



**Sustainable Development Plan**

# **Grout Remediation Plan**

**West Wallsend Colliery**

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## 1. BACKGROUND

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West Wallsend Colliery (WWC) undertakes its mining operations in accordance with the sites Project Approval (PA\_09\_0203), Environment Protection License (EPL1360), Environmental Assessment (West Wallsend Colliery Continued Operations Project 2010) and Subsidence Management/Extraction Plans. As outlined in the WWC Environmental Assessment, the majority of the WWC's underground mining area is located within the Sugarloaf State Conservation Area (SSCA).

The Environmental Assessment for continued operations, predicted subsidence cracking within the Sugarloaf State Conservation Area as part of its detailed Subsidence Assessment for the operation.

Subsidence remediation activities coordinated by WWC are undertaken in accordance with the approved remediation management methods listed in the sites Environmental Assessment and subsequent Subsidence Management/ Extraction Plans required under the site's Project Approval. As outlined in these respective management plans, remediation of surface cracking on gently sloping terrain with vehicular and equipment access is generally undertaken using earthworks machinery. In areas where access is limited or in steeper terrain WWC has utilised a contractor Orica Australia (Orica) to assist with filling selected surface cracks using grout.

Remediation activities undertaken within the SSCA are undertaken in consultation with the OEH (through a consent with the National Parks and Wildlife Service). Grout products used by Orica within the SSCA to fill surface cracking in the SSCA have been chosen in consultation with and approved by OEH.

WWC has developed and maintained a site specific surface grouting procedure to assist with providing guidance for remediation activities. Prior to the remediation of each surface cracking area WWC adopts a risk based approach to managing hazards associated with any work area.

Since April 2012, WWC has successfully remediated surface cracking across Longwalls 38 - 41 using grouting techniques within the SSCA in accordance with its existing procedures.

The grouting activities within the SSCA generally involve the establishment of a grout mixing site (adjacent existing access tracks/trails) and the installation of poly pipelines, these are run from the mixing site to the location of the subsidence cracks requiring remediation.

Orica has been the site's principle grouting contractor for subsidence grouting remediation works in the SSCA during this time.

Remediation of surface cracking adjacent Longwall 41 commenced in December 2012. Since March 2013, Orica had been undertaking grouting activities on a subsidence crack adjacent to LW41 within the SSCA (Refer to **Figure 1**). Orica had been successfully remediating the above mentioned subsidence crack adjacent Longwall 41 in accordance with the sites approved surface grouting procedure.

At approximately 10.00am on 4 June 2013, Orica, WWC's principle subsidence grouting contractor, identified a potential leak of the sites approved grouting product (Air-O-Cem) downslope of their work

site in the Sugarloaf State Conservation Area. Following confirmation of the incident, notifications to the relevant authorities were made by Oceanic Coal Australia Ltd (OCAL).

**Figure 1** shows the location of the grout affected area within the SSCA.

## 1.1 Existing Environment

The Sugarloaf State Conservation Area (SSCA) was created in 2007 and covers an area of approximately 3,937Ha. The conservation area extends from Seahampton in the North to Awaba in the South. The area is predominantly vegetated with forest consisting of several general vegetation communities. The incident area is located within the foothills of the Sugarloaf Range within the Hunter Sub-region of the Sydney Basin Bioregion (Thackway and Cresswell, 1995) and the Gosford-Cooranbong Coastal Slopes landscape (OEH, 2007).

As outlined in WWC's detailed incident report, the affected area is estimated to extend approximately 250m downslope of a cliffline feature within the SSCA and is generally confined to an ephemeral unnamed drainage channel within the Cockle Creek Catchment. The terrain within the affected area varies from gentle slopes (towards the bottom of the affected area) to moderate sloping terrain (on the foothills toward the top of the affected area).

Based on vegetation mapping undertaken during the WWC continued operations environmental assessment (Umwelt 2010) and a targeted ecological assessment (Kleinfelder 2013) of the affected area (Refer to **Appendix 1**) the dominant vegetation community within the affectation area is the Hunter Valley Moist Forest (Dry and Mesic Variants).

As described by Kleinfelder, the proposed access track into the remediation area is predominantly Hunter Valley Moist Forest – Dry Variant. The floristic description of this variant is outlined below:

**Floristic Description:** The dominant canopy species are *Corymbia maculata* (Spotted Gum) and *Corymbia gummifera* (Red Bloodwood). Other canopy species which occur to a lesser extent include *Eucalyptus punctata* (Grey Gum) and *Eucalyptus acmenoides* (Red Mahogany). A sparse midstorey of *Allocasuarina torulosa* (Drooping Sheoak) and *Glochidion ferdinandi* (Cheese Tree) also occurs. Shrub species include *Leptospermum trinervium* (Flaky-barked Tea-tree), *Leptospermum polygalifolium* (Lemon-scented Tee-tree), and *Pittosporum undulatum*. The upper ground layer is dominated by *Pteridium esculentum* (Bracken Fern) and *Lomandra longifolia* (Spiny-headed Mat-rush). Other ferns include *Adiantum aethiopicum* (Common Maidenhair). The dominated grass species include *Imperata cylindrica* (Blady Grass), *Entolasia stricta* (Wiry Panic) and *Themeda australis* (Kangaroo Grass).

A typical visual description of this community is provided in **Plate 1** below:



**Plate 1** Hunter Valley Moist Forest – Dry Variant

As described by Kleinfelder, the affected section of the drainage channel is predominantly characterised by Hunter Valley Moist Forest – Mesic Variant. The floristic description of this variant is outlined below:

**Floristic Description:** The dominant canopy species are *Corymbia maculata* (Spotted Gum) and *Eucalyptus punctata* (Grey Gum). A mesic midstorey occurs which is dominated by species such as *Acmena smithii* (Lilly Pilly), *Eupomatia laurina* (Bolwarra), *Pittosporum revolutum* (Rough-fruit Pittosporum), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Commersonia fraseri* (Brush Kurrajong). The ground layer is dominated by *Pteridium esculentum* (Bracken Fern), *Lomandra longifolia* (Spiny-headed Mat-rush) and *Adiantum aethiopicum* (Common Maidenhair). Other ferns include *Asplenium australasicum* (Birds Nest Fern) and *Doodia aspera* (Rasp Fern).

A typical visual description of this community is provided in **Plate 2** below:



