrain sloping to the northeast.

Soils within the Project Application Area have developed on the Illawarra Coal Measures and are naturally low in fertility. The soils have been subject to erosion, physical disturbance due to mining activities, and past overgrazing. The majority of soils are generally shallow and stony or contain coal material. However, there are two more developed soil types which are suitably structured, and of sufficient depth, for low intensity agricultural activities. These more developed soil types are structured loams and Gleyed podzolic soils, and Yellow Podzolic soils.

2.7 Geology

The Project is located in the southern part of the Western Coalfields and on the western edge of the Sydney Basin. The stratigraphy of the region consists of material from the Tertiary, Triassic and Permian periods.

The Sydney Basin is characterised by coal, shale and sandstone sedimentary beds of Permo-Carboniferous age. These form the gently dipping beds of the Illawarra Coal Measures, capped by

shale and sandstone from the Wiannamatta and Narrabeen Group (Triassic Period) and Basalt from the Tertiary period.

The main geological unit in the area is the Cullen Bullen Subgroup of the Illawarra Coal Measures. The Lithgow Seam is the main target for the underground mines in the district with the other seams above this being extracted in the open cut operations where they occur and economically viable. Above this sequence is Triassic Sandstone while the unit below the coal measures is the Shoalhaven Group consisting of the Berry Formation (siltstones and shales) and the Megalong Conglomerate. The more recent Quaternary alluvium deposits are associated with the Coxs River and associated tributaries including Wangcol Creek.

There are seven identified coal seams within this region, listed in descending stratigraphical order as follows:

- Katoomba Seam
- Middle River Seam
- Moolarben Seam
- Upper Irondale Seam
- Irondale Seam
- Lidsdale Seam
- Lithgow Seam.

Directly below the Illawarra Coal Measures lies the silty, coaly sedimentary rocks of the Nile Subgroup and sandy siltstone of the Berry Siltstone. Basement rocks of Western Sydney are folded Palaeozoic metamorphosed rocks of the Lachlan Fold Belt, Late Carboniferous granites and Early Permian Rylstone Volcanics.

Seismic activity has been noted along the Coxs River Lineament Fault Zone, a 250 m wide, north-south trending graben structure which follows the valley of Coxs River.

2.8 Hydrology

The Project is located within the upper Hawkesbury River catchment, which includes the greater Warragamba Dam catchment and the upper Coxs River sub-catchment. The Coxs River is a perennial river that drains a catchment area of approximately 1,700 km^2 and is part of the greater Hawkesbury/Nepean catchment. The river rises within the Ben Bullen State Forest east of Cullen Bullen and flows generally in a south-east direction into Lake Burragorang (impounded by Warragamba Dam), which is the primary reservoir for drinking water supply to Sydney. The flow in Coxs River is regulated by three reservoirs, Lake Wallace, Thompsons Creek Reservoir and Lake Lyell.

The SCSS is located within the Wangcol Creek catchment. Wangcol Creek is a highly modified stream that drains into the Coxs River approximately 2 km to the east of SCSS. The creek has also been diverted to assist in mining land uses historically.

The runoff upstream of and within the SCSS concentrates into two natural watercourses, Huon Gully to the west and Lamberts Gully to the east. The hydrology of the site has been significantly changed due to open cut and underground mining and related activities. The natural watercourse in Huon Gully now terminates in a surface water storage, Huon Gully sediment pond 1 (SHG1) (**Figure 7**), as the

gully has been disturbed by open cut mining and lower down filled by the MPPS Ash Emplacement Area.

2.9 Groundwater Environment

The geological conditions present within the vicinity of the Project create a range of aquifer systems associated with higher permeability sandstones and coal seams. These are likely separated by lower permeability aquitards associated with mudstones, claystones and shale layers.

Shallow sandstone aquifers are predominant across the SCSS and are expected to be associated with the Gap and Ivanhoe sandstone units. These aquifers are likely to be weathered in their near-surface profile resulting in relatively high permeability with potential for significant hydraulic connection with surface water features, including Wangcol Creek.

Surrounding the SCSS operations, groundwater is connected to remnant open cut areas, some of which have been backfilled while others remain open. SKM (2010) indicate that following mining (pillar extraction), the connectivity between surface water and groundwater can increase up to three times due to changes in permeability and storage capacities above the mine. This is supported by observations at the SCSS where a number of groundwater recharge areas exist, which maintain an influencing factor over discharge volume and quality currently.

The SCSS has a long history of mining using both underground and open cut methods. There are a number of historical open cut voids in the western part of the SCSS, including the H Pit West, H Pit East and Council Pit. Water stored in these voids is likely to be connected to the historical underground mine workings which contribute down gradient to Cooks Dam. Inflows to Cooks Dam have been observed to occur from various locations along the western edge of the dam, originating from historical underground workings. The storage was historically constructed using a small (less than 3 m in height) homogeneous earth fill (overburden) bund, around the crest of an existing open cut pit and is not lined. Cooks Dam is located at the lowest point within the Lithgow Seam and forms a sink for much of the local groundwater environment.

The mudstone and siltstone units that are present between the primary coals seams (the Lidsdale and Lithgow seams) and sandstones throughout the profile significantly retard vertical flow between aquifer units. Much of this material has been extracted through mining activities

Regionally, the typical use of groundwater has been limited to stock use due to the low bore yields and water quality that is not potable.

2.10 Climate

2.10.1 Temperature

The climate in the region surrounding the Project is typical of a cool temperate mountain climate, characterised by cold winters and warm summers. Temperature data from Lithgow (Braidwood Street) Bureau of Meteorology Station (BOM) 063224, located 13 km southeast of SCSS, is provided in **Table 2**. The annual mean maximum and minimum temperature experienced at Lithgow are 18.2°C and 6.4°C respectively. On average January is the hottest month, with a mean maximum temperature of 25.5°C. July is the coldest month, with a mean minimum temperature of 0.7°C.

Table 2 – Distribution of Temperature (°C) at Lithgow (Braidwood Station, BOM Station 063224)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)	25.5	24.7	22.4	18.4	14.3	11.1	10.4	12.0	15.4	18.7	21.5	24.5	18.2
Mean minimum temperature (°C)	11.9	12.1	10.1	6.7	3.9	1.8	0.7	1.3	3.4	6.0	8.1	10.4	6.4

2.10.2 Rainfall

Annual Rainfall

SILO (Scientific Information for Land Owners) rainfall data from Lithgow (Braidwood Street) for the period January 1889 to December 2015 show the following rainfall statistics:

- Minimum annual rainfall – 447 mm in 1944
- Average annual rainfall – 862 mm
- Median annual rainfall – 853 mm
- Maximum annual rainfall – 1683 mm in 1950.

Monthly Rainfall

The monthly rainfall statistics determined for the period of record from the Lithgow (Birdwood St) showed the average monthly rainfall was observed to vary from a low of approximately 57 mm in September to a high of approximately 93 mm in January. A significant variation in the maximum recorded monthly rainfall is observed with the maximum monthly value being approximately 374 mm in August and the lowest monthly value being approximately 196 mm in September. The minimum monthly rainfall is less than 10 mm for all months.

2.10.3 Evapotranspiration

Average monthly evaporation rates, determined from the closest BOM station which records evaporation, Bathurst Agricultural Station (station number 63005), and based on 44 years of data from 1966 to 2016, showed the total average annual evaporation is approximately 1,350 mm. The annual average rainfall is approximately 862 mm, which gives an annual deficit (difference between annual rainfall and annual evaporation) of approximately 488 mm.

2.11 Sensitive Receptors

The following sensitive surface and groundwater receptors have been identified for the modification:

- Aquatic ecology maintained in local waterbodies, including macroinvertebrate fauna, frogs, macrophytes and algae, fish, semi-aquatic invertebrate species and semi-aquatic mammals
- Waterways of Wangcol Creek and Coxs River

- The drinking water catchment for Warragamba Dam, which receives inflows from a number of waterways including Coxs River
- Users of surface water and groundwater downstream of the Project, including licensed water users and basic landholder rights.

3.0 APPROVED OPERATIONS

3.1 Overview of Approved Operations

The Western Coal Services Project operates under State Significant Development consent SSD 5579. The supporting document for SSD 5579 is the *Western Coal Services Project*: *Environmental Impact Statement* (WCS EIS) (RPS, 2013a), which describes in detail the operations approved under the consent. SSD 5579 was approved to allow:

- Up to 9.5 Mtpa of ROM coal to be received at the SCSS from:
  - Springvale Mine (up to 4.5 Mtpa)
  - Angus Place Colliery (up to 4.0 Mtpa)
  - Other Centennial Coal sources, such as the future Neubeck Coal Project (up to 1.0 Mtpa)
- Upgrade of facilities and infrastructure within the SCSS to provide a total coal processing (beneficiation) capacity of up to 7 Mtpa within the CHPP
- Construction of ancillary infrastructure including additional conveyors and transfer points and other coal handling requirements to cater for the upgraded CHPP facility within the existing disturbance footprint of the SCSS
- Extension and enlargement of an existing reject emplacement area within the SCSS to enable sufficient reject emplacement capacity for a 25 year project life.
- Construction of a private Link Haul Road linking the SCSS with the existing Mount Piper Haul Road
- Improvement of the water management systems at the SCSS by separating clean and dirty water streams prior to either reuse or discharge off site
- Integration of the existing approved transport and processing of coal at Springvale Mine and Angus Place Colliery into the one consent
- Integration of the remaining rehabilitation, monitoring, water management and reporting requirements associated with the Lamberts Gully Open Cut Mine within the SCSS
- Up to 6.3 Mtpa of product (processed and unprocessed (ROM)) coal to be delivered to the Lidsdale Rail Siding via the overland conveyor.
- Continued use all previously approved infrastructure (existing conveyors, private haul roads, Kerosene Vale Stockpile Area, reject emplacement areas, services, access roads, car parks and buildings), facilities and activities associated with the transport and processing of coal from each mine gate and the point of delivery to the SCSS.

3.2 Existing Approvals

3.2.1 Development Consents and Licences

Table 3 provides a summary of the development consents and licences relevant to the Project. The Project operates in accordance with the Mining Operations Plan (21 December 2015 – 31 December 2022).

Table 3 – Existing Development Consents and Licences

Reference	Description	Issued by	Issue Date	Expiry Date
SSD 5579	State significant development consent permitting: • Receipt of a total of 9.5 Mtpa off ROM coal, comprising 5.5 Mtpa from Springvale Mine, 4.0 Mtpa from Angus Place Colliery and 1 Mtpa from other Centennial Coal sources • Consent life of 25 years from date of consent (04/04/2014 – 30/06/2039) • Operations 24 hours per day, seven days per week • Employment of up to 18 full time equivalent personnel • Operations at SCSS comprising: o Coal handling, stockpiling and processing o Reject material emplacement o Water management o Waste management • Coal transportation using: o An overland conveyor system o Mount Piper Haul Road o Wallerawang Haul Road o Link Haul Road • Beneficiation of ROM coal to up to 7 Mtpa • Transport of reject material off site (Neubeck Project) using private road haulage • Progressive rehabilitation and life of project rehabilitation.	NSW Planning Assessment Commission	04/04/2014	30/06/ 2039
DA 110/98	Lamberts Gully Open Cut Mine (Lot 501, DP825541) Consent	Lithgow City Council	14/09/1998	In perpetuity
DA 105/92	Mount Piper Haul Road Consent (Coal>Link Pty Ltd)	Lithgow City Council	14/09/1992	In perpetuity
EPL 467 Angus Place Colliery	Environment Protection Licence 467 Holders: Centennial Springvale Pty Limited and Springvale SK Kores Pty Limited	EPA	Anniversary 1 January	N/A
EPL 3607 Springvale Mine	Environment Protection Licence 3607 Holder: Springvale Coal Pty Limited	EPA	Anniversary 1 January	N/A
Radiation Management Licence 5061304	Radiation gauges	EPA	19/05/2016	15/06/2017
Coal Mine Health and Safety Act 2002	Section 100 Approval Establishment of Reject Emplacement Area – A Pit	Industry and Investment	07/10/2010	06/2026

Reference	Description	Issued by	Issue Date	Expiry Date
High Risk Activity (*Work Health and Safety (Mines) Regulation 2014*)	New Reject Emplacement Area – Lamberts Gully	DRE	24/08/2015	N/A
Monitoring Bore Licences	10BL605382 (for 4 bores) 10BL605349 10BL605348 10BL605347 10BL605346	DPI Water	03/06/2013 12/03/2013 12/03/2013 12/03/2013 12/03/2013	In perpetuity

3.2.2 Mining Tenements

The Project operates under a variety of mining tenements, included in **Table 4**, comprising mining lease (ML), coal lease (CL), consolidated coal lease (CCL), mining purposes lease (MPL), private lands lease (PLL).

Table 4 – Mining Tenements

Reference	Title Holder	Grant Date	Expiry Date	Area (ha)
CCL733	Centennial Springvale Pty Ltd	23/05/1990	03/07/ 27	693
CL361	Centennial Springvale Pty Ltd	17/07/1990	16/07/32	14.26
CL394	Centennial Springvale Pty Ltd	27/05/1992	27/05/34	17
ML1319	Centennial Springvale Pty Ltd	05/07/1993	05/07/35	1.476
ML204	Centennial Springvale Pty Ltd	27/05/1910	27/05/33	10.12
ML564	Centennial Springvale Pty Ltd	02/05/1922	02/05/23	19.75
PLL133	Centennial Springvale Pty Ltd	10/08/1922	10/08/24	16.51
Part MPL314	Centennial Springvale Pty Ltd	03/08/1993	03/08/35	95.98
ML1352	Centennial Springvale Pty Ltd	23/06/1994	23/06/36	7.6
ML1448	Centennial Springvale Pty Ltd	31/05/1999	30/05/20	95.16
Part MLA497	Mining Lease Application	Submitted 28/05/2015		
Part MLA498	Mining Lease Application	Submitted 02/06/2015		

3.3 Existing Operations

3.3.1 Hours of Operation

The hours of operation for the Project are as follows:

- SCSS: 24 hours per day, 7 days per week

- Kerosene Vale Stockpile Area: Day period only (7 am – 6 pm)
- Mount Piper Haul Road: No operations during adverse meteorological conditions during the night period (10 pm – 7 am)
- Wallerawang Haul Road: No operations during the night period (10 pm – 7 am).

3.3.2 Workforce

The Project is approved to employ a workforce of up to 18 full-time equivalent employees.

3.3.3 Site Access

SCSS is accessed via the Access Road which joins Castlereagh Highway in Blackmans Flat. From the Castlereagh Highway, access is readily available to the sub-regional and regional road network.

3.3.4 Coal and Reject Material Transport

ROM coal from the Springvale Mine pit top is transported to either Mount Piper Power Station directly, or the SCSS via the overland conveyor system for stockpiling and further processing (beneficiation). Product coal (beneficiated and ROM) from the CHPP is transferred to the Lidsdale Siding Rail Loading Facility, using the return belt of the overland conveyor system, for the export market.

ROM coal from Angus Place Colliery is approved to be transferred by road haulage to the MPPS via the Mount Piper Haul Road and to Wallerawang Power Station (under care and maintenance) via the Wallerawang Haul Road. No truck movements are to occur during the adverse meteorological conditions during the night period on Mount Piper Haul Road. No truck movements are to occur during the night on Wallerawang Haul Road.

A private Link Haul Road from the Mount Piper Haul Road to the SCSS is approved but not yet constructed. Once the Link Haul Road is constructed it will allow the transport of:

- ROM coal from Angus Place Colliery pit top to the SCSS
- Coal from SCSS to Kerosene Vale Stockpile Area and vice versa
- Course reject material from the SCSS to the proposed Neubeck Project (once the consent for this project is in place)
- ROM coal from other Centennial operations (including the proposed Neubeck Project (once the consent for this project is in place).

3.3.5 Coal Handling and Stockpiling

The Project is approved to receive ROM coal up to a maximum of 9.5 Mtpa from all sources, (**Figure 3**) comprising coal from:

- Springvale Mine – up to 4.5 Mtpa
- Angus Place Colliery – up to 4.0 Mtpa
- Other Centennial Coal sources – up to 1.0 Mtpa.

The Project is approved to transfer up to 6.3 Mtpa of product coal to the Lidsdale Rail Siding, and up to 6.7 Mtpa of ROM coal to the domestic power stations.

Once ROM coal has been received at the SCSS the coal is stockpiled in a 150,000 tonne capacity ROM coal stockpile area in the vicinity of the CHPP, and which serves as the CHPP feed.

An additional stockpile capacity of 600,000 tonnes is available at the SCSS if MPPS is unable to receive coal for an extended period. This stockpile area can also be used to blend reject and to store and feed raw coal produced from other operations.

The Kerosene Vale Stockpile Area provides the Project with an additional coal storage capacity of 500,000 tonnes.

3.3.6 Coal Processing

The SCSS houses the original CHPP constructed as part of the old Springvale Mine consent DA 11/92. This CHPP has the capacity to process coal up to 2.0 Mtpa.

A new CHPP with an additional 5.0 Mtpa ROM coal beneficiation capacity is approved to be constructed in the vicinity of the existing CHPP, however has not been constructed to date. The new CHPP will include waste recovery and water recycling circuits which will allow generation and separation of dry course and fine reject material streams.

3.3.7 Reject Materials Management

The SCSS is approved to operate a co-disposal reject emplacement area for the for the co-disposal of both the coarse and fine reject emplacement. This REA consists of a series of tailings ponds and a retention dam, located on the eastern boundary of the site. The REA is being progressively rehabilitated.

The A-Pit REA, formed by the final void of the Lamberts Gully Open Cut Mine, is located on the southern boundary of the SCSS, south of the CHPP and overland conveyor. It is no longer used for emplacement of reject materials, and currently serves as water management structure.

A new enlarged REA was approved to be constructed in SSD 5579 to up to approximately 1000 m long and approximately 700 m wide surrounded by a purpose built dirty water management system. The construction of the new REA was commenced in 2015. It is a progressive structure with works incorporating the former A-Pit REA. The first stage of the REA construction, referred to as the REA Storage Augmentation Project (REASA) has involved the extension to the south and east of the A-Pit REA, in order to store up to 1.4 million m^3 of sub-aerially deposited fine coal reject material. The walls of the REA are constructed from coarse reject materials.

The REA development has been planned as part of five stages based on the down gradient crest level. Each stage will comprise maximum 5 m high embankment lift. The stages and crest levels are as follows:

- Stage 1 with crest level at RL 960 m AHD
- Stage 2A facility extension westwards with crest level at RL 965 m AHD
- Stage 2B with the final crest level at 970 m AHD
- Stage 3 with the final crest level at RL 970 m AHD.

The Lamberts Gully REASA will have a life of up to approximately 8 years at current reject production levels.

The total volume of reject material approved to be stored in the REAs at the SCSS is up to 12.5 million m^3. Based on a conservative compaction density of 2 tonnes/m^3, the available reject emplacement capacity approved at SCSS over the 25-year life of the Project is 25 Mt.

SSD 5579 also authorises the transport of up to 1 Mtpa of coarse reject off site using the private haul road network for emplacement within the final void of the proposed Neubeck Project (subject to obtaining the necessary approvals).

3.3.8 Surface Facilities and Infrastructure

3.3.8.1 Support Facilities

The support facilities at SCSS consist of the following.

- Site access road and internal roads
- Car park
- Administration buildings
- Potable and ablutions water from Lithgow City Council main town water supply
- Biocycle sewerage systems – two units are available and both units have spray irrigators and utilise adjacent landscaping areas
- Bath house and ablutions facilities
- Workshop stores and services
- Telecommunications systems
- Water storage tanks for storage of process water for the CHPP and fire-fighting purposes
- Main control room
- Electrical substations and transformer yards.

3.3.8.2 Surface Infrastructure

The infrastructure within the Project comprises the following.

- The main overland conveyor system with sections OL1 – OL5, spanning from Springvale pit top (OL1) to MPPS (OL5), with OL2 section connecting the SCSS and Lidsdale Siding. A conveyor spur branching from the overland conveyor system at a point approximately 1 km west from the Springvale Mine services the WPS (now under care and maintenance).
- A system of internal conveyors within the SCSS for the transfer of ROM coal and product coal from and to stockpiles and the CHPP.
- Coal stockpile areas and REAs
- Surface water management and pollution control infrastructure including separation of dirty and clean water flow paths, both at the SCSS and Kerosene Vale Stockpile Area, comprising:
    - water storage dams
    - diversion drains, grit traps, and settling ponds
    - licensed discharge points
    - dust suppression facilities.

Installation of additional clean water diversions, described further in **Section 3.3.9.1**, have commenced at the SCSS, as was committed to in the WCS EIS (RPS, 2013a).

The SCSS infrastructure is shown in **Figure 5** while the Kerosene Vale Stockpile Area infrastructure is shown in **Figure 6**.

3.3.9 Surface Water Management

The objective of the water management system at SCSS is to generally secure supply for coal washing, washdown and dust suppression (haul roads and coal stockpiles), and to control the quantity and quality of water discharged into Wangcol Creek via the licensed discharge point LDP006 (EPL 3607).

The inputs into the surface water system consist of:

- Surface water runoff from catchment areas as a direct result of rainfall events
- Groundwater from old underground workings
- Runoff water from the CHPP.

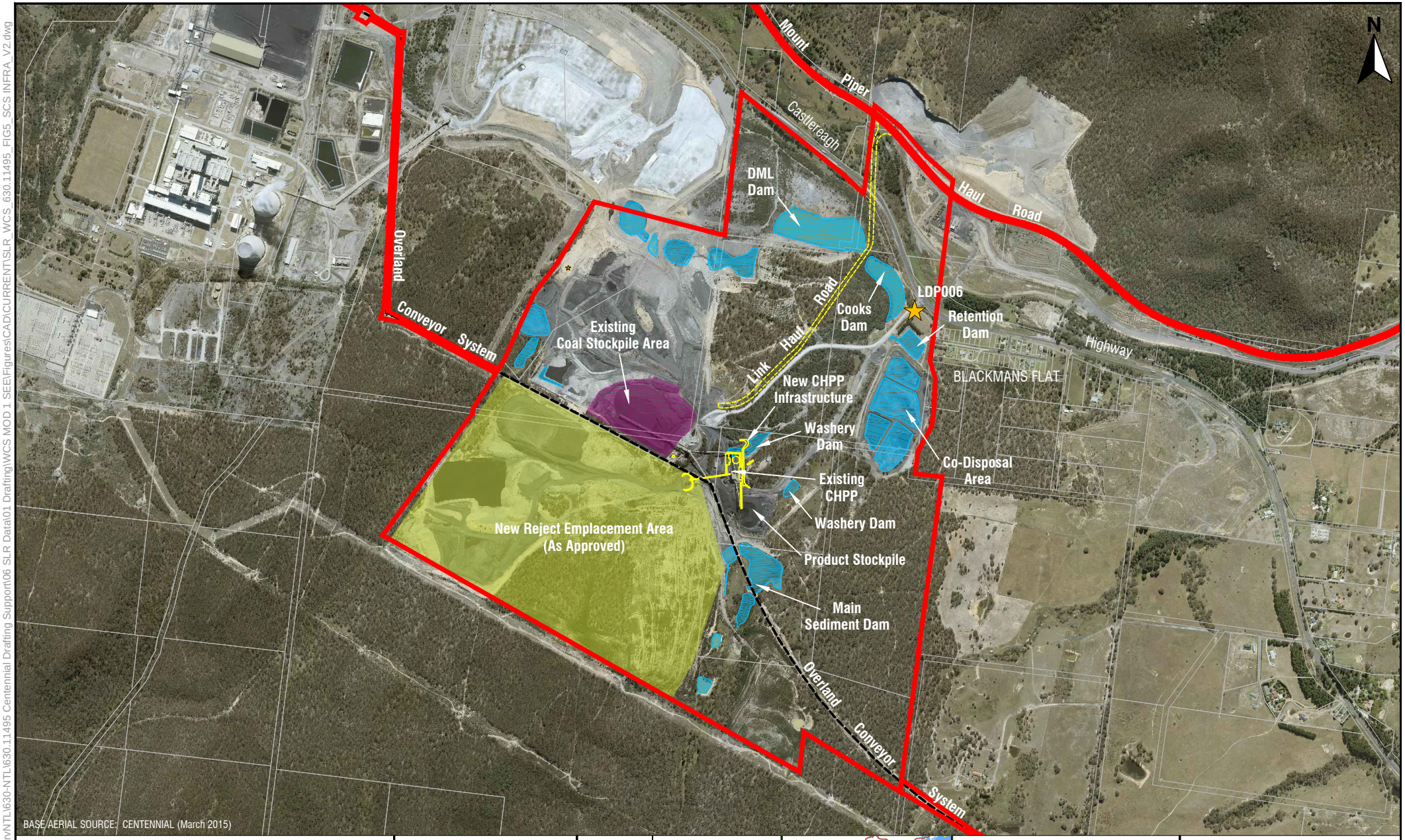
The surface water management system at SCSS consists of a series of dams (**Figure 7**) and other water management structures, allowing surface water runoff from the site and water seeping from the old underground mine workings to be captured and redistributed within the site for reuse or to improve the water quality of another dam.

3.3.9.1 Clean Water Management

Clean water diversion drains at the SCSS concentrate the catchment upstream of the site into two drainage lines that are then intercepted by the site. Lamberts Gully, to the east, is intercepted by Main Sediment Dam, which also collects runoff from established rehabilitation areas. Huon Gully, to the west, terminates at SHG1 where retained runoff is lost to seepage. It is likely that water seeping out of this storage is seeping into historical underground workings. The Main Sediment Dam provides the site's most reusable source of water. However, from time to time, suspended sediment can increase in concentration above environmental limits for discharge, which results in various management measures being adopted.

The SCSS is currently undertaking design and construction works relating to the separation and optimisation of clean and dirty surface water flow paths within the Lamberts Gully catchment. The works are consistent with a Statement of Commitment included in the WCS EIS, which committed to completing the separation of clean and dirty water at SCSS within five years of date of the development consent. As part of the optimisation of clean and dirty water separation at the SCSS, stabilisation of some catchments will be undertaken to reduce the risk of sediment laden water contributing to the clean water system. These works are expected to be minimal. .

