

4. UPDATED SUMMARY OF ENVIRONMENTAL MANAGEMENT AND MONITORING MEASURES

4.1 INTRODUCTION

Table 4.1 records a range of proposed Environmental Management and Monitoring Measures that have been drawn from the EIS for the amended Project. These measures would be adopted to achieve the desired outcomes nominated with the proposed timing recorded. In the event a development consent is contemplated for the amended Project, GRL would review these measures and remove or amend any measures that are duplicated by, or inconsistent with, any proposed condition of development consent or environment protection licence.

The measures outlined in **Table 4.1** effectively update those presented in Section 5 of the EIS. Six new measures have been added, namely 2.4, 5.1, 5.4, 6.11, 14.4 and 15.1 with minor edits/amendments to a number of other measures (highlighted in red), all of which have been included in the responses to matters raised in various submissions as presented on Section 2.

Table 4.1
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*	
1. Noise and Vibration			
Minimise noise-related impacts during construction activities	1.1	Communicate with surrounding landowners and occupiers regarding proposed construction activities within the Site and road construction sites.	Prior to commencement of and during specific construction activities.
	1.2	Maintain good communications with surrounding landowners and occupiers.	Throughout all construction activities.
	1.3	Ensure all mechanical plant and equipment has appropriate mufflers and enclosures, etc.	Throughout all construction activities.
	1.4	Educate all contractors and personnel regarding noise sensitivities and expectations of surrounding landowners and occupiers.	Prior to commencement of and during construction activities.
	1.5	Respond to all legitimate noise complaints from surrounding landowners and occupiers.	As soon as practicable.
Effective implementation of active noise management strategies during operations	1.6	Restrict the use of specific earthmoving equipment e.g. scrapers and bulldozers, in exposed areas.	Of an evening or as determined by real-time monitoring results
	1.7	Operate a reduced fleet of earthmoving equipment in defined areas.	Of an evening or as determined by real-time monitoring results
	1.8	Adjust the number of haul trucks and haul routes used for hauling overburden and coal.	Of an evening or as determined by real-time monitoring results
* Or as modified by the development consent conditions.			

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*	
1. Noise and Vibration (Cont'd)			
Manage noise generated by the amended Project to levels that are compliant with conditional criteria during operations	1.9	Establish and maintain two real-time noise monitors – one in or adjacent to Forbesdale Estate and the other in or adjacent to Avon River Estate.	During the site establishment and construction stage for use throughout the life of the amended Project.
	1.10	Install a predictive meteorological system to identify/predict adverse meteorological conditions for the following day.	During the site establishment and construction stage and throughout the operational life of the amended Project.
	1.11	Install and maintain broadband reversing alarms on all mobile earthmoving equipment.	For the operational life of the amended Project.
2. Blasting			
Compliance with blasting criteria at all privately-owned residences / receivers	2.1	Ensure all blasts within the Mine Area are designed to meet airblast overpressure and ground vibration criteria at all privately-owned residences / receivers.	All blasts.
	2.2	Provide notification of blasts to occupants of residences within 2km of each blast (subject to individual arrangements with landowners and/or occupiers).	At least 24 hours prior to each blast.
	2.3	Commission structural surveys of all privately-owned residences within 2km of all open cut pits (subject to the agreement of the landowner and/or occupier).	Prior to the first blast (where agreement of the landowner and/or occupier has been provided).
	2.4	Undertake all routine blasts between 10:00am and 4:00pm, Monday to Saturday, public holidays excluded	Continuous during operations.
3. Air Quality			
Site activities are undertaken without exceeding relevant air quality criteria	3.1	Install a predictive meteorological system to identify /predict meteorological conditions for the following day.	During the site establishment and construction stage and throughout the operational life of the amended Project.
	3.2	Prepare and implement a real-time Dust Monitoring System involving monitors at two sites identified in the Air Quality and Greenhouse Gas Management Plan. Establish sites to monitor PM ₁₀ and PM _{2.5} concentrations.	During the site establishment and construction stage and throughout the operational life of the amended Project.
* Or as modified by the development consent conditions.			