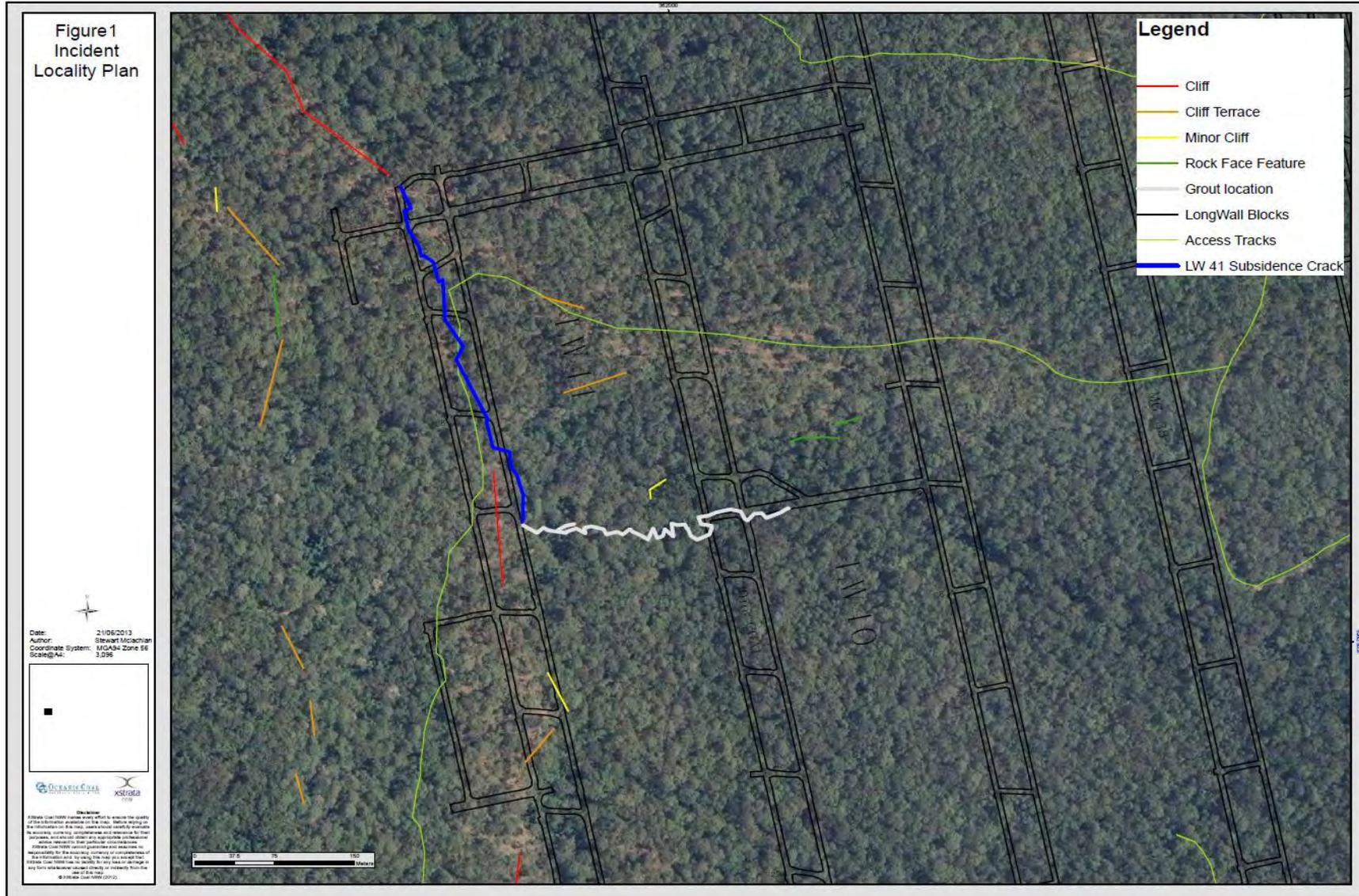
**Plate 2** Hunter Valley Moist Forest – Mesic Variant

It was also identified by Kleindfelder, during their survey that a significant portion of the drainage channel and the proposed access track is dominated by the invasive weed species *Lantana camara*.

## 1.2 Regulatory Context

As outlined in **Section 1.0** WWC undertakes its mining operations in accordance with the sites Project Approval (PA\_09\_0203), Environment Protection License (EPL1360), Environmental Assessment (West Wallsend Colliery Continued Operations Project 2010) and Subsidence Management/Extraction Plans.

This Remediation Plan has been developed and will be implemented in accordance with the Remediation Direction issued by the OEHL (Notice DOC13/84676). Refer to **Appendix 2**.



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## 2. INTRODUCTION

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### 2.1 Key Objectives and Purpose

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The Key Objectives and Purpose of the Grout Remediation Plan are listed below:

- Outline identified remediation options for the removal of the grout product from the affected area of the SSCA.
- Identify and discuss the preferred remediation option based on site investigations.
- Outline associated activities required to successfully implement the remediation plan.
- Identify and outline the potential environment and community impacts regarding the remediation plan and the mitigation measures to be implemented to reduce these impacts.
- Outline the proposed operational planning, monitoring, reporting and timing of the remediation activities.
- Outline how the remediation activities will be carried out to an extent as far as possible to restore the natural, environmental, and cultural values of the site in a controlled and sustainable manner to allow for a net environmental benefit from the remediation works.
- Satisfy the Direction to Carry Out Remedial Works DOC 13/33914 issued by OEH.
- Clearly outline the responsibilities of all parties associated with the implementation of the Remediation Plan.

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## 3. REMEDIATION OPTIONS

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### 3.1 Remediation Options Investigated

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Following the identification of the incident, OCAL, in consultation with Orica, commenced investigations into potential remediation options for the affected area. Following investigations of the potential remediation options for the grout affected area, OCAL and Orica confirmed the following potential remediation options were possible for the site:

1. Manual breakup of grout material and removal by Capalotta Cap Bora Super Sucker heavy vehicle.
2. Manual breakup of grout material and removal by person and/or All Terrain Vehicle (ATV).
3. Manual breakup of grout material and removal by heavy vehicle.
4. Manual breakup of grout material and removal by helicopter.
5. Mechanical breakup of grout material and removal by earthmoving equipment/heavy vehicles
6. Mechanical breakup of grout material and removal by helicopter.
7. Leaving the grout in situ and allowing it to weather naturally.

These options are discussed in further detail over page:

### 3.1.1 **Option 1 - Manual breakup of grout material and removal by Capalotta Cap Bora Super Sucker heavy vehicle**

This remediation option involved the manual break up of grout material using various types of non mechanical equipment and then pulverising it into a powder like state. This would potentially allow for the grout material to be 'sucked' approximately 500 metres across the State Sugarloaf Conservation Area to the nearest possible potential truck accessible access track on an adjacent private landholders property.

JR Richards, a waste services provider was engaged to provide advice into the practicality and feasibility of this removal method. Schematics of the typical 'sucker truck' to be used (Cap Bora) were provided and are displayed below in **Figure 2**.

Upon further investigation, the waste services provider was not able to provide assurance as to the design capability of the Cap Bora for this particular application due to the difficult terrain. It was also recognised that significant upgrades to existing access tracks would be required to provide safe and stable access for this equipment. The advantages and disadvantages of this option are discussed below:

**Figure 2:**

Vacuum Loader - Cap Bora Excavation Unit



**Tank / Debris - capacity 11 cubic metres**

- Tipping with dual-action hydraulic cylinders
- Rear door hinged with hydraulic opening
- 8" pneumatic exhaust valve.
- De-cant / Discharge of sludge / liquids 6" outlet
- Vacuum shut-off via electronic tank sensor when tank full with liquid

**Vacuum System - High capacity tri-lobe Hibon Rotary blower**

- 9000m<sup>3</sup>/h ( 5301cfm)
- Innovative sound proofing to reduce noise emissions
- Large filter bag house ( ref filtering system)
- Noise levels below 85dB(A) @ 1 metre within working RPM rang

**Unloading / Pneumatic Unloading system (Discharge)**

- Special tipping body system allows unloading over standard mobile skip bins and bunded areas, which can be filled up completely without moving the vehicle
- Unloading from a maximum height of 2 metres
- Pneumatic / Venture discharge allows vehicle to unload dry / wet / sludge material up to a height of 40 metres – 1bar / 102.9 kpa
- Eliminate dust contaminates whilst unloading using special equipment



Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Removal method would require minimal disturbance to the SSCA during grout removal activities.</li> <li>• Would reduce potential for manual handling injuries as material would be transferred via mechanical means.</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary investigations confirmed that the required application was likely to fall outside of the equipments design parameters.</li> <li>• Noise impacts from the daily use of sucker truck could potentially impact on the local community</li> <li>• Would require the grout to be pulverised into a powder like state prior to removal. This would potentially increase the risk of the grout material becoming airborne or mobilised in the drainage channel during removal.</li> </ul>

