DONALDSONCOAL
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DONALDSON COAL PTY LIMITED

ABEL MINE

Service Boreholes Management Plan

June 2014

Document Control

Description

Title	Service Boreholes Management Plan
General Description	This Management Plan details the processes developed by Abel Mine to manage the issues associated with the construction and use of service boreholes including; community consultation, landholder agreements, environmental impact and achievement of applicable standards.
Key Support Documents	Notice of Modification (MOD 3) to Project Approval 05_0136 for the Abel Coal Project

Approvals

ORIGINATOR	Ben Tockuss	**Position** Mining Engineer	**Signed**	**Date** 18/6/14
REVIEWED	Phil Brown	**Position** Environment and Community Relations Manager	**Signed**	**Date** 18.6.14
APPROVED	Tony Sutherland	**Position** Technical Services Manager	**Signed**	**Date** 18.6.14

Revisions

					Approved	
Version #	**Date**	**Description**	**By**	**Checked**	**Name**	**Signed**

The nominated Coordinator for this document is:	Technical Services Manager –Underground Operations

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1 PURPOSE AND SCOPE

This Management Plan details the processes developed, including identification of key risks, by Abel Mine to manage the issues associated with the construction and use of service boreholes such as; employee/public safety, community consultation, landholder agreements, environmental impact and achievement of applicable standards.

2 RESPONSIBILITIES AND RESOURCES

It is the responsibility of all employees and contractors to undertake practices to manage and minimise potential environmental and safety impacts outlined in this Service Borehole Management Plan.

The Environment and Community Manager is responsible for the implementation of this management plan and also for periodic reviews of the plan at regular intervals during borehole construction.

The Environment and Community Manager will also be responsible for ensuring the commitments contained within this management plan are met during borehole construction. This will include:

- Overseeing the operation and maintenance of environmental controls during construction of service boreholes;
- Overseeing the implementation of any environmental monitoring; and,
- Production and dissemination of reports and appropriate summaries of information in reports.

Project Engineers and Mine Surface coordinators are responsible for the maintenance and operation of the service boreholes during the construction and operational phases respectively.

3 SUBMISSION

This plan is submitted to the Director General Planning for approval.

4 BACKGROUND

Abel Mine is an underground coal mine in the Newcastle Coalfields located approximately 25km from the Port of Newcastle. Production at the mine commenced in May 2008 with production rates increasing to current levels of approximately 2.7 Mtpa.

Mining takes place under a combination of land owned by Donaldson Coal, the Catholic Diocese of Maitland - Newcastle, Telstra Corporation and several private rural residential land holdings. Abel currently utilises the pillar extraction method to recover coal from the Upper Donaldson Seam at depths of cover ranging generally from 50 to 200 metres. In order to support the underground operations, service boreholes are occasionally required to be drilled from the surface to the underground workings.

The construction and operation of service borehole infrastructure is required to be approved by the Director General of the Department of Planning and Infrastructure in accordance with Condition 11, Schedule 3 (Specific Environmental Conditions – Underground Mining) of the Abel Coal Project Modification 3:

"The Proponent shall prepare and implement a Service Boreholes Management Plan in respect of construction and use of future service boreholes (i.e. any service boreholes not subject to

approval at the date of MOD 3) to the satisfaction of the Director-General. This plan must be submitted to the Director-General for approval prior to the construction of any future service borehole and must include details of the proponent's commitments regarding:

A. *Community consultation;*

B. *Landholder agreements;*

C. *Assessment of noise, air quality, traffic, heritage, public safety and other; Impacts in accordance with approved methods;*

D. *Avoidance of significant impacts and minimisation of impacts generally;*

E. *Achievement of applicable standards and goals;*

F. *Mitigation and compensation for significant noise, air quality and visual impacts; and,*

G. *Rehabilitation of disturbed sites."*

This Service Boreholes Management Plan addresses the general requirements of this condition. This plan will be updated as the assessment and management of specific borehole construction and use highlights opportunities to improve the Plan's content.