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
3. Air Quality (Cont'd)		
Site activities are undertaken without exceeding relevant air quality criteria (Cont'd)	3.3 Modify working practices, as required by limiting dust generating activities.	During the periods described in the Air Quality and Greenhouse Gas Management Plan.
	3.4 Deploy water truck(s), as required, to suppress dust on unsealed areas within the Mine Area.	Ongoing, as required
	3.5 Where practical, limit the extent of vegetation clearing and soil exposed within designated areas.	Ongoing
	3.6 Delay blasts during weather conditions that would direct excessive dust or fume towards Forbesdale, Thunderbolt or Avon River Estates in accordance with the Blast Management Plan.	Consider prior to initiation of each blast.
	3.7 Control potential for spontaneous combustion through the implementation of a stockpile management and slope stability management protocols as set out in the Spontaneous Combustion Management Plan.	Ongoing.
	3.8 Implement all reasonable and feasible measures to minimise GHG emissions from operations ensuring an emphasis on energy efficiency.	Ongoing.
	3.9 Respond to all legitimate air quality complaints from surrounding landowners and occupiers.	As soon as practicable.
4. Visibility		
Screen the operation visually from the surrounding local area	4.1 Construct and progressively revegetate the western and northern amenity barrier to shield mine-related activities (and reduce operational noise levels).	During indicative Years 1, 2 and Year 3 as areas are available.
	4.2 Construct and revegetate the southern and northern interim amenity barriers (to shield overburden placement activities).	Southern (indicative Year 2), Northern (indicative Year 4) as areas are available.
	4.3 Progressively rehabilitate completed final landforms, interim amenity barriers and interim overburden emplacement.	Ongoing.
	4.4 Paint the sized coal bin in a "wilderness" greyish-green hue to blend with the background.	On installation.
	4.5 Selectively plant trees and shrubs on the downslope side of the clean water diversion channels on the eastern side of the Mine Area (outside the 132kV power line easement or as agreed with TransGrid).	Progressively during the construction of the diversion channels or development of the adjacent overburden emplacement.
	4.6 Ensure all lighting complies with Australian Standard AS 4282 – Control of Obtrusive Effects of Outdoor Lighting (as amended from time to time).	Ongoing.

* Or as modified by the development consent conditions.