### 3.1.2 **Option 2 - Manual breakup of grout material and removal by person and/or ATV**

This remediation option involved the manual break up of grout material using various types of non mechanical equipment and then collecting the material into bags. The bags would then be either dual lift carried by person or transported from the affected area approximately 500m by a small all terrain vehicle (ATV), to the nearest possible potential truck accessible access point on an adjacent private landholders property. The advantages and disadvantages of this option are discussed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Removal method would require minimal disturbance to the SSCA during grout removal activities.</li> <li>• Use of ATV's can reduce risk of manual handling injuries in difficult terrain.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for manual handling injury when dual lifting and transporting bags of waste grout by foot from the affected area over undulating terrain.</li> <li>• Potential for unplanned movement/ injury when using an ATV to remove grout from the affected area over undulating terrain.</li> <li>• Dual lift carry would be extremely time consuming and would require a substantial increase in workforce numbers to maintain efficient progress with remediation activities.</li> <li>• Increased potential for weed spread</li> </ul>

	<p>through the use of an ATV.</p> <ul style="list-style-type: none"> <li>Track clearing for access to the affected area.</li> </ul>
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### 3.1.3 **Option 3 - Manual breakup of grout material and removal by vehicle**

This remediation option involved the manual break up of grout material using various types of non mechanical equipment and then collecting the material into bags. A formed access track would be constructed into and adjacent the affected area to create access for heavy and light vehicles into the site. The bags of grout would be loaded into vehicles adjacent the affected area for transport offsite. The advantages and disadvantages of this option are discussed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>Construction of a formed access track into the affected area would allow ready access for vehicles into the area which would in turn reduce the time required to transport the waste grout from the immediate area.</li> <li>Construction of a formed access track into the affected area would improve emergency response capability for emergency services and or employees/contractors.</li> <li>Construction of a formed access track into the affected area would reduce distance needed to be walked by site employees/contractors.</li> </ul>	<ul style="list-style-type: none"> <li>Would require moderate ground disturbance works within the SSCA during the construction period of the access track due to difficult terrain.</li> <li>Increased disturbance footprint could result in surface water quality impacts from erosion and sedimentation of exposed areas.</li> <li>Additional surface disturbance could result in localised spreading of weeds from vehicle movements.</li> </ul>

**3.1.4 Option 4 - Manual breakup of grout material and removal by helicopter**

This remediation option involves the manual break up of grout material using various types of non mechanical equipment and then bagging the grout into bags suitable for heli-lifting. The grout bags would then be heli-lifted to a location on an adjacent landholders property. The grout bags would then be loaded onto trucks and transported to an appropriately licensed waste facility by a licensed waste contractor. The advantages and disadvantages of this option are discussed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Removal method would require minimal disturbance to the SSCA during grout removal and transport activities.</li> <li>• Use of heli-lifting technique would reduce risk of manual handling injuries associated with carrying bags out by foot.</li> <li>• Heli-lifting has been proven to be an efficient access technique in remote areas.</li> <li>• Doesn't require the construction of formed access tracks into the affected area which reduces the disturbance footprint for the remediation activities.</li> <li>• Less intrusive method of remediation with minimal impact on surrounding environment.</li> <li>• Manual removal allows for the activity to be controlled in a sustainable manner as opposed to mechanical means.</li> <li>• Manual removal will ensure that care can be taken around sensitive areas to minimise disturbance within the drainage channel.</li> </ul>	<ul style="list-style-type: none"> <li>• Option still requires access into the affected area by foot across undulating terrain which has the potential for injury.</li> <li>• Increased noise impacts on surrounding community during heli-lifting campaigns</li> <li>• Increase visual exposure to the local community through the use of helicopters.</li> <li>• Potential for increased dust generation from heli-lifting process.</li> <li>• Manual removal can be quite time consuming which could delay the time taken to complete the works.</li> <li>• Additional risks associated with introducing airborne equipment to the removal process.</li> </ul>

**3.1.5 Option 5 – Mechanical breakup of grout material and removal by earthmoving equipment/heavy vehicles**

This remediation option involved the mechanical break up of grout material using various types of mechanical equipment (small earthmoving equipment, jackhammers, power tools etc). The broken up material would then be collected into bags. A formed access track would be constructed into and adjacent to the affected area to create access for earthmoving equipment as well as heavy and light vehicles into the site. The bags of grout would be loaded into vehicles adjacent the affected area for transport offsite. The advantages and disadvantages of this option are discussed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Construction of a formed access track into the affected area would allow ready access for vehicles into the area which would in turn reduce the time required to transport the waste grout from the immediate area.</li> <li>• Construction of a formed access track into the affected area would improve emergency response capability for emergency services and or employees/contractors.</li> <li>• Construction of a formed access track into the affected area would reduce distance needing to be walked by site employees/contractors.</li> <li>• The use of small earthmoving machinery to break the grout up in situ could be undertaken very quickly.</li> </ul>	<ul style="list-style-type: none"> <li>• Would require moderate ground disturbance works within the SSCA during the construction period of the access track due to difficult terrain.</li> <li>• Mechanical breakup of the grout material increases the potential for impacts on the morphology of the drainage channel (channel bed, embankments, and flow control structures).</li> <li>• Increased disturbance footprint could result in surface water quality impacts from erosion and sedimentation of exposed areas.</li> <li>• Increased potential for injury with mechanical equipment in close proximity to workers.</li> <li>• Additional surface disturbance could result in localised spreading of weeds from vehicle movements.</li> </ul>

**3.1.6 Option 6 – Mechanical breakup of grout material and removal by helicopter**

This remediation option involves the mechanical break up of grout material using various types of mechanical equipment (small earthmoving equipment, jackhammers, power tools etc). Small earthmoving machinery would be tracked into the affected area across the undulating terrain. The broken up material would then be collected into bags suitable for heli-lifting. The grout bags would then be heli-lifted to a location on an adjacent landholder’s property where they would then be loaded onto trucks and transported to an appropriately licensed waste facility by a licensed waste contractor. The advantages and disadvantages of this option are discussed over page:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• The use of small earthmoving machinery to break the grout up in situ could be undertaken very quickly.</li> <li>• A formed access track isn't necessarily required for this option as the equipment could be tracked into the affected.</li> <li>• Use of heli-lifting technique would reduce risk of manual handling injuries associated with carrying bags out by foot.</li> <li>• Heli-lifting has been proven to be an efficient access technique in remote areas.</li> <li>• Doesn't require the construction of access track into the affected area for Heli-lifting which reduces the disturbance footprint for the remediation activities .</li> </ul>	<ul style="list-style-type: none"> <li>• Option still requires access into the affected area by foot across undulating terrain which has the potential for injury.</li> <li>• Mechanical breakup of the grout material increases the potential for impacts on the morphology of the drainage channel (channel bed, embankments, and flow control structures).</li> <li>• Potential increase for erosion due to equipment tracking adjacent the drainage line.</li> <li>• Potential for finite material to be left behind.</li> <li>• Increased potential for injury with mechanical equipment in close proximity to workers.</li> <li>• Tracking of earthmoving equipment would require a moderate amount of vegetation clearing during access into and adjacent the affected area to allow for this equipment to be used.</li> <li>• Increased noise impacts on surrounding community during heli-lifting campaigns.</li> <li>• Increase visual exposure to the local community through the use of helicopters.</li> <li>• Potential for increased dust generation from heli-lifting process.</li> <li>• Additional risks associated with introducing airborne equipment to the removal process.</li> <li>• Modified surface water flows within the drainage channels.</li> </ul>

**3.1.7 Option 7 - Leave the grout in situ, undertake channel stabilisation activities and allow it to naturally weather.**

This remediation option involved leaving the grout material in situ within the drainage channel, undertake channel stabilisation works and allowing it to naturally weather.