5 LEGISLATIVE REQUIREMENTS AND PROPOSED PERFORMANCE STANDARDS

5.1 Legislative and Other Requirements

Legislation applicable to noise, water, biodiversity, cultural heritage, erosion and sediment control management includes, but is not limited to:

- Protection of the Environment Operations Act 1997 (POEO Act);
- Environmental Planning and Assessment Act 1979;
- Soil Conservation Act 1938;
- Water Management Act 2000;
- Water Act 1912;
- National Parks and Wildlife Act 1974;
- Abel Noise Management Plan;
- Abel Air Quality Management Plan;
- Abel Project Approval # 05_0136; and,
- Site (Abel) POEO Licence # 12856.

5.2 Proposed Environmental Performance Standards

5.2.1 Noise

Abel Mine will aim to ensure that the noise generated by the project is in line with the criteria stipulated in conditions 1 and 4 of schedule 4 (Specific Environmental Conditions – General) of the Abel Coal Project Modification 3 listed below in **Figure 1** and **Figure 2**.

FIGURE 1. OPERATIONAL NOISE CRITERIA

Table 4: Operational noise criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
Location I	Lord Howe Drive, Ashtonfield	36	36	36	45
Location K	Catholic Diocese Land	37	37	37	45
Location L	Kilshanny Avenue, Ashtonfield	40	40	40	47
All other locations	All other privately-owned residences	35	35	35	45

FIGURE 2. CUMULATIVE NOISE CRITERIA

Table 7: Cumulative noise criteria dB(A)

Location	Day	Evening	Night
	$L_{Aeq\ (period)}$		
All privately-owned land	55	45	40

Note: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

Any foreseeable service boreholes are expected to be constructed and operated in relatively remote bush land locations which will also help to ensure minimal, if any, noise impact on nearby residents.

Monitoring of the construction and operation of the service boreholes will be in accordance with the site's "Integrated Noise Monitoring Program". This includes regular noise monitoring and procedures for complaints management should they be received.

5.2.2 Air Quality

Air quality standards are specified in condition 9 of schedule 4 (Specific Environmental Conditions – General) of the Abel Coal Project Modification 3 which are stated below in **Figure 3**.

FIGURE 3. LONG-TERM CRITERIA FOR PARTICULATE MATTER

Table 8: Long-term criteria for particulate matter

Pollutant	Averaging period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 9: Short-term criterion for particulate matter

Pollutant	Averaging period	[d] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 10: Long-term criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 8-10:

- *[a] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);*
- *[b] Incremental impact (ie incremental increase in concentrations due to the project on its own);*
- *[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and*
- *[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Director-General.*

The construction of boreholes may generate dust through clearing and drilling activities. Air quality will be managed during construction by:

- Use of water carts to maintain dust in the general area;
- Only clearing the minimum amount of required area for construction;
- Use of drilling equipment that has ventilation systems attached; and,
- Where possible, use of "wet drilling" to minimise dust generation.

Ongoing monitoring of the construction and operation will be undertaken in accordance with the site's approved Air Quality Management Plan.

Dust related air quality impacts may occur during the service borehole construction phase primarily due to earth moving and drilling operations. Standard dust suppression operations such as the use of a water cart and minimising the area of disturbed land will be used. Once construction of the service borehole is complete, the disturbed non-operational area will be revegetated.

During the operational phase, the majority of service boreholes will have no air quality impacts. All plant and equipment will be appropriately maintained and operated to minimise exhaust emissions.

Where exposed areas have elevated dust generation potential, water carts will be used for suppression purposes. The frequency of movements will be adjusted based on the activities being undertaken, as well as weather conditions; including wind and temperature.

5.2.3 Soil and Water

Except as may be expressly provided by an Environment Protection Licence, Donaldson Coal shall comply with section 120 of the Protection of the Environment Operations Act 1997 (POEO Act 1997).