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
4. Visibility (Cont'd)		
Screen the operation visually from the surrounding local area (Cont'd)	4.7 Direct all stationary/fixed lights downwards and install appropriate shrouds/shielding to light fittings.	Ongoing.
	4.8 Direct all stationary/fixed lights away from the northwestern, western and southwestern sectors.	Ongoing.
	4.9 Position all in-pit lighting towers appropriately to reduce reflected light escaping the open cut pits.	Ongoing.
	4.10 Where practical, select haul routes to minimise light visible from truck headlights.	Ongoing.
5. Groundwater		
An accurate understanding of the characteristics of the groundwater inflows to the open cut pits from all sources	5.1 Identify appropriate trigger levels for investigating adverse impacts on groundwater levels and quality – to be recorded in the Water Management Plan.	As nominated in the development consent.
	5.2 Conduct monitoring in nominated groundwater bores and record pit inflows.	In accordance with the Water Management Plan.
	5.3 Undertake a review of groundwater inflows from water sources to ensure sufficient Water Access Licences/entitlements are acquired to account for water inflows or losses.	Ongoing.
Avoidance of groundwater-induced instability issues for both Waukivory Creek and the Main Pit.	5.4 Undertake a geotechnical study of the area between the Main Pit and Waukivory Creek to identify any geological features that could initiate instability in either location.	Prior to open cut mining within 200m of Waukivory Creek.
6. Surface Water		
Separate the clean water, sediment-laden water and saline water streams	6.1 Where practical, divert runoff upslope away from areas to be stripped of ground cover and soil.	Prior to clearing and stripping in operational areas.
	6.2 Progressively construct the southern and northern clean water diversion channels.	Prior to disturbance for out-of-pit overburden emplacements and open cut pits downslope from the channels.
	6.3 Construct sediment dams to capture sediment-laden water with the capacities nominated in the Water Management Plan.	Prior to upslope clearing and stripping operations.
	6.4 Where possible, use water within the saline water management system for dust suppression purposes.	Ongoing.
	6.5 Construct and maintain all water management infrastructure in accordance with Volume 2E of the guideline document "Soils and Construction: Managing Urban Stormwater" (DECC, 2008).	Ongoing.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
6. Surface Water (Cont'd)		
Prevent the discharge of contaminated water from the Mine Area	6.6 Install and maintain an oil/water separator to treat potentially contaminated water from the maintenance and wash-down bay area.	Ongoing.
Maintain the active storage capacity of all sediment dams	6.7 Release water from sediment dams within 5 days of significant rainfall events e.g. 25mm in 24 hours, in accordance with the conditions of the Site's environment protection licence.	Ongoing.
Implementation of a comprehensive and ongoing surface water monitoring program	6.8 Monitor surface water quality at licensed discharge points for parameters nominated in the Site's environment protection licence.	As required by an environment protection licence.
	6.9 Monitor surface water quality within receiving waters (Avon River and Waukivory Creek) for parameters nominated in the Water Management Plan.	Quarterly.
	6.10 Monitor surface water quality at selected sediment dams and saline water storages for parameters nominated in the Water Management Plan.	Quarterly.
Maintenance of sufficient Water Access Licences/ entitlements for surface water requirements	6.11 Undertake a review of sediment dams and establish if they are no longer functioning as sediment dams and can be regarded as clean water dams. Undertake a review of clean water dam capacities within the Mine Area to ensure the Maximum Harvestable Rights Dam Capacity is not exceeded through either a reduction in dam capacities or the acquisition of additional entitlements.	Ongoing – Annual Review.
7. Land and Soil Capability		
Maintenance of soil value for rehabilitation and minimisation of soil loss through erosion	7.1 Strip topsoils and subsoils to depths specified in EIS Section 4.8.3.7.	During soil stripping activities.
	7.2 Minimise soil handling as much as possible with no stripping or soil placement to occur when soil is wet.	During soil stripping and stockpiling activities.
	7.3 Stockpile topsoil and subsoil in defined stockpiles or on interim landforms in greater thicknesses, generally in accordance with the soil stripping and stockpiling component of the Biodiversity Management Plan.	During soil stockpiling activities.
	7.4 Construct soil stockpiles to mitigate the need for reshaping.	During soil stockpiling activities.
	7.5 Avoid machinery traffic on soil stockpiles where practicable.	During soil stockpiling activities.
	7.6 Sow stockpiles with stabilising groundcover species.	Following soil stockpiling activities (if not to be used within 3 months).
	7.7 Where appropriate, divert surface water via upslope diversion banks or drains to avoid soil stockpiles.	During and following soil stockpiling activities.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
7. Land and Soil Capability (Cont'd)		
Maintenance of soil value for rehabilitation and minimisation of soil loss through erosion (Cont'd)	7.8 Install downslope sedimentation control structures as required until the formed soil stockpiles have been stabilised by ground cover species.	During soil stripping activities.
	7.9 Where practicable, transfer stripped soil directly from source to active revegetation area.	Prior to soil stripping activities.
Create a final landform that is safe, stable and is amenable to a combination of agricultural and native flora/fauna conservation activities	7.10 Apply lime to the topsoil within the private coal haul road at the rate recommended in SOILmgt (2016).	Prior to soil stripping.
	7.11 Place all subsoils stripped within the private haul road corridor into the fill components of the road.	During soil stripping activities in the private haul road corridor.
	7.12 Remove and dispose of subsoils located in watercourses to the out-of-pit and in-pit overburden emplacements.	During soil stripping activities in SMU 2 areas.
	7.13 Return subsoils and topsoils to rehabilitated areas.	During rehabilitation activities.
	7.14 Return all previously disturbed land to a Land and Soil Capability Class comparable to the existing class.	During rehabilitation activities.
	7.15 Revegetate rehabilitation areas with native trees and shrubs (where applicable) and pasture grasses.	During rehabilitation activities.
8. Transportation		
Achieve safe and efficient road transport operations	8.1 Prepare and implement a Code of Conduct for contractors / employees travelling to and from the Mine Area, with particular emphasis upon drivers of heavy vehicles and any over-size vehicles.	Prior to commencement of construction activities and review annually. Implement throughout the entire life of the amended Project.
	8.2 Prepare and implement a Code of Conduct for contractors delivering equipment to the Mine Area via the Stratford Mining Complex.	Prior to the commencement of equipment deliveries and thereafter for new contractors.
	8.3 Construct all road and intersection upgrades in accordance with relevant Austroads Standards.	During road upgrading works.