Where required, it was proposed that a series of strategic tree felling works adjacent to the drainage channel. This vegetation would then be laid across the drainage channel to slow the water during rainfall events to assist with reducing potential for erosion, allowing for bioaccumulation to occur and eventually vegetative matter to cover the grout material in time. The advantages and disadvantages of this option are discussed below:

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Low level of disturbance within the SSCA required.</li> <li>• Tree felling can speed up the bioaccumulation process and can provide potential habitat for fauna.</li> </ul>	<ul style="list-style-type: none"> <li>• This option could be perceived by the community as “doing nothing”.</li> <li>• The grout material, while inert in nature is a foreign material which is not consistent with other materials within the SSCA.</li> <li>• Visual impact to the local community using the SSCA.</li> <li>• Could potentially impact on surface water quality within the drainage channel following rainfall events.</li> </ul>

### 3.2 Preferred Remediation Option

Following a detailed assessment of all options it was decided that the preferred option was **Option 4** for the following reasons:

- This option requires minimal surface disturbance works to achieve the desired outcome.
- Use of heli-lifting technique would reduce risk of manual handling injuries associated with carrying bags out by foot.
- Heli-lifting has been proven to be an efficient access technique in remote areas.
- This option does not require the construction of an access track into the affected area for Heli-lifting which reduces the total disturbance footprint for the remediation activities.

Further detail on the preferred option and how it was implemented throughout the Trial Phase of the GRP is outlined below in **Sections 3.2.1 to 3.4**.

### 3.2.1 Grout Removal - Trial Phase

In accordance with the approved Grout Remediation Plan, grout removal activities commenced on 25 October 2013 as part of the Trial Phase using the methodology outlined in Option 4. The Trial Phase was successfully completed on 28 November 2013. Provisional signoff of the Trial Phase area was formally granted by OEHL on 5 December 2013. A report on the key findings and learning's from the Trial Phase was developed by Oceanic Coal and submitted to OEHL on 5 December 2013. This GRP has been updated based on the key findings and learning's from the Grout Remediation Trial Phase.

### 3.2.2 Operational Planning

Given the complex and unique nature of this remediation project, careful consideration and planning of operational requirements was critical to achieving the outcomes of the Grout Remediation Plan. As outlined in **Section 3.2.1**, prior to commencing grout removal activities under the Grout Remediation Plan, WWC, in consultation with OEHL developed a detailed Operational Project Plan (OPP) for the Trial Phase area of remediation activities. The OPP provided the operational framework for the remediation activities to be undertaken during the Trial Phase and provided the following:

- Detailed key actions/activities/milestones required to achieve the outcomes of the GRP; and
- Outlined estimated completion timeframes for the various actions/activities/milestones required under the GRP;

The OPP for the remediation project has been updated taking into account the key findings and learning's from the Trial Phase. The updated OPP for the remainder of the remediation area was provided to OEHL on 5 December 2013 for approval. The OPP is a dynamic project management tool that is regularly updated and managed by the OCAL Grout Remediation Project Supervisor to assist with tracking remediation progress. This OPP will continue to be used for the remainder of the remediation program.

### 3.2.3 Grout Removal Process

Physical grout removal activities within the SSCA commenced on 25 October 2013. The methodology adopted for the manual breakup and removal of grout was generally consistent with Option 4 of the GRP - Manual breakup of grout and removal by helicopter. Based on the outcomes from the trial phase the following equipment will be used to breakup and remove the grout material from the remainder of the affected drainage channel into Bulk bags ahead of heli-lifting activities:

- Crow bars – Bulk removal
- Breaker bars – Bulk removal
- Pelican Picks– Bulk removal
- Mattocks– Bulk removal
- Shovels– Bulk removal
- Hand Picks and Screw Drivers– Bulk removal
- Chisels– Bulk removal
- Wire brushes– Fine removal
- Battery powered tools – Bulk and Fine removal
- Dust pan and brooms – Fine removal
- Blower Vacs – Fines removal
- Scoops – Fines removal
- Misting spray bottles – Dust control
- Rakes – Leaf Litter / Fine removal

- Storage buckets (20l) – Grout transport
- Brattice/Tarps– Grout wet weather management
- Bulk Bags – Grout storage and transport

Grout removal during the trial phase was generally undertaken in two teams (a bulk removal team and a fines removal team) consisting of between 4 to 6 men in total. It is proposed that this manning structure remain in place for the remainder of the work program as it was proven to be successful. Additional labour will be sourced where greater productivity can be achieved and environmental conditions allow. Grout removal and ancillary activities will continue to be undertaken during daylight hours Monday to Friday for the remainder of the program.

As displayed in **Figure 4** the remediation project area has been broken up into 20 metre sections. OCAL/Orica will obtain approval from OEH to commence grout removal activities in 60m blocks (3 sections at a time) for the remainder of the remediation program. After each section has been completed, OCAL/Orica will obtain provisional signoff of each section from OEH as works progress. Once provisional signoff has been provided by OEH for a section, an additional 20m section will be added in front of the existing active work area to keep removal activities progressing.

The grout material will continue to be placed in bulk heli-lift bags following its removal from the drainage channel. These bags will be positioned at the designated heli-lifting locations as determined by OCAL, Orica and OEH.

During the trial phase it was identified that wet weather impacted on grout removal productivity. It was identified that following rainfall events the drainage channel would hold water in pooled sections and for limited periods water could be seen flowing through the site. Grout removal was generally suspended during these periods to reduce the potential for fines to be transported downstream. To reduce delays associated with wet weather conditions, where required, water pooled in the work area will be transferred below the site in consultation with OEH to allow works to progress.

Pre and post remediation Photos from Section 1 following the trial phase are shown below (**Photos 1 and 2**):



**Photo 1** - Pre Remediation Photo Section 1 monitoring point (3 October 2013)



**Photo 2** - Post Remediation Photo Section 1 monitoring point (4 December 2013)

### 3.2.4 Heli – Lifting

Approximately 25 potential heli-lift locations were identified within the affected section of the drainage channel by a specialist heli-lifting contractor as part of the development of the original GRP.

These heli-lift locations were based on the existing topography and the canopy spans of surrounding vegetation and are generally located adjacent or within the affected section of the drainage channel.

During the Trial Phase, waste grout bags were successfully heli-lifted from existing pre determined locations to a suitable cleared area on an adjacent private landholding (Refer to **Figure 3** and the Trial Phase Report).

Depending on remediation progress it is expected that multiple heli-lift campaigns will be required throughout the remainder of the remediation project. Based on the outcomes from the trial phase heli-lifting these campaigns are expected to be relatively short in duration and are unlikely to impact on the surrounding community due to limited time required to undertake the works.

Although it is not expected that equipment/supplies will be required to be heli-lifted into or out of the work area for the remainder of the program it is possible that this may need to occur as remediation works progress and will be undertaken where required in consultation with OEH. Heli-lifting of equipment/supplies into or out of the work area will be assessed on a case by case basis and appropriate controls will be implemented to minimise the impacts on the surrounding environment and local community should this be required.

### 3.2.5 Waste Characterisation, Disposal and Tracking

Based on the products MSDS, the grout material has been assessed by a waste management services provider and is characterised as general waste – non putrescible.

Each bag of grout material that is removed from the affected area will be transported to a licensed waste disposal facility by a licensed waste contractor. The volumes and tonnages of the waste material will be recorded and tracked in accordance with the OEH Direction.