As is the Industry Standard, an Erosion and Sediment Control Plan will be prepared which:

- Is consistent with the requirements of Managing Urban Stormwater: Soils and Construction manual (Landcom 2008 or its latest version);
- Identifies activities that could cause soil erosion and generate sediment;
- Describes measures to minimise soil erosion and the potential for transport of sediment to downstream waters; and,
- Describes the location, function and capacity of erosion and sediment control structures; and describes what measures would be implemented to monitor and maintain the structures over time.

Given the nature of the soil the following control measures will be implemented to minimise the risk of soil degradation:

- Slashing will be used over removal of vegetation where practical;
- Enclosed above ground sumps will be used as a first preference to minimise excavation;
- Rehabilitation will be undertaken as soon as practical upon completion of drilling; and,
- Silt fences will be installed on the lower slopes of drill pads.

A Water Management Plan will be prepared which:

- Describes where water used for the project will be sourced. Water will generally be sourced from the mine water supply, or be transported to site from an authorized Hunter Water supply;
- Describes that all boreholes will be fully lined and grouted to avoid interaction with aquifers;
- Describes any drilling fluid additives that may be used in the drilling process; and,
- Describes that all boreholes will be comprehensively rehabilitated in accordance with prescribed standards once they are no longer required.

Donaldson will undertake the following mitigation measures to minimise the impacts on surface water:

- Sourcing required water from Abel's integrated water management system (including potable water);
- Implementing erosion and sediment control measures;
- Spill management kits will be located on site to enable immediate clean-up of spills; and,
- The capturing of drilling wastewater in sumps, following completion of drilling works at each site, the sumps will be pumped out and transferred to an approved waste facility.

Operational controls relating to groundwater management that will be employed by Donaldson Coal include the following:

- Using appropriately licensed drillers;

- Enclosed above ground sumps will be used as a first preference;
- The sealing of bores to prevent any ingress of water into the hole which could allow for cross contamination between aquifers; and,
- Grouting of holes on completion of testing.

Erosion, sediment control and water management measures for each service borehole project will be outlined in the site specific environmental assessment appended to this Management Plan.

5.2.4 Vegetation

Potential impacts from most service boreholes are confined to areas within a highly modified and disturbed environment. Where possible, Donaldson Coal will avoid clearing any native vegetation.

Service Boreholes are not likely to have a significant impact on any threatened species, population or ecological community through either direct or indirect impacts. A site specific ecological assessment of each service borehole project will be undertaken.

Given the nature of service boreholes it is considered unlikely that any significant ecological values will be impacted. Therefore, the following performance standards are proposed in regards to vegetation and fauna:

- All vehicles and machinery be restricted to the proposed access tracks and sites;
- Avoid shrubs, trees and fallen timber; and,
- Minimise clearance of native vegetation, endangered ecological communities or threatened species.

5.2.5 Heritage

Potential impacts from most Service Boreholes are confined to areas within a highly modified and disturbed environment. Where possible, Donaldson Coal will avoid clearing any cultural heritage sites or places.

Aboriginal cultural heritage issues will be assessed in accordance with the Abel Mine Aboriginal Heritage Management Plan. Where any Aboriginal sites are known to occur, specific management measures will be developed to avoid or minimise impacts on these sites. Registered Aboriginal Stakeholders will be provided site assessments and management prescription for their consideration prior to commencement of the service borehole construction.

5.2.6 Traffic

There will be a slight increase in traffic during the construction of boreholes which may include:

- Light vehicles for drilling personnel;
- Road registered water cart; and,
- Support vehicles such as float and tipper truck.

After construction there will be no general increase in traffic to the sites during the use and operation of the boreholes.

Ongoing visits to the sites would be for regular maintenance and inspection of the systems that utilise the boreholes.

5.2.7 Site Commissioning

Boreholes will require a drilling area of approximately 50m x 50m (0.25 ha) to be established, this will include the drill pad, parking area and access for water carts and other vehicles. The drill pad itself will be approximately 15m x 15m. Established tracks will be used to access sites. Some minor undergrowth will need to be removed from some sites. Site preparation for these boreholes will involve the following activities:

- The use of a slasher to prepare the drill site and access tracks to the site. Access tracks will be a maximum of 4m wide, some sections may require the placement of or removal of rock to allow safe access;
- Enclosed aboveground sumps will be used for all boreholes as a first preference;
- Barriers will be put in place to prevent stock accessing the drill sites;
- Suitable erosion and sediment control measures will be put in place prior to drilling commencing; and,
- It is anticipated that approximately ten days of drilling will be required at each borehole.