	8.4 Upgrade Jacks Road and Waukivory Road (east of Jacks Road).	During site establishment and construction stage.
	8.5 Upgrade the following intersections. <ul style="list-style-type: none"> • Jacks Road / The Bucketts Way. • Jacks Road / Waukivory Road. • Waukivory Road / McKinleys Lane. 	During site establishment and construction stage.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
8. Transportation (Cont'd)		
Achieve safe and efficient road transport operations (Cont'd)	8.6 Install "Give Way" signs and associated transverse bar or hold lines on Jacks Road at the Thunderbolt and Avon River Estates Intersections and Maslens and McKinleys Lanes (subject to Council approval).	During site establishment and construction stage.
	8.7 Replace the Jacks Road bridge over the Avon River.	During site establishment and construction stage.
9. Aboriginal Cultural Heritage		
Site activities are undertaken without authority impact upon any Aboriginal heritage items	9.1 Engage a qualified archaeologist to compile relevant documentation for inclusion in Site Induction Notes relating to the identification and protection of Aboriginal heritage items.	Prior to any development that may impact heritage items.
	9.2 Engage a suitably qualified archaeologist to salvage the objects from the nine recorded sites within the proposed area of disturbance.	Prior to any development that may impact heritage items.
	9.3 Undertake limited sub-surface scraping activities where further artefacts may remain as described in the Aboriginal Cultural Heritage Assessment (Part 11A).	Prior to development in those areas.
	9.4 In the event any previously unidentified 'objects' or other Aboriginal sites are uncovered, ensure all work in that area is suspended and OEH is informed.	During site establishment and construction and operational stages.
	9.5 Monitor turf stripping on the land to be disturbed for the construction of the private haul road in accordance with the recommendations in the Aboriginal Cultural Heritage Assessment (Part 11B).	Prior to and during turf stripping for construction of the private haul road.
10. Historic Heritage		
A record of any historical items within the "Aminya" cottage	10.1 Observe and record the demolition and removal of the "Aminya" cottage and removal of turf 30m around the cottage to note any items of historical significance.	During the demolition of the cottage.
11. Terrestrial Ecology / Biodiversity		
Secure the Biodiversity Offset Area in perpetuity for the purposes of biodiversity conservation	11.1 Secure in perpetuity the biodiversity offset identified in EIS Figure 2.23.	By the end of Year 2 of operations.
	11.2 Maintain and enhance the Biodiversity Offset Area in accordance with an approved Biodiversity Management Plan.	Ongoing.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
11. Terrestrial Ecology / Biodiversity (Cont'd)		
Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Site	11.3 Undertake monitoring and inspection programs annually in accordance with an approved Biodiversity Management Plan to review the progress of rehabilitation. The findings and resulting actions will be reported in the Annual Review for the amended Project.	Ongoing.
	11.4 Review rehabilitation progress annually against performance indicators documented in an approved Mining Operations Plan.	Annually.
	11.5 Create a final landform generally in accordance with Figure 2.19 including replanting of native species in areas defined in the Mining Operations Plan.	Ongoing.
12. Aquatic Ecology		
Avoid and minimise impacts on aquatic vegetation and aquatic animal habitats where possible	12.1 Where practical, treat water to be released from all existing dams to eradicate invasive mosquito fish.	Prior to release of water from existing dams.
	12.2 Screen any discharge pipes to minimise any mosquito fish from entering surrounding watercourses, if treatment in 12.1 is not successful.	Ongoing during water releases.
13. Social Impact		
Minimise potential socio-economic impacts and maximise socio-economic benefits	13.1 Prepare and implement a detailed Stakeholder Engagement Plan.	During commencement of site establishment and construction stage.
	13.2 Establish or contribute to a Charitable Trust Program with annual donations provided at a rate of 50cents per tonne of product coal sold. The guidelines for the distribution of funds from the charitable trust would reflect the areas of priority needs identified by Key Insights (2016) and those arising from the development consent.	At commencement, and maintained throughout the life of the amended Project. The donations would be made annually for the duration of coal production.
	13.3 Sponsor up to three tertiary education scholarships annually and provide trade apprenticeships for local youth at the Rocky Hill Coal Project.	Ongoing during operations.
	13.4 Provide competency training and certification on mining related equipment to assist local men and women gain employment in mining or other related fields.	Ongoing during operations.
	13.5 Develop a management strategy to ensure the ongoing use of GRL-owned agricultural land in the vicinity of the Site remains productive. Encourage local training and employment for local people through the farming enterprises on the Applicant's land.	Ongoing during operations.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
13. Social Impact (Cont'd)		
Minimise potential socio-economic impacts and maximise socio-economic benefits (Cont'd)	13.6 Facilitate the establishment of a Rocky Hill Coal Project CCC following the disbanding of or transition from the Gloucester Exploration Project CCC. Establish the CCC in accordance with DPE Guidelines.	As nominated in the development consent.
	13.7 Consider convening a joint annual CCC meeting with other resource company CCCs.	As required.
	13.8 Ensure the most appropriate methods are available to provide the community with access to up-to-date information regarding the Rocky Hill Coal Project.	Ongoing during operations.
	13.9 Implement measures to attract non-locally resident employees and their families to re-locate to Gloucester with a goal of 50% of employees living locally in the first 2 years and target of 75% at the end of Year 3.	Ongoing during operations.
	13.10 Implement a preferred supplier policy that utilises local suppliers and suppliers employing local people as far as possible.	Ongoing during operations.
	13.11 Investigate the possibility of partnering with other stakeholders to provide relocation incentives to suppliers prepared to establish their businesses in Gloucester and employ local people.	Ongoing during operations.
	13.12 Participate in the Chamber of Commerce and other business networks to monitor flow of employees from local enterprises into mining.	Ongoing during operations.
	13.13 Monitor and implement actions, where appropriate, in response to relevant health studies undertaken by the Hunter New England Area Health Service.	Ongoing during operations.
Continue to provide Gloucester and its surrounds with access to leisure and agricultural aerial activities	13.14 Develop a database of local rental opportunities, including rooms and board for permanent, short term and temporary accommodation within Gloucester and surrounding villages.	Ongoing during operations.
	13.15 Assist Gloucester Aero Club re-orientate the Gloucester airstrip.	Prior to interference to airstrip use.
* Or as modified by the development consent conditions.		