### 3.3 Ancillary Activities

In order for OCAL/ Orica to achieve the outcomes of this remediation plan the following ancillary activities have been and will continue to be undertaken:

#### 3.3.1 Rockfall Stabilisation Works

As identified at the time of the incident, rockfall stabilisation activities were required on an affected section of cliffline and steep slope immediately above the top section of the grout affected drainage channel prior to works commencing in this area. These works have already been successfully undertaken by a specialist contractor and involved the controlled displacement of rocks above the work area to reduce the potential of these rocks rolling downslope when grout removal activities are being undertaken in this area. Future stabilisation activities may need to be undertaken during the remainder of the program in consultation with OEH if required using a similar methodology. The approximate area where the works were undertaken is shown in **Figure 4**.

#### 3.3.2 Vegetation Clearing / Minor Ground Disturbance

Selective brush cutting/trimming of vegetation as well as the removal of selected logs and rocks along the access track, heli-lift locations and sections of the affected channel have been undertaken as part of the trial phase. Vegetation clearing was undertaken by suitably qualified bush regeneration contractors ahead of grout removal works. All vegetation to be modified or removed was marked and assessed by OEH prior to works commencing. This ensured that any clearing of vegetation was undertaken in a controlled and environmentally responsible manner. As highlighted in **Appendix 1** the extent of clearing along the access track was minimised and primarily required to allow safe, unobstructed access for personnel and equipment to access the remediation area. Where possible, the clearing of mature trees (>30cm diameter) was and will continue to be avoided. No clearing of mature trees was undertaken without consultation and approval from OEH and all clearing activities were undertaken in accordance with the recommendations identified in **Section 3.6** of **Appendix 1**.

The original GRP assumed that the clearing of heli-lift locations would involve brushcutting/trimming of vegetation in areas approximately 3-4m<sup>2</sup> and would be confined to low and mid storey vegetation where possible to allow for direct line of sight from the helicopter to the ground. During the trial phase however it was determined, through an independent aviation audit that an area of approximately 5m<sup>2</sup> around heli-lift locations would be required to provide adequate line of sight. In the field it was evident that this recommendation required the trimming of canopy vegetation which was not anticipated at the time of writing the initial GRP. Approval was subsequently sought and granted by OEH during the trial phase to allow for these trimming works to be undertaken. It is anticipated that these trimming activities will be required for future heli-lift locations throughout the remainder of the remediation project. Where possible and safe to do so, branches that are impacted by trimming activities will be placed outside the drainage channel to limit impact on the channel bed and embankments. Any hollows that are identified during pre clearance inspections will be offset with nest boxes by OCAL/Orica throughout the remediation campaign.

Although approximately 25 heli-lift locations were identified initially, it is not expected that all locations will be required. Future heli-lift locations will be designed to reduce potential impacts to surrounding vegetation. Oceanic Coal / Orica will minimise the required number of heli-lift points required throughout the program where possible in consultation with OEH.

Based on the outcomes from the trial phase it was determined that a coordinated approach for the planning, establishment and management of heli-lift sites going forward would be required and will be implemented.

Clearing of vegetation within and adjacent the affected section of the drainage channel will continue to be undertaken to reduce the risk of slips, trips, falls and improve the accessibility of the area for safety, remediation works and access in the case of an emergency. As the vegetation is dense in most areas with uneven ground, slopes and multiple trip hazards do exist in some areas. Vegetation clearing will be minimised where possible and will be constrained to low and mid storey vegetation along these sections.

Where required access paths or steps may be constructed adjacent to steep embankments to reduce the potential for slips/trips or falls during remediation activities. It is envisaged that these additional controls will be minor in nature and will be undertaken in consultation with OEH.

### 3.3.3 Installation of safety barriers/ controls/manual handling systems

Based on the outcomes of the site inspections and the trial phase additional safety barriers and controls have been and will continue to be installed as the works progress. These works have included the following:

- Installation of demarcation barriers/signage around the perimeter of the work area
- Construction of walk bridges or walkways along the access track in higher risk areas to reduce the risk of slips and trips.
- Installation of working at heights equipment, anchor points, guidance ropes
- Installation of transfer shutes in steep areas; and
- Pulley transport systems to allow for grout removal in steep areas to be controlled.

It is expected that these areas will be minor in nature and will be confined to adjacent the existing remediation areas.

### 3.3.4 Weed Control Activities

Weed control activities were undertaken by a qualified weed control contractor to reduce the potential for weed spread prior to remediation activities in consultation with OEH. As identified by Kleinfelder, the most dominant weed located within and adjacent to the remediation work area is *Lantana camara*. As such, weed control activities will be focused, but not limited to the control of *Lantana camara*. Monitoring for weeds will continue to be undertaken throughout the remediation program and weed control activities undertaken where required.

### 3.3.5 Equipment Storage Areas

Secure equipment storage areas have been and will continue to be established adjacent the active work areas as remediation works progress. It is anticipated that secure portable containers will continue to be utilised to store equipment/tools/supplies/safety gear overnight on site. Equipment storage areas are generally less than 10m<sup>2</sup> in area and will be minimised where possible to limit the impact on the surrounding environment.

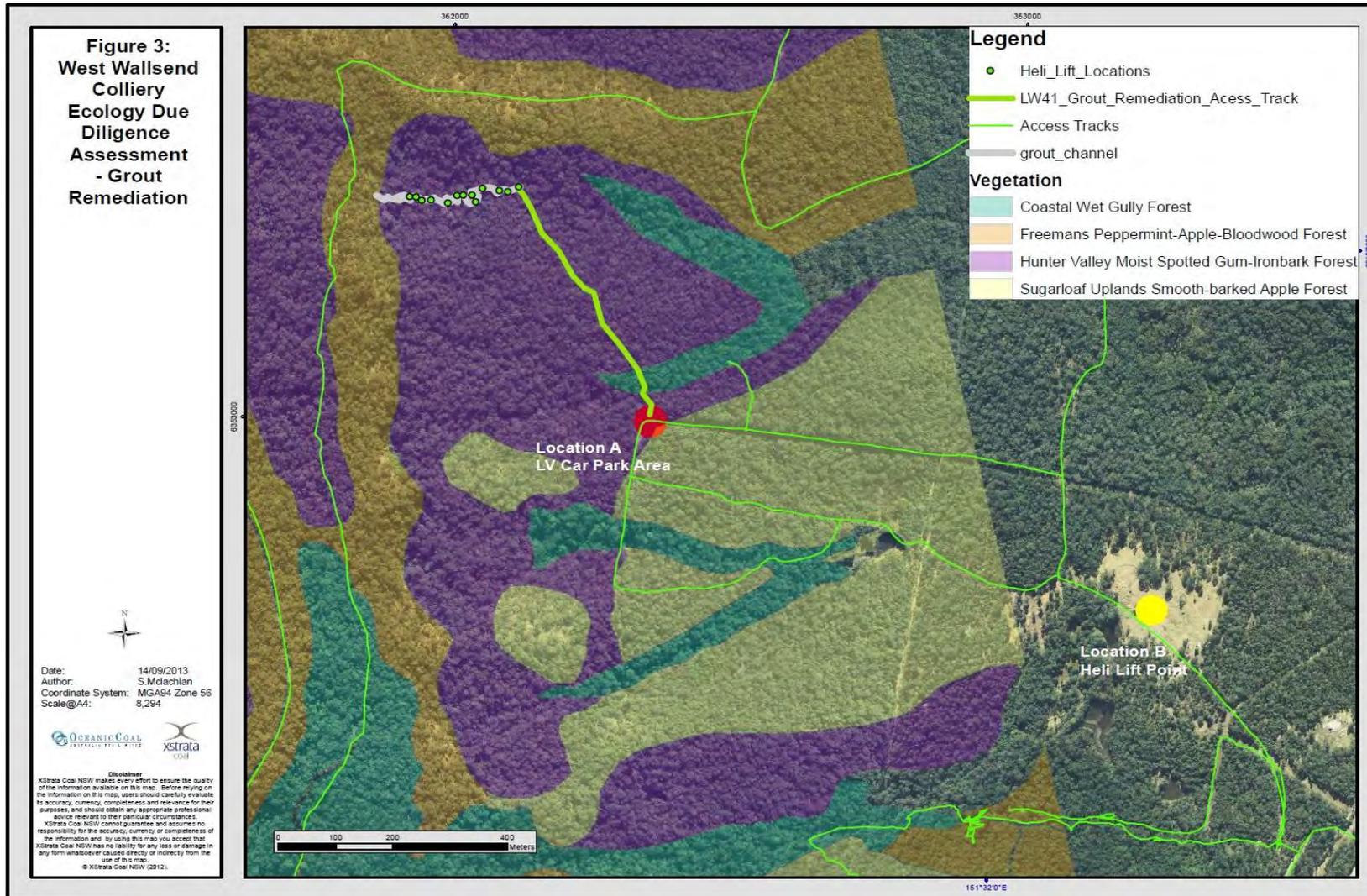
### 3.3.6 Erosion and Sediment Control Activities