5.2.8 Site Decommissioning

Decommissioning at the site will involve the complete removal of all equipment and rehabilitation of the sites with native, local flora species (where appropriate). Boreholes will be rehabilitated in accordance with EDG01 Borehole Sealing Requirements on Land Coal Exploration.

The general aim of rehabilitation will be to return sites to their original form. Silt fencing will remain in place at all sites until the risk of erosion has been reduced to negligible by on site rehabilitation. Donaldson personnel will monitor the progress of rehabilitation at the sites until a stable landform has been achieved and ground vegetation has been successfully re-established.

5.2.9 Public Safety

Project sites will be fenced temporarily during the Construction Phase, with permanent fencing installed during the Operations Phase, to restrict site access from the public or livestock.

Access to sites will be via designated roads/ tracks and a Traffic Management Plan will be established prior to the commencement of works.

Communication will occur with any landholders potentially affected by service borehole projects to minimise any interactions or other safety risks.

6 CONSULTATION

6.1 Land Holder Agreements

Any foreseeable service boreholes are expected to be located on properties owned by Donaldson Coal. In situations where Donaldson Coal does not own the property, Donaldson Coal will seek an Agreement with all landholders whose property will be accessed for the proposed works. The Agreements will detail:

- Periods during which Donaldson Coal may access the land;
- Indicative location, size and details of works proposed on the property and any land to be utilised;
- Any conditions to be adhered to by Donaldson Coal at the request of the landholder;
- Any compensation to be paid to any landholder;

- The manner of resolving any dispute arising in connection with the arrangement; and,
- Any other matters agreed to between Donaldson Coal and the landholder.

6.2 Communication and Consultation Plan

Community and stakeholder consultation for the Donaldson Coal Project has been ongoing since the granting of ML 1461 (Donaldson Open Cut) and ML1618 (Abel Underground) mining leases. This has included the establishment and implementation of:

- Community consultation activities implemented throughout the exploration stage and environmental assessment process for the Donaldson Operations.
- A dedicated website (www.doncoal.com.au) and community Hotline (1800 111 271) has been established to enable residents of the area, interested persons and key community groups to remain informed of the Donaldson Coal Projects and contact representatives of Donaldson Coal; and,
- Donaldson Coal operates the Abel Community Consultative Committee (CCC), members of which include local residents, Donaldson employees and local government members. The CCC meets every three months to provide members with information on activities at Abel mine.

A communication and consultation plan will be prepared and implemented for service borehole sites to provide effective and timely communication of key messages to support the approval process and to provide opportunity for stakeholder input to design and operation.

6.2.1 Stakeholders

- Affected landowners/occupiers;
- Abel Community Consultative Committee;
- Relevant local government council, such as Cessnock Shire Council;
- Elected representatives;
- Donaldson Coal employees; and,
- The wider Donaldson Coal community.

7 ENVIRONMENTAL ASSESSMENT

A comprehensive Environmental Assessment (EA) will be undertaken for each new service borehole project.

These EA's will identify, investigate and justify a range impacts relevant to the service borehole. These EA's will generally include (where relevant):

- Surface Water;
- Groundwater;
- Air Quality;
- Greenhouse Gas;
- Terrestrial Flora and Fauna;
- Cultural Heritage;

- Noise; and,
- Traffic.

The site specific EA's and management prescriptions to manage the identified environmental issues will be progressively appended to the generic Service Borehole Management Plan as required.

7.1 Overview of General Management Measures

Table 1 summarises the general management measures applicable to the construction, operation and rehabilitation of service boreholes. These will be reassessed on a site by site basis.