The clean water diversion works at the SCSS will reduce the clean water load from LDP006 and improve the quality of water discharged from the site in both daily and rainfall discharge events. Additionally, the volume of clean water that infiltrates into the groundwater and subsequently reports to LDP006 is expected to reduce, in part due to improved flow efficiency through the site and the planned pumping of water from SHG1 to the Main Sediment Dam. The primary objective is to promote the capture and settlement of runoff from dirty catchments and to bypass cleaner water appropriately through the site.



LEGEND:

- Project Application Area
- New Reject Emplacement Area (as approved)
- Coal Stockpile Area
- Overland Conveyor System
- Water Management Structures
- New Infrastructure
- Licensed Discharge Point

DATE	10.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG5_SCS INFRA_V2.dwg
SCALE	1 : 4000

Figure 5

Springvale Coal Services Site Infrastructure

0 325 650 M

Centennial Coal
Western Coal Services

Prepared by: SLR

A4

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LEGEND:
- Project Application Area
- Rehabilitation Area
- Coal Stockpile Area
- Water Management Structures
- Licensed Discharge Point

DATE	10.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG6_ SCS KEROV STOCKPILE_V2.dwg
SCALE	1 : 4000

Figure 6

Kerosene Vale Stockpile Area

0 325 650 M

Centennial Coal
Western Coal Services

Prepared by: SLR

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LEGEND:
- Project Application Area
- Water Management Structure
- Licensed Discharge Point
- Watercourse - Non Perennial
- Watercourse - Perennial

DATE	10.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG7_CSC WATERMAN_V2.dwg
SCALE	1 : 4000

Figure 7

Water Management Structures at Springvale Coal Services Site

0 325 650 M

Centennial Coal
Western Coal Services

Prepared by: SLR

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The proposed civil design works for the clean diversion works are based on storm event criteria of 20 to 50 year ARI. The most significant of the works is that the Retention Dam will have the overflow diverted away from LDP006 and all clean water from the site is diverted to it. Briefly, the works will comprise:

- Expanding a number of existing channels
- Extending existing channels
- Blocking culverts under the access road (to avoid mixing of water from dirty and clean catchments)
- Construction of berms along existing channels
- Installation of a pump out system to transfer dirty water from SLG6 into Cooks Dam.

3.3.9.2 Dirty Water Management

The dirty water management system consists of a series of water management structures (, pumps and pipes that allow runoff and water seeping from the groundwater to be captured, treated (if required) and redistributed within the site for reuse or to improve the water quality of another dam through dilution. Water is used in the CHPP and for dust suppression.

The existing dams and sediment basins across the north-east and south-east perimeter of the SCSS provide containment of predominantly surface runoff. The arrangement of the basins permits the settling of suspended sediment prior to discharge at LDP006. Surface water predominantly entering these containment basins is either runoff from undisturbed catchment areas off site or from the partly rehabilitated previous open cut mine areas at the site. Water running off from contaminated hardstand areas is directed to primary sediment control basins, which is either recycled or further treated within the existing water management system.

Various measures are employed to manage the water quality on site. Runoff from disturbed areas and areas not fully rehabilitated are captured in sediment ponds and treated if required prior to discharge. This allows for maximum reuse of influenced water. The Retention Dam is used as a final storage location (settling pond) prior to water being discharged off site via LDP006.

A number of the surface water storages are unlined and are expected to seep into and/or receive seepage from groundwater including water in the historical mine workings. These unlined storages include DML Dam, Cooks Dam, SHG1, Council Pit, H Pit East, H Pit West, A Pit REA and the New REA.

3.3.9.3 Water Management Structures

The locations of the dams that exist within the SCSS and discussed below are shown in **Figure 7**.

Water management structures at the Kerosene Vale Stockpile Area are limited and shown in **Figure 6**. Pollution control and water retention is provided by Kerosene Vale Dam. Surface water run-off from the site is directed by a drainage line to the dam. Water discharges occur from the dam via LDP003 (**Section 3.3.9.4**) to Coxs River.

Cooks Dam

With a capacity of 44.6 ML, Cook Dam is used for the collection and management of dirty water on site. Water is received from a pipeline from Washery Sediment Dam and Washery Makeup Tank.

Decant water from A Pit also reports to Cooks Dam. Water from this dam can be pumped to the CHPP or discharged off site via LDP006.

DML Dam

DML Dam receives inflow from catchment runoff. Subsurface inflows possibly also enter the dam, similar to the relationships observed at Cooks Dam. The water level in the dam reportedly remains relatively constant apart from after significant rainfall events, which causes the water level to rise temporarily.

No spillway exists at the dam and there has been no known uncontrolled spilling from the dam as a result of its capacity being exceeded, however it is likely that water from the dam infiltrates into the historical mine workings. DML Dam is an unlined storage.

Retention Dam

Retention Dam (3.9 ML capacity) indirectly collects catchment runoff from a large proportion of the site. Excess inflows bypass through the cement impregnated geotextile fabric lined spillway. Water discharges from the spillway into the same outflow channel that outflows from the Cooks Dam spillway flow and contributes to LDP006. Retention Dam is a partially lined dam. There is a pump located at the dam that supplies all dust suppression on site and also supplements supply to the CHPP.

Co-disposal Reject Emplacement Area

This co-disposal REA has been divided into six separate cells (total capacity of 121.9 ML), with four utilised for tailings and coarse reject co-disposal and the remaining two (located along the eastern side) used to hold decant water. Historically, the cells were used to temporarily hold tailings and coarse rejects for a drying period, before they were mined out using a long-arm excavator and blended with coal product. This facility is currently not utilised.

Washery Sediment Dam

Washery Sediment Dam (0.8 ML) receives runoff water from the CHPP and surface water runoff from the haul roads and administration building areas and surrounding catchments. During high rainfall events, depending on the preceding water levels in the dam, water will overflow from Washery Sediment Dam into SLG6 via overland flow across rehabilitated land. The dam has an overflow weir and low flow outlet pipe.

Stockpile Sediment Dam

Stockpile Sediment Dam (0.8 ML) receives surface water runoff from the coal stockpile area and surrounding contributing catchments. Water levels within the dam are controlled by a manually operated diesel pump, pumping water from the Stockpile Sediment Dam to the Washery Makeup Tank for re-use within the CHPP.

During high rainfall events, water may overflow from Stockpile Sediment Dam into SLG6 via a combination of open channels and pipe networks.

Main Sediment Dam

Main Sediment Dam (29.7 ML), also known as Conveyor Dam, is located south of the main coal stockpile area. The dam is designed to be operated at a level greater than 1.0 m below the full supply level so that it has sufficient capacity to store the 80th percentile, 5 day runoff event. The retention

time within the dam allows for settlement before the water is discharged into a channel that reports to SLG6. Controlled discharges occur via a 30 m long 425 mm diameter pipe with a valve on the downstream outlet, whilst the storage may overflow via a nearby concrete spillway.

Main Sediment Dam receives overflow from five upstream 'fill and spill' sediment ponds in the Lamberts Gully area, SLG1, SLG2, SLG3, SLG4 and SLG5.

A Pit REA

A Pit (50.3 ML) is a historical open cut used as a fine rejects emplacement area until late 2015. It serves as the sediment pond for the New REA by receiving tailings return water, which is then pumped to Cooks Dam.

SHG1

Huon Gully Sediment Dam 1, SHG1 (9.5 ML) is a clean water retention structure located in Huon Gully that terminates the natural watercourse. Previously this storage contributed to Wangcol Creek, however, it is now intercepted by historical open cut mine workings and part of Mount Piper Ash Emplacement. Despite the storage having no defined outlet, the storage has not been observed to overtop. Given that evaporation is not significant enough for all captured water to be lost, it is inferred that there is significant seepage into the historical mine workings.

Historical Open Cut Voids

A number of historic open cut voids in the western part of the site hold a volume of water, and the water these voids is believed to be connected to the historical mine workings and then down gradient to Cooks Dam. These voids are:

- H Pit East (10.2 ML)
- H Pit West (10.5 ML)
- Council Pit (19.9 ML)

New REA

The new REA is a fine reject and coarse reject materials storage facility with an ultimate storage capacity of 1449 ML. The fine reject material is pumped as a slurry from the CHPP and deposited within the centre of the REA.

Decant water is drawn from a shallow decant pond, with a maximum pond radius under normal operating conditions of 50 m. Return water is decanted to A Pit.

3.3.9.4 Discharges from Springvale Coal Services Site and Kerosene Vale Stockpile Area

At the SCSS all the catchments draining towards LDP006 converge upstream and discharge off site through a single discharge point into Wangcol Creek. Surface water runoff from both clean and dirty water catchments is thus combined prior to being discharged from site.

Discharge to Wangcol Creek flow south-east to the Coxs River. The SCSS currently operates with a surplus of water, which is stored on site.

Due to the extent of historical disturbance at the SCSS, the current water management system involves the mixing of clean and dirty water prior to discharge into Wangcol Creek. Water from disturbed and undisturbed areas that drains into Lamberts Gully eventually drains into the Retention Dam where it overflows to LDP006. Overflows from Cooks Dam also discharge via LDP006. The effect of this mixing of clean and dirty water has previously increased the sediment loading on the Retention Dam, and also unnecessarily increased the total volume of water that reaches LDP006. The discharge historically includes all the water from forested areas located upstream of the SCSS.

A significant component of the discharge at LDP006 has been shown to result from the overflow of Cooks Dam. LDP006 monitors discharges from the SCSS as well as the contribution of catchment runoff to Lamberts Gully and hence discharge volumes become elevated following rainfall events. Discharge volumes from the SCSS are on average 1.29 ML/day which is predominately from the contribution of groundwater to Cooks Dam

The Kerosene Vale Stockpile Area has a number of settling ponds. Water discharges from the site occur from the settling ponds via LDP003 (EPL 467) to Coxs River.

3.3.9.5 Licensed Discharge Points

The Project operates under the provisions of EPL 3607 and EPL 467 (**Table 3**). EPL 3607 for Springvale Mine (held by Springvale Coal Pty Limited) allows discharge of water in the Project via LDP006 located at SCSS (**Figure 6**) and via LDP007 from the overland conveyor system. There are no volumetric limits for LDP006 or LDP007 specified by EPL 3607. Discharges through LDP006 and LDP007 are required to be monitored daily during discharges. EPL 467 (held by Centennial Angus Place Pty Limited) allows discharge of water in the Project via LDP003 located at the Kerosene Vale Stockpile Area (**Figure 7**).

The Project will have its own EPL in the future. LDP006 and LDP007 (on Springvale Mine's EPL 3607) and LDP003 (on Angus Place Colliery's EPL 467) will effectively be 'transferred' to the new EPL for the Project.

3.4 Waste Management

Production Waste

Production waste comprising reject materials from ROM coal beneficiation in the CHPP is generated at SCSS. The emplacement of these reject materials (coarse and fine) is discussed in **Section 3.3.7**.

Non-Production Waste

The waste management contractor utilised by Springvale Coal provides a comprehensive Waste Management System across the site including detailed waste tracking, monitoring, measurement, and recycling. Springvale Coal is committed to operating the Project in an environmentally responsible manner and abides by the waste management hierarchy of "avoidance, reduction, reuse, recycle and disposal" as much as practicable to minimise the volume of waste generated from the operation of the mine.

General solid waste is disposed of to landfill by licensed waste contractors. Waste paper and cardboard is separated and collected for recycling as required. Recyclable materials, are recycled whenever possible at the site. Any recyclable material unable to be used at the site is removed from the site by a recycling service provider.

Oil drums and filters (after rinsing and crushing) are disposed of with waste metals through metal recyclers. Aluminium cans are sold to metal recyclers. Waste oil (and oily water) is disposed of by licensed waste transporters and recyclers, or at treatment plants. Oily rags, filters, oily water and general workshop wastes plus other miscellaneous waste generated are separated for collection by a licensed waste contractor.

No hazardous waste is generated at the site.

Regular waste management inspections are completed by the waste contractor. An internal review process is carried out regularly to monitor and continually improve waste management procedures.

3.5 Environmental Management

The Project has an established Environmental Management System (EMS) that has been developed in accordance with Centennial Environmental Policy that sets out Centennial Coal's aims and values applicable to all employees and contractors. The EMS provides an environmental management framework for all activities and areas managed under the Project. This EMS ensures the effective management of environmental issues and compliance with all regulatory requirements. The EMS incorporates Environmental Management Plans (EMPs) designed to assist in meeting community expectations and regulatory conditions.

The EMS applies to:

- All surface operations undertaken within the Project
- all personnel who have specific responsibilities and duties within the EMS and associated standards and procedures
- all mine employees, contractors and external parties.

The EMPs have been established in response to approval and licence requirements noted in **Section 3.2**, and documents described below.

- Statement of Commitments made in the Western Coal Services Project EIS (RPS, 2013a) that accompanied development application for SSD 5579
- EPL3607 (Springvale Mine) and EPL 467 (Angus Place Colliery)
- Environmental Management System Framework Document

The current approved management plans and strategies that relate to the Project and include management plans required to be prepared by SSD 5579 are as follows.

- Mining Operations Plan (MOP) (21 December 2015 – 31 October 2022)
- Western Region Stygofauna Monitoring and Assessment Plan
- Western Region Air Quality and Greenhouse Gas Management Plan
- Western Region Noise Management Plan
- Western Region Aboriginal Cultural Heritage Management Plan
- Water Management Plan
- Rehabilitation Management Plan
- Environmental Management Strategy

- Stage 1 Lamberts Gully REASA Construction Noise Management Plan
- Stage 1 Lamberts Gully REASA Construction Traffic Management Plan

The following management plans and strategies are being prepared or will be prepared in the future as relevant to meet the SSD 5579 consent conditions.

- Biodiversity Management Plan (due 31 December 2016)
- Biodiversity Offset Strategy (due 31 December 2016)
- Construction Traffic Management Plan (prior to commencement of any construction activities).

Monitoring results undertaken are reported on Centennial's website as required by EPL 3607 and EPL 467 requirements, and on an annual basis in an Annual Review.

3.6 Rehabilitation and Final Landform

The rehabilitation activities undertaken in the Project are described in the MOP (21 December 2015 – 31 October 2022), based on the life of Project rehabilitation strategy included in the WCS EIS (RPS, 2013a). Springvale Coal has a progressive approach to rehabilitation to reduce and mitigate potential environmental impacts. All reasonable and feasible measures are implemented to minimise the total area exposed for dust generation at any time. Given that the Project is well established, ongoing establishment of additional erosion and sediment controls at the disturbed sites is not required. However, active monitoring and maintenance of rehabilitated areas and existing erosion and sediment controls are being undertaken at SCSS on an ongoing basis.

Since the development consent was granted on 04 April 2014 a *Rehabilitation and Closure Plan* for the Project was prepared and approved, as required by Condition 45 Schedule 3 of SSD 5579. The plan outlines the rehabilitation and closure management in detail.

An indicative closure timeline was provided in the WCS EIS, and also included in the WCS *Rehabilitation and Closure Plan*, which noted that the closure planning will commence 5 years prior to the closure of the facilities. Closure and post-closure activities will continue 10 years after cessation of coal processing and transport.

3.6.1 Rehabilitation Domains

The primary and secondary rehabilitation domains nominated in the WCS EIS and included in the WCS *Rehabilitation and Closure Plan* are included in **Table 5.** The infrastructure sites noted in the primary domains are shown in **Figure 5**, **Figure 6** and **Figure 7**. The primary domains are shown in **Figure 8**, while the secondary domains are shown in **Figure 9**.

The SCSS includes land owned by EnergyAustralia and LCC, and as noted below, the management and rehabilitation of these lands lie with these entities.

Table 5 – Primary and Secondary Rehabilitation Domains within the Project Application Area

Code	Domain	Description
Primary Domains		
1	Domain 1 – Washery and Coal Handling	Area includes the existing and approved (not constructed) coal processing area, coal stockpiles, associated conveyors and access roads.
2	Domain 2 - REA	Area incorporates the A-Pit REA and the new expanded REA.
3	Domain 3 – Co- Disposal REA	Area includes the co-disposal REA incorporating the old tailings dams.
4	Domain 4 – Water Management at Springvale Coal Services Site	Water management structures include: • Cooks Dam • DML Dam • Main Sediment Dam • Stockpile Dam • Retention Dam • Other water management structures at SCSS.
5	Domain 5 - Rehabilitation	Previous rehabilitation work and offsets associated with the Lamberts Gully Open Cut Mine
6	Domain 6 – Kerosene Vale Stockpile Area	The site includes: • Coal stockpile area • Rehabilitation area • Water management • Stockpile stowage material • Sealed underground entries.
7	Domain 7 – Haul Roads and Overland Conveyor System	Including (Centennial Coal) owned haul roads and conveyor system associated with Western Coal Services Project.
8	Domain 8 – Energy Australia Ash Emplacement Area	Management of this area is the responsibility of Energy Australia.
9	Domain 9 – Lithgow City Council Waste Emplacement	Management of this area is the responsibility of Lithgow City Council.
Secondary Domains		
A	Rehabilitation - Woodland	The following areas will be rehabilitated using a woodland seed mix: • New REA • Co-disposal REA • Existing rehabilitation areas • Administration Area • Coal Processing Area • Kerosene Vale Stockpile Area.
B	Rehabilitation - Pasture	Pasture rehabilitation will be used in rehabilitating haul road batters and any disturbed areas in the conveyor corridor.

Code	Domain	Description
C	Ash Emplacement from nearby power stations	There are areas of the site owned by Energy Australia which will be used for future ash emplacement. These areas are located within the Project Application Area, but it is the responsibility of Energy Australia to manage and rehabilitate this area.
D	Industrial Land use	This includes the continuing use of existing private haul roads for access following closure completion of the Project.
E	Water Management	The existing water management system will remain at closure.
F	Energy Australia Ash Emplacement Area	Final land use for this area is the responsibility of Energy Australia.
G	Lithgow City Council Waste Emplacement	Final land use for this area is the responsibility of Lithgow City Council.

As noted above rehabilitation works at the SCSS have commenced and are being undertaken in accordance with the approved WCS MOP (21 December 2015 – 31 October 2022). The rehabilitation phases that will be undertaken during the MOP period within the primary domains may include as relevant:

- Landform establishment
- Growth media establishment
- Ecosystem establishment
- Ecosystem development.

It is noted that only decommissioning works will be undertaken at the Kerosene Vale Stockpile Area in the current MOP period. This will involve the decommissioning of the existing three drifts and air shaft / fan house, which will be undertaken at the end of the MOP term.

Monitoring and maintenance of the rehabilitated areas at SCSS are ongoing. The MOP outlines the adaptive management that will be implemented where the rehabilitation performance is not trending to the nominated completion criteria. A Trigger Action Response Plan has been developed to identify required management actions in the event that rehabilitation outcomes are not achieved within an acceptable timeframe.

3.6.2 Final Land Form and Land Use

The final land form and end use options for the Project's land components were discussed in the WCS EIS. The Project is required to return any land disturbed due to exploration or mining activities to its pre-mining capacity and Schedule 3 Condition 43 of SSD 5579 stipulates the final landform be consistent with the surrounding environment.

In accordance with the Project's decommissioning and rehabilitation strategy outlined in the WCS EIS, and further detailed in the WCS *Rehabilitation and Closure Plan*, a large proportion of the SCSS falls within the secondary domain A – Rehabilitation Woodland (**Figure 9**) and these lands will be returned to 'woodland' for an end use of forest ecosystem. This land form is commensurate with the surrounding land use and the pre-mining environment. Habitat augmentation activities will be undertaken within this secondary domain to enhance the ecological values of the rehabilitated area.

Grassland rehabilitation (Secondary Domain B – Pasture) will only be used to rehabilitate the haul road batters and any disturbed areas associated with the conveyor at the time of closure. Grassland rehabilitation aims for long-term stabilisation of areas.

The final landform will also include permanent water bodies and drainage structures (Secondary Domain E – Water Management). These water management structures will be selected dams from the primary Domain 4 – Water Management at Springvale Coal Services Site, which will be retained to manage surface water flows and provide water resources for native fauna and stock.

The secondary Domain F – EnergyAustralia Ash Emplacement Area comprises land owned by EnergyAustralia (formerly Delta) within the SCSS (**Figure 8**, **Figure 9**) and is subject to ash emplacement. The rehabilitation and the establishment of the final land form of this area will be the responsibility of EnergyAustralia.

The secondary Domain G – Lithgow City Council Waste Emplacement comprises land owned by LCC (**Figure 8**, **Figure 9**) and is subject to an approval for municipal waste emplacement. The rehabilitation and the establishment of the final land form of this area will be the responsibility of LCC.

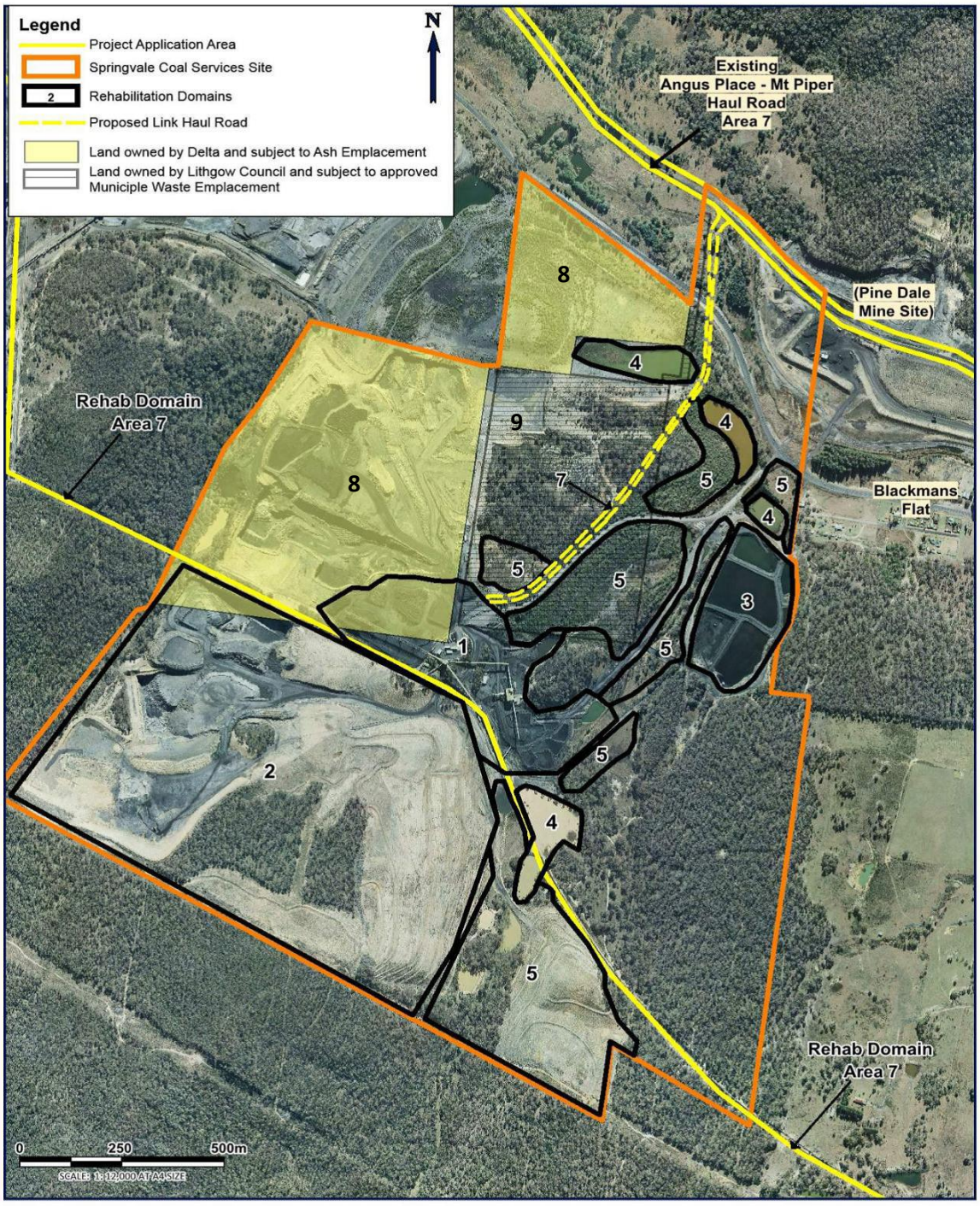


Figure 8 – Primary Rehabilitation Domains at the SCSS (Adapted from RPS (2013a))

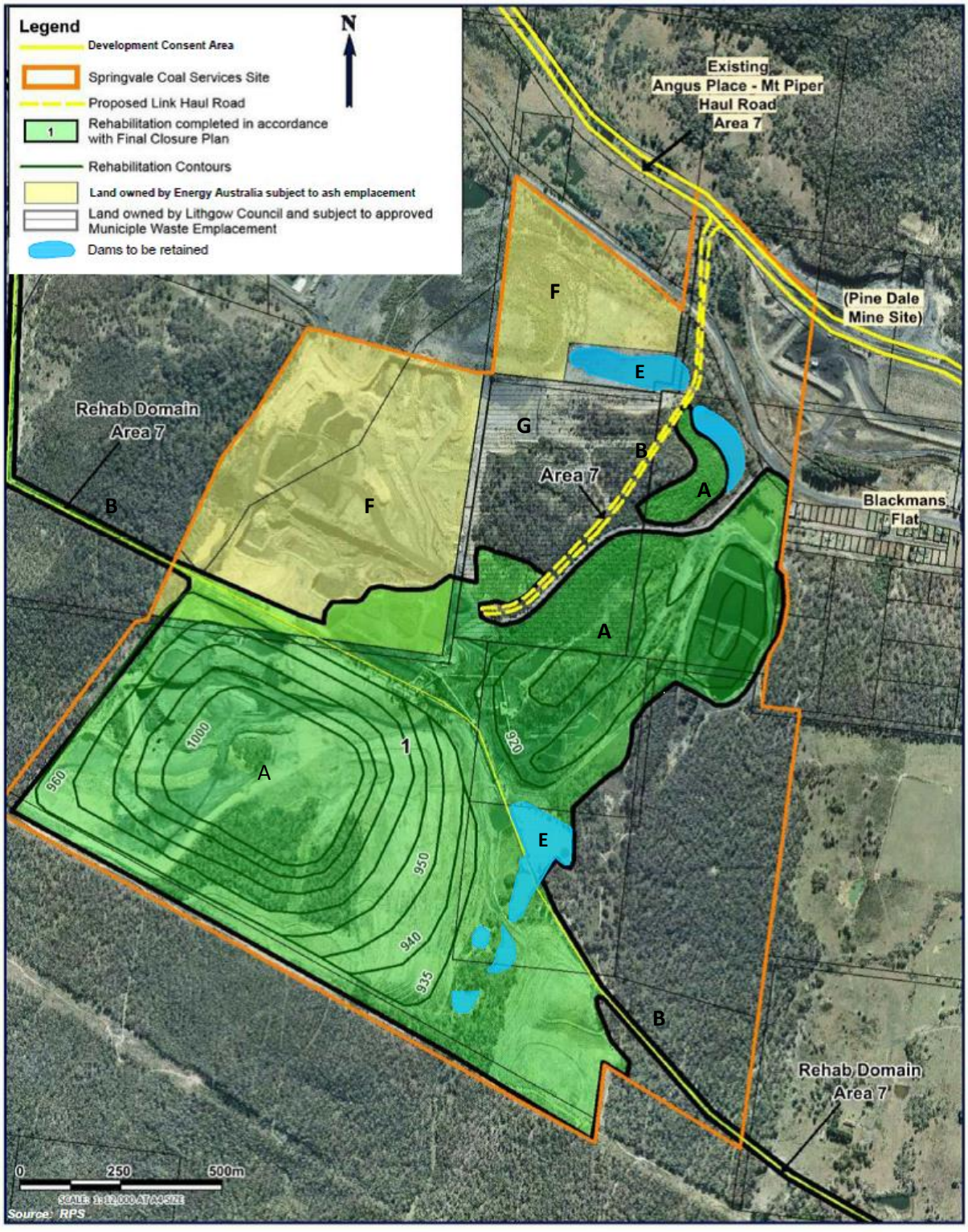


Figure 9 – Secondary Rehabilitation Domains in the Final Landform at the SCSS (Adapted from RPS (2013a))

4.0 PROPOSED MODIFICATION

4.1 Overview

Springvale Coal is seeking to modify consent SSD 5579 under the provisions of Section 96(2) of the EP&A Act. The proposed modification will allow for:

- The receipt of residuals material from the water treatment plant proposed in the Springvale WTP and emplacement within the existing reject emplacement area at the SCSS
- Changes to the decommissioning and rehabilitation strategy approved in SSD 5579.