An erosion and sediment control plan has been developed for the remediation site in consultation with the Soil Conservation Service.

Prior to the removal of grout from each predefined section appropriate erosion and sediment control works have been installed. During the trial phase sedimentation fencing was installed at 20m intervals along the drainage channel to help reduce flow velocities and reduce the potential for grout material to be transferred downstream after rainfall events. To date these controls have been effective in controlling sedimentation from the work site. Additional measures that may be used over the remainder of the project may include:

- Jute Mesh;
- Coco Logs;
- Level Spreaders;
- Sand/Gravel Bags
- Alike sedimentation controls.

Where required specialist advice will continue to be sought regarding the design, placement and maintenance of erosion and sedimentation controls for the remediation work area during and post remediation works.



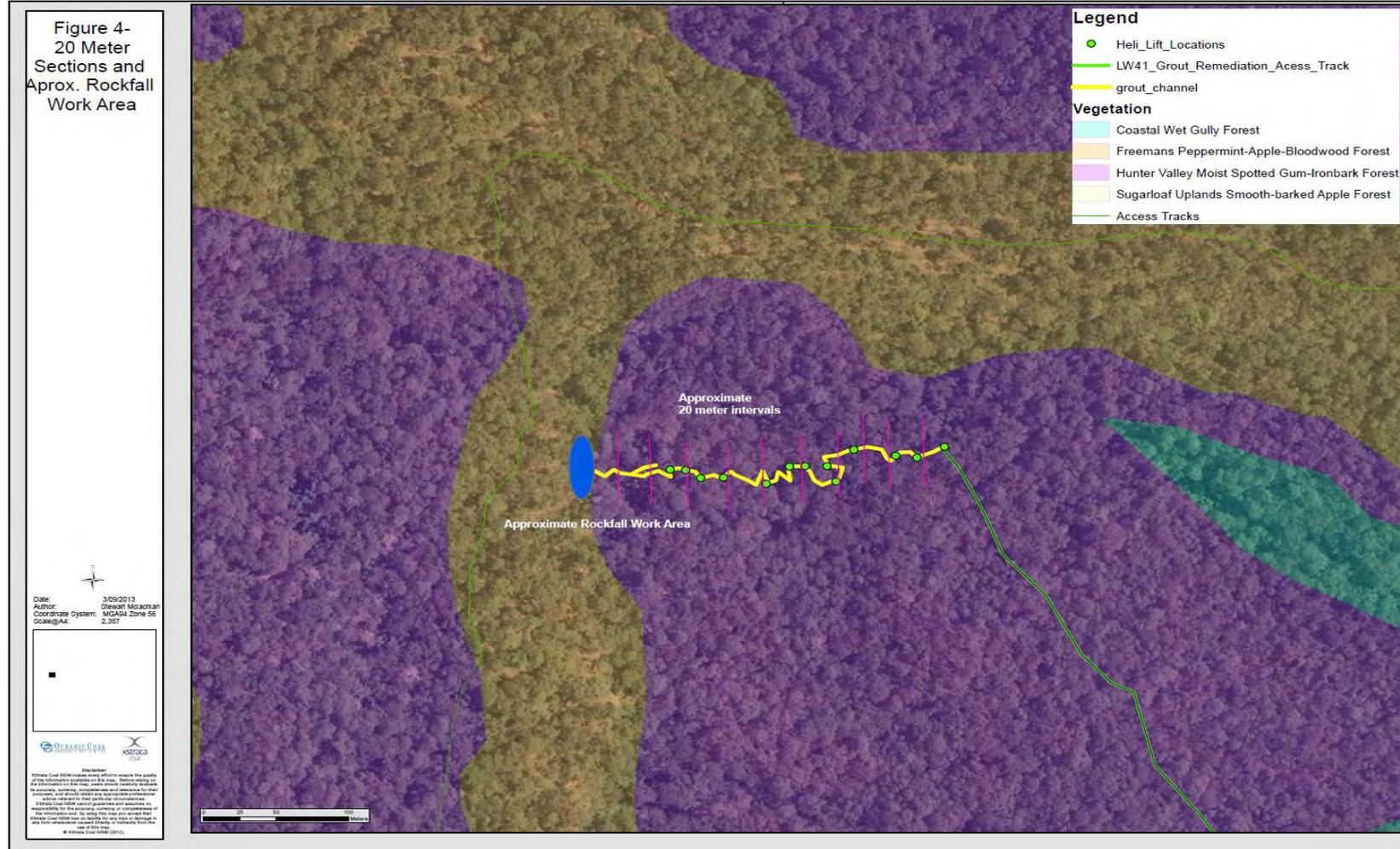
### 3.3.7 Post Remediation Activities and Determination of Final Rehabilitation Criteria

OCAL, in consultation with Orica and the Office of Environment and Heritage will determine if any post remediation activities are required for the site upon remediation completion. These activities may include but are not limited to:

- Additional weed control activities;
- Identification and supplementary planting of endemic species if required;
- Channel embankment stabilisation activities ( E.g. Include use of Coco Logs, Brush Matting, Jute Mesh, Endemic Seeding, Coir Cells);
- Rehabilitation of access tracks established for the remediation works;
- Removal of all safety barriers/demarcation

OCAL, in consultation with Orica and the Office of Environment and Heritage will develop final rehabilitation criteria for the remediation site to assist with defining the completion requirements for the site. The criteria will be determined based on industry and site knowledge and should take into account existing environmental conditions in similar reference channels in the SSCA. An assessment against the criteria will be provided in the post remediation completion report that will be submitted to OEHL at the completion of the remediation project.

Figure 4



## 3.4 Risk Management

A Broad Brush Risk Assessment (BBRA) has been undertaken by OCAL and Orica and the controls identified from this assessment have been incorporated into site specific Standard Operating Procedures (SOPs).

OCAL and Orica have comprehensive risk management standards in place to assist with assessing risks to personal safety, the environment and the local community. Where required specific risk assessments may be undertaken for specific tasks to further identify additional controls to manage risks associated with the activity and where deemed appropriate the outcomes from the assessments will be incorporated into site specific Standard Operating Procedures (SOPs) as remediation works progress.

### 3.4.1 Training and Awareness

A site specific induction/training package has been developed outlining the key environmental/ safety hazards and controls identified in the risk assessment, SOP's and the Grout Remediation Plan as well as providing basic environmental awareness information. It is a site requirement that any contractor/employee undertaking remediation activities on the site is inducted prior to any works commencing. Regular tool box talks on safety and environmental matters are provided as required by the Orica Crew Supervisor and or OCAL Project Supervisor.