TABLE 1. IMPACTS AND MITIGATION MEASURES

Impact	Management Measures
Surface Water	The work sites will be well maintained and include appropriate surface water control measures to direct flow and reduce runoff velocity. The sites will include sediment filters or fences and will direct clean water around the work area. Water will be supplied by Donaldson Coal or sourced from Hunter Water Corporation. Any bulk materials stored on the surface (e.g. fuel, soluble oils) will be stored in suitable tanks/bunds to prevent any contamination of surface waters. Any polluted surface waters will either: • Be captured on site and treated to an acceptable standard to discharge to the environment. Preferably, discharge will be to surrounding well vegetated paddocks, rather than directly to waterways; or, • Be captured on site then transported to an appropriately licensed facility for treatment and/or discharge.
Groundwater	The drilling process will use water of high quality to minimise any chance of pollution of ground water. The proposed boreholes will be cased (e.g. steel, fiberglass, plastic) and grouted. Above ground drilling sumps will be used. Additives to drilling water (e.g. Superfoam, Potassium Chloride, drilling muds) may be used in small quantities and do not cause contamination of aquifers during drilling operations. Boreholes will be plugged and rehabilitated including well capping, grouting and removal of surface infrastructure.

Impact	Management Measures
Air Quality	Watering of exposed areas and spraying of excavations and operational areas. Removal of replacement of stockpiled soil without undue delay. Full or partial enclosure of product stockpiles. In some instances, product (e.g. stone dust) may be stored in silos. Modification, reduction or stoppage of dust generating activities during high wind. Abel Mine Air Quality Management Plan.
GHG Emissions	Use of well serviced machinery and plant. Use of modern equipment that is energy efficient.
Terrestrial Flora and Fauna	Clearing of native vegetation will be avoided where possible by locating service boreholes in cleared areas. Native vegetation disturbance will be minimised. Any screen plantings and rehabilitation planting will use native vegetation endemic to the area. Compliance with Abel's Flora and Fauna Management Plan.
Cultural Heritage	Locations containing cultural heritage will be avoided when possible. Mark locations of Aboriginal sites on all relevant site plans and work instructions. Site to be separated by a physical barrier from construction activities. Construction vehicles to be confirmed to designated access tracks and work areas.
Noise	Select sites remote or naturally shielded from residential receivers. Install noise screens around any drilling rigs located in direct site to receivers. Consult with impacted noise receivers to determine suitable noise management measures to mitigate impacts. Use well maintained equipment. Manage the site so as to minimise/reduce need for trucks to reverse, therefore having their reversing alarm sound.
Waste	Waste will be reused, recycled or disposed of appropriately as per regulatory requirements.

Impact	Management Measures
Public Safety	Project sites will be fenced temporarily during the Construction Phase, with permanent fencing installed during the Operations Phase, to restrict site access from the public or livestock. Access to sites will be via designated roads/ tracks and a Traffic Management Plan will be established prior to the commencement of works. Communication will occur with any landholders potentially affected by service borehole projects to minimise any interactions or other safety risks.
Site Rehabilitation	Boreholes will be back filled and appropriately sealed. All work areas will be rehabilitated with appropriate pasture or native plant species following completion of works.

In general, potential environmental impacts from service boreholes are relatively minor and localised, and all of the impacts are managed by relatively standard techniques or implementation of contemporary standards.

8 REHABILITATION, MONITORING AND REPORTING

Rehabilitation of the service boreholes and ancillary infrastructure will be undertaken as soon as practical after the cessation of the operation of the borehole. Rehabilitation of the service borehole will:

- Comply with all regulatory requirements set out in the Abel Project Approval and other legislation with regards to rehabilitation management and monitoring including DTIRIS borehole sealing requirements;
- Ensure Donaldson Coal environmental and other relevant Strategies and Policies are met and upheld;
- Implement progressive rehabilitation of temporary construction-phase impacts associated with construction operations;
- Rehabilitation of all areas at the completion of operations;
- Outline monitoring and performance evaluation measures that are practical; and,
- Provide procedures associated with reporting the results of the monitoring.

The following sections provide some background and details on the management measures required to ensure rehabilitation is undertaken progressively during the construction phases of the project, as well as final rehabilitation once works are completed.