The SSD 5579 consent boundary for the Project remains unchanged (**Figure 2**). There are no changes proposed to the surface infrastructure. No major changes are proposed with respect to the current surface operations. Majority of activities will continue to be undertaken as described WCS EIS (RPS, 2013a). The emplacement of the residuals from the Springvale WTP will be undertaken as described in **Section 4.2.7**, and will be consistent with the existing reject emplacement and water management practices at the SCSS.

Progressive and life of project rehabilitation will be undertaken as described in the WCS EIS. The Springvale WTP is proposing to install, predominantly trenched pipelines within the Project Application Area and the decommissioning of these pipelines will become the responsibility of the operator of the Springvale WTP. Following decommissioning of all infrastructure within the Project Application Area (both the Project components and the Springvale WTP components), the rehabilitation works will be undertaken as discussed in the WCS EIS.

There is no proposal to reduce the life of the consent in this modification from the approved 25 years from the date of consent, and the consent expiry date (31 December 2028) will remain unchanged. The approved hours of operations are not proposed to change.

4.2 Proposed Modification

Table 6 summarises and compares the major components of the operations approved under SSD 5579, and the operations that are proposed to be modified. The individual modification elements are discussed below in the relevant sub-sections.

Table 6 – Key Features of the Proposed Modification and Comparison with Approved Operations

Key feature	Approved Operation	Proposed change
Project Life	25 years, expiring on 30 June 2039	No change

Hours of Operation	• SCSS:
	  ○ 24 hours per day, 7 days per week
	• Kerosene Vale Coal Stockpile Area:
	  ○ Day period only (7 am – 6 pm)
	• Mount Piper Haul Road:
	  ○ No operations during adverse meteorological conditions during the night period (10 pm – 7 am)
	• Wallerawang Haul Road:
	  ○ No operations during the night period (10 pm – 7 am)
		No change

Workforce	• 18 full time equivalent personnel	No change

Coal Handling	• 9.5 Mtpa total ROM coal received at SCSS as follows:
	  ○ 4.0 Mtpa from Angus Place Colliery
	  ○ 4.5 Mtpa from Springvale Mine
	  ○ 1.0 Mtpa from other Centennial Coal sites
		No change

	• 6.3 Mtpa of product (processed and unprocessed) coal transferred from Springvale Coal Services Side to Lidsdale Rail Siding.	No change
Coal Stockpiles	• 150,000 tonne capacity ROM Coal Stockpile for stockpiling prior to processing • 600,000 ROM Coal Stockpile for storage of ROM coal if Mount Piper Power Station is unable to receive coal for an extended period. Also used to blend reject material and to store and feed ROM coal from other operations. • Kerosene Vale Stockpile Area provides storage of up to 500,000 tonnes of coal, and is used to temporarily store coal when power stations are unable to accept coal.	
Coal Transport	• ROM coal from Springvale Mine to SCSS and Mount Piper Power Station via the overland conveyor system (maximum capacity at 900 tonnes per hour). ROM coal can be directly transferred from Springvale Mine to Mount Piper Power Station or can be	No change

Key feature	Approved Operation	Proposed change
	transferred to ROM coal stockpile for processing in the CPP. • ROM coal from Angus Place Colliery to Wallerawang and Mount Piper Power Stations (via Wallerawang and Mount Piper Haul Roads, respectively) and to SCSS (via approved Link Haul Road) using private haul roads. • ROM coal from Angus Place Colliery other Centennial sources (eg Neubeck Coal Project) transferred to SCSS using the Mount Piper Haul Road and the private Link Haul Road (approved but not constructed). • Product (ROM and beneficiated) coal to Lidsdale Siding by the overland conveyor system.	
Coal Processing	Beneficiate coal within the SCSS to up to 7 Mtpa.	No change
Reject material management	• Total course and fine reject material production at SCSS, representing 15% of the CHPP throughput split equally to course and fine reject materials. • Total reject material storage capacity at SCSS, is 12.5 million cubic metres (12.5 Mm^3) or 25 Mt (using a compacting density of 2 t/m^3 available over a 25 year project life. • Reject emplacement areas at SCSS as follows: ○ A-Pit REA: Located within the final void of the Lamberts Gully Open Cut Mine, the A-Pit REA has been the existing emplacement area for both coarse and fine reject materials. Coarse reject material trucked to the REA is used to construct cells to contain the fine reject material. The latter is pumped as slurry into the cells. When full each cell is capped with the coarse material. ○ New Enlarged REA: will incorporate the A-Pit REA (extension to the south and east) and will be the main REA within the SCSS for course and reject material emplacement, referred to as the Lamberts Gully REA Storage Augmentation Project (Lamberts Gully REASA). ○ Co-disposal REA: Located near the main entrance to the SCCC the Co-Disposal REA offers above ground emplacement ad used as a back-up to the fine reject material circuit, however only the two southern ponds are used for this purpose. • The Project approved to transport reject material off site (eg Neubeck Coal Project) at a rate 1 Mtpa using the private road network (Mount Piper Haul Road and Link Haul Road) subject to Neubeck Coal Project (SSD 5598) obtaining the necessary approvals.	The new REA will receive residuals material stream from the new water treatment plant located at the MPPS proposed as part of the Springvale WTP (SSD 7592). The emplacement of the residuals will be undertaken in accordance with the current practices at the SCSS for reject material emplacement in the REA and water management. No increase in the reject emplacement capacity is being sought in the modification. The total solids component of the residuals material will be accommodated within the 12.5 million m^3 or 25 Mt of reject material emplacement capacity approved at SCSS. (**Section 4.2.7**)

Key feature	Approved Operation	Proposed change
Surface Infrastructure	• An overland conveyor system (10 km in length) link the Springvale Mine pit top to the MPPS via SCSS (for the transfer of ROM coal to both sites), Lidsdale Siding (for transfer of product coal) and Wallerawang Power Station (WPS) (currently under care and maintenance). Predominantly above ground except for the underpass beneath the Castlereagh Highway and a section parallel to Duncan Street, Wallerawang. Conveyor system is three-quarters enclosed to protect the belt from rain water and reduce coal dust emissions. The transfer of ROM coal MPPS utilises the upper belt of the conveyor system • An enclosed overland conveyor system between SCSS and Lidsdale Siding to allow transfer of product coal (ROM and beneficiated) to Lidsdale Siding. The transfer of coal to Lidsdale Siding utilises the return strand of the belt. • Private Haul Roads comprising: o Mount Piper Haul Road between Angus Place pit top and MPPS o Wallerawang Haul Road between Angus Place pit top and WPS o Link Haul Road (approved but not constructed yet) will connect SCSS with Mount Piper Haul Road. • Coal handling and preparation plant (CHPP) at SCSS with processing capacity of up to 2 Mtpa and associated conveyor systems and switchroom. An additional CHPP approved to increase processing capacity at SCSS to up to 7 Mtpa. The approved components in the upgraded CHPP comprise: o waste recovery and water recycling circuits for the production of both dry coarse and fine reject material o additional conveyors and transfer points o reject bin o product coal stacker and reclaim system o new belt press filter building o upgraded electrical and communication system o internal road modifications o new control room. • Water storage tanks for storage of process water for the CHPP and fire-fighting purposes	No change

Key feature	Approved Operation	Proposed change
	• Main control room • Electrical substations and transformer yards • Administration infrastructure • Site Access Road and other internal access roads • Coal stockpiles • Water management structures – settlement ponds, and dirty and clean water containment structures • Reject emplacement areas.	

Water Management and Pollution Control	• SCSS: Surface water management system at SCSS consists of separate clean (Lamberts Gully drainage line from upstream catchment) drainage and dirty water (Cooks Dam catchment) flow paths. Dirty water is captured and contained within pollution control dams:
	  ○ Main Sediment Dam / Conveyor Dam
	  ○ Washery Dam
	  ○ Stockpile Dam
	  ○ DML Dam
	  ○ Cooks Dam
	  ○ Retention Dam
	  ○ New A Pit REA Dam
	• Contained water from the four main pollution control structures (Washery, Stockpile, DML and Cooks Dams) at SCSS preferentially reused on site as process water for the CHPP, and for other raw water uses, such as dust suppression and fire-fighting purposes
	• Water pipeline (approved but not constructed yet) from Springvale Mine to SCSS and Lidsdale Siding along the overland conveyor structure
	• Excess water at SCSS discharged to Wangcol Creek through LDP006 (EPL 3607 held by Springvale Coal Pty Limited
	• Kerosene Vale Stockpile Area: Stormwater run-off from disturbed areas of Kerosene Vale Stockpile Area drain to a dirty water system, which is directed through on site settling ponds and dosing system prior to discharge through LDP003 (EPL467 held by
		No change

Key feature	Approved Operation	Proposed change
	Centennial Springvale Pty Limited and Springvale SK Kores Pty Limited). • Overland Conveyor System: Given the overland conveyor system is predominantly above ground, no specific drainage controls are required or exist. The transfer point at the intersection of the conveyor from the Springvale Mine to the conveyor between SCSS and Lidsdale Siding, has a collection pit and sump to contain any coal spillage from the transfer point. This collection point represents LDP007 on EPL3607 (Springvale Mine). • Mount Piper Haul Road: The road runs generally east-west, with the predominant natural drainage flowing from north to south. Watercourse crossings on Coxs River, Neubeck Creek and Wangcol Creek are in-fill sections of the road with multiple piped culverts. The road is predominantly in cut, with an earthen bund on the southern side. These sections are drained via a series of channels along the upslope side which direct water away from the road and into natural watercourses. These, in turn, are piped under the road in-fill sections. • Wallerawang Haul Road: The road is aligned generally north-south, and prevailing drainage flows from east to west. Natural drainage is directed beneath the road into piped culverts generally in areas of fill batters. When the road is in-cut, i.e. below the natural surface, runoff is collected in channels above cut batters and directed to natural drainage paths towards the existing culverts. The pavement is drained via table drains along the road verge into culverts beneath the road. The final section of the road, as it enters Wallerawang Power Station, is drained into the existing surface water management system of the power station.	
Waste (non-production) Management	• Undertaken by a waste management contractor, utilising the waste management hierarchy of "avoidance, reduction, reuse, recycle and disposal" • Waste generated comprises packaging, timber, waste oil, oil filters, oily water, empty oil drums, metal, hoses and paper.	
Rehabilitation	• Three potential final land uses within SCSS are: o Ash emplacement from nearby power stations o Industrial land use, including continuing use of existing private haul roads for access, for example for use as a waste disposal facility by Lithgow City Council o Reforestation and conservation – return to forest community comparable with the nearby Ben Bullen State Forest. • The rehabilitation program for SCSS comprises a mix of rehabilitated stable landforms covering the reject material emplacements and forest ecosystem for the remaining areas	

Key feature	Approved Operation	Proposed change
	not identified for future industrial activities or ash emplacements. • The Kerosene Vale Stockpile Area, located adjacent to Energy Australia's Ash Emplacement Area, could be used for ash disposal in the future. Unless a separate project is proposed for this area, the final land use for this site will be revegetation to a forest ecosystem compatible with the surrounding vegetation communities. • Rehabilitation of the Project Application Area have been divided into the following primary domains, and rehabilitation will be undertaken progressively: o Domain 1 – Coal Processing Handling: this area includes the coal processing area including the CHPP, coal stockpiles, associated conveyors, access roads and storm water dams o Domain 2 – REA: this area incorporates A Pit REA and the new / enlarged REA. o Domain 3 – Co-Disposal REA: this incorporates the tailings dams o Domain 4 – Cooks and DML Dams and other water management structures at SCSS o Domain 5 – Rehabilitation work and offsets associated with the Lamberts Gully Open Cut Mine o Domain 6 – Kerosene Vale Stockpile Area o Domain 7 – Haul roads and overland conveyor system. • Secondary domains in the final landform will include: o Rehabilitation - Woodland o Rehabilitation - Pasture o Ash Emplacement from nearby power stations o Industrial Land use o Water Management o Energy Australia Ash Emplacement Area o Lithgow City Council Waste Emplacement	Minor changes to the WCS rehabilitation strategy relating to Domain 2 and Domain 7 decommissioning and rehabilitation activities, due to the installation of the raw water and residuals transfer pipelines (Springvale WTP) within the Project Application Area, described in **Section 4.4**

4.2.1 Hours of Operation

No change is proposed to the approved hours of operation.

4.2.2 Workforce

No change in workforce is proposed.

4.2.3 Site Access

No change to access to SCSS is proposed. The site will continue to be accessed via Access Road off Castlereagh Highway in Blackmans Flat.

4.2.4 Coal and Reject Material Transport

No change is proposed in the approved coal and rejects material transport modes for the receipt of coal and reject material by the Project, and transfer of these materials to other projects or sites.

4.2.5 Coal Handling and Stockpiling

No changes are proposed to the approved coal handling and stockpiling in the Project.

4.2.6 Coal Processing

No change is proposed to the approved 7.0 Mtpa ROM coal processing or beneficiation capacity.

4.2.7 Reject Materials Management

The proposed modification is seeking approval for the SCSS to receive up 0.43 ML/day of residuals material stream from the water treatment plant proposed as part of the Springvale WTP (SSD 7592) when that project becomes operational, expected in June 2019. An overview of the Springvale WTP is shown in **Figure 10**.

A pipeline, referred to as the residuals pipeline, shown in **Figure 11**, will be used to transfer the residuals material from the Water Treatment Plant located at the adjacent MPPS site to the new REA at the SCSS. It is noted this pipeline will be constructed and operated under Springvale WTP's consent SSD 7592. This residuals transfer pipeline and the raw water pipeline (also part of the Springvale WTP and traversing in sections through the Project Application Area), shown in **Figure 10,** will be entirely trenched, up to one metre deep, as they traverse the WCS Project Application Area. The residuals pipeline in the vicinity of the REA will be trenched at the bottom of the REA batter slopes, between the clean water diversions and the REA. The pipeline leading into the REA and the header to be installed at the end of the pipe will be installed above the ground surface to allow the transfer of the residuals material into the REA sub-aerially, similar to the current practice of transferring the coal fine reject materials into the REA described in **Section 3.3.7**.

The header at the end of the residuals transfer pipe will be arranged as a distribution header which will allow the water to discharge at multiple points with low velocity and low volumetric flow to avoid localised erosion within the REA. The pipeline will be capable of transferring residuals at a flow rate of 30 L/s in batch flow periods. The maximum transfer rate to the REA from the water treatment plant will be 0.43 ML/day.

Two sources that will contribute to the residuals stream to be transferred to the Project are:

- Residuals generated from the removal of solids from the mine water feed during the pre-treatment (clarification) processes in the water treatment plant
- Clean-in-place waste from the reverse osmosis membrane cleaning.

The residuals stream will have a dry solids content of up to 2% solids, and would be classified as liquid waste in accordance with the *Waste Classification Guidelines* (EPA, 2014). The pre-treatment process will remove the suspended solids in the raw mine water feed, thickening the solids via a thickener process to allow facile transfer of the residuals material stream to the transfer pipeline.

The clean-in-place waste will be transferred to the REA once every three months. The volume of these residuals is predicted to be approximately 10 kL at a time, which is minor in comparison to the standard residual material to be transferred. However, this volume will be included in the maximum 0.43 ML/day proposed to be transferred to the REA.

The clean-in-place solution will consist of treated water, acids and bases as the main cleaning agents. Typically, hydrochloric acid is used as is the common industry practice. Prior to the clean-in-place solution being discharged into the residuals stream, the solution will be neutralised and stored. Appropriate blending of the clean-in-place solution will occur into the residual stream to achieve a consistent overall quality target. Additional treatment chemicals may be introduced to the clean-in-place solution, which may include surfactants and chelating agents depending upon the final water treatment plant design and operation, however all chemicals are proposed to be biodegradable and compatible with the receiving environment.

Further clarification on the specific clean-in-place chemical, including material safety data sheets, will be provided as part of the water treatment plant commissioning period and assessment. The WCS Water Management Plan will be updated to include the relevant information and management of the residuals material stream.

As the residuals material will be mostly water the transferred volume will be decanted from the REA and managed in accordance with the current water management practices at the SCSS. The total solids component of the residuals material will be accommodated within the 12.5 million m^3 or 25 Mt of reject material emplacement capacity approved in the Project. As such the modification is not seeking approval to increase the reject emplacement capacity at the site.

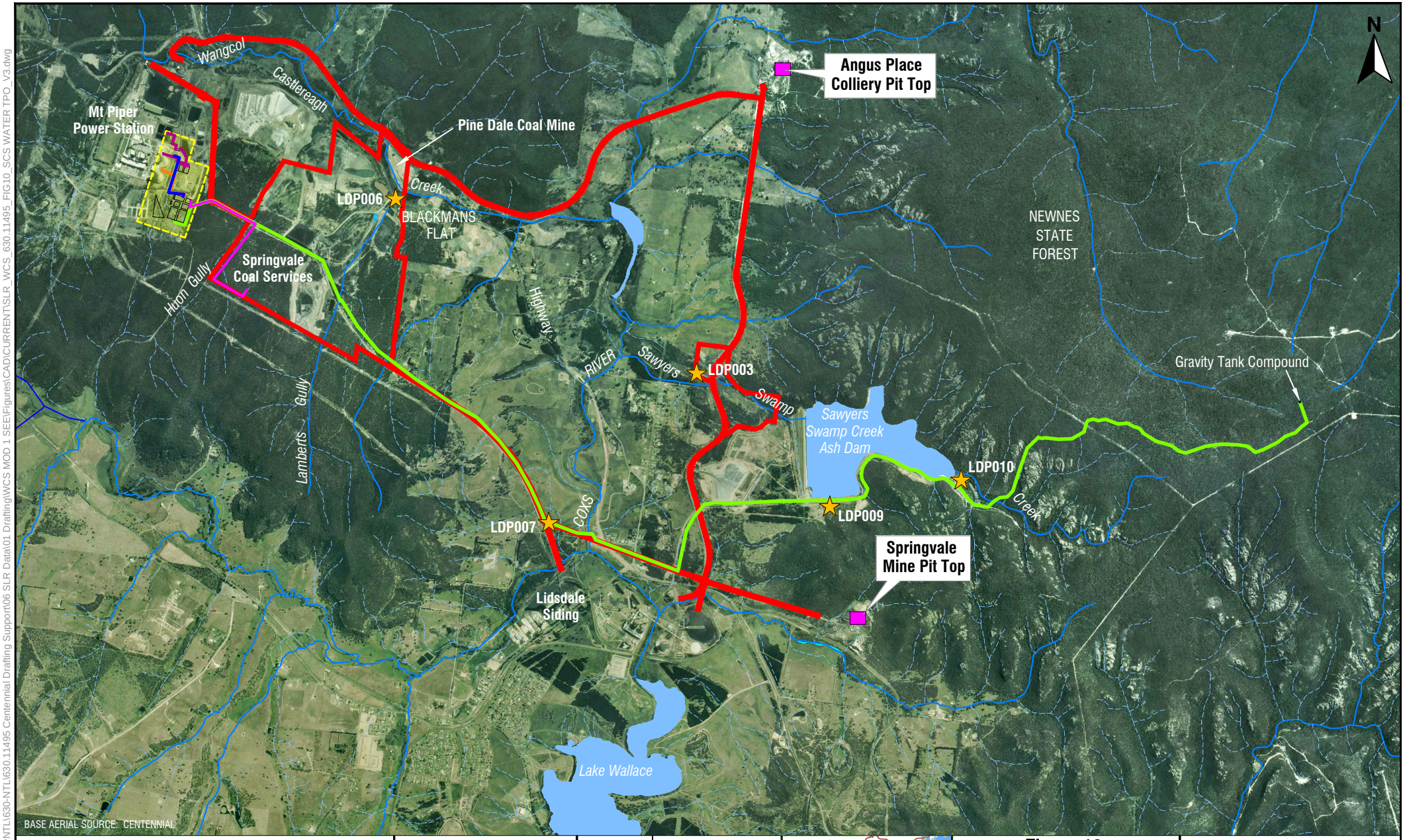
4.2.8 Surface Facilities and Infrastructure

4.2.8.1 Support Facilities

No changes to the existing mine support facilities and surface infrastructure are proposed due to the proposed modification.

4.2.8.2 Surface Infrastructure

As discussed in **Section 3.3.9.1** installation of clean water diversions have commenced at the SCSS, with the objective of promoting the capture and settlement of runoff from dirty catchments and to bypass clean water appropriately through site. The works are expected to reduce the clean water load from LDP006 and improve the quality of water discharged from the site to Wangcol Creek in both daily and rainfall discharge events.



LEGEND:

- Project Application Area
- Water Treatment Plant Site
- Licensed Discharge Point
- Watercourse - Non Perennial
- Watercourse - Perennial
- Water Treatment Plant Layout
- Brine Transfer Pipe
- Crystallised Salt transfer Pipelines
- Raw Water Transfer Pipeline
- Residuals Transfer Pipeline
- Treated Water Pipeline to Cooling Tower Forebay

DATE	11.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG10_SCS WATER TPO_V3.dwg
SCALE	1 : 4000

Figure 10
Springvale Water Treatment Project Overview

0 1.0 2.0 KM

Centennial Coal
Western Coal Services

Prepared by: SLR

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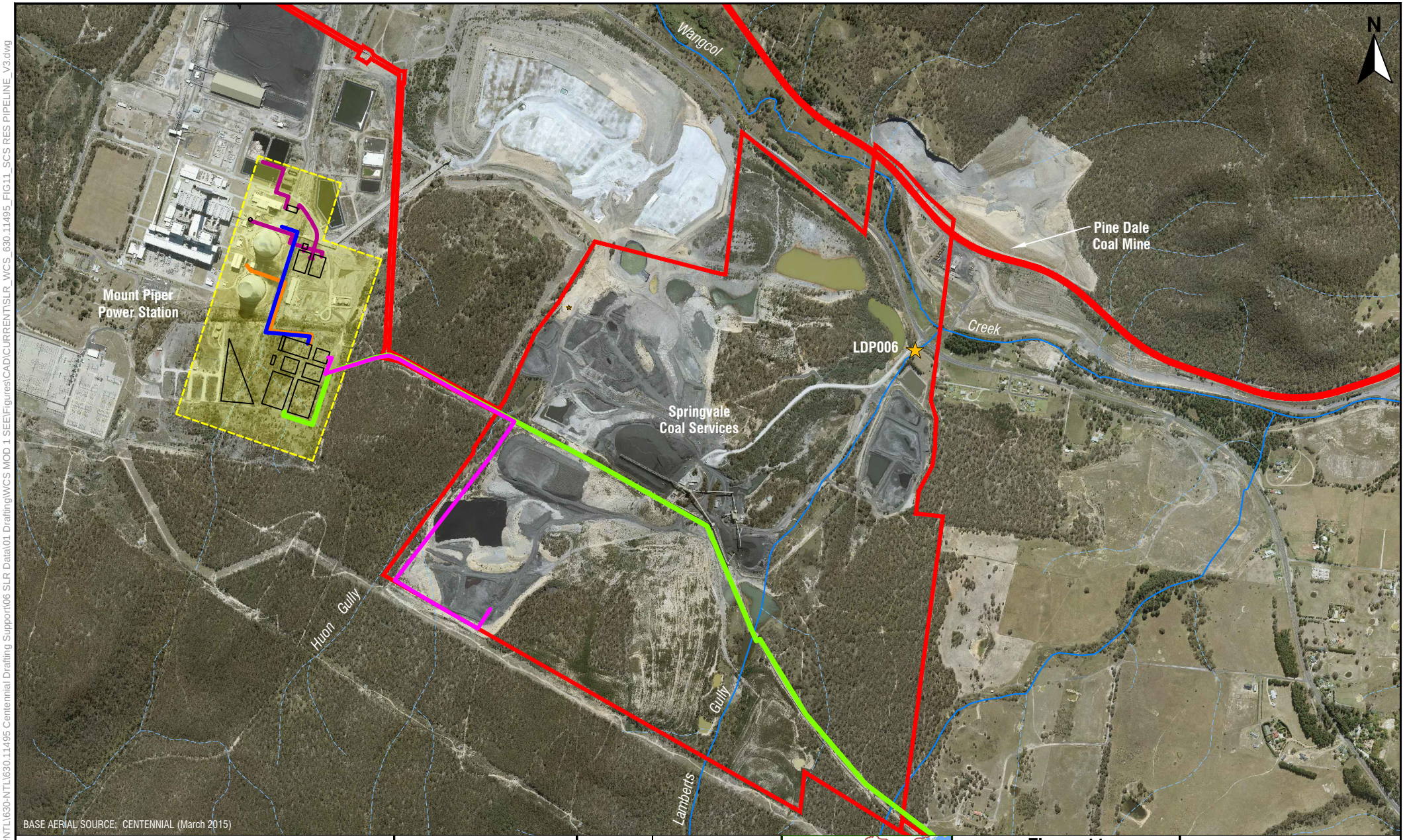

LEGEND:

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DATE	11.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG11_ SCS RES PIPELINE_V3.dwg
SCALE	1 : 4000

Figure 11
Residuals Transfer Pipeline at Springvale Coal Services Site

0 325 650 M

Centennial Coal
Western Coal Services

Prepared by: SLR

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No changes to the water management and pollution control infrastructure specifically in response to the proposed modification are required.