### 3.4.2 Grout Remediation Team – Required Knowledge and Skills

Orica are responsible for the coordination of the day to day activities associated with the implementation of the GRP. Orica, as the supplier and principle contractor for the grouting activities at WWC over the last 20 months have extensive experience in handling the grout product and are familiar with its chemical and physical characteristics.

Orica employees have experience working at various operations which broadens their exposure to strong positive corporate cultures enabling them to understand the importance placed upon requirements for working in sensitive environments. OCAL and Orica management has inspected the remediation site and has tailored induction programs and modules for all employees proposed to undertake works under the Grout Remediation Plan. Prior to the commencement of works on site all employees will be trained (based on the task required to be undertaken) and assessed as competent in the following (as required):

- Orica Site Specific Safe Operating Procedures
- Grout Remediation Plan Requirements
- WWC Contractor Management System / Induction
- Use of Behavioural Safety Systems (SLAM's, Take Two)
- Safe Act Observation System
- Task Analysis System
- Accident Training Module
- Chemical Awareness Module
- Hazard Awareness
- Basic Strata Control Operations
- Manual Handling

To this end Orica have appointed a full time supervisor with experience in managing multiple crews who is also familiar with the grouting product. The Orica remediation team will also be supervised by an OCAL Project supervisor who will have training in environmental management and will have the necessary skills to ensure that the remediation activities are carried out in accordance with the Plan.

Specialist advice or services will be engaged by Orica where the skills or knowledge required to undertake a specific task fall outside Orica's or OCAL's knowledge or skills set. To date, activities which have been identified as requiring specialist advice and/or coordination have included:

- Ecological assessments
- Erosion and sediment control design
- Vegetation clearing activities
- Weed management activities
- Heli-lifting activities
- Rockfall Stabilisation Works
- Working at heights planning
- Waste removal (disposal)

### 3.4.3 Public Safety

OCAL / Orica take the management of Public Safety seriously. Based on the outcomes from the site wide BBRA and the trial phase the following public safety controls have been and will continue to be implemented to control Public Safety:

- All active work areas have been clearly demarcated and appropriate signage installed advising the Public not to enter these areas.
- All work areas within the SSCA have been closed to the Public for the duration of the remediation works.

## 3.5 Change Management

While it is not expected, and although OCAL in consultation with Orica have undertaken significant planning to form the basis of this remediation plan there may be circumstances arise that require actions to be implemented on the site that may not have been foreseen during the development of this plan.

Any changes to remediation activities outside the approved Remediation Plan will be thoroughly assessed in accordance with the OCAL Change Management Standard. The change management process provides a framework for the assessment of risks associated with a proposed change to site activity to ensure that any changes outside of an approved scope have been approved by the appropriate levels of management and that any required controls have been identified and implemented prior to the change being adopted or accepted.

As part of the change management process, OEH will be notified and due diligence assessments will be undertaken where required in consultation with OEH to minimise impacts. If warranted and if the change management process identifies, the remediation plan may require modification in consultation with OEH. Any significant changes to the methodology approved under this plan will be assessed in consultation with OEH which may involve further trials to assess the effectiveness of the proposed changes.

### 3.6 Responsibilities

The following table, **Table 1**, outlines the responsibilities of various personnel associated with the implementation of the Grout Remediation Plan.

**Table 1:**

Position	Key Responsibilities
Remediation Activity Operators	<ul style="list-style-type: none"> <li>• Ensuring they undertake their remediation activities in accordance with the Approved Grout Remediation Plan.</li> <li>• Be aware of the requirements of the Grout Remediation Plan and the key controls to be implemented associated with the activity they are undertaking.</li> <li>• Have an understanding and adhere to all safety and environmental controls required to complete their respective tasks.</li> <li>• Report and incidents immediately to the Remediation Crew Supervisor.</li> <li>• Participate in any safety or environmental tool box talks.</li> </ul>
Orica Remediation Crew Supervisor	<ul style="list-style-type: none"> <li>• Provide regular communication of all safety and environmental controls within the Grout Remediation Plan and associated SOP's.</li> <li>• Coordinate day to day activities on site.</li> <li>• Undertake regular inspections of the remediation activities to ensure that all activities are being carried out in accordance with the approved Remediation Plan.</li> <li>• Ensure all work party members are inducted and trained in the appropriate management systems applicable to the tasks they are undertaking.</li> <li>• Coordinate risk based assessments where required for specific tasks.</li> <li>• Regularly report on remediation progress to the OCAL Remediation Project Supervisor.</li> <li>• Liaise with the OEH site supervisor where required in consultation with OCAL Remediation Project Supervisor.</li> </ul>
Orica Operations/HSEC Manager	<ul style="list-style-type: none"> <li>• Ensure that there are adequate resources to allow for the successful implementation of the Grout Remediation Plan.</li> <li>• Provide strategic support to assist the Crew Supervisor where required.</li> </ul>

OCAL Remediation Project Supervisor	<ul style="list-style-type: none"> <li>• Oversee remediation activities and undertake regular inspections of the work area to confirm activities are being undertaken in accordance with the Grout Remediation Plan.</li> <li>• Undertake HSEC interactions to confirm activities are being undertaken in a safe and environmentally responsible manner.</li> <li>• Liaise with OEH Site Supervisor in regards to remediation progression.</li> <li>• Collation of the weekly remediation status reports for submission to OEH.</li> <li>• Undertake regular reviews of the remediation activities based on site progress and communicate any changes to the OCAL E&amp;C Manager.</li> </ul>
OCAL Environment and Community Manager and Operations Manager	<ul style="list-style-type: none"> <li>• Ensure adequate OCAL resources are made available for overseeing the implementation of the Grout Remediation Plan.</li> <li>• Responsible for the management of any changes to the Remediation Plan.</li> <li>• Undertake regular consultation with OEH on the implementation of the Remediation Plan.</li> </ul>
OEH Site Representative	<ul style="list-style-type: none"> <li>• Responsible for providing provisional signoff of each remediation section.</li> <li>• Oversee remediation activities and provide advice as required during the implementation of the plan.</li> </ul>
All Contractors/Visitors Specialists	<ul style="list-style-type: none"> <li>• Undertake all activities in accordance with the Grout Remediation Plan.</li> <li>• Ensure all work has been approved and is recognised by the Crew Supervisor prior to works commencing.</li> </ul>

## 4. ENVIRONMENTAL IMPACT ASSESSMENT

The following assessment outlines the potential environmental impacts associated with the preferred Grout Remediation Plan and outlines the proposed mitigation strategies to be implemented to manage these impacts.