8.1 Legislative and Other Requirements

8.1.1 Legislative and Other Requirements

Legislation applicable to rehabilitation management includes, but is not limited to:

- Mining Act 1992;
- Mining Amendment Act 2008;
- Environment Planning and Assessment Act 1979 (EP&A Act);

- Protection of the Environment Operations Act 1997; and,
- Water Management Act 2000.

8.1.2 Mining Lease Requirements

Donaldson Coal Abel coal mine operations are governed by Mining Lease (ML 1618). In accordance with the ML it is required that, upon completion of operations, Donaldson Coal rehabilitate the ML and establish vegetation to the satisfaction of the Minister and other relevant stakeholders.

8.1.3 Guidelines and Standards

A number of guidelines and standards exist which govern and inform the mine closure and rehabilitation process. Donaldson Coal will always refer to the appropriate Standards and Guidelines available at the time. At present, relevant guidelines include:

- EDG01 Borehole Sealing Requirements on Land;
- EDG03 Guidelines to the Mining Rehabilitation and Environmental Management Process – MREMP Guideline;
- Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia);
- Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia);
- Strategic Framework for Mine Closure (ANZMEC); and,
- Other relevant DRE NSW guidelines.

8.1.4 Proposed Closure Approach

This rehabilitation and closure concept will be based on:

- The pre-existing environment of the proposed works;
- Management measures and criteria proposed in existing Environmental Management Plans; and,
- Current legislation, guidelines and approvals.

Site specific Environmental Management Plans for proposed service boreholes will address aspects of the progressive rehabilitation to be undertaken during the Construction and Operation Phases of the Project.

The extent and scope of final rehabilitation/closure works will be more clearly defined closer to the end of the Operation Phase in consultation with landowners. However, the default position is to rehabilitate the disturbed sites to its pre-project landform and land use.

8.1.5 Post Construction Rehabilitation

Construction works will initially be focused on the access tracks, drill pads and pipelines. The amount of clearing undertaken during construction will be minimised to reduce the project footprint at any time and subsequently the area that requires rehabilitation.

Where possible, rehabilitation works will be staged progressively to improve the ongoing aesthetics and environmental condition of the site, as well as limit the amount of rehabilitation required post-construction. The types of rehabilitation works that can be undertaken progressively during the Construction Phase will include:

- Rehabilitation of the disturbed areas alongside the access roads;
- Top soiling;
- Rehabilitating of any Construction Phase disturbance areas once they are no longer required; and,
- Remove equipment and temporary infrastructure as it is no longer required.

Progressive rehabilitation of the above items will include the stabilisation, re-shaping and vegetating of exposed areas.

During construction activities the maximum footprint will be exposed to enable construction of roadways and borehole construction pads. As soon as practical the exposed areas will be reduced to enhance stability and improve aesthetics.

At the completion of the Construction Phase the remaining rehabilitation activities will be undertaken, including:

- Removing drilling equipment and temporary infrastructure not required during the operational phase;
- Rehabilitation of any remaining Construction Phase disturbance areas including drilling sumps and some of the drill pad area; and,
- Rehabilitating the surface of buried pipeline routes.

Expected outcomes of the rehabilitation are outlined in the following sections.

8.1.6 Collection of Materials

Materials for rehabilitation will be stored throughout the Construction Phase. This includes topsoil which will be stockpiled on site.

8.1.7 Post-Construction Infrastructure & Landscape Rehabilitation Outcomes

At the completion of the Construction Phase, rehabilitation works associated with the sites of the proposed works will have been undertaken. At this time, the following outcomes should have been achieved.

Access Road Verges and Internal Roads

As sections of road are completed the exposed verges will be shaped to facilitate controlled runoff and minimise the potential for erosion.

When any internal roads required for the Construction Phase are no longer required they will also be rehabilitated by re-shaping to fit the existing landscape. However, access to the boreholes will still be needed for the operational phase.

Top Soil Stockpiling

It is likely topsoil will be required to enable pasture to establish on access track and drill pad verges. Topsoil will generally be sourced from the site as it will be stockpiled whenever clearing works are undertaken.