4.2.9 Surface Water Management

The Project will continue to manage surface water as currently undertaken. As the residuals material will be mostly water the transferred volume will be decanted from the REA and managed in accordance with the current water management practices at the SCSS.

4.2.10 Waste Management

No changes to the Project's current waste management practices are proposed.

4.3 Environmental Management

The Project will continue to undertake monitoring and reporting in accordance with the existing EMS as described in **Section 3.5**. The management plans will continue to be reviewed regularly and updated as required. Monitoring results will continue to be reported in accordance with the EPL 3607 / EPL467 requirements, and on an annual basis in an Annual Review.

The relevant WCS management plans will be updated within three months of the approval of the proposed modification as required by Schedule 5, Condition 5 of SSD 5579.

4.4 Rehabilitation and Final Landform

Progressive rehabilitation at the SCSS and the Kerosene Vale Stockpile Area will continue to be undertaken as outlined in the WCS MOP. Similarly, monitoring and maintenance of rehabilitated areas will continue to be undertaken as described in the MOP, and will be reported in the Annual Review.

4.4.1 Rehabilitation Strategy for the Western Coal Services Project

Given that Springvale WTP will construct the raw water and residual transfer pipelines within the Project Application Area boundary, there will be minor changes to the decommissioning and rehabilitation strategy included in the WCS EIS and further detailed in the WCS *Rehabilitation and Closure Plan.* It is noted that both the raw water and residual transfer pipelines will be fully trenched as described in **Section 4.2.7**.

The raw water pipeline will follow the alignment of the existing overland conveyor system (**Figure 11**) and falls within the primary rehabilitation Domain 7 – Haul Roads and Conveyor System identified in the WCS EIS and the WCS *Rehabilitation and Closure Plan* (**Table 5**). The residuals transfer pipeline will run along the western boundary and the south western boundary of the SCSS (**Figure 11**), and these areas fall within the primary rehabilitation Domain 2 – REA (**Table 5**).

The decommissioning of the raw water and the residuals pipelines will be undertaken by the Springvale WTP. The Springvale WTP EIS discusses and commits to the decommissioning of these pipelines, and rehabilitation works as required.

Progressive rehabilitation of the pipeline alignments, by the Springvale WTP, will be implemented following trenching of the pipelines and installation of sediment and erosion controls within the disturbed areas. This will involve filling in the trenches and application of top soil. Temporary vegetation cover will be established if required.

At the end of the Springvale WTP project life (when mining at Springvale Mine and Angus Place Colliery and power generation at MPPS cease) the trenched pipelines will not be removed, in order to avoid further disturbance, but will be capped at the ends and made safe. This will be undertaken in accordance with the relevant guidelines and practice in place at the time of closure. With the residuals transfer pipeline the above ground distribution header at the end of the open pipe within the REA, and any section of this pipeline above the ground surface at the SCSS, will be removed before the trenched section of the pipeline will be isolated.

There is no proposal in this modification to amend the nominated primary domains that the Springvale WTP pipeline areas fall in currently, namely Domain 2 – REA (residuals transfer pipeline) and Domain 7 – Haul Roads and Conveyor System (raw water pipeline), or any other rehabilitation domains within the Project Application Area.

The Project will undertake the decommissioning of its infrastructure as described in the WCS EIS. Rehabilitation of Domain 7 will be rehabilitated at the end of WCS project life, as was discussed in the WCS EIS.

The Domain 2 – REA was proposed to be rehabilitated progressively in the WCS EIS. This activity is not proposed to change and will continue to be undertaken progressively, and will not be impeded by the presence of trenched residuals transfer pipeline at the periphery of the REA on the west and southwest.

Schedule 3 Condition 26 of SSD 5579 relates to Additional Rehabilitation Initiatives for the Lamberts Gully Creek catchment at the SCSS, and requires the establishment and enhancement of locally endemic native vegetation species and improvement of fauna habitat values in the area (refer Appendix 7 of the SSD 5579 consent). The proposed modification will have no bearing on these Lamberts Gully Creek rehabilitation areas.

The rehabilitation of the entire REA to achieve the final landform will be completed after the 25 years of operations on cessation of coal handling and processing. The modification does not propose to change the timing of these rehabilitation works.

The Project's current MOP will not require to be updated in the current MOP period with respect to the proposed decommissioning and rehabilitation works relating to the Springvale WTP. The WCS *Rehabilitation and Closure Plan* will be updated when the Springvale WTP and the proposed modification are approved.

4.4.2 Final Landform and Land Use

The final landform planned for the SCSS in the WCS EIS and the *Rehabilitation and Closure Plan* is not proposed to change in this modification. The Domain 7 – Haul Roads and Conveyor System (raw water pipeline) will be rehabilitated to the nominated secondary domain of pasture (Domain B) and the Domain – 2 REA (residuals pipeline) will be rehabilitated to a final end use of Woodland or forest ecosystem (Domain A), as shown in **Figure 10**.

5.0 REGULATORY FRAMEWORK

5.1 Introduction

This chapter describes the applicable State and Commonwealth legislation under which the proposed modification will be assessed and determined. Full consideration of the environmental planning instruments has also been provided. The regulatory framework under which Western Coal Services Project was approved is described in Chapter 7 of the WCS EIS (RPS, 2013a) and discussed below as relevant.

5.2 Approval Pathway and Permissibility

State Significant development consent SSD 5579 was granted to the Western Coal Services Project under Part 4 Division 4.1 of the EP&A Act on 04 April 2014 by the Planning Assessment Commission of NSW, as delegate of the then Minister of Planning and Infrastructure. The SSD 5579 consent allows Springvale Coal to carry out operations until 30 June 2039 (**Appendix A**). .

The Project is classified as SSD pursuant to Section 89C of the EP&A Act and declared to be such by the *State and Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Clause 5(3) of Schedule 1 of the SRD SEPP identifies development for the purpose of mining related works that is ancillary to another SSD project or has a capital investment value of more than $30 million as SSD. The Project is not permissible without development consent under an environmental planning instrument (**Section 5.5**). The capital investment value of the Project was in excess of $30 million. As a result, pursuant to Clause 8(1) of the SRD SEPP, the Western Coal Services Project comprises SSD.

Springvale Coal is now proposing to modify its consent SSD 5579. SSD consents may be modified under Section 96 of the EP&A Act provided that the information stipulated in Clause 115 of the EP&A Regulation is contained within the modification application, and that the development as modified will be substantially the same development as the development for which consent was originally granted. This approval pathway is further discussed in **Section 5.3.1**. When assessing an application under Section 96 for modification to consent, the consent authority is required to take into consideration the relevant matters outlined in Section 79C of the EP&A Act, which include the provisions of any relevant environmental planning instruments. The environmental planning instruments relevant to the modification are discussed in **Section 5.4** and **Section 5.5**.

5.3 NSW State Legislation

5.3.1 Environmental Planning and Assessment Act 1979

Section 96 of the EP&A Act applies to modifications to Part 4 development consents generally, and includes provisions for modifications involving minor error, misdescription or miscalculation (Section 96(1) of EP&A Act)), and modifications involving minimal environmental impacts (Section 96(A) and other modifications (Section 96(2)).

Section 96(2) other modifications includes the following provisions:

> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*

(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and

(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 5) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and

(c) it has notified the application in accordance with:

(i) the regulations, if the regulations so require, or

(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and

(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.

The proposed modification for SSD 5579 described in this SEE is being made under Section 96(2) other modifications. Negligible to minimal predicted environmental impacts and consequences, described in **Chapter 7.0** result from the proposed modification elements. The approval pathway is appropriate as the proposed modification elements will necessitate only minor changes to the currently approved activities, and the modified development would be substantially the same development for which the consent was originally granted (**Section 9.2**).

An application for modification of development consent under Section 96 of the EP&A Act must contain information stipulated in Clause 115 of the EP&A Regulation. **Table 7** provides the relevant information for the proposed modification and notes where the information has been addressed in the SEE.

Table 7 – Clause 115 Requirements for Section 96 Applications

Requirement	Where Addressed in SEE
(a) The name and address of the applicant.	**Section 1.4**
(b) A description of the development to be carried out under the consent.	**Chapter 3.0**
(c) The address, and formal particulars of title, of the land on which the development is to be carried out.	**Table 1** and **Appendix C**
(d) A description of the proposed modification to the development consent.	**Section 4.2, Table 6**
(e) A statement that indicates either: (i) that the modification is merely intended to correct a minor error, misdescription or miscalculation, or (ii) that the modification is intended to have some other effect, as specified in the statement.	N/A **Chapter 7.0, Section 9.2** The modification will have minimal environmental impacts.
(f) A description of the expected impacts of the modification.	**Chapter 7.0**

Requirement	Where Addressed in SEE
(g) An undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved.	**Section 9.2** The development as modified will remain substantially the same as the development (Western Coal Services Project) that was originally approved in consent SSD 5579.
(h) If the applicant is not the owner of the land, a statement signed by the owner of the land to the effect that the owner consents to the making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner), (i) A statement as to whether the application is being made to the Court (under Section 96) or to the consent authority (under Section 96AA), and, if the consent authority so requires, must be in the form approved by that authority.	Landowner's consent is not required for SSD projects. Landowners will be notified of the application to modify consent SSD 5579 through an advertisement placed in the local newspaper following lodgement of modification application. The application is not being made to the Court (under Section 96) or to the consent authority (under Section 96AA).

Objects of the EP&A Act

The EP&A Act is the principal piece of legislation overseeing the assessment and determination of development proposals in NSW. It aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development.

The objects of the EP&A Act generally seek to promote management and conservation of natural and artificial resources, while also permitting appropriate development to occur. The principles of ecologically sustainable development and public participation are also objects of the EP&A Act. The consistency of the modification with the relevant objects is summarised in **Table 8**.

Table 8 – Objects of the EP&A Act

Object	Consistency of the Modification
(a) to encourage: *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*	GHD was engaged to assess and report on the potential for the modification to impact upon the water resources. The *Water Resources Impact Assessment* (GHD, 2016a) is attached as **Appendix D** and is discussed in **Chapter 7.0** of the SEE. This assessment assesses the impact of the modification on the natural resources and provides information on the proper management of the resources.
(ii) the promotion and co-ordination of the orderly and economic use and development of land,	The orderly and economic use of land is served by development which is permissible under the relevant planning regime and predominantly in accordance with the prevailing planning controls. The modification comprises a permissible development which is consistent with the statutory and strategic planning controls. The modification proposes a minor alteration to the operations of an existing operation which handles and processes coal from Springvale Mine (and in the future from Angus Place Colliery and Neubeck Coal Project) an approved coal mine which represents an orderly and economic use of a resource approved for extraction for supply to domestic power generation. The proposed modification will not impact on land uses within and

Object	Consistency of the Modification
	surrounding Project Application Area.
(iii) the protection, provision and co-ordination of communication and utility services,	The modification will not affect public communication networks or utilities.
(iv) the provision of land for public purposes,	Not applicable to the proposal.
(v) the provision and co-ordination of community services and facilities, and	Not applicable to the proposal.
(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	The proposed modification will not impact on threatened species, populations and ecological communities, and their habitats.
(vii) ecologically sustainable development, and	The Project is consistent with the principles of ecological sustainable development (ESD), as outlined in Section 11.3 of WCS EIS. The proposed modification is also consistent with the principles of ESD, discussed in detail in **Section 9.5**. The discussions included in **Section 9.5** address both this object of the EP&A Act and clause 7(1)f in Schedule 2 of the EP&A Regulation.
(viii) the provision and maintenance of affordable housing, and	Not applicable to the proposal.
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	The Western Coal Services Project is an SSD and its assessment and approval was subject to the provisions of Part 4 of the EP&A Act. Extensive consultation with many different levels of government (Federal, State, local) was undertaken during the preparation of the WCS EIS. The assessment process and determination again included consultation with different levels of government, including local government. The modification will be assessed and approved under Section 96(2) of the EP&A Act and the assessment process will be undertaken by the DPE in consultation with other relevant government agencies. The preparation of the SEE in support of the proposed modification has involved engagement with DPE. The proposal to transfer the residuals stream from the Springvale WTP to the REA at SCSS (and a need to modify SSD 5579 to receive the residuals by the Project) was discussed at a number of government agency consultation meetings for that project (**Section 6.3.1**).
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.	Extensive consultation with a wide range of stakeholder was undertaken during the preparation of the WCS EIS. The consultation has been ongoing since the grant of SSD 5579. The community was made aware of the proposed transfer of the residuals stream from the Springvale WTP to the SCSS to facilitate that project. This consultation was undertaken at a number of meetings discussed in **Section 6.3.3**. Community consultation will continue through Centennial Coal's Western Region Community Consultative Committee, and other community engagement tools. The community will have the opportunity to comment on the modification application during the public exhibition of the SEE.

Section 79C Evaluation

Section 79C of the EP&A Act applies to the determination of development applications for SSD. In determining an application for modification, the consent authority is required to consider the matters listed in Section 79C(1) of the EP&A Act as are of relevance to the development. Each of the relevant matters has been addressed in the SEE (**Section 5.4**, **Section 5.5**, **Chapter 7.0**) and will need to be considered by the consent authority during the assessment of the modification application.

Other Approvals

Pursuant to Section 89J of the EP&A Act, the following authorisations are not required for approved SSD proposals:

- The concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of the Act
- A permit under Section 201, 205 or 219 of the *Fisheries Management Act 1994*
- An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*
- An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*
- An authorisation referred to in Section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation or State protected land
- A bushfire safety authority under Section 100B of the *Rural Fires Act 1997*
- A water use approval under Section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*
- An order under Division 8 of Part 6 of the *Heritage Act 1977* restricting harm to buildings, works or relics that are not protected by a heritage listing.

Pursuant to Clause 89K of the EP&A Act, an authorisation of the following kind cannot be refused if it is necessary for carrying out an approved SSD proposal, and must be granted "substantially consistent" with the SSD consent:

- An aquaculture permit under Section 144 of the *Fisheries Management Act 1994*
- An approval under Section 15 of the *Mine Subsidence Compensation Act 1961*
- A mining lease under the *Mining Act 1992*
- A production lease under the *Petroleum (Onshore) Act 1991*
- An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in Section 43 of that Act);
- A consent under Section 138 of the *Roads Act 1993*
- A licence under the *Pipelines Act 1967*.

5.3.2 Other Key NSW State Legislation

The existing approvals relevant for Springvale Mine operations are described in **Section 3.2**. **Table 9** lists the key relevant pieces of NSW State legislation and indicates the implications, if any, for the modification.

Table 9 – Other Key NSW State Legislation

Relevant State Legislative Act	Project Implications (approvals, licences and/or authorities)
Protection of the Environment Operations Act 1997	The POEO Act is the principal environmental protection legislation in NSW and is administered by the EPA. The Act regulates waste generation and disposal, and water, air and noise pollution in NSW. Under the POEO Act, an EPL is required for any premises at which a scheduled activity, as defined in Schedule 1 of the Act, is conducted. Clause 10 of Schedule 1 includes 'Coal works, meaning any activity (other than coke production) that involves storing, loading or handling coal (whether at any coal loader, conveyor, washery or reject dump or elsewhere) at an existing coal mine or on a separate coal industry site [where] it has a capacity to handle more than 500 tonnes per day of coal, or it has capacity to store more than 5,000 tonnes of coal (not including within a closed container or building)'. The Western Coal Services Project is a premises-based "scheduled activity" and currently operates under the provisions of EPL 3607 and EPL 467 (**Table 3**). EPL 3607 for Springvale Mine (held by Springvale Coal Pty Limited) covers the mining operations, surface facilities, overland conveyors and the SCSS and eight licensed discharge points (LDP001, LDP002, LDP004 – LD007, LDP009, LDP010) for water discharge off site. EPL 467 for Angus Place Colliery (held by Centennial Angus Place Pty Limited) covers the mining operation, surface facilities, road haulage of coal, Kerosene Stockpile Area and three licensed discharge points (LDP001 – LDP003). EPL 3607 allows discharge of water in the Project via LDP006 located at SCSS and via LDP007 from the overland conveyor system. EPL 467 allows discharge of water in the Project via LDP003 located at the Kerosene Vale Stockpile Area.
Mining Act 1992	The Western Coal Services Project holds mining leases (**Table 4**) granted under the *Mining Act 1992*. A Mining Operations Plan, for the period 23 December 2015 to 31 October 2022, has been prepared to outline proposed operations and rehabilitation approved under development consent SSD 5579. The MOP has been prepared in accordance with the Department of Industry – Division of Resources and Energy publication titled *ESG3: Mining Operations Plan (MOP) Guidelines* (DRE, 2013). The MOP was approved on 23 December 2015. The MOP has also been prepared to satisfy the requirements of a *Rehabilitation Management Plan*, required by Schedule 3, Condition 45 of SSD 5579.
Water Act 1912	The *Water Act 1912* (Water Act) governs access, trading and allocation of licences associated with surface water and groundwater sources where a Water Sharing Plan is not in place. As Water Sharing Plans ((WSP) have been developed for the Project Application Area, the Water Act no longer applies. The Project holds groundwater monitoring bore licences (**Table 3**) for eight boreholes (10BL605382 (for 4 bores), 10BL605349, 10BL605348, 10BL605347, 10BL605346) granted under the Water Act.
Water Management Act 2000	The *Water Management Act 2000* (WM Act) is intended to ensure that water resources are conserved and properly managed for sustainable use benefitting both present and future generations. WSPs prepared in accordance with the WM Act include rules for protecting the environment and administrating water licensing and trading. The following two WSPs made under Section 50 of the WM Act are relevant to the Project: • *Greater Metropolitan Region Groundwater Source 2011* • *Greater Metropolitan Region Unregulated River Water Sources 2011* For groundwater, the Project is located within the *Greater Metropolitan Region Groundwater Source* WSP. This WSP covers 13 groundwater sources on the east coast of NSW. The Project is located within the Sydney Basin Coxs River Groundwater Source.

Relevant State Legislative Act	Project Implications (approvals, licences and/or authorities)
	For surface water, the Project is located within the *Greater Metropolitan Region Unregulated River Water Sources* WSP. This WSP covers six water sources which are made up of a total of 87 management zones. The Project is located within the Wywandy Management Zone of the Upper Nepean and Upstream Warragamba Water Source. The Project will seek a water access licence for the transfer of mine water from the Springvale Mine to the SCSS and the Lidsdale Siding, along the existing overland conveyor approved in SSD 5579 , when required. The proposed modification will not require any water access licences under the above-noted WSPs.
Work Health and Safety (Mines and Petroleum Sites) Act 2013	*Work Health and Safety (Mines and Petroleum Sites) Act 2013* aims to securing and promoting the health and safety of persons at work at mines, petroleum sites or related places, and to protect workers at mines and petroleum sites and other persons against harm to their health and safety through the elimination or minimisation of risks arising from work. Springvale Coal currently holds all necessary approvals for the Project under the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.
Mine Subsidence Compensation Act 1961	The Project Application Area is not located within a Mine Subsidence District. The modification will not require approval by the Mine Subsidence Board given no significant surface improvements are proposed.
Dams Safety Act 1978	The Project Application Area does not include any prescribed dams. The modification does not propose any underground mining or surface disturbance on or in the vicinity of any dams prescribed under the *Dam Safety Act 1978*.
Crown Lands Act 1989	There is Crown land within the Project Application Area. However, no operations are undertaken within the Crown Land or proposed in the modification. No licence is required for the modification to use Crown Land under the provisions of the *Crown Lands Act 1989*.
Roads Act 1993	Section 138 of the *Roads Act 1993* requires consent be obtained prior to disturbing or undertaking work in, on or over a public road. The Project will require an approval under Section 138 of the Roads Act prior to the construction of the private Link Haul Road, which will cross Castlereagh Highway. However, no additional approval under the Roads Act will be required due to the proposed modification given that no disturbance or works on public roads within the Project Application Area are proposed.
Threatened Species Conservation Act 1995	The *Threatened Species and Conservation Act* (TSC Act) provides protection for threatened plants and animals native to NSW (excluding fish and marine vegetation) and integrates the conservation of threatened species into development control processes under the EP&A Act. A terrestrial ecological impact assessment was prepared for the WCS EIS (RPS, 2013b). The assessment had concluded the Project was unlikely to significantly impact on threatened species, population or ecological community or their habitat listed under the TSC Act. The proposed modification is not proposing any vegetation clearing, therefore will not impact any protected entities under the TSC Act.
National Parks and Wildlife Act 1974	The *National Parks and Wildlife Act 1974* (NPW Act) contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage. Under the NPW Act, it is an offence to harm Aboriginal objects or places unless authorised by an Aboriginal Heritage Impact Permit (AHIP) issued under section 90 of the NPW Act. By operation of Section 89J of the EP&A Act, the Project does not require any additional approvals, including an AHIP, under the NPW Act.
Heritage Act 1977	Historical archaeological relics, buildings, structures, archaeological deposits and

Relevant State Legislative Act	Project Implications (approvals, licences and/or authorities)
	features are protected under the *Heritage Act 1977* (Heritage Act). The Project's cultural heritage impact assessment (RPS, 2013c) concluded there are no heritage items in the Project Application Area within the World Heritage List, National Heritage Database, NSW State Heritage Place Inventory. Lithgow LEP 1994, Draft Lithgow LEP 2013. In any event, approval is not required under Part 4 of the *Heritage Act 1977* due to the operation of Section 89J of the EP&A Act. The proposed modification is not proposing any land disturbance and will therefore not impact any heritage items protected under the Heritage Act.
Contaminated Land Management Act 1997	The *Contaminated Land Management Act1997* establishes a process for the investigation and remediation of contaminated land. The relevance of this legislation to the proposed modification is outlined in **Section 5.4.5**.
Forestry Act 2012	The Project Application Area includes the Ben Bullen State Forest land within the SCSS, however, Springvale Coal does not hold Occupation Permits for the land under the *Forestry Act 2012* for that land. The overland conveyor traverses the Ben Bullen State Forest land. While no occupation permit exists the conveyor corridor is covered by MPL314. No surface disturbance activities are proposed on any State Forest land in the proposed modification.

5.4 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) are Environmental Planning Instruments (EPIs) prepared by the Minister to address issues significant to NSW. The SEPPs outlined in the below sub-sections contain provisions that are relevant to the proposed modification, and therefore are matters to be taken into consideration by the consent authority.

5.4.1 SEPP (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) came into effect upon the repeal of Part 3A of the EP&A Act and identifies development to which the SSD assessment and determination process under Division 4.1 in Part 4 of the EP&A Act applies. The Western Coal Services Project is classified as SSD pursuant to Section 89C of the EP&A Act and declared to be such by the *SEPP (State and Regional Development) 2011* (SRD SEPP). Clause 5(3) of Schedule 1 of the SRD SEPP identifies development for the purpose of mining related works that is ancillary to another SSD project or has a capital investment value of more than $30 million as SSD. The Project is not permissible without development consent under an environmental planning instrument (**Section 5.5**). The capital investment value of the Project was in excess of $30 million. As a result, pursuant to Clause 8(1) of the SRD SEPP, the Western Coal Services Project comprises SSD.

5.4.2 SEPP (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of NSW. **Section 5.5** discusses the permissibility of the Project due to the application of sub-clauses 7(1)(d) and 5(3) of the Mining SEPP.

Under Clause 7(1)(d) of the Mining SEPP, facilities for the processing or transportation of minerals or mineral bearing ores on certain land are permissible with development consent. The transport and

processing of minerals, in this case coal, is permissible under the Mining SEPP because coal from the Springvale Mine Extension Project (SSD 5594) is processed at the SCSS.

5.4.3 SEPP (Sydney Drinking Water Catchment) 2011

State Environmental Planning Policy (*Sydney Drinking Water Catchment*) *2011* applies to land within the Sydney drinking water catchment. The Project Application Area is partly located within the Sydney drinking water catchment.

The aims of SEPP (Sydney Drinking Water Catchment) 2011 are:

(a) to provide for healthy water catchments that will deliver high quality water while permitting development that is compatible with that goal

(b) to provide that a consent authority must not grant consent to a proposed development unless it is satisfied that the proposed development will have a neutral or beneficial effect on water quality, and

(c) to support the maintenance or achievement of the water quality objectives for the Sydney drinking water catchment.

Clause 9(1) of this SEPP provides that any development or activity proposed to be carried out on land within the Sydney drinking water catchment should incorporate the Water NSW's current recommended practices and standards. Clause 10(1) requires a development under Part 4 of the EP&A Act to demonstrate a neutral or beneficial effect on water quality.

The proposed modification can be considered to be of no benefit in terms of salt discharged to the receiving environment, and minor benefit in terms of dissolved constituent concentrations contributing via LDP006. Whilst there is a predicted increase in electrical conductivity locally within Wangcol Creek, the transfer of the residuals to the REA at SCSS is required to facilitate the Springvale WTP. The benefits of the Springvale WTP provide a regional benefit to the water quality downstream to Lake Burragorang. The likely influence of the residuals on the chemistry of water contributing to Wangcol Creek is unlikely to result in change (given the similarities to existing quality) of the current receiving environment health with these risks being minimal when compared to the overall benefit to the catchment provided by the Springvale WTP.

5.4.4 SEPP No. 55 – Remediation of Land

SEPP No. 55 – Remediation of Land (SEPP 55) provides for a state-wide planning approach to the remediation of contaminated land in order to reduce the risk to human health or any other aspect of the environment.

Clause 7(1) of SEPP 55 provides that a consent authority must not consent to the carrying out of any development on land unless:

- It has considered whether the land is contaminated
- If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
- If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

Further, Clause 7(2) of SEPP 55 provides that before determining an application for consent to carry out development that would involve a "change of use" in respect of certain land specified in clause 7(4) of SEPP 55, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines (being the 1998 publication *Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land*).

Centennial Coal undertook a contaminated site assessment across majority of its sites in accordance with the *Contaminated Land Management Act 1997* to determine whether any site triggered the Duty to Report criteria. A three phase approach was adopted as follows:

- Phase 1 Environmental Site Assessment (ESA) – desk top assessment completed in December 2010
- Phase 2 ESA – intrusive sampling and analysis programme, completed in February 2012
- Phase 3 ESA – implementation of remediation plans.

In the case of Western Coal Services Project, a Phase 1 ESA was undertaken in April 2013 by Aecom, and included with the EIS. The Phase 1 ESA concluded that past and current use of the site have resulted in potential soil, sediment and surface water contamination, and potentially groundwater impact in some areas of the site, however, no significant contamination was identified. In accordance with the schedule provided by Centennial Coal to the EPA in a letter dated 2 February 2012, the EIS committed to the completion of a Phase 2 ESA by February 2015 for the Project deemed a low risk site.

The Kerosene Vale Stockpile Validation Report (HLA – Envirosciences, February 2007) and its subsequent review by NSW DECC accredited Site Auditor Ross McFarland (Site Auditor No.9819). validated the condition of the land at the site and demonstrates that a diesel spill that was reported to have taken place in a certain area of the site has been remediated.

The overland conveyor and the existing haul roads operate under an established EMS that has been developed in accordance with the Centennial EMS Framework. The EMS has been developed and implemented to ensure the effective management of environmental issues and compliance with all regulatory requirements.

A Phase 2 ESA was undertaken by AECOM in 2014. The Phase 2 ESA included drilling soil boreholes, collection and testing of sediment and the collection testing of water samples from LDP006 and Wangcol Creek. Based on the AECOM findings the site is suitable for ongoing commercial/industrial land use. A targeted Phase 3 Assessment and remediation would be required at mine closure, with some possible remediation around the area of the workshop at Western Coal Services and the stowage area at Kerosene Vale Stockpile .

With the continued implementation of best management practices for hydrocarbons, as well as effective implementation of the approved environmental management plans and work health and safety management systems, the potential for contamination and associated issues remains low for the Project.

5.4.5 SEPP No. 44 – Koala Habitat Protection

SEPP No. 44 – Koala Habitat Protection provides for the protection of koala habitat by ensuring that areas subject to development proposals are considered for their value as habitat or potential habitat for koalas. The Greater Lithgow LGA (now Lithgow City LGA) is listed under Schedule 1 of SEPP No. 44 as an area to which this SEPP applies.

The *Ecology Impact Assessment* (RPS, 2013b) undertaken to support the WCS EIS concluded the SCSSs does not constitute Potential Koala Habitat and hence no further provisions of the policy applied to the Project. No Koalas or evidence of Koalas were recorded during surveys. Given the nature of the Project and likelihood of impacts on habitat, it was considered unlikely that impacts to the Koala would result. The modification will not result in any impacts to the Koala.

5.4.6 SEPP No. 33 – Hazardous and Offensive Development

SEPP No. 33 - Hazardous and Offensive Development (SEPP 33) regulates, amongst other things, the determination of development applications to carry out what is defined in SEPP 33 as development for the purposes of a "potentially hazardous industry" or "potentially offensive industry". With the continued implementation of best management practices for chemicals used at the Project's infrastructure sites as well as effective implementation of the approved EMS and occupation health and safety management systems, the proposed modification would not pose any significant risk, in relation to its locality, to human health, life or property or to the biophysical environment over and above that currently approved in the Project.

The proposed modification elements would not result in the emission of a polluting discharge in a manner which would have a significant adverse impact in its locality or on the existing or likely future development on other land.

On the above bases, the proposed modification is not considered to comprise a "potentially hazardous industry" or a "potentially offensive industry" within the meaning of these expressions in SEPP 33. Therefore a preliminary hazard analysis was not prepared as required by Clause 12 of SEPP 33 and nor does Clause 13 of SEPP 33 apply to the consent authority's determination of the modification.

5.5 Lithgow Local Environmental Plan 2014

Local Environmental Plans (LEPs) are instruments that guide planning decisions for Local Government Areas (LGAs) and allow Councils to manage the ways in which land is used through zoning and development consents. The *Lithgow Local Environmental Plan 2014* (Lithgow LEP 2014) was gazetted on 19 December 2014, after development application for SSD 5579 had been submitted on 29 July 2013.

The aim of the Lithgow LEP 2014 is to make local environmental planning provisions for land in Lithgow in accordance with the relevant standard environmental planning instrument under Section 33A of the EP&A Act. In particular, the aims of the Lithgow LEP 2014 include the encouragement of sustainable and planned development that complements the unique character and amenity of Lithgow, and to provide for a range of development opportunities that contribute to the social, economic and environmental resources of Lithgow through the implementation of the principles of ecologically sustainable development.

The land use zonings of the Project Application Area pursuant to the Lithgow LEP 2014, as illustrated on **Figure 4**, are:

- RU1 Primary Production
- RU3 Forestry
- SP2 Infrastructure
- IN1 General Industrial.

The objectives of Zone RU1 Primary Production are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- To encourage diversity in primary industry enterprises and systems appropriate for the area
- To minimise the fragmentation and alienation of resource lands
- To minimise conflict between land uses within this zone and land uses within adjoining zones
- To minimise the environmental and visual impact of development on the rural landscape
- To provide for recreational and tourist development and activities of an appropriate type and scale that do not detract from the economic resource, environmental or conservation value of the land
- To maintain or improve the water quality of receiving water catchments

The objectives of Zone RU3 Forestry are:

- To enable development for forestry purposes
- To enable other development that is compatible with forestry land uses.

The objectives of Zone SP2 Infrastructure are:

- To provide for infrastructure and related uses
- To prevent development that is not compatible with or that may detract from the provision of infrastructure
- To maintain or improve the water quality of receiving water catchments.

The objectives of Zone IN1 General Industrial are:

- To provide a wide range of industrial and warehouse land uses
- To encourage employment opportunities
- To minimise any adverse effect of industry on other land uses
- To support and protect industrial land for industrial uses
- To maintain or improve the water quality of receiving water catchments.

Development for the purposes of “open cut mining” is permissible with development consent under the Lithgow LEP 2014 within Zone RU1 Primary Production and Zone RU3 Forestry. Mining is prohibited within Zone SP2 Infrastructure and Zone IN1 General Industrial. Notwithstanding, it is noted Clause 1.8A ‘Savings provision relating to development applications’ of Lithgow LEP 2014 states:

> *“If a development application has been made before the commencement of this Plan in relation to land to which this Plan applies and the application has not been finally determined before that commencement, the application must be determined as if this Plan had not commenced.”*

The development application was made on 29 July 2013 and determined on 04 April 2014, before the commencement of the Lithgow LEP 2014 on 19 December 2014.

Furthermore, Sub-clause 7(1)(d) of the Mining SEPP (**Section 5.4.2**) states that development for the purposes of processing or transportation of minerals or mineral bearing ores on certain land are permissible with development consent. The transport and processing of minerals, in this case coal, is permissible under the Mining SEPP because coal from the Springvale Mine Extension Project (SSD 5594) is processed at the SCSS. In relation to any inconsistency between the Mining SEPP and an LEP, Clause 5(3) of Mining SEPP provides that the Mining SEPP prevails to the extent of the inconsistency. On this basis, any provision in the Lithgow LEP 2014 that would otherwise operate to prohibit the Project has no effect, and accordingly, the Western Coal Services Project is permissible with development consent on the land in which the Project will be carried out that is within the Lithgow LGA.

5.6 Other Considerations

5.6.1 Lithgow Land Use Strategy 2010 – 2030

Lithgow City Council's *Lithgow Land Use Strategy 2010-2030* (LLUS) was adopted by Council on 31 October 2011 and endorsed by the NSW Department of Planning and Infrastructure on 24 May 2012.

The LLUS is a combined *Land Use Issues Paper and Strategy*. It explores the issues that currently face the Lithgow LGA and recommends a new planning approach to address these issues. The Strategy will be implemented through the planning system, primarily through the Lithgow LEP 2014 and Development Control Plan, as well as Council's other policy, regulatory and governance functions. This Strategy is significant to Council and the community because it will set directions and policy for the LGA's settlement and land use management for the next 20 years. The Strategy will be reviewed throughout this period every five years to ensure that its findings and recommendations remain relevant, are in keeping with sound planning principle and are continuing to meet the needs and expectations of the community.

5.6.2 Water Sharing Plans

Water Sharing Plans (WSP) prepared in accordance with the *Water Management Act 2000* include rules for protecting the environment, extractions, managing licence holders' water accounts, and water trading within defined areas and specified water sources. The WSPs provide the basis for equitable sharing of surface water and groundwater between water users, including the environment.

The following two WSPs made under Section 50 of the WM Act are relevant to the Project:

- Greater Metropolitan Region Groundwater Source 2011
- Greater Metropolitan Region Unregulated River Water Sources 2011.

For groundwater, the Project is located within the Greater Metropolitan Region Groundwater Source WSP. This WSP covers 13 groundwater sources on the east coast of NSW. The Project is located within the Sydney Basin Coxs River Groundwater Source.

For surface water, the Project is located within the Greater Metropolitan Region Unregulated River Water Sources WSP. This WSP covers six water sources which are made up of a total of 87 management zones. The Project is located within the Wywandy Management Zone of the Upper Nepean and Upstream Warragamba Water Source.

There is no direct extraction of surface water or groundwater from either WSP by the Project as approved. The Project will seek a water access licence for the transfer of mine water from the

Springvale Mine to the SCSS and the Lidsdale Siding, along the existing overland conveyor, when required.

The proposed modification will not result in any take of surface or groundwater and will not require any water access licences under the above-noted WSPs.

5.6.3 Strategic Regional Land Use Policy

The NSW Government's *Strategic Regional Land Use Policy* (DP&I, 2012) was introduced in September 2012 and sets out a range of initiatives to better balance growth in the mining industry with the need to protect agricultural land and water resources. The Policy includes a package of measures including the following key elements:

- The preparation of Strategic Regional Land Use Plans (SRLUPs) for both the Upper Hunter and the New England North West regions of NSW which identify and map Strategic Agricultural Land (SAL) and Critical Industry Clusters (equine and viticulture land uses) within these areas
- The introduction of the NSW Aquifer Interference Policy (**Section 5.6.4**)
- The requirement for Agricultural Impact Statements to accompany SSD applications for mining projects that have the potential to affect agricultural resources.

The proposed key policy response for resolving land use conflict between mining and coal seam gas proposals and agricultural land is a 'gateway process'. Under this process, a panel of independent experts would assess proposals involving mining or coal seam gas development on mapped SAL at an early stage before the lodgement of a development application. The outcome of the 'gateway process' would be that the proposal either meets the gateway criteria relating to agricultural and water impacts, or the proposal does not meet the criteria and therefore stringent requirements will be imposed that must be addressed at the development application stage. The 'gateway process' has commenced.

The existing SRLUPs do not apply to the Project Application Area. Notwithstanding, matters relating to soil landscapes, land use impacts, land capability and agricultural suitability had been addressed within the WCS EIS. There is currently no agricultural production or forestry within the SCSSs no Strategic Land in accordance with the *Strategic Regional Land Use Policy*.

5.6.4 NSW Aquifer Interference Policy

The *NSW Aquifer Interference Policy* (AIP) (DPI, 2012) is a key component of the NSW Government's *Strategic Regional Land Use Policy*. The AIP clarifies the water licensing and approval requirements for aquifer interference activities, including the taking of water from an aquifer in the course of carrying out mining, and defines the considerations for assessing potential impacts to key water-dependent assets.

The AIP indicates that where mining results in the loss of water from an overlying source that is covered by a Water Sharing Plan, a water access licence is required under the *Water Management Act 2000* to account for this take of water. According to the AIP, proponents of a mining project seeking development consent under Part 4 of the EP&A Act must provide estimates of all quantities of water likely to be taken from any water source during and following cessation of the activity and all predicted impacts associated with the activity. No water will be taken from any water source due to the proposed modification.

The AIP requires that potential impacts on groundwater sources, including their users and Groundwater Dependent Ecosystems (GDE), be assessed against minimal impact considerations. If

the predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable. The Project Application Area does not include any GDEs (RPS, 2013a,c). Hence, there are no potential impacts on groundwater sources, groundwater users and GDEs due to the proposed modification.

No aquifer interference activities are predicted as a result of the modification. No pressure head decline would occur as a result of the modification, and no change in the groundwater quality which would lower the beneficial use of the groundwater (as agricultural or industrial water) is predicted.

5.7 Commonwealth Legislation

5.7.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment (DoE), and provides a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as matters of 'national environmental significance' (MNES). An action that "*has, will have or is likely to have a significant impact on a matter of National Environmental Significance*" may not be undertaken without prior approval from the Commonwealth Environment Minister, as provided under Part 9 of the EPBC Act. Approval under the EPBC Act is also required where actions are proposed on, or will affect, Commonwealth land and its environment.

The EPBC Act identifies MNES as:

- World heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- Nuclear actions (including uranium mining)
- Great Barrier Reef Marine Park
- A water resource in relation to coal seam gas development and large coal mining development.

Potential impacts on any MNES are subject to assessments of significance pursuant to the EPBC Act *Significant Impact Guidelines 1.1* (DoE, 2013a). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister.

The *Significant Impact Guidelines 1.3* (DoE, 2013b) includes general criteria for whether an action is likely to have a significant impact on water resources, which are for the possibility for direct or indirect changes to:

- The hydrology of a water resource
- The water quality of a water resource.

According to the *Significant Impact Guidelines for Coal Seam Gas and Large Coal Mines 1.3* (DoE, 2013b), the value of the water resource needs to be confirmed such that impacts from actions can be evaluated on their significance. The guidelines indicate that key factors for evaluating a water resource's value include its utility for all third party users. Third party user categories specific to the proposed modification include:

- Provisioning services (e.g. use by other industries and use as drinking water)
- Cultural services (e.g. recreation and tourism, science and education)
- Supporting services (e.g. maintenance of ecosystem function).

If evidence can be provided that proposed actions would not materially affect the availability and quality for third party users, then the likelihood of an action having a significant impact would be reduced (DoE, 2013b).

The proposed modification has the potential to impact on a water resource and the identified third party users. A *Water Resources Impact Assessment* (GHD, 2016a) appended as **Appendix D** and discussed in **Chapter 7.0** of this SEE was undertaken. GHD (2016a) includes an assessment of the proposed modification against the *Significant Impact Guidelines for Coal Seam Gas and Large Coal Mines 1.3* (DoE, 2013b). This assessment concluded the modification would not, nor be likely to, have a significant impact on water resources in the catchment or the identified third part users. Therefore a referral under the EPBC Act is not required.

5.7.2 Native Title Act 1993

The *Native Title Act 1993* recognises that Aboriginal people have rights and interests to land which derives from their traditional laws and customs. Native title rights can include rights to: live on the land, access the land for traditional purposes, protect important places and sites, collect food and medicinal resources from native plants, hunt and fish, teach traditional law and customs, and to have input into land use practices and development planning. Where it is proposed to carry out an act which may affect the exercise of native title rights it is necessary to validate this act under the 'future act' validation procedures set out in the Act. The applicable validation procedures depend on the nature of the future act. One way a future act can be validated is through an Indigenous Land Use Agreement (ILUA).

An ILUA is an agreement between a native title group and other parties who use or manage the land and waters. The ILUA process allows for negotiation between indigenous groups and other parties over the use and management of land and water resources, and the ability to establish a formal agreement. An ILUA is binding once it has been registered on the Native Title Tribunal's Register of Indigenous Land Use Agreements.

The proposed modification will not trigger a new mining lease application as all required mining leases are in place. Two mining lease applications (MLA497, MLA498) submitted are not subject to native title claims.

6.0 STAKEHOLDER ENGAGEMENT

6.1 Introduction

This chapter provides information on consultation undertaken with stakeholders with respect of the proposed modification.

6.2 Western Coal Services Stakeholder Engagement Strategy

Springvale Coal has an ongoing consultation strategy with all stakeholders, identified in the *Western Coal* Services *Stakeholder Management Plan* (WCS SEP). The WCS SEP provides a framework to identify and appropriately consult with stakeholders that may be influenced by or have an interest in the Project's operations. The WCS SEP identifies the following groups as the Project's stakeholders:

- Local community
- Indigenous stakeholders
- Non-government organisations
- Government (Local, State, Commonwealth)
- Forestry Corporation of NSW (FCNSW)
- Springvale Coal workforce and workforce at other Centennial Coal operations
- EnergyAustralia.

The WCS SEP is underpinned by Centennial Coal's Environment and Community Management Standards which set out the minimum requirements for effective consultation and engagement with all stakeholders. The WCS SEP requires consultation with stakeholders on proposed modifications to the consent SSD 5579.

Springvale Coal is committed to the timely, orderly, consistent and credible dissemination of appropriate information within the constraints of legal and regulatory requirements to all interested stakeholders. To date, no major complaints have been received on the Project from the community.

6.3 Consultation for the Modification

6.3.1 Consultation with Government

Department of Planning and Environment

A letter was sent to DPE on 21 September 2016 to advise DPE of Springvale Coal's intention to modify the Project's consent SSD 5579. The letter included a description of the modification elements, the proposed approval pathway for the modification, and the technical assessments proposed to be undertaken for the preparation of the SEE supporting the modification application. DPE provided a response to the letter on 11 October 2016 (**Appendix B**) to confirm (i) that Section 96(2) of the EP&A Act was the applicable approval pathway for the modification application, and (ii) that the Department considered the proposed assessment approaches were reasonable, however, noted that the modification application should also assess impacts on the surface water and discuss any changes to the rehabilitation strategy.

On 26 September 2016 Centennial Coal and Energy Australia representatives met with DPE to discuss the Springvale WTP. The timing of the submission of the WCS modification application and the possible timeline for SEE exhibition and the assessment process were discussed at the meeting.

Consultation with Government as Part of the Springvale Water Treatment Project

The modification is proposed to address primarily the operational interactions of the Springvale WTP with the Western Coal Services Project, specifically to allow the Project to receive and emplace within its REA at the SCSS residuals stream from the water treatment plant proposed in the Springvale WTP.

The *Preliminary Environmental Assessment* (PEA) of the Springvale WTP was submitted to DPE on 05 April 2016 to request for the Secretary's Environmental Assessment requirements and the environmental assessment requirements of the relevant government agencies. The project description included in the PEA described the proposals (i) to install water and by-product transfer pipelines in areas which overlap with the WCS Project Application Area, and (ii) to transfer residuals material stream from the water treatment plant to the REA at the SCSS. The PEA noted that, in order for the Project to receive residuals material, the consent SSD 5579 will require to be modified. The PEA was made available to the relevant government agencies (EPA, OEH, RMS, DPI, WaterNSW, DRE, LCC) and other stakeholders (FCNSW) by the DPE to request for their inputs to the SEARs.

Discussions on the Springvale WTP elements, including the proposed transfer of the residuals material to the Project, were discussed at a number of meetings with government agencies, summarized in **Table 10**. At these meetings the need to modify the Project's consent SSD 5579 to allow receipt of the residuals material by the Project were noted.

Table 10 – Summary of Government Consultation

Date	Consultation Type and Participating Government Agencies	Purpose
18 February 2016	Briefing Meeting with DPE	To introduce the Springvale WTP and the project elements.
17 March 2016	Springvale WTP definition and planning pathway meeting with DPE	To discuss the ongoing development of the Springvale WTP, and the relevant planning pathway for the development application.
03 May 2016	Government agency briefing and site visit with DPE, EPA, LCC, WaterNSW	To provide an overview of the Springvale WTP elements, alternatives investigated, and procurement process being undertaken concurrently with the EIS. Site visit included a visit to the SCSS and the new REA where the emplacement of the residuals will take place.
17 June 2016	Update meeting with DPE	To provide DP&E with an update on the status of Springvale WTP EIS preparation and overall progress in delivery of that project.
22 June 2016	Meeting with EPA, DPE and WaterNSW	To present the initial water impact assessment modelling results, and to specifically discuss the modelling approach and the achievement of NorBE at the catchment level.
14 July 2016	Meeting with FCNSW	To provide an overview of the Springvale WTP elements and access agreements.
20 July 2016	Meeting with LCC	To provide an update on the status of the EIS preparation and overall progress in delivery of the Springvale WTP.

The EIS for the Springvale WTP supporting the State Significant Development 7592 application included discussions on the modification to the Western Coal Services Project required to receive residuals stream from the Springvale WTP. The EIS for the Springvale WTP was on exhibition from 27 September to 08 November 2016.

6.3.2 Consultation with EnergyAustralia

Centennial Coal has a well-established and long standing working relationship with EnergyAustralia. Regular meetings are held to discuss coal supply, property matters and transfers, water supply and project related matters.

Since September 2015 Centennial Coal and Energy Australia have been developing the Springvale WTP designed to meet Springvale Mine's consent condition relating to achieving specified water quality criteria. Consultation with EnergyAustralia on the Springvale WTP has been undertaken at all levels – project development, water treatment alternatives, EIS preparation, and procurement. Consultation with EnergyAustralia will be ongoing on matters relating to Springvale WTP, and approval and relevant operational matters relating to Centennial's operations which have interactions with the Springvale WTP, including the proposed modification of the Western Coal Services Project's consent SSD 5579.

6.3.3 Consultation with Community

As noted above, Springvale Coal has ongoing consultation with the local community. Meetings are held on a regular basis with the Centennial Western Region Community Consultative Committee (CCC). The CCC includes five community representatives and LCC representatives. At the CCC meeting of 14 April 2016 the Springvale WTP was discussed and its interactions with the operations at SCSS due to the proposed transfer of residuals from the water treatment plant to the SCSS REA.

On 30 June 2016 EnergyAustralia briefed the Pinedale Coal Mine CCC Meeting on the Springvale WTP background and the project components.

At the Community Information Session held on 20 July 2016 in Lithgow for the Springvale WTP, the community was given an opportunity to discuss that project's elements, including the transfer of the residuals material from the proposed water treatment plant to the SCSS REA, the environmental assessments undertaken and outcomes. This Community Information Session was advertised:

- In Lithgow Mercury on 09 July 2916
- In The Village Voice for weeks commencing 04 July and 11 July 2016
- On Lithgow 2790 Facebook webpage.

The broader community will be notified of the proposed modification through an advertisement placed in the local newspaper (Lithgow Mercury) following lodgment of the modification application. The local community will also be asked to take part in the modification assessment process through the public exhibition process, whereby the community will be invited to make formal submissions on the modification.

6.4 Future Consultation

Consultation with the community and other stakeholders will continue to ensure the community remains informed of the Project's operations and the outcomes of the modification application.

7.0 ASSESSMENT AND MANAGEMENT OF WATER RESOURCES

7.1 Introduction

A Water Resources Impact Assessment (WRIA) for the modification was prepared by GHD Pty Ltd, *Western Coal Services Project Modification 1: Water Resources Impact Assessment* (GHD 2016a), which is provided in full in **Appendix D**. The WRIA includes *Springvale Coal Services: Hydrogeological Model Report – 2016 Update* (GHD, 2016d) and *Springvale Coal Services: Site Water and Salt Balance Assessment* (GHD, 2016e).

The WRIA included:

- A water and salt balance assessment to determine changes in the SCSS water and salt cycle
- An assessment of the stream health of Wangcol Creek in reference to its geomorphological condition and aquatic ecology
- A surface water quality assessment of current existing conditions in order to establish baseline water quality for Wangcol Creek upstream and downstream of the SCSS, and for site storages and the LDP006 discharge
- A groundwater quality assessment of existing conditions in order to establish baseline groundwater quality at the SCSS
- A description of the proposed changes to water management at the SCSS, and a prediction of the water quality of the residual stream from the Water Treatment Plant from the Springvale WTP
- Predictions of the potential impacts of the modification on the surface water and groundwater environments and on the stream health of Wangcol Creek
- Water quality impact assessment on local and regional levels and impact on the stream health (geomorphology and aquatic ecology)
- Potential impact on the downstream surface water users
- Description of measures to avoid, mitigate and manage potential impacts to surface water and groundwater and the framework of monitoring programs required for the modification.

A broad brush, desktop-level risk assessment for the modification identified the above aspects to be undertaken to broadly assess the potential environmental risks that may arise as a result of the proposed modification. The risk assessment did not identify other technical assessments to be undertaken for the proposed modification elements.

7.2 Study Area

The study area primarily encompasses the existing facilities and infrastructure at the SCSS. The WRIA also considered impacts on surface water and groundwater environments that extend beyond the study area within the Coxs River catchment.

The sensitive receptors for the WRIA are discussed in **Section 2.11**.

7.3 Assessment Methodology

7.3.1 Site Water and Salt Balance Assessment

A *Site Water and Salt Balance Assessment* (GHD, 2016e) was undertaken to quantify the water and salt budgets, including inflows, outflows and net change in storage, in relation to the water management system at SCSS. A site water and salt balance was previously developed in GoldSim (Version 11.1) for SCSS. For the purposes of assessing the impacts of the proposed residuals transfer from the Springvale WTP to the SCSS REA the water and salt balance model was updated, and the results for the proposed impact of the transfer is included in the WRIA (GHD, 2016a).

The water management system for SCSS was modelled for the following scenarios:

- Existing conditions, represent the current operations at SCSS
- Future conditions, following the construction of clean water diversions at the SCSS (**Section 3.3.9**)
- Proposed conditions, where the inputs from the transfer of residuals stream from the Springvale WTP to the new REA at the SCSS (**Section 4.2.7**), are accounted for in the site water and salt balance.

The GoldSim model was created by representing the water and salt cycle as a series of elements, each containing pre-set rules and data, that were linked together to simulate the interaction of these elements within the water and salt cycle. The water management system was simulated over time in the model and selected outputs from the model were statistically summarised.

To assess the impact of rainfall on the site, modelling was completed using a historical time series of daily rainfall data extending over 127 years, from January 1889 to December 2015. A total of 127 simulations were applied with each simulation modelling a different rainfall pattern.

The salt balance was developed as an extension of the water balance model, with expected concentrations of salt applied to water inflows to the system. Transfers of the resulting salt loads were modelled throughout the site. The mass and concentration of salt within particular storages was established such that a mass balance was achieved after allowing for salt discharged via extraction and overflows.

The regional water and salt balance from GHD (2016b) was updated to consider the regional influence of the modification on the water resources such as Coxs River and the reservoirs of Lake Wallace, Lake Lyell and Lake Burragorang.

7.3.2 Surface Water Quality

A surface water quality assessment was undertaken for the existing site conditions in order to establish baseline water quality for receiving watercourses. This water quality assessment was undertaken in accordance with the assessment framework and methodologies outlined by ANZECC (2000).

The surface water quality assessment considered data from 14 monitoring locations, shown in Figure 4-1 and details provided in Table 4-1 of GHD (2016a) appended as **Appendix D**. The monitoring locations were categorised into the following:

- Upstream locations – upstream of the SCSS within the Wangcol Creek catchment

- SCSS locations – surface water storages at the SCSS and the LDP006 discharge
- Downstream locations – downstream of the SCSS on Wangcol Creek.

Surface water quality data was compared to the default guideline values (DGVs) as recommended by ANZECC (2000) and the site-specific guideline values (SSGVs) derived for Wangcol Creek (GHD 2014). Water quality at LDP006 was also compared to the EPL discharge limits for the SCSS at LDP006.

A summary of the three ecotoxicology assessments that have been conducted on the LDP006 discharge was also provided in the Springvale WTP (GHD, 2016b,c) based on investigations reported in GHD (2016g).

7.3.3 Groundwater

The hydrogeology at the SCSS has been modelled (GHD, 2016c) to establish groundwater flow paths and predict seepage into and from surface water storages at the site. A review of the baseline groundwater level and quality data was undertaken using data reported by SCSS.

7.3.4 Stream Health

Stream health of Wangcol Creek was previously assessed as part of the Springvale WTP (GHD 2016b,h), which included a desktop assessment for aquatic ecology and a geomorphologic review. These studies have been considered with a specific focus on the potential impacts on the water quality and volume of the LDP006 discharge from the transfer of the residuals stream to the REA.

7.3.5 Residuals Stream Water Quality

The predicted water quality of the residuals stream was assessed based on results of jar testing performed by Hunter Water and the limiting maximum transfer of residual of 0.43 ML/day, as reported in GHD (2016f).

GHD have also undertaken water quality testing of mine water pre- and post-dosing with ferric chloride, in order to provide a better indication of the likely mobility of metals in the residual stream. These samples were collected from the Centennial Newstan Water Treatment Plant on 23 September 2016, and analysed by the NATA accredited Eurofins|MGT laboratory in Sydney. The results from this testing were used to predict the potential impact of the dissolved fraction of the proposed residual stream on the quality of water discharged at LDP006.

7.3.6 Downstream Water Users

The potential impacts of the modification on licensed surface water users and basic landholder rights under the *Water Management Act 2000* were assessed by identifying the downstream users within the potential area of impact. The potential area of impact was estimated conservatively based on the results of the assessments on water and salt balance, catchment hydrology and hydraulics, waterway geomorphology, surface water quality and groundwater environment.

Licensed surface water users and domestic and stock rights users with a water supply work approval were identified by searching for all lots within the potential area of impact in the NSW Water Register. Groundwater users were identified by searching the NSW groundwater bore database for registered groundwater bores.

7.4 Existing Environment

7.4.1 Overview of the Surface Water Management at SCSS

An overview of the existing water management at the SCSS is provided in **Section 3.3.9**. The objective of the water management system is to generally secure supply for coal washing and dust suppression and to control the quantity and quality of water discharged into Wangcol Creek via LDP006.

Discharges from Cooks Dam and the Retention Dam at SCSS occur to Wangcol Creek via LDP006. LDP006 monitors discharges from the SCSS as well as the contribution of catchment runoff to Lamberts Gully, and hence discharge volumes become elevated following rainfall events. Discharge volumes from the SCSS are on average 1.29 ML/day which is predominately from the contribution of groundwater to Cooks Dam.

As noted in **Section 3.3.9** and above SCSS is currently undertaking design and construction works relating to the separation and optimisation of clean and dirty surface water flow paths within the Lamberts Gully catchment. These works will reduce the clean water load from LDP006 and improve the quality of water discharged from the site in both daily and rainfall discharge events. It is expected the volume of clean water that infiltrates into the groundwater and subsequently reports to LDP006 will also reduce. The primary objective is to promote the capture and settlement of runoff from disturbed and rehabilitated catchments and to bypass clean water appropriately through site, away from its contribution to LDP006.

The site water and balance results below are presented for both the existing condition and the future conditions, resulting from the proposed clean diversion works. It is noted that the modelling of the existing conditions are based on monitoring data acquired to date at the SCSS whereas the future conditions are modelling predictions which will be validated in the future when the clean water diversions have been installed and monitoring data have been acquired.

7.4.2 Site Water and Salt Balance

The *Water and Salt Balance Assessment* for the SCSS (GHD, 2016d) is provided as an appendix to the WRIA (GHD, 2016a). Outputs of the water and salt balance model were compared to the available discharge and EC data for LDP006 to provide an indication of the validity of the representation of existing conditions in the model. The following sections below provide summaries of the existing and future condition predictions from the modelling undertaken for annual average water and salt transfers.

7.4.2.1 Water Balance Results

Table 11 presents the key information from the water balance model in the form of average annual water transfers under existing and future conditions, prior to the transfer of the residual materials stream to the new REA.

Table 11 – Annual Average Water Transfers for Existing and Future Conditions

Inputs/Outputs	Existing Conditions (ML/year)	Future Conditions (ML/year)
Inputs		
Direct rainfall	137	163
Catchment runoff	743	743
ROM coal moisture	108	108
Flocculant makeup	11	11
Seepage into Cooks Dam	1095	1095
Water Treatment Plant residuals	0	0
Total Inputs	**2094**	**2003**
Outputs		
Evaporation	201	243
Dust suppression	32	35
Product coal moisture	100	100
Coarse coal rejects moisture	11	11
Discharge through LDP006	848	441
Discharge via clean water diversion	0	350
Seepage into groundwater system	831	752
Retained in REA	71	71
Total Outputs	**2094**	**2003**
Change in storage		
Total change in storage	0	0
Balance	0	0

7.4.2.2 Salt Balance Results

Table 12 presents the key from the salt balance model in the form of average annual salt transfers under existing and future conditions, prior to the transfer of the residual stream to the new REA.

Table 12 – Annual Average Salt Transfers for Existing and Future Conditions

Inputs/Outputs	Existing Conditions (tonne/year)	Future Conditions (tonne/year)
Inputs		
Direct rainfall	3	3
Catchment runoff	433	445
ROM coal moisture	82	82
Flocculant makeup	1	1

Inputs/Outputs	Existing Conditions (tonne/year)	Future Conditions (tonne/year)
Seepage into Cooks Dam	2935	2622
Water Treatment Plant residuals	0	0
Total Inputs	**3454**	**3153**
Outputs		
Evaporation	0	0
Dust suppression	15	15
Product coal moisture	226	226
Coarse coal rejects moisture	25	25
Discharge through LDP006	1517	1107
Discharge via clean water diversion	0	152
Seepage into groundwater system	1498	1466
Retained in REA	172	162
Total Outputs	**3454**	**3153**
Change in storage		
Total change in storage	0	0
Balance	0	0

Water balance modelling indicated (**Table 11**) that, under the existing conditions, the average annual discharge from LDP006, the licensed discharge point at the SCSS, was 848 ML. This discharge accounts for approximately 831 ML of surface water that has migrated into the groundwater system via historical workings. Discharges via LDP006 contribute approximately 1517 tonnes of salt to Wangcol Creek per year under existing conditions (**Table 12**).

For future conditions the water and salt balance modelling indicated that the average annual discharge from LDP006 reduced from existing conditions to 441 ML (approximately 48% reduction in flow volume). Salt load also reduced due to the diversion of clean water away from LDP006 with a reduction from existing conditions down to 1107 tonnes per year (approximately 27% reduction in salt load via LDP006).

7.4.3 Surface Water Quality

Water quality in the Wangcol and Neubecks Creek catchments upstream of the SCSS shows evidence of impacts from historical landuse, as salinities were shown to be slightly elevated for an upland creek. Numerous exceedances of the ANZECC (2000) DGVs have been noted for total nitrogen and total phosphorous concentrations. Regular exceedances of the relevant DGVs were also observed for aluminium and zinc ions.

Surface storages at the SCSS generally exhibit elevated salinities and metal concentrations due to water reuse at the site. Of the metals, elevated concentrations of nickel and zinc ions in particular have been observed, which are common water quality indicators associated with historical coal mine workings.

The LDP006 discharge is moderately saline, and salinity has been shown to be gradually increasing over time. In contrast to the surface water in Wangcol Creek upstream of the discharge, LDP006 exhibits low nutrient concentrations, however, dissolved concentrations of the metals boron, iron, manganese, nickel and zinc are generally high. The impact of the discharge on Wangcol Creek is evident in the salinities and metal concentrations of the downstream sites, however significant dilution is observed in Wangcol Creek, far downstream from LDP006.

Toxicity testing on discharges from LDP006 have been conducted in May 2011, July 2012 and May 2016, details of which are provided in Sections 4.3.2 and 5.3.4 of GHD (2016a) attached as **Appendix D**. Summaries of these tests are provided below.

- The discharge sampled from LDP006 in May 2011 was toxic to the cladoceran, alga and duckweed bioassays. The cladoceran was shown to be the most sensitive to the discharge from LDP006. The rainbowfish and the shrimp tests showed no toxicity to the discharge.
- The results of the toxicity testing conducted in July 2012 indicated that the LDP006 discharge was less toxic to the cladoceran than the sample collected in May 2011.
- The results of the toxicity testing on samples collected in May 2016 indicated that the LDP006 discharge was toxic to the cladoceran, alga and duckweed species. The fish and the shrimp tests showed no toxicity to the discharge, similar to that observed in May 2011.

In conclusion the LDP006 discharge has been shown by ecotoxicology assessments to be toxic to the cladoceran, microalga and duckweed bioassays. Use of the BurrliOZ 2.0 software package (CSIRO, 2014) indicated that significant dilution of the discharge would be required to attain the species protection levels as prescribed in ANZECC (2000).

7.4.4 Groundwater Environment

Groundwater at the SCSS is monitored monthly. The groundwater environment consists of a shallow and a deep aquifer. The shallow aquifer is comprised of a material historically mined as part of both underground and open cut workings throughout the SCSS. The deep aquifer is defined as the groundwater within and below the Shoalhaven geology group.

The hydrogeology model report for the SCSS (GHD, 2016d) indicated that seepage from the main REA is possible due to the elevated position of the REA on the SCSS and the lack of any low permeability lining. Modelled groundwater contours indicate that groundwater generally flows to the northeast, following the dip in the regional strata, whereas groundwater contours developed using the observed groundwater monitoring data indicate a general west to east hydraulic gradient.

Historical mining within the SCSS and the surrounding areas has had a long-term influence on groundwater quality. The groundwater environment specific to the SCSS is dominated by geochemical influences of the seams that have been exposed. Much of the historical open cut workings have been backfilled with overburden material, with some existing remnant voids being utilised as REAs and potential landfill areas.

A statistical summary of the groundwater quality at 8 boreholes at the SCSS indicated a variable groundwater quality with elevated concentrations of sulfate, iron, manganese, nickel and zinc ions, which are typical indicators for the water quality of the historical workings.

It should be noted that groundwater is reused in washing of coal at the SCSS. It is likely that through the reuse of groundwater, concentrations of some parameters have increased in concentration as coal reject materials is emplaced and some water from the washing process re-enters the groundwater.

No GDEs were identified as part of the WCS EIS (RPS, 2013a) for the SCSS.

7.4.5 Stream Health

Downstream of LDP006, Wangcol Creek exhibits four different watercourse types. The headwaters of tributaries to Wangcol Creek largely drain forested catchments, however, the middle and lower reaches have been disturbed by mining and agricultural practices. The channel is highly modified downstream of LDP006, having been diverted through excavation into in situ soil or bedrock materials as well as being bounded by overburden and/or reject coal materials in sections. Despite this, the channel is generally stable and the subject reach of Wangcol Creek is considered to be in moderate to poor geomorphic condition.

The existing condition of the aquatic ecology of Wangcol Creek was assessed within the *Aquatic Ecology Impact Assessment* (GHD, 2016h) for the Springvale WTP and is summarised below.

GHD (2016h) described Wangcol Creek as an ephemeral stream which is highly degraded due to past land-use activities. Minimal instream habitat remains within the creek, with evidence suggesting that the monitoring site WC2, a site approximately 500 m downstream from the LDP006 location (shown in Figure 4-1 of GHD (2016a)), is the most degraded. This site is located within the mixing zone of the LDP006 discharge.

Macroinvertebrate sampling of four sites, WCUp, WC1, WC2, WC3 (marked in Figure 4-1 in GHD (2016a)) distributed along Wangcol Creek over the past four years has indicated significant variation. Recent sampling found more taxa in the two upstream (WCUp, WC1) and the furthest downstream site WC3. Results indicate that site WC2 has the lowest level of macroinvertebrate diversity. Signs of recovery in terms of habitat condition and macroinvertebrate diversity were noted at site WC3, a site located approximately 2 km downstream from LDP006 at the confluence of Wangcol Creek and Coxs River.

The vegetation health of Wangcol Creek was determined to be of a moderate level, with some degradation and incompleteness in riparian vegetation extent. Historical sampling of the site has found that the health of Wangcol Creek has improved with bank stabilisation works. Previous development and current mining land uses have degraded some reaches of Wangcol Creek.

7.5 Impact Assessment

7.5.1 Proposed Water Management

The proposed changes comprise the implementation of the residuals transfer system within the new REA. A detailed water cycle schematic of the Springvale WTP is provided in GHD (2016b), where the residuals stream is identified as the management of a by-product volume from the pre-treatment process. The pre-treatment process involves solids removal via a lamella clarifier. Clarified water will then be directed to the water treatment process with residuals (thickened solids) transferred to the REA at SCSS.

As noted in **Section 4.2.7**, the residuals transfer system is proposed to facilitate the Springvale WTP, and it is noted that:

- The residuals transfer pipeline from the water treatment plant at the MPPS to the REA at the SCSS will be terminated as an open end pipe arranged as a distribution header which will allow the water to discharge at multiple points with low velocity and low volumetric flow to avoid localised erosion within the REA

- The maximum transfer rate to the REA of the residuals stream, comprising both the regular pre-treatment clarification process and the three-monthly clean-in-place residuals from the reverse osmosis membrane cleaning (approximately 10 kL), will be 0.43 ML/day. The volume of the clean in place residuals material is minor in comparison with the standard pre-clarifications residuals.

The sections below assess the impacts of the proposed emplacement of the residuals material stream within the new REA at the SCSS, the impacts on the local surface and groundwater environments and the downstream receiving environment.

7.5.2 Predicted Residuals Stream Water Quality

The assumed chemical properties of the residuals material stream (regular pre-treatment clarification process) have been calculated based on jar testing performed by Hunter Water (GHD, 2016f). The required dosing rate of ferric chloride was assumed to be 90 mg/L (as $FeCl_3$) for an average flow of 30 ML/day and 50th percentile Total Suspended Solids (TSS) of 46 mg/L, and 180 mg/L for the maximum flow of 36 ML/day (as proposed in the Springvale WTP) with a TSS of 721 mg/L. It is important to note that these dosing rates were based on jar tests undertaken on a sample of raw mine water taken from a single dewatering bore, and therefore may not accurately represent the mine water to be supplied to the Springvale WTP's water treatment plant from the SDWTS, which handles water from both Springvale Mine and Angus Place Colliery.

Table 13 provides the EC, the pH, the TSS and total metals concentrations of the raw mine water used for the jar tests, and those predicted for the thickened residual stream based on the aforementioned dosing rates. These jar testing results are considered conservative as the assessment assumes that the pre-treatment process captures all of the constituents listed, whereas in practice some of these constituents will pass through to the reverse osmosis process. **Table 13** also provides the EC and pH data for the Springvale LDP009 discharges, noting these parameters are more representative of the raw mine water that will be transferred to the Springvale WTP.

Table 13 – Assumed Residuals Material Stream Properties Based on Jar Tests

Analyte	Unit	Raw Mine Water		Residuals Stream	
		50%ile	Maximum	50%ile	Maximum
EC at 25°C	µS/cm	[1]1167	[1]1310	[2]1170	2500
pH (20th%tile-80th%tile range)	pH unit	[1]7.81 – 7.97	[1]8.28	7.81 – 7.97	[3]6.5 – 8.5
TSS	mg/L	46.21	721	3224.0	60362.7
Aluminium (total)	mg/L	0.4	1.57	27.9	131.4
Arsenic (total)	mg/L	0.04	0.07	2.79	5.86
Cadmium (total)	mg/L	0.0002	0.0002	0.014	0.017
Copper (total)	mg/L	0.002	0.006	0.14	0.50
Cobalt (total)	mg/L	0.002	0.002	0.14	0.17
Nickel (total)	mg/L	0.005	0.008	0.35	0.67
Zinc (total)	mg/L	0.02	0.07	1.4	5.9
Iron (total)	mg/L	1.26	2.22	2251.8	5379.1
Boron (total)	mg/L	0.08	0.12	5.6	10.0

Analyte	Unit	Raw Mine Water		Residuals Stream	
		50%ile	Maximum	50%ile	Maximum
Manganese (total)	mg/L	0.02	0.07	1.4	5.9
Lead (total)	mg/L	0.001	0.001	0.07	0.08
Mercury (total)	mg/L	0.0001	0.0001	0.007	0.008
Chromium (total)	mg/L	0.002	0.002	0.14	0.17
Selenium (total)	mg/L	0.01	0.01	0.7	0.8
Total solids	kg/day	-	-	2316.8	28189.1

Note 1: EC and pH data from LDP009 (SDWTS) discharges.

Note 2: Based on the makeup of the water that would form the residuals, the EC is expected to be equal to or less than the median raw water EC. This outcome however is to be confirmed during the commissioning phase of the Springvale WTP.

Note 3: Maximum pH required to be within the range provided.

A comparison has been made between the measured water quality properties of residuals material stream from Centennial Coal's Newstan Colliery Water Treatment Plant (reverse osmosis water treatment) and the predicted residuals material properties (**Table 13**) expected from the water treatment plant proposed in the Springvale WTP. **Table 14** shows the results for the water quality samples taken at the Centennial Newstan Water Treatment Plant on 23 September 2016.

Table 14 – Raw Mine Water and Residuals Material Stream Quality at Newstan Water Treatment Plant

Analyte	Unit	Raw Mine Water Supply to Newstan Water Treatment Plant	Newstan Residual Stream
Physicochemical parameters			
pH	pH unit	8.4	8.2
EC at 25 C	µS/cm	2400	2500
Anions			
Chloride	mg/L	380	400
Sulfate	mg/L	100	99
Total alkalinity as $CaCO_3$	mg/L	740	780
Cations			
Calcium	mg/L	29	31
Magnesium	mg/L	11	11
Potassium	mg/L	5.5	5.1
Sodium	mg/L	450	470
Dissolved Metals			
Aluminium	mg/L	<0.05	0.46

Analyte	Unit	Raw Mine Water Supply to Newstan Water Treatment Plant	Newstan Residual Stream
Arsenic	mg/L	<0.001	<0.001
Barium	mg/L	0.23	0.19
Boron	mg/L	0.16	0.17
Cadmium	mg/L	<0.0002	<0.0002
Chromium	mg/L	<0.001	<0.001
Cobalt	mg/L	<0.001	<0.001
Copper	mg/L	0.002	<0.001
Iron	mg/L	<0.05	<0.05
Lead	mg/L	0.001	<0.001
Manganese	mg/L	0.048	0.075
Nickel	mg/L	0.007	0.008
Selenium	mg/L	<0.001	<0.001
Zinc	mg/L	<0.005	<0.005
Total Metals			
Aluminium	mg/L	0.12	0.75
Arsenic	mg/L	0.001	0.01
Barium	mg/L	0.24	0.74
Boron	mg/L	0.18	0.2
Cadmium	mg/L	<0.0002	<0.0002
Chromium	mg/L	<0.001	0.018
Cobalt	mg/L	<0.001	0.002
Copper	mg/L	0.003	0.008
Iron	mg/L	0.24	89
Lead	mg/L	0.003	0.016
Manganese	mg/L	0.078	0.34
Nickel	mg/L	0.007	0.012
Selenium	mg/L	<0.001	<0.001
Zinc	mg/L	0.006	0.037

A comparison of the 50th percentile raw mine water condition used for the Springvale WTP jar tests (**Table 13**) and the raw water supply to the Newstan Water Treatment Plant (**Table 14**) indicates that, in terms of total metals concentrations, the former has:

- Comparable concentrations of cadmium, chromium, cobalt, copper, lead and nickel

- Higher concentrations of aluminium, arsenic, iron, selenium and zinc
- Lower concentrations of boron and manganese.

A comparison of the dissolved and total metals concentrations of the Newstan residuals material stream indicates that ferric chloride dosing is effectively removing arsenic, chromium, cobalt, copper, iron, lead and zinc from solution, as the total concentrations of these metals all exceeded the dissolved concentrations, which were below the laboratory Limit of Reporting (LOR). This same comparison shows that a proportion of the total aluminium, barium, boron, manganese and nickel concentrations remains in solution following dosing, indicating the possibility of the residuals transfer to the REA impacting upon concentrations of these metals in the groundwater at SCSS.

The risk of exceeding the DGV for aluminium (ANZECC 2000) at LDP006 is slightly increased by the transfer of residuals material to the REA, as a significant proportion of the total concentration is shown to remain in solution, at a concentration which exceeds the DGV of 0.055 mg/L. It is also possible that the raw mine water that will be received by the proposed water treatment plant will have higher concentrations of aluminium, as indicated by the jar testing results. This would also increase the risk of exceeding the DGV for aluminium at LDP006.

Of the other metals shown to have observable dissolved concentrations following ferric chloride dosing, there are only DGVs/SSGVs for manganese and nickel. The predicted concentrations of these metals in the residuals are predicted to be lower than those of the present day LDP006 discharge. As such, the residual is predicted to dilute the concentrations of these metals as it reports to LDP006.

From the review of the results obtained from the Newstan Colliery WTP case study it is clear that for parameters such as pH and EC that little variance is observed between the raw water feed from Newstan underground and the residuals material stream generated at their water treatment plant. This should be noted when Newstan Colliery WTP results are compared with the results of the Hunter Water jar testing undertaken for the Springvale WTP and used in the residuals impact assessment for this modification. The Hunter Water jar tests (**Table 13**) show there is at least a two-fold increase in EC (2500 µS/cm) from the raw mine water EC (1170 µS/cm). As discussed below (**Section 7.5.3.2**) it is unlikely that pre-clarification process in the water treatment plant will result in large increase in the EC of the residuals.

7.5.3 Site Water and Salt Balance

The water and salt balance model for the SCSS, which was developed based on existing conditions, was modified to predict the impacts of the residual transfer to the REA at a rate of 0.43 ML/day and an EC of 2500 µS/cm, as per GHD (2016f) and the assumed maximum salinity from the jar testing undertaken by Hunter Water, noted above.

7.5.3.1 Water Balance Results

Table 15 presents the key information from the water balance model in the form of average annual water transfers under existing and future conditions, and the proposed conditions i.e. the transfer of residuals to the REA at SCSS.

Table 15 – Predicted Annual Average Water Transfers for Existing, Future and Proposed Conditions

Input/Outputs	Existing Conditions (ML/year)	Future Conditions (ML/year)	Proposed Conditions (ML/year)
Inputs			
Direct rainfall	137	163	169
Catchment runoff	743	743	743
ROM coal moisture	108	108	108
Flocculant makeup	11	11	11
Seepage into Cooks Dam	1095	978	1109
Water Treatment Plant residuals	0.0	0.0	157
Total Inputs	**2094**	**2003**	**2298**
Outputs			
Evaporation	201	243	253
Dust suppression	32	35	35
Product coal moisture	100	100	100
Coarse coal rejects moisture	11	11	11
Discharge through LDP006	848	441	570
Discharge via clean water diversion	0	350	350
Seepage into groundwater system	831	752	909
Retained in REA	71	71	71
Total Outputs	**2094**	**2003**	**2297**
Change in storage			
Total change in storage	0	0	0
Balance	0	0	0

Data in **Table 15** shows, discharges through LDP006 are predicted to decrease under the future conditions from the existing conditions due to the construction of the clean water diversions. For future conditions the modelling indicated that the average annual discharge from LDP006 reduced from existing conditions to 441 ML (approximately 48% reduction in flow volume).

Modelling of the proposed conditions predicted that the annual input of 157 ML of Springvale WTP residuals material stream to the system would result in an average annual discharge from LDP006 of 570 ML, which is an increase from the modelled future conditions (29%), however is a decrease from the existing conditions by 278 ML/year or approximately 33%.

7.5.3.2 Salt Balance Results

Table 16 presents the results from the salt balance model in the form of average annual salt transfers under existing and future condition, and the proposed conditions, with the latter representing the

transfer of residuals to the REA. Again, the inclusion of existing and future conditions was provided for comparative purposes.

Table 16 – Predicted Annual Average Salt Transfers for Existing, Future and Proposed Conditions

Inputs/Outputs	Existing conditions (tonne/year)	Future conditions (tonne/year)	Proposed conditions (tonne/year)
Inputs			
Direct rainfall	3	3	3
Catchment runoff	433	445	441
ROM coal moisture	82	82	82
Flocculant makeup	1	1	1
Seepage into Cooks Dam	2935	2622	2971
Water Treatment Plant residuals	0	0	264
Total Inputs	**3454**	**3153**	**3763**
Outputs			
Evaporation	0	0	0
Dust suppression	15	15	15
Product coal moisture	226	226	227
Coarse coal rejects moisture	25	25	25
Discharge through LDP006	1517	1107	1444
Discharge via clean water diversion	0	152	152
Seepage into groundwater system	1498	1466	1769
Retained in REA	172	162	130
Total Outputs	**3454**	**3153**	**3762**
Change in storage			
Total change in storage	0	0	0
Balance	0	0	0

The total input of salinity to the SCSS is predicted to increase due to the emplacement of residuals to the REA. The most notable changes to salt outputs under the proposed conditions are in the:

- Discharge through LDP006, which is shown to increase from the future conditions, though remain below the existing conditions
- Seepage into the historical mine workings, for which a slight increase from the existing and future conditions is predicted.

It is important to note that the water and salt balance modelling was performed assuming the maximum predicted salinity of the residuals material (2500 µS/cm) provided by Hunter Water from their jar testing test. It is more likely, based on the results from the Newstan Colliery WTP case study, that the EC of the residuals to be emplaced at the REA is expected to be closer to the raw water feed

to the Springvale WTP, which in the case of SDWTS mine water median EC is approximately 1170 µS/cm. This assumption is further supported by the likely process ramifications of a pre-treatment system. The pre-treatment system (filtration process) is unlikely to influence the chemical parameters that comprise of EC or concentrate the feed water significantly resulting in EC increases. Therefore the predicted impacts on the salt outputs from the SCSS can be seen as conservative, upper-limit estimates.

The modelling for the proposed conditions predicted an average annual salt output from the SCSS through LDP006 as 1444 tonnes per year, which was accompanied by an increase in average EC being discharged to the receiving environment due the modification. The salt load at LDP006 increases by approximately 30% when compared against the future conditions but represents a 5% decrease compared to the existing conditions. Increased EC was primarily due to the increased flow volume load on Cooks Dam with the dam at capacity most days. The EC within Cooks Dam is elevated (median EC of 3273 µS/cm), and is dominant over the lower residuals stream EC, assumed to be 2500 µS/cm, which itself is overly conservative, as noted above.

7.5.4 Surface Water Environment

As predicted by the water balance modelling, an increase in the volume of water discharged through LDP006 is likely as a result of the increased load on the SCSS water management system due the residuals material transfer. This outcome is based on the comparison of future and proposed conditions. When compared against existing conditions there will be a decrease in LDP006 discharges.

The consideration of EC is typically used as an indicator for impact from mining related systems and processes. Given the proposed modification is a result of the management of a by-product stream from a water treatment plant designed to treat mine water, a more detailed approach in addition to simply the evaluation of EC was undertaken. The following sections detail speciation and mix modelling (using PHREEQC) in addition to the site and regional evaluation of water and salt balance results.

PHREEQC modelling (Parkhurst and Appelo, 1999) was undertaken using the median LDP006 water quality data (presented in Table 5-5 of GHD (2016b)) and the Newstan residual stream data (**Table 14**) in order to predict the effect of seepage from the REA on the LDP006 discharge. The modelling results predicted the following changes from the historical LDP006 discharge water quality as a result of the transfer of the residual stream to the REA:

- pH is predicted to increase as a result of the increased alkalinity of the residual stream
- Concentrations of the major ions sulfate, calcium, magnesium and potassium are predicted to decrease
- Dissolved boron, iron, manganese, nickel and zinc concentrations are predicted to decrease.

The PHREEQC modelling results are particularly limited by the use of historical LDP006 data, which is not considered to be representative of discharge conditions following the construction of the clean water diversions at SCSS (future conditions). However, the modelling results provide a comparison against the existing conditions. Without the significant dilution provided by catchment runoff, dissolved constituent concentrations in the site's dirty water system are predicted to increase, which is likely to result in the salinity of the LDP006 discharge increasing compared to the existing conditions, however the salinity will be limited to the water quality currently within Cooks Dam.

As the predicted maximum EC of the residuals stream is 2500 µS/cm, this would have the effect of dilution as it reports to Cooks Dam but more so when considering a more realistic EC of 1170 µS/cm

(based on LDP009 feed water quality). This should be considered with caution however as a number of other influences are in place on the Cooks Dam such as localised increased groundwater EC and its minimal capacity to accept additional flows. These influences, for EC specifically, mean that dilution effects are likely to be minimal for EC. This effect is observed within the water and site balance results presented in **Section 7.5.3**.

From the PHREEQC mass balance modelling major ion and metals concentrations can be considered reliable predictions, though in a comparative sense only, as the future water quality at Cooks Dam following the construction of the clean water diversions could not be accounted for in the modelling.

As part of plant commissioning phase of the Springvale WTP the residuals stream quality will be assessed and these are to be compared to the predictions outlined above.

7.5.5 Groundwater Environment

7.5.5.1 Groundwater Quality

The results for the case study of residuals stream from Newstan Colliery WTP (**Section 7.5.2**) indicate that the increased transport of metals from the REA to the groundwater environment as a result of the proposed residual transfer is unlikely. This case study, where dissolved metal concentrations of the supply water to the Newstan Colliery WTP were mostly similar to those predicted for the Springvale WTP, showed that the majority of metals were co-precipitated with ferric hydroxide as a result of the ferric chloride dosing during the pre-treatment or clarification process. The case study indicated that aluminium ion may be concentrated in the residuals stream when compared to the raw mine water supplied to the water treatment plant in Springvale WTP, however the concentrations indicated by the Newstan Colliery case study and the Hunter Water jar testing (**Section 7.5.2**) are less than those of the majority of the groundwater monitoring bores at the SCSS.

7.5.5.2 Aquifer Interference Policy

No aquifer interference activities are predicted as a result of the modification, as the seepage of residual into the historical mine workings is not predicted to have an observable impact on the groundwater table outside of the SCSS. No pressure head decline would occur as a result of the modification, and no change in the groundwater quality, which would lower the beneficial use of the groundwater (as agricultural or industrial water), is predicted.

7.5.6 Stream Health

7.5.6.1 Geomorphology of Wangcol Creek

The water balance modelling predicts a decrease in the average LDP006 discharge rate to Wangcol Creek when the proposed scenario is compared with the existing scenario. As a result, there is no predicted change to the geomorphological stream health, as the channel of Wangcol Creek has been found to be relatively stable (**Section 7.4.5**).

7.5.6.2 Aquatic Ecology of Wangcol Creek

The preliminary PHREEQC modelling discussed in **Section 7.5.4** suggested that concentrations of the metal toxicants boron, manganese, nickel and zinc in the LDP006 discharge are all predicted to decrease as a result of the proposed modification. Additionally, the increased alkalinity predicted has the effect of reducing the toxic/bioavailable concentrations of metals, particularly for nickel and zinc. A possible increase in dissolved aluminium concentration has been predicted, however, the predicted

increase can be considered conservative due to the assumptions outlined. Additionally, higher concentrations of aluminium have been regularly observed in the groundwater monitored at the SCSS which do not appear to report to Cooks Dam or LDP006.

When compared to the future conditions, the proposed modification is unlikely to result in the discharge of poorer quality water, though the volume and frequency of discharges is predicted to increase. The increased volume of discharges and frequency of discharges expected due to the proposed modification is not predicted to impact on the geomorphological Wangcol stream health given the creek channel has been found to be relatively stable.

The increased frequency of discharges has the effect of increasing the frequency of exposure of aquatic species in Wangcol Creek to potential toxicants (boron, iron, manganese, nickel and zinc), albeit at decreased concentrations. This is not predicted to impact on the existing instream habitat and macroinvertebrate diversity of Wangcol Creek, as GHD (2016h) identified that site WC2 in the vicinity of LDP006, and which is located within the mixing zone of the LDP006 discharge, had the most degraded habitat and the lowest level of macroinvertebrate diversity of the four Wangcol Creek aquatic ecology monitoring sites. The lower toxicant concentrations predicted in the LDP006 discharge may result in increased macroinvertebrate diversities downstream of the discharge.

7.6 Cumulative Impact Assessment

7.6.1 Regional Water and Salt Balance Modelling

Regional water and salt balance modelling was undertaken for the Springvale WTP (GHD, 2016b). The modelling in GHD (2016b) was reviewed and updated for this assessment based on management changes at SCSS and further progression of the design process for the Springvale WTP. As such, the results of the regional water and salt balance modelling undertaken for this modification should not be compared to those of GHD (2016b).

Summaries of the average results for existing, future and proposed scenarios (**Section 7.5.3**) for the regional water and salt balance model are provided in **Table 17** (volume) and **Table 18** (EC). Electrical conductivity has been considered in **Table 18** over salt load as this is more representative of the risk to the environment.

Results are provided for the following modelled locations (refer **Figure 12** and **Figure 13**) and are consistent with those used in regional modelling undertaken for the Springvale WTP:

- Wangcol Creek at confluence with discharge from SCSS
- Wangcol Creek at confluence with Coxs River
- Coxs River flow to Lake Wallace
- Coxs River to Lake Lyell
- Coxs River to Lake Burragorang.

All results in **Table 17** and **Table 18** are based on a 50% power generation requirement at MPPS modelled in the Springvale WTP's *Water Resources Impact Assessment* (GHD, 2016b). This modelled scenario is appropriate due to regional extraction influences from Thompsons Creek Reservoir and Lake Lyell, however do not consider discharges of excess treated water within the region, as was proposed in the Springvale WTP EIS (GHD, 2016c).

Table 17 – Summary of Change in Water Volume Results from Regional Model at Modelled Locations

Modelled Location	Existing Conditions (ML/year)	Future Conditions (ML/year)	Proposed Conditions (ML/year)	Difference between		
				Existing and Future Conditions	Existing and Proposed Conditions	Future and Proposed Conditions
Wangcol Creek at confluence with discharge from SCSS	2720	2661	2791	-2%	3%	5%
Wangcol Creek at confluence with Coxs River	3028	2969	3099	-2%	2%	4%
Coxs River flow to Lake Wallace	46,960	46,754	45,994	Negligible	-2%	-2%
Coxs River flow to Lake Lyell	57,399	57,185	56,362	Negligible	-2%	-1%
Coxs River flow to Lake Burragorang	124,097	123,874	123,062	Negligible	-1%	-1%

Table 18 – Summary of Change in Electrical Conductivity Results from Regional Model at Modelled Locations

Modelled Location	Existing Conditions (µS/cm)	Future Conditions (µS/cm)	Proposed Conditions (µS/cm)	Difference between		
				Existing and Future Conditions	Existing and Proposed Conditions	Future and Proposed Conditions
Wangcol Creek at confluence with discharge from SCSS	1000	870	1010	-13%	1%	16%
Wangcol Creek at confluence with Coxs River	910	790	920	-13%	1%	16%
Coxs River flow to Lake Wallace	600	600	480	Negligible	-20%	-20%
Coxs River flow to Lake Lyell	520	520	420	Negligible	-19%	-19%
Coxs River to flow Lake Burragorang	170	170	160	Negligible	-6%	-6%

DATE	18.11.2016
SEAM	LITHGOW
REFERENCE	SLR_WCS_630.11495_FIG12_COXSCATCH_V2.dwg
SCALE	1 : 350000

Figure 12

Water Balance Modelling Locations in Coxs River Catchment

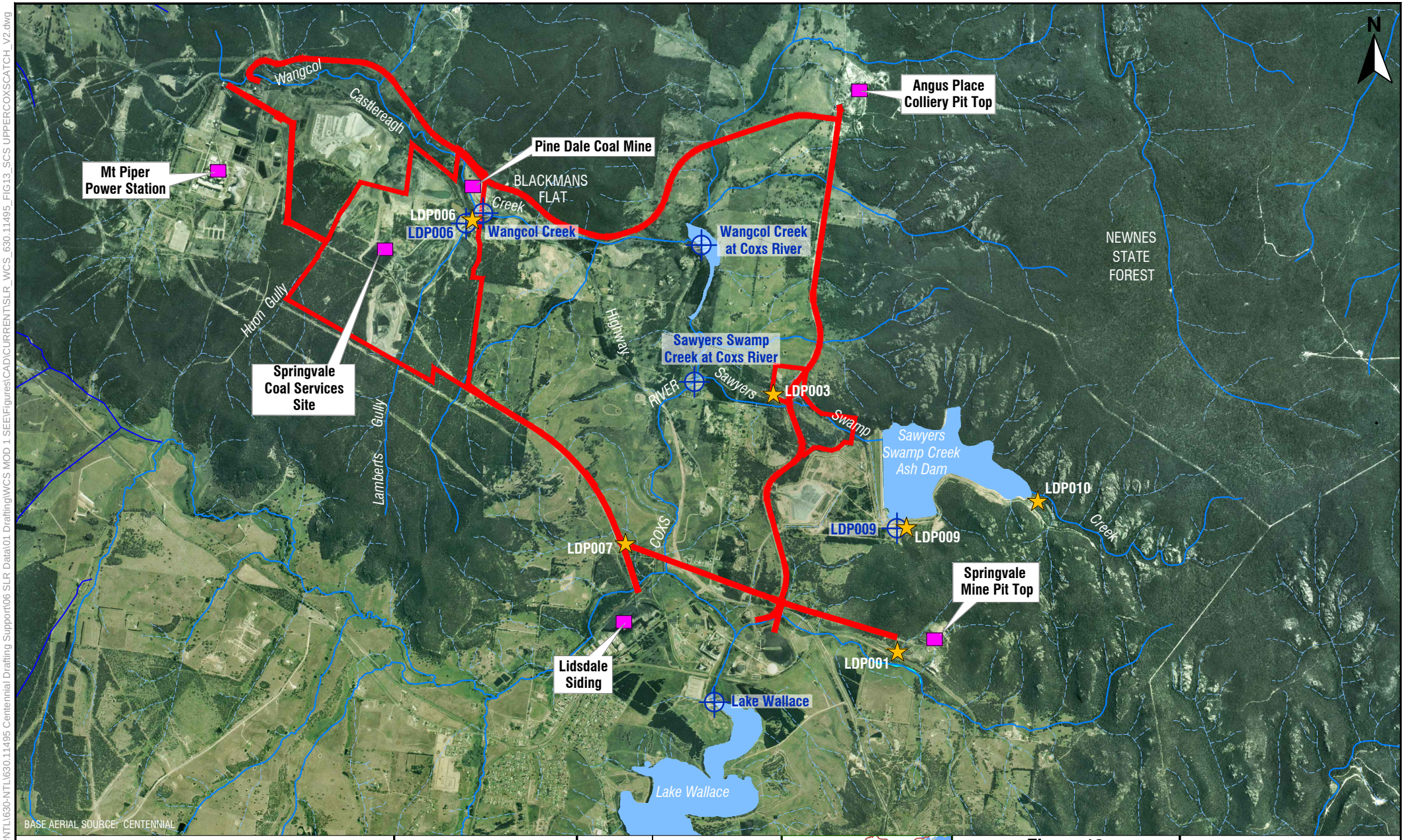
0.0 6.25 12.5 KM

Centennial Coal
Western Coal Services

Prepared by: SLR

A4

H:\Projects-SLR\630-Syd\NTL\630-NTL\630.11495 Centennial Drafting Support\06 SLR Data\01 Drafting\WCS MOD 1 SEE\Figures\CAD\CURRENT\SLR_WCS_630.11495_FIG12_SCS COXSCATCH_V2.dwg



LEGEND:

- Project Application Area
- Site Location
- Modelling Points of Interest
- Licensed Discharge Point
- Watercourse - Non Perennial
- Watercourse - Perennial

DATE	18.11.2016
SEAM	LITHGOW
REFERENCE	SLR_630.11701_FIG13_UPPERCOXSCATCH_V2.dwg
SCALE	1 : 50000

Figure 13

Water Balance Modelling Locations in Upper Coxs River Catchment

0 1.0 2.0 KM

Centennial Coal
Western Coal Services

Prepared by: SLR

A4

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Summaries of potential impacts from the regional water quality assessment for the transfer of residuals stream to the REA at SCSS are provided below.

- There will be an increase in flows along Wangcol Creek, with flows predicted to increase by approximately 5% if the proposed conditions are compared to the future conditions, and by approximately 3% when compared against the existing conditions.
- There will be an increase in the EC along Wangcol Creek by approximately 16% if the proposed conditions are compared against the future conditions, and by 1% when compared against the existing conditions.
- At Lake Wallace the effects of the proposed modification are significantly reduced as a result of catchment influences and the cessation of Springvale Mine's LDP009 discharges to be implemented as part of the proposed Springvale WTP:
    - Regional model predictions between proposed conditions and both future and existing conditions indicate a reduction in flow at Lake Wallace of 2%
    - Regional model predictions between proposed conditions and both future and existing conditions indicate a reduction in EC at Lake Wallace by 20%.
- Predictions at Lake Lyell indicate a reduction of flow by 2% when the proposed conditions are compared against future conditions and 1% when compared against existing conditions. There is a reduction in the EC of 19%.
- Predictions at Lake Burragorang indicate a reduction of flow of 1% and a reduction in EC of 6%.

The EC in Wangcol Creek was predicted by the regional water and salt balance model to decrease by 13% under future conditions compared to existing conditions, as shown in **Table 18**. This is due to a reduction in salt yield from disturbed areas as they are rehabilitated (where this is required with catchment contributing to the clean water diversion) however the majority of this change is as a result of the improved separation of clean and dirty water system. Where the two systems were mixed, reuse on-site was required in greater volumes with dirty water captured on-site and recirculated. With the clean water diversion in place, the runoff volume captured is reduced with volumes rather discharged to Wangcol Creek. This change allows for a reduced onsite recirculation component which can contribute to increased EC through concentration of water and can be influenced by the groundwater environment which can be as high as 4460 µS/cm.

As noted above the EC was predicted to increase by 16% on average as a result of the proposed conditions in Wangcol Creek when compared against future conditions. When compared against the existing conditions the increase in EC is 1%. The increases are expected to be more contributable to increased water volume load on the SCSS water management system rather than specific toxicants being added into the REA as a result of residuals transfer. From a review of the chemical constituents of LDP006, the proposed residuals, and the Newstan Colliery WTP case study, a series of toxicants are likely to be of more risk to the receiving environment as a result of the modification. The parameters of aluminium, boron, manganese and nickel all indicated no change or an increase as a result of the Newstan Colliery WTP case study. Aluminium concentration was found to be elevated at reference sites upstream of Wangcol Creek with the residual load unlikely to exceed the concentrations already present within the receiving environment, on existing predictions. Due to the concentrations of boron, manganese and nickel already present within the surface and groundwater environment, the addition of the residual load is likely to dilute these three concentrations present and contributing to LDP006 historically and therefore will unlikely result in a material effect within the receiving environments specifically as a result of the introduction of residuals material. Loads for these chemical parameters however would most likely increase given the residual flow volume.

Considering future versus proposed scenario results beyond Wangcol Creek, predicted EC levels indicated that the increase at Wangcol Creek at the confluence of SCSS discharges is likely to be ameliorated by the time it enters Lake Wallace. Modelled EC within Coxs River at the inflow to Lake Wallace was found to decrease by 20% on average under proposed conditions compared to both existing and future conditions. This is as a result of the cessation of discharges from Springvale Mine via LDP009 to Sawyers Swamp Creek due to the Springvale WTP and significant catchment contribution at this location. For locations further downstream of the Coxs River, such as Lake Lyell and Lake Burragorang, the EC predictions indicated a decrease of 19% and 6% in EC as a result of comparisons between future and proposed conditions, respectively. Due to extractions from Lake Lyell for power generation the changes in EC are different at the modelled locations Coxs River flow to Lake Wallace and Coxs River flow to Lake Lyell.

In summary, whilst there is an increase in EC locally within Wangcol Creek as a result of the modification, the transfer of the residuals to the REA is required to facilitate the SWTP. Equally, it is the Springvale WTP that ameliorates this impact in Lake Wallace and further downstream at Lake Lyell and Lake Burragorang through cessation of discharges at LDP009.

7.6.2 Neutral or Beneficial Effect

The assessment of neutral or beneficial effect (NorBE) on water quality is undertaken through consultation between WaterNSW and the DPE. As the Minister for Planning is the consent authority for the modification, the assessment of NorBE is at the Minister's discretion. The NorBE guideline (WaterNSW, 2015) provides some guidance to how various projects can be assessed. As the modification is an SSD, it falls under Module 5 of the guideline. Module 5, defined as 'other development', allows for a customised assessment approach that still achieves the overall objectives of the effect-based assessment and provides the framework for the consultation process between WaterNSW and DPE during the evaluation of a development.

As the transfer of residuals material to the REA is planned to occur following the construction of the clean water diversions at the SCSS, the evaluation of NorBE has been performed through the comparison of the future and proposed conditions, as they have been referred to for the water and salt balance modelling. This evaluation used the results of the water and salt balance results from **Section 7.5.2**, **Section 7.5.3** and **Section 7.5.4**.

The salinity of the residuals stream, being lower than that of the overall groundwater environment at SCSS (which can be as high as 4460 µS/cm), should result in a decrease in salinity observed at LDP006 through dilution however this is not replicated in the water and salt balance modelling, as indicated by **Table 17** and **Table 18**. Potential EC dilution from the residuals stream result is instead dominated by the EC of the Cooks Dam (3723 µS/cm) where increased volumetric contribution to the dam results in an increase in Cooks Dam discharges and hence an increase in predicted EC of LDP006 discharges. The EC increase is likely to result in receiving environment EC levels of 1010 µS/cm reducing to 920 µS/cm by the location of Wangcol Creek at the confluence with Coxs River.

The concentrations of some metal toxicants in the discharge are predicted to decrease as a result of dilution effects with the Newstan Colliery WTP case study supporting either reductions or no change in a number of parameters.

The outcome of the modification can be considered to be of no benefit in terms of salt discharged, and minor benefit in terms of dissolved constituent concentrations contributing via LDP006. The increases in flow volume and EC level are observed for the length of Wangcol Creek.

From a regional perspective, the modelling outcomes indicate that residuals steam impact from the proposed LDP006 discharges have an influence for flows and EC levels up to Lake Wallace. Downstream of Lake Wallace, reductions in flow volume and EC levels were predicted that occur as a result of the cessation of discharges from Springvale Mines LDP009 allowed for by the operation of the Springvale WTP.

In summary, whilst there was a predicted increase in EC locally within Wangcol Creek as a result of the modification, the transfer of the residuals stream to the REA is required to facilitate the Springvale WTP. As observed in the results including and below Lake Wallace, the benefits of the Springvale WTP, for which the Project supports, provide a regional benefit to the water quality downstream to Lake Burragorang. The likely influence of the residuals stream on the chemistry of water contributing to Wangcol Creek is unlikely to result in change (given the similarities to existing quality) of the current receiving environment health with these risks being minimal when compared to the overall benefit to the catchment provided by the Springvale WTP.

7.6.3 Downstream Water Users

Based on the search of the NSW Water Register, three Water Access Licences (WALs) were identified for surface water use downstream of the Project. These WALs are applicable to allotments that are within the upper Coxs River catchment (Lake Lyell). The WALs have been summarised in **Table 19**.

From a review of the location of the allotments with WALs from **Table 19**, one user is likely to be at risk of increased conductivity as a result of the modification. The location of the applicable lot is adjacent to both the Coxs River and Sawyers Swamp Creek located on the downstream side of the Sawyers Swamp Creek (**Figure 13**). The application of results from the modelled location of the regional modelling undertaken are likely to be conservative based on the subject allotment's location especially given its proximity downstream of the existing LDP009 discharges, which are to be ceased as a result of the Springvale WTP, resulting in an improvement to EC. Regardless of improvements, the predicted increase is unlikely to degrade the usage category (irrigation) of the water given a predicted EC of between approximately 800 and 1000 µS/cm.

Table 19 – Surface Water Users within Coxs River Catchment (After Jacobs 2016)

Surface Water User	Allocation	Distance from LDP006	Impact to Flow	Impact to Quality
WAL 25607 – Unregulated River, Irrigation usage, Lot 2, DP574754	10 ML	4.1 km downstream	Approximately 4% increase in flow	Approximately 16% increase in EC
WAL 27428 (Lake Wallace Storage) – Major Utility (Power Generation)	25,000 ML	7.9 km downstream	Negligible	Negligible
WAL 27428 (Lake Lyell Storage) – Major Utility (Power Generation)		21.2 km downstream	Negligible	Negligible

7.6.4 Licensing Implications

As a result of the modification, the management of residuals stream will form part of a new EPL to be applied for the Western Coal Services Project in the future. It is unlikely that any additional LDPs will be required to be implemented as part of a new EPL. The existing LDP006 and LDP007 (Springvale

Mines EPL 3607) and LDP003 (Angus Place Colliery's EPL 467) will effectively be transferred to the new EPL.

The preparation of the new EPL will include other revisions likely to occur as the EPL requirements for operations in the Project. This is to be undertaken in consultation with EPA.

The Project will not result in any additional take of surface or groundwater and hence does not require any water access licences.

7.7 Consequence of Potential Impacts

The transfer of residuals stream from the Springvale WTP to the SCSS for emplacement within the existing REA results in increases in volume (up to 5%) and salt discharges (up to 16% increase in EC) through LDP006 to Wangcol Creek. The increased volume of discharges and frequency of discharges expected is not predicted to impact on geomorphological Wangcol stream health given the creek channel has been found to be relatively stable.

The increased frequency of discharges has the effect of increasing the frequency of exposure of aquatic species to potential toxicants (boron, iron, manganese, nickel and zinc), albeit at decreased concentrations. This is not predicted to impact on the existing instream habitat and macroinvertebrate diversity of Wangcol Creek as the creek in the vicinity of LDP006 has the most degraded habitat and the lowest level of macroinvertebrate diversity of the current four Wangcol Creek aquatic ecology monitoring sites. The lower toxicant concentrations predicted in the LDP006 discharge may result in increased macroinvertebrate diversities in Wangcol Creek downstream of the discharge.

The increased EC in Coxs River has the potential to impact one downstream surface water user located adjacent to both the Coxs River and Sawyers Swamp Creek on the downstream side of the Sawyers Swamp Creek. However the predicted increase is unlikely to degrade the usage category (irrigation) of the water given a predicted EC of between approximately 800 and 1000 µS/cm.

7.8 Mitigation and Management Measures

7.8.1 Monitoring and Management Requirements

The transfer of the residuals stream from the Water Treatment Plant proposed in the Springvale WTP to the new REA at the SCSS will result in changes to the existing water management at the site and will require a revision to the existing Western Coal Services *Water Management Plan*. A Trigger Action Response Plan will be developed which considers triggers and responses to the following potential risks:

- Groundwater contamination
- Erosion or scour of material within the new REA
- Water volume on REA
- Surface water quality of decant water from REA
- Water quality of the LDP006 discharge.

The current surface and groundwater monitoring at the SCSS is proposed to continue. In addition, the residuals stream transfer to the REA is proposed to be monitored monthly during discharge for the following parameters:

- **Physicochemical parameters**: pH, EC, turbidity, TSS, Oil&Grease
- **Metals** (dissolved and total): Al, B, Cd, Fe, Pb, Mn, Ni, Se and Zn
- **Anions**: alkalinity, sulfate, chloride
- **Cations**: sodium, calcium, potassium, magnesium, total hardness.

In addition, the residuals stream pipeline will be added to the existing discharge flow monitoring program. Monitoring will comprise of an inline electronic metering device recording the total volume discharged through each point over a day.

7.8.2 Implementation

As part of Springvale WTP, the commissioning phase will undertake specific monitoring of the water treatment plant's performance which will be compared against predictions. The assessment of flow and quality of the residuals stream is to be reviewed as part of the Project and the Springvale WTP.

7.8.3 Review

The review of the outcomes predicted within the WRIA will be undertaken to validate the assumptions made concerning the impacts of the transfer of the residuals stream to the REA on the surface water and groundwater environments.

At a minimum, a review of the impacts of the transfer of the residuals stream will be undertaken every year or specifically as a result of:

- Any statutory or regulatory requirements
- Any significant change to water management practices
- Continual exceedances of any relevant criteria at LDP006 and/or the Wangcol Creek sites downstream of the Lamberts Gully confluence
- Any incident that requires reporting.

7.9 Conclusion

An assessment of the potential impacts of the proposed transfer of the residuals stream from the water treatment plant (Springvale WTP) on the surface and groundwater environments has been undertaken. The groundwater impact investigations indicate that the increased transport of metals from the REA to the groundwater environment as a result of the proposed residuals transfer is unlikely. No aquifer interference activities are predicted as a result of the modification, as the seepage of residuals into the historical mine workings is not predicted to have an observable impact on the groundwater table outside of the SCSS. No pressure head decline would occur as a result of the modification, and no change in the groundwater quality, which would lower the beneficial use of the groundwater (as agricultural or industrial water), is predicted.

The regional water and salt balance impact assessment undertaken to assess the impact of the residual transfer on the receiving water environment shows an increase of up to 5% on flows in Wangcol Creek. Salinity in Wangcol Creek is predicted to increase by 16%. The increases in flow volume and EC level are observed for the length of Wangcol Creek. There is a 2% reduction in flow Coxs River flow to Lake Wallace and the salinity decreases by 20% when compared against the existing environment. This latter effect is largely due to the cessation of discharges from Springvale Mine via the mine's LDP009 (EPL 3607) to Sawyers Swamp Creek due to the operation of the

Springvale WTP. There are further minor decreases (up to 2%) to flows at Lake Lyell and decreases in salinity by approximately 19%. At Lake Burragorang a decrease of approximately 1% in flow is predicted and approximately 6% reduction in salinity.

It is noted the transfer of residuals is required to facilitate the implementation of the Springvale WTP, which will result in considerable environmental benefits achieved through the removal of mine water discharges to Sawyers Swamp Creek in the Upper Coxs River Catchment

There are predicted minor adverse environmental impacts along Wangcol Creek due to the proposed residuals transfer. The environmental consequences on receiving waters is considered negligible and will only be realised upstream of the confluence of the Coxs River and Sawyers Swamp Creek. The impacts of the discharges (flow, EC) have limited influence at Lake Wallace, and further downstream to Lake Burragorang.

Overall, the impacts in Wangcol Creek are minor relative to the significant benefit observed at Lake Wallace and further downstream in the Coxs River catchment by the operation of the Springvale WTP.

8.0 STATEMENT OF COMMITMENTS

Table 20 provides a compilation of the mitigation controls to be implemented in the Project in order to effectively monitor, mitigate and / or manage the potential environmental impacts of the modification. Springvale Coal will continue to implement the controls already at place including those noted in the Statement of Commitments of the WCS EIS (RPS, 2013a) and Responses to Submissions provided on the EIS.

Table 20 – State of Commitments

Desired Outcome	Action
1. General	
Undertake all operations in a manner that will minimise the environmental impacts associated with the operation of Springvale Mine.	Operations will be undertaken in accordance with operations approved in the Western Coal Services Project (SSD 5579) as modified, and the Mining Operations Plan.
2. Hours of Operation	
Undertake all operations within the approved operating hours.	Springvale Coal Services Site: 24 hours per day, 7 days per week Kerosene Vale Stockpile Area: Day period only (7 am – 6 pm) Mount Piper Haul Road: No operations during adverse meteorological conditions during the night period (10 pm – 7 am) Wallerawang Haul Road: No operations during the night period (10 pm – 7 am).
3. Groundwater and Surface Water Resources	
All surface water, groundwater and aquatic impacts are minimised to the greatest extent possible.	The surface and groundwater management and monitoring will be managed in accordance with the site's *Water Management Plan*. Springvale Coal will continue to implement measures to optimise the clean and surface water separation at Springvale Coal Services Site, and reduce flows and improve water quality through LDP006 as much as practicable.
4. Rehabilitation	The *Rehabilitation and Closure Plan* will be updated with the proposed changes to the Project's decommissioning and rehabilitation strategy.

9.0 JUSTIFICATION AND CONCLUSION

9.1 Introduction

This chapter provides a justification for the proposed modification having regard to environmental, considerations. It summarises the potential environmental impacts, and considers the proposed modification against the principles of Ecologically Sustainable Development.

9.2 Substantially the Same Development

The proposed modification constitutes a minor change to an existing approved Project that has been operating successfully since the grant of consent SSD 5579 in 2014. Prior to this date, the majority of the components of the Project were constructed and / or operated under Springvale Mine's former consent DA 11/92 or Angus Place Colliery's current project approval PA 06_0021.

The modification proposes to accept the residuals stream from the water treatment plant proposed in the Springvale WTP to be emplaced within the REA at the SCSS. The Project will not construct and operate infrastructure under its consent to transfer the residuals from the Water Treatment Plant at MPPS. The residuals transfer pipeline will be constructed and operated under the Springvale WTP consent. The emplacement of the residuals material in the REA will not significantly change the current water management practices at SCSS or impede any future and ongoing efforts to improve the water management at the site.

There will be minor changes to the decommissioning and rehabilitation strategy presented in the WCS EIS and further detailed in the WCS *Rehabilitation and Closure Plan*. The decommissioning of the residuals and the raw water pipelines located within the Project Application Area will be undertaken by the Springvale WTP. However, the rehabilitation works within the Project Application Area, including the areas with the installed Springvale WTP pipelines will be undertaken by the Project, as discussed in **Section 4.4**. The changes to the Project's current decommissioning and rehabilitation strategy are minor.

A *Water Resources Impact Assessment* (GHD, 2016a) was undertaken to assess the impact of the residuals transfer on the local and regional surface water and groundwater environments. Summaries of the outcomes of the impact assessment are provided below.

The regional water and salt balance impact assessment undertaken to assess the impact of the residual transfer on the receiving water environment shows an increase of up to 5% on flows in Wangcol Creek. Salinity in Wangcol Creek is predicted to increase by 16%. The increases in flow volume and EC level are observed for the length of Wangcol Creek. There is a 2% reduction in flow Coxs River flow to Lake Wallace and the salinity decreases by 20% when compared against the existing environment. This latter effect is largely due to the cessation of discharges from Springvale Mine via the mine's LDP009 due to the operation of the Springvale WTP. There are further minor decreases (approximately 1%) to flows and decreases in salinity at Lake Lyell (approximately 19%) and Lake Burragorang (approximately 6%).

The proposed transfer of the residuals to the REA at SCSS is unlikely to result in increased groundwater metal concentrations due to the seepage of the residuals material from the REA into the groundwater environment. .

PHREEQC modelling (Parkhurst and Appelo 1999) undertaken using the median LDP006 water quality data and the Newstan Colliery Water Treatment Plant residual stream data (**Table 14**) in order to predict the effect of seepage from the REA on the LDP006 discharge predicted the following

changes from the historical LDP006 discharge water quality as a result of the transfer of the residual stream to the REA:

- pH is predicted to increase as a result of the increased alkalinity of the residual stream
- Concentrations of the major ions sulfate, calcium, magnesium and potassium are predicted to decrease
- Dissolved boron, iron, manganese, nickel and zinc concentrations are predicted to decrease.

The increased volume of discharges and frequency of discharges expected due to the proposed modification is not predicted to impact on geomorphological Wangcol stream health given the creek channel has been found to be relatively stable.

The increased frequency of discharges has the effect of increasing the frequency of exposure of aquatic species to potential toxicants (boron, iron, manganese, nickel and zinc), albeit at decreased concentrations. This is not predicted to impact on the existing instream habitat and macroinvertebrate diversity of Wangcol Creek as the creek in the vicinity of LDP006 has the most degraded habitat and the lowest level of macroinvertebrate diversity of the current four Wangcol Creek aquatic ecology monitoring sites. The lower toxicant concentrations predicted in the LDP006 discharge may result in increased macroinvertebrate diversities downstream of the discharge.

The predicted increase in EC in Coxs River has the potential to impact one downstream surface water user located adjacent to both the Coxs River and Sawyers Swamp Creek on the downstream side of the Sawyers Swamp Creek. However, the predicted increase is unlikely to degrade the usage category (irrigation) of the water given a predicted EC of between approximately 800 and 1000 µS/cm.

Overall, the impacts in Wangcol Creek are minor relative to the significant benefit observed at Lake Wallace and further downstream by the operation of the Springvale WTP.

The Project (as modified) will remain substantially the same as the development that was originally approved as SSD 5579.

9.3 Benefits from the Proposed Modification

The modification is proposing to receive residuals stream from the water treatment plant proposed in the Springvale WTP to facilitate that project. The Springvale WTP will achieve improved environmental outcomes for the Upper Coxs River catchment and meet the water quality performance measures for mine water discharges required under the Springvale Mine's consent SSD 5594. The Springvale WTP identified the transfer of residuals stream from the water treatment plant at MPPS to the neighboring SCSS as the most practical and cost-effective option with the least environmental impact due to the installation of a relatively short transfer pipeline required between the water treatment plant and the REA.

The residuals transfer will result in minor impacts (flow, water quality) on Wancol Creek, which are mitigated further downstream from LDP006 through the cessation of mine water discharges from Springvale Mine, as proposed in the Springvale WTP. The minor impacts the discharges have limited influence at Lake Wallace relative to the significant benefit observed at Lake Wallace and further downstream to Lake Burragorang by the operation of the Springvale WTP. Overall the significant benefits of the Springvale WTP far outweigh the minor impacts from the residuals transfer. The benefits of the Springvale WTP can be achieved with little to no risk of adverse environmental impact or harm to the environment.

9.4 Alternative to Proposed Modification: Do Nothing Option

In the 'Do Nothing' option the Project will continue to operate as currently approved in the consent SSD 5579 and will not receive the residuals stream from the Springvale WTP. The environmental impacts due to the proposed modification noted above will not eventuate. The Springvale WTP will not be approved, constructed and operated as proposed. There will be a delay in the commencement of the Springvale WTP as Springvale Coal investigates other options for the management of the residuals stream from the water treatment plant. The benefits of the Springvale WTP may not materialize within the current timeline for its operation.

9.5 Ecologically Sustainable Development

The principles of ecologically sustainable development (ESD) are outlined in Section 6(2) of the NSW *Protection of the Environment Administration Act 1991* and Clause 7(4) Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. Section 5(a)(vii) of the EP&A Act adopts ESD as one of its objects.

Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) The precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

(b) inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The consistency of the modification with each of the ESD principles noted above is discussed in sub-sections below.

9.5.1 The Precautionary Principle

The precautionary principle reinforces the need to take risk and uncertainty into account, particularly in relation to threats of irreversible environmental damage. In the application of the precautionary principle for the modification (and the Springvale WTP), decisions were guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and by an assessment of the risk-weighted consequences of various options for the management of the project's residuals stream.

The scope to assess the impact of the residuals transfer to SCSS on the receiving water environment was based on a risk-based approach and was finalised by GHD specialists with many years' experience working on similar water resources impact assessments in the vicinity of SCSS eg Neubeck Coal Project and Springvale WTP.

The assessment process involved computer modelling based on a large volume of monitoring data, robust data analysis, interpretation of the data with reference to historical monitoring data from the Project and Neubeck Project, to deduce the potential environmental impacts associated with the proposed modification. This process has enabled the impacts of the modification to be predicted with a reasonable degree of certainty. All predictions, however, contain a degree of uncertainty, which reflects the variable nature of the water environment. Where there has been any uncertainty in the prediction of impacts throughout the assessment process, a conservative approach was adopted to ensure the worst case scenario was predicted in the assessment of impacts. Where applicable, environmental safeguards have been developed in the water resources assessments to avoid or minimise any impact on the receiving environment. The current surface and groundwater monitoring will be ongoing. Additional monitoring will be undertaken to assess the impact of the residuals transfer and modelling updated as relevant based on the new data.

The proposed modification is unlikely to result in any significant environmental impacts and most importantly will assist the Springvale WTP achieve environmental benefits by improving the water quality in Coxs River catchment.

9.5.2 Intergenerational Equity

The principle of intergenerational equity is centred on the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The potential impact of the proposed modification elements is not considered significant, and as a consequence has negligible potential to adversely affect the health, diversity or productivity of the environment.

Springvale Coal has an existing environmental monitoring framework with management strategies, mitigation measures and monitoring programmes designed to minimise adverse impact upon the local environment and nearby communities. Mitigation measures arising from the proposed modification will be incorporated into the monitoring framework as relevant to ensure potential impacts are managed appropriately.

For the reasons noted above the modification will not adversely impact the current or future generations.

9.5.3 Conservation of Biological Diversity and Ecological Integrity

The principle of conservation of biological diversity and ecological integrity holds that it should be a fundamental consideration for development proposals. The Centennial West Aquatic Ecology

Monitoring Program includes the monitoring of four sites on Wangcol Creek, which is considered among other catchment and creek systems in the region. The *Water Resources Impact Assessment* (GHD, 2016a) for the modification considered the potential impacts of the proposed emplacement of residuals within the SCSS REA on the macroinvertebrate diversity of Wangcol Creek. The existing microinvertebrate diversity is low due to the degraded instream habitat associated with past land use activities. As discussed in **Section 7.5.6**, the modification is unlikely to adversely impact on the existing aquatic ecology environment of Wangcol Creek. On this basis, the modification is consistent with the principle of conservation of biological diversity and ecological integrity.

9.5.4 Improved Valuation, Pricing and Incentive Mechanisms

The principle of improved valuation, pricing and incentive mechanisms deems that environmental factors should be included in the valuation of assets and services, and that those who generate the pollution and waste should bear the cost of containment, avoidance or abatement. The cost associated with using or impacting upon an environmental resource, together with remediation costs is seen as a cost incurred to protect that resource.

The water resources impact assessment has evaluated the environmental consequences of the modification on the water resources, and has concluded the environmental consequences of the modification are negligible. The assessment has identified mitigation measures where appropriate to manage any adverse impacts to the water resource.

The proposed modification is required to support the operation of the Springvale WTP which in turn is required to address the consent conditions of Springvale Mine. The continued operation at Springvale Mine is contingent on both the Springvale WTP and the Western Coal Services Project. The continued operation of the Springvale Mine will ensure the natural resources are valued both during mining and after mining has been completed.

9.6 Conclusion

The proposed transfer of the residuals stream from the new water treatment plant at MPPS to the SCSS is required to facilitate the Springvale WTP, and the proposed modification seeks to modify SSD 5579 to allow receipt of the residuals material stream. The Springvale WTP will achieve improved environmental outcomes for the upper Coxs River catchment and meet the water quality performance measures for mine water discharges required under the Springvale Mine's consent SSD 5594. The Springvale WTP identified the transfer of residuals stream from the water treatment plant at MPPS to the neighboring SCSS as the most practical and cost-effective option with the least environmental impact due to the installation of a relatively short transfer pipeline required between the sites.

The residuals transfer will result in minor impacts (flow, water quality) on Wangcol Creek, which are mitigated further downstream from LDP006 through the cessation of discharges from Springvale Mine's LDP009 proposed in the Springvale WTP. The minor impacts of the discharges have limited influence at Lake Wallace and further downstream in the catchment to Lake Burragorang relative to the significant benefit observed at Lake Wallace by the operation of the Springvale WTP. Overall, the significant benefits of the Springvale WTP far outweigh the minor impact of the residuals transfer on the receiving environment. The benefits of the Springvale WTP can be achieved with little to no risk of adverse environmental impact or harm to the environment.

The modification is a minor alteration of the approved Western Coal Services Project and the Project as modified can be considered to be substantially the same development. The adverse environmental impacts of the proposed modification elements are predicted at local level in Wangcol Creek but are not predicted to result in harm to the environment. The modification meets the relevant objects of the

EP&A Act and is consistent with the four principles of the ecologically sustainable development. It meets all government policies. On these bases, the modification will meet the environmental performance requirements to be considered for approval.

10.0 REFERENCES

ANZECC and ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy,* Australian and New Zealand Environment and Conservation Council Agriculture and Resource Management Council of Australia and New Zealand, October 2000.

CSIRO (2014), BurrliOZ 2.0 software. Available at: https://research.csiro.au/software/burrlioz/

DoE ((2013a), *Significant Impact Guidelines 1.1: Matters of National Environmental Significance*, Australian Government Department of the Environment.

DoE (2013b), *Significant Impact Guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments – Impacts on Water Resources*, Australian Government Department of the Environment.

DP&I (2012), *Strategic Regional Land Use Policy,* NSW Department of Planning and Infrastructure, September 2012.

DPI (2012), *NSW Aquifer Interference Policy*, Department of Primary Industries, NSW Office of Water, September 2012.

DRE (2013), *ESG3: Mining Operations Plan (MOP) Guidelines,* Department of Industry – Division of Resources and Energy, September 2013.

EPA (2014) *Waste Classification Guidelines*, Part 1: Classifying Waste, Environment Protection Authority NSW, Sydney, November 2014.

GHD (2014), *Wangcol Creek ANZECC and ARMCANZ 2000 Assessment Environment Protection Licence Report.,* prepared for Springvale Coal Pty Ltd, Orange

GHD (2016a), *Western Coal Services Project Modification 1: Water Resources Impact Assessment*, GHD Pty Ltd, November 2016.

GHD (2016b) *Springvale Water Treatment Project, Water Resources Impact Assessment,* prepared for EnergyAustralia and Centennial Coal, Newcastle, September 2016

GHD (2016c), *Springvale Water Treatment Project: Environmental Impact Assessment*, GHD Pty Ltd, September 2016.

GHD (2016d), *Springvale Coal Services, Hydrogeological Model Report – 2016 Update*. prepared for Springvale Coal Pty Ltd, Newcastle, November 2016.

GHD (2016e) *Springvale Coal Services, Site Water and Salt Balance Assessment*, prepared for Springvale Coal Pty Ltd, Newcastle, November 2016.

GHD (2016f), *Water quality and quantity provisions, and the management of residuals and waste streams*, *Part 1: Water Specification*, prepared for EnergyAustralia and Centennial Coal, Newcastle, November 2016.

GHD (2016g), *Centennial West, Ecotoxicology Assessment of Springvale Coal Services LDP006*. Prepared for Centennial Coal Company Ltd.

GHD (2016h), *Springvale Coal/EnergyAustralia, Water Treatment Project, Aquatic Ecology Impact Assessment*, prepared for EnergyAustralia and Centennial Coal, Newcastle

Jacobs (2015), *Additional Simulations of the Regional Water Quality Impact Assessment Model – Angus Place and Springvale Mine Extension Projects.* Consultant report prepared by Jacobs Group (Australia) Pty Ltd for Springvale Coal Pty Ltd. Reference No. IA059800/002c, 26 March 2015.

Jacobs (2016), *Springvale Mine, Surface Water Assessment – SSD5594 Modification 1*, Rev C, Consultant report prepared by Jacobs Group (Australia) Pty Ltd prepared for Springvale Coal Pty Ltd, Jacobs Pty Limited, July 2016.

Parkhurst and Appelo (1999), *User's guide to PHREEQC (Version 2)—A computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations*. Parkhurst, D. L., & Appelo, C. A. (Authors) U.S. Geological Survey Water-Resources Investigations Report 99-4259, 310 p.

RPS (2013a), *Western Coal Services Project: Environmental Impact Assessment*, RPS Australasia East Pty Ltd, July 2013.

RPS (2013a), *Western Coal Services Project: Environmental Impact Assessment*, RPS Australasia East Pty Ltd, July 2013.

RPS (2013b), *Western Coal Services Project: Ecological Assessment*, RPS Australasia East Pty Ltd, April 2013.

RPS (2013c), *Western Coal Services Project: Cultural Heritage Assessment*, RPS Australasia East Pty Ltd, June 2013.

RPS (2013d), Centennial *Western Coal Services Project: Groundwater Assessment*, RPS Aquaterra Pty Ltd, March 2013.

SKM, (2010) *Groundwater Assessment, MPPS Ash Placement Project*, prepared for Mount Piper Power Station

WaterNSW (2015), *Neutral or Beneficial Effect on Water Quality Assessment Guideline*. Guideline prepared by WaterNSW for the NSW Government. Reference No. ISBN 987-0-9874680-3-1, February 2015.

11.0 ACRONYMS, UNITS AND ABBREVIATIONS

Acronyms, Units and Abbreviations	Definition
%	percent
%ile	Percentile
^{o}C	Degrees Celsius
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	Annual recurrence interval
AWS	Automatic weather station
BOM	Bureau of Meteorology
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
Centennial Coal	Centennial Coal Company Limited
CHPP	Coal Handling and Preparation Plant
CL	Coal Lease
cm	centimetre
DGV	Default guideline value
DoE	Federal Department of the Environment (formerly SEWPaC)
DPE	Department of Planning and Environment (NSW)
DPI	Department of Primary Industries
DPI Water	Department of Primary Industries – Water
DRE	Division of Resources and Energy (within DTIRIS)
DTIRIS	Department of Trade & Investment, Regional Infrastructure and Services (NSW)
EC	Electrical conductivity
EIS	Environmental Impact Statement
EL	Exploration Licence
EMS	Environmental Management System
EMP	Environmental Management Plan
EnergyAustralia	EnergyAustralia NSW Pty Ltd
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	Environment Protection Authority
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development

Acronyms, Units and Abbreviations	Definition
FCNSW	Forestry Corporation of NSW
g	gram
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
GHD	GHD Pty Ltd
GMR WSP	Greater Metropolitan Region Groundwater Sources Water Sharing Plan
GMRU WSP	Greater Metropolitan Region Unregulated River Water Sources Water Sharing Plan
GPS	Geographic Positioning System
ha	hectare
hr	hour
kg	kilogram
kL	kilolitre
km	kilometre
km^2	square kilometre
LCC	Lithgow City Council
LDP	Licensed discharge point
LEP	Local Environmental Plan
LGA	Local Government Area
LOR	Limit of Reporting
m	metre
M	million
m/s	Metre per second
m^2	Square metre
m^3	Cubic metre
min	minute
mg/L	Milligram per litre
ML	Megalitre or Mining Lease
MLA	Mining Lease Application
MNES	Matter of National Environmental Significance
mm	millimetre
Modification	Proposed modification to Western Coal Services Project and SSD 5579
MOP	Mining Operations Plan
Mt	Million tonne
MPPS	Mount Piper Power Station
Mtpa	Million tonnes per annum

Acronyms, Units and Abbreviations	Definition
NATA	National Association of Testing Authorities
NES	National Environmental Significance
NP&W Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NTU	Nephelometric turbidity units
OEH	NSW Office of Environment and Heritage
PEA	Preliminary Environmental Assessment
POEO Act	*Protection of the Environment Operations Act 1997*
Project	Western Coal Services Project (SSD 5579)
PRP	Pollution Reduction Programme
REA	Reject emplacement area
RMS	NSW Roads and Maritime Services (former RTA)
ROM	Run of Mine
RPS	RPS Australasia East Pty Ltd
SAL	Strategic Agricultural Land
SCSS	Springvale Coal Services Site
SDWTS	Springvale Delta Water Transfer Scheme
SEARs	Secretary's Environmental Assessment Requirements
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SILO	Scientific Information for Land Owners
SLR	SLR Consulting Australia Pty Ltd.
SMP	Subsidence Management Plan
SoC	Statement of Commitments
Springvale Coal	Springvale Coal Pty LImited
Springvale WTP	Springvale Water Treatment Project (SSD 7592)
SSD	State significant development
SSGV	Site-specific guideline value
TARP	Trigger Action Response Plan
TDS	Total Dissolved Solids
t	Tonne
t/year	Tonne per year
TSC Act	*Threatened Species Conservation Act 1995*
TSS	Total dissolved solids

Acronyms, Units and Abbreviations	Definition
WAL	Water access licence
WM Act	*Water Management Act 2000*
WRIA	Water Resources Impact Assessment
µg	Microgram
µm	Micrometre or micron
µS/cm	Microsiemens per centimetre
WAL	Water access licence
WCS	Western Coal Services
WPS	Wallerawang Power Station
WRIA	Water Resources Impact Assessment
WSP	Water Sharing Plan