## 4.1 Aboriginal Cultural Heritage

**Table 4.1:**

Potential Impact	Proposed Mitigation Measures
<p><b>Impact /affect on known Aboriginal objects or Aboriginal places?</b></p>	<p>There are no known cultural heritage sites within grout affected drainage channel area. Area extensively surveyed as part of WWC Continued Operations Project environmental assessment. WWC has an established Aboriginal Cultural Heritage Management Plan (ACHMP) in place to manage cultural heritage items.</p> <p>Regular consultation with the sites registered Aboriginal stakeholder groups. AAC Meetings.</p>
<p><b>Is the activity located in areas where landscape features indicate the presence of Aboriginal objects?</b></p>	<p>AHIMS Search, GIS Mapping and archaeological assessment undertaken as part of PA09_0203.</p> <p>OCAL is aware of the sensitive land units (i.e. near creek-lines and floodplain areas or ridges close to existing drainage) and that these locations are likely to increase the risk on impacting unknown Aboriginal heritage within the mine lease area.</p> <p>All people working within the remediation area will be inducted. This induction will include Cultural heritage awareness.</p> <p>Should a site be identified during the remediation works it will be managed in accordance with the procedures outlined in the WWC ACHMP.</p>
<p><b>Impact on wild resources or access to these resources, which are used or valued by the Aboriginal community.</b></p>	<p>The proposed activity does not significantly affect wild resources within the area, or does it restrict access to surrounding resources.</p>

## 4.2 Historic Cultural Heritage

Table 4.2:

Potential Impact	Proposed Mitigation Measures
<p><b>Impact on places, buildings, landscapes or moveable historic heritage items?</b></p>	<p>Vegetation clearing limited to defined areas as discussed throughout the Grout Remediation Plan and in <b>Appendix 1</b>.</p> <p>Ultimately, there will be a minimal impact on the vegetation within this area that will not have a significant impact on the visual aesthetics of the landscape.</p>
<p><b>Impact on vegetation of cultural landscape value.</b></p>	<p>As per mitigation measures listed above.</p>

### 4.3 Noise

Table 4.3:

Potential Impact	Proposed Mitigation Measures
<b>Impact on surrounding environment (Neighbours, community, Fauna etc)?</b>	<p>Remote nature of the site</p> <p>Only two residential neighbours located within proximity to the affected area. Consultation with affected landholders will be undertaken.</p> <p>Removal proposed by manual techniques with only small industrial vacuums or alike for small time periods unlikely to impact on surrounding properties.</p> <p>Heli-lift campaigns will be minimised where possible to reduce any noise impacts on the local community. Flights will only occur during daylight hours.</p>

### 4.4 Air Quality

Table 4.4:

Potential Impact	Proposed Mitigation Measures
<b>Dust Generation from Heli- Lifting causing community complaints or air quality impacts</b>	<p>Heli-lifting will only be undertaken in low wind conditions. Heli-lift drop off zone (Location B) will be suppressed where required to reduce air borne dust.</p>
<b>Dust generation from break up of grout material</b>	<p>Monitor remediation plan and techniques, if significant dust generation occurs, modify technique as required to reduce dust generation.</p>

## 4.5 Flora and Fauna

Table 4.5:

Potential Impact	Proposed Mitigation Measures
<p><b>Clearing or modification of vegetation along access track or drainage channel leading to poor regeneration of vegetation after remediation activities.</b></p>	<p>Due Diligence survey conducted to identify the vegetation community, and if any potential threatened or endangered flora and fauna and proposed mitigation measures (<b>Appendix 1</b>).</p> <p>Clearing activities to be confined to minimum area required.</p> <p>Bush Regeneration Specialists to undertake clearing activities to minimise impact to existing vegetation within the remediation areas.</p> <p>Vegetation monitoring program</p> <p>Categorisation and demarcation of vegetation to be removed will be undertaken prior to clearing works commencing</p> <p>Delineated clearing areas.</p> <p>Replacement of hollows that are removed as a result of ancillary activities with nest boxes (1:1 ratio)</p> <p>Clearing of mature trees (&gt; 30cm diameter) will be avoided where possible.</p>
<p><b>Is the activity likely to have a significant effect on threatened flora or fauna species, populations, or their habitats, or critical habitat; or an endangered ecological community or its habitat?</b></p>	<p>As per mitigation measures described above.</p>
<p><b>Does the activity have the potential to endanger, displace or disturb fauna (including fauna of conservation significance) or create a barrier to their movement?</b></p>	<p>As per mitigation measures described above.</p>

<p><b>Impact on an ecological community of conservation significance?</b></p>	<p>As per mitigation measures described above.</p>
<p><b>Is the activity likely to cause a threat to the biological diversity or ecological integrity on an ecological community?</b></p>	<p>As per mitigation measures described above. Macro invertebrate monitoring to be undertaken within a 2km reach downstream of the affected area if permanent water bodies are identified.</p>
<p><b>Is the activity likely to introduce noxious weeds, vermin, feral species or genetically modified organisms into an area?</b></p>	<p>As per mitigation measures described above. As outlined in <b>Section 3.3.4</b>, weed control activities will be undertaken within the remediation area to minimise the chance of any further weed spread in the SSCA as a result of the remediation activities.</p>

## 4.6 Erosion, Sedimentation and Geomorphic Stability

Table 4.6:

Potential Impact	Proposed Mitigation Measures
<p><b>Increased erosion from clearing activities/surface disturbance along access tracks or drainage channel</b></p>	<p>Vegetation clearing limited to defined areas as discussed throughout the Grout Remediation Plan and in <b>Appendix 1</b>.</p> <p>An erosion and sediment control plan will be maintained for the remediation work area. The plan will detail all erosion and sedimentation controls to be established prior to, during and post remediation activities as outlined in <b>Section 3.3.7</b>.</p> <p>Erosion monitoring to be undertaken as outlined in <b>Section 5.1.4</b></p> <p>Photo Monitoring Points</p> <p>Post remediation works</p>
<p><b>Increased sedimentation, water logging as a result of erosion process during and after remediation activities.</b></p>	<p>As per mitigation measures listed above.</p>

## 4.7 Surface Water and Hydrology

Table 4.7:

Potential Impact	Proposed Mitigation Measures
<p><b>Change in surface water quality within drainage channel/Cockle Creek catchment following rainfall</b></p> <p><b>- Impacts on downstream water users</b></p>	<p>Installation of erosion and sediment controls at the base of each remediation section as the remediation works progress.</p> <p>Surface water monitoring program (<b>Section 5.1.1</b>).</p> <p>Adjacent landowners have been notified of the proposed remediation activities. Ongoing consultation with adjacent landowners will be undertaken throughout the program.</p> <p>Drainage channels are ephemeral in nature.</p> <p>Remediation activities will not affect water flows within the catchment area. No loss of water from the catchment is expected.</p>
<p><b>Changes in drainage channel morphology (bank stability, creek bed, scours) as a result of remediation activities</b></p>	<p>As per mitigation measures above.</p> <p>Bi monthly (once every two months) walkover inspections by qualified specialist.</p> <p>Inspections following heavy rainfall events.</p>

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## 5. MONITORING, STAKEHOLDER CONSULTATION, REPORTING, REMEDIATION TIMELINE AND EVALUATION

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### 5.1 Monitoring

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#### 5.1.1 Surface Water Monitoring

As outlined in **Section 4**, a surface water quality monitoring program has been implemented for the site to monitor water quality in the surrounding catchment. OCAL has identified 7 sample locations which will be sampled during flow conditions for pH, EC, TSS and alkalinity. Given that the drainage channel in the vicinity of the affected area is ephemeral in nature, samples will not be able to be taken on a defined frequency. Monitoring locations have been chosen to provide water quality results upstream, from the affected channel, downstream as well as a reference channels. The indicative monitoring locations are shown below on **Figure 5**.

OCAL/Orica has sourced and installed samplers at surface water monitoring locations as outlined in **Figure 5**. OCAL has obtained approval from the relevant agencies for the installed samplers to be used. Samples will be collected upstream from access tracks where possible to limit potential for access track runoff to affect samples.

#### 5.1.2 Aquatic Macro Invertebrate Monitoring

As outlined in **Section 4**, OCAL/Orica engaged a suitably qualified specialist to undertake a field survey up to 2km downstream of the affected drainage channel and the reference channel (Refer to **Figure 5**) to identify any permanent water bodies. The results of the survey indicated determined that only 1 semi-permanent water body existed which was located approximately 300m downstream from the grout affected drainage channel. The first round of macro-invertebrate monitoring has already been undertaken with preliminary findings indicating no negative impacts within the water body. Further monitoring is scheduled to be undertaken on a 3 monthly basis during grout removal and six monthly after removal in consultation with OEH.