Topsoil stored for final rehabilitation will be re-vegetated and, once vegetation is established, temporary sediment controls removed.

Removal of Infrastructure

Throughout the Construction Phase a number of pieces of infrastructure and equipment will need to be stored on site. Temporary infrastructure will include demountable buildings and

sheds which will be required for people, equipment and materials. As parts of the construction are completed some of these facilities will no longer be required and therefore will be removed from site as appropriate.

Once drilling has been completed and the rig has been removed the construction area will be able to be reduced to the remaining infrastructure and the area outside the reduced footprint can be rehabilitated.

Drilling Sumps

All drilling sumps will be transportable above ground types. These sumps are self-contained and generally require no soil removal.

Pad Consolidation

Drill pads will be:

- Consolidated to an area sufficient for borehole infrastructure;
- Fenced to provide security from people or livestock; and,
- Top soiled and re-vegetated where access is no longer required for operational purposes.

8.1.8 Post-Construction General Rehabilitation Outcomes

At the completion of service borehole operations, all site and transmission/reticulation infrastructure will be removed.

Boreholes

All boreholes will be plugged with cement based grout to avoid any cross contamination or interference with aquifers. Plugging will be undertaken in accordance with *EDG01 Borehole Sealing Requirements on Land: Coal Exploration. Prepared by Mineral Resources New South Wales Environmental Management Guidelines for Industry.* NSW Department of Mineral Resources, 1 December 1997. The borehole will be removed approximately 2m below ground level.

Landform Establishment

Infrastructure pads will be contoured to match the pre-project landform, unless otherwise requested by the landowner or infrastructure owner.

Pasture Establishment

The re-contoured area will be covered with top soil and then spray grassed with a pasture mix. All disturbed land will be re-vegetated to a self-supporting and stable landform.

8.1.9 Final Land Use Objectives

At this stage it is anticipated that post-rehabilitation land use for the service borehole sites would be rural agricultural as that is the pre-existing use at most potential sites. However this is subject to the legislative, stakeholder and landowner requirements at the time of rehabilitation.

8.1.10 Monitoring & Reporting

Construction Phase

During the construction phase the Project Manager will ensure weekly inspections are undertaken to determine the success of management measures in place for aspects including sedimentation, erosion, and vegetation. These inspections will incorporate criteria extracted from key commitments in Environmental Management Plans. Criteria will include:

- Erosion controls in are in place and maintained to prevent erosion;
- Minimisation of cleared areas and the undertaking of progressive rehabilitation where appropriate; and,
- Soils are separated and stockpiled to enable reuse for rehabilitation works.

In general the success of rehabilitation will be determined by achieving ground cover sufficient to provide a stable, non-erodible land surface that does not require routine maintenance.

Operation Phase

During the Operation Phase the environment and community responsibilities for the project site will be managed by the Environmental and Community Relations Manager. By the Operation Phase the cleared footprint will have been reduced as the extended construction area will have been progressively rehabilitated during the Construction Phase.

During the Operation Phase the rehabilitation monitoring required for the sites will have reduced significantly. Inspections will continue to be undertaken of the site and general maintenance of drainage facilities, vegetation and weed management will occur.

Project Completion

At the completion of the Operation Phase, final rehabilitation for the sites will occur. Inspections will continue to be undertaken of the site and general maintenance of drainage facilities, vegetation and weed management will occur until the site is deemed to be stable and self-supporting.

Reporting

Rehabilitation reporting will be in accordance with the consent conditions of the Abel Project Approval.

Rehabilitation programs undertaken for the prior year and expected for the following year will be reported in the Annual Environmental Manager Report.

8.2 ENVIRONMENTAL MONITORING

Monitoring that is described in Environmental Management Plans developed in accordance with the requirements of the Abel Project Approval (such as those for noise, surface water, air quality and greenhouse gas and waste) may also be applicable.