Table 4.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

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Desired Outcome	Measure*	Timing*
14. Environmental Management System and Documentation		
A systematic set of documents are in place to guide the planning and implementation of all environment management strategies	14.1 Incorporate the environmental procedures in an on-site management system.	Develop during site establishment and construction stage.
	14.2 Prepare and implement the following management and monitoring plans: <ul style="list-style-type: none"> • Environmental Management Strategy. • Mining Operations Plan. • Air Quality and Greenhouse Gas Management Plan incorporating an Air Quality Monitoring Plan. • Construction Noise Management Plan. • Operational Noise Management Plan. • Blast Management Plan incorporating a Blast Monitoring Plan and Blast Fume Management Strategy. • Visual Impacts Management Plan incorporating a Lighting Management Plan. • Construction Water Management Plan incorporating a Surface Water Monitoring Plan. • Water Management Plan incorporating Groundwater and Surface Water Monitoring and Contingency Plans. • Construction Transport Management Plan. • Operational Transport Management Plan. • Aboriginal Cultural Heritage Management Plan. • Aquatic Flora and Fauna Management Plan. • Waste Management Plan. • Biodiversity Management Plan 	As nominated in the development consent.
	14.3 Incorporate relevant environmental data and information in Annual Reviews.	Annually.
	14.4 Place a summary of all relevant monitoring data and project-related information on the Rocky Hill website http://www.rockyhillproject.com.au/	Monthly, or as data is assembled.
15. EL 6523 Partial Relinquishment		
A reduced area within EL6523	15.1 Relinquish the area of approximately 6km² from EL6523 north of Waukivory Road.	At the time of EL6523 renewal (March 2018)
* Or as modified by the development consent conditions.		