8.2.1 Noise

Due to the short term nature of the Construction Phase and the significant mitigation measures that will be implemented, it is not proposed to conduct attended noise monitoring for most service boreholes unless complaints are received.

If any noise complaints are received by Donaldson Coal in regard to construction or operational aspects of this project, then attended noise monitoring will be undertaken to determine if additional mitigation measures will be implemented.

Where service boreholes are co-located with more significant surface mine infrastructure (e.g. pit tops, upcast vent shafts) then regular noise compliance monitoring will be undertaken in accordance with the Abel Noise Management Plan.

Noise barriers may be installed where projects may have impact on any adjacent residences.

8.2.2 Water

Drilling water tanks will be inspected on a weekly basis as well as after every significant storm and rainfall event (i.e. >10mm in a 24hour period) to ensure the tanks continue to operate satisfactorily and to perform any maintenance work and repairs that may be required. Regular monitoring and maintenance will include:

Weekly inspection of site drainage and erosion/sediment controls;

Repairs of areas which may become unstable following periods of high rainfall; and,

Treatment and disposal of drilling fluid additives will be managed on a site by site basis.

Where any storm water is captured on site, monitoring for pH, Electrical Conductivity and turbidity will generally be implemented before any water is released to the environment. Site specific discharge limits will be proposed where water is discharged directly to waterways.

Where water is captured and is required to be transported offsite for treatment or disposal, then a monitoring system will be implemented to ensure that the tank does not overflow. Specific water quality and flow monitoring requirement may be necessary.

During construction activities, such as the construction of drilling pads and roadways, environmental controls including diversion drains and sediment fences will be installed to manage water, erosion and sedimentation. Sites will be protected by temporary fencing or similar to reduce the potential for livestock accessing construction sites and destabilising such controls.

8.2.3 Cultural Heritage

Avoidance and physical protections for cultural heritage sites will be monitored on a weekly basis during the construction phase of service boreholes. These sites will be visited during the operational phase on an as needed basis.

The following emergency response procedure will be implemented if Aboriginal objects are discovered during the construction of the project in accordance with the Abel Aboriginal Heritage Management Plan.

A. In the event that suspected Aboriginal objects are encountered during construction, all work in the area, and all work that may cause further harm, must cease immediately;

B. If there is doubt about the item encountered being an Aboriginal object, a professional archaeologist should be briefed to attend the site and determine this;

C. If there is no doubt about the items being Aboriginal objects the following people must be contacted:

   - An archaeologist; and,
   - Relevant Local Aboriginal Land Council (LALC).

D. The archaeologist, LALC and other registered Aboriginal stakeholders must determine the objects' significance, the extent of harm, and whether or not the harm will continue if construction proceeds;

E. The following agencies must be advised of the discovery, and any plans for mitigation or avoidance of further harm should be also outlined in the advice:

   - Office of Environment and Heritage; and,
   - Department of Planning.

F. Steps to avoid or mitigate further harm should be formulated in writing, in an object/site specific management plan, which must at least include an appropriate level of recording and documentation of the object/site;

G. Work at the site can only resume once a site specific management plan is in place, and written advice from the archaeologist and project manager is completed.

Any identified Aboriginal cultural heritage sites will be marked prior to the commencement of construction activities to prevent any impacts from such activities.

8.3 REPORTING

The details of the implementation of the Service Boreholes Management Plan and the performance of its vegetation, air, noise, cultural heritage, water and erosion and sediment controls aspects will be reported in the Abel AEMR Annual Report. The reporting requirements relating to this project are detailed in the Environmental Management Strategy.

9 REVIEW

This plan will be reviewed as necessary, including regular periodic reviews and when inspections or monitoring demonstrate that the impacts are such that a review is warranted.

10 REFERENCES

- Abel Noise Management Plan
- Abel Air Quality Management Plan
- Notice of Modification (MOD 3) to Project Approval 05_0136 for the Abel Coal Project - 2013
- Site (Abel) POEO Licence # 12856 Environment Protection Authority.
- Department of Resources and Energy (2012) Borehole sealing requirements on land: coal exploration. Environmental Management Guidelines for Industry EDG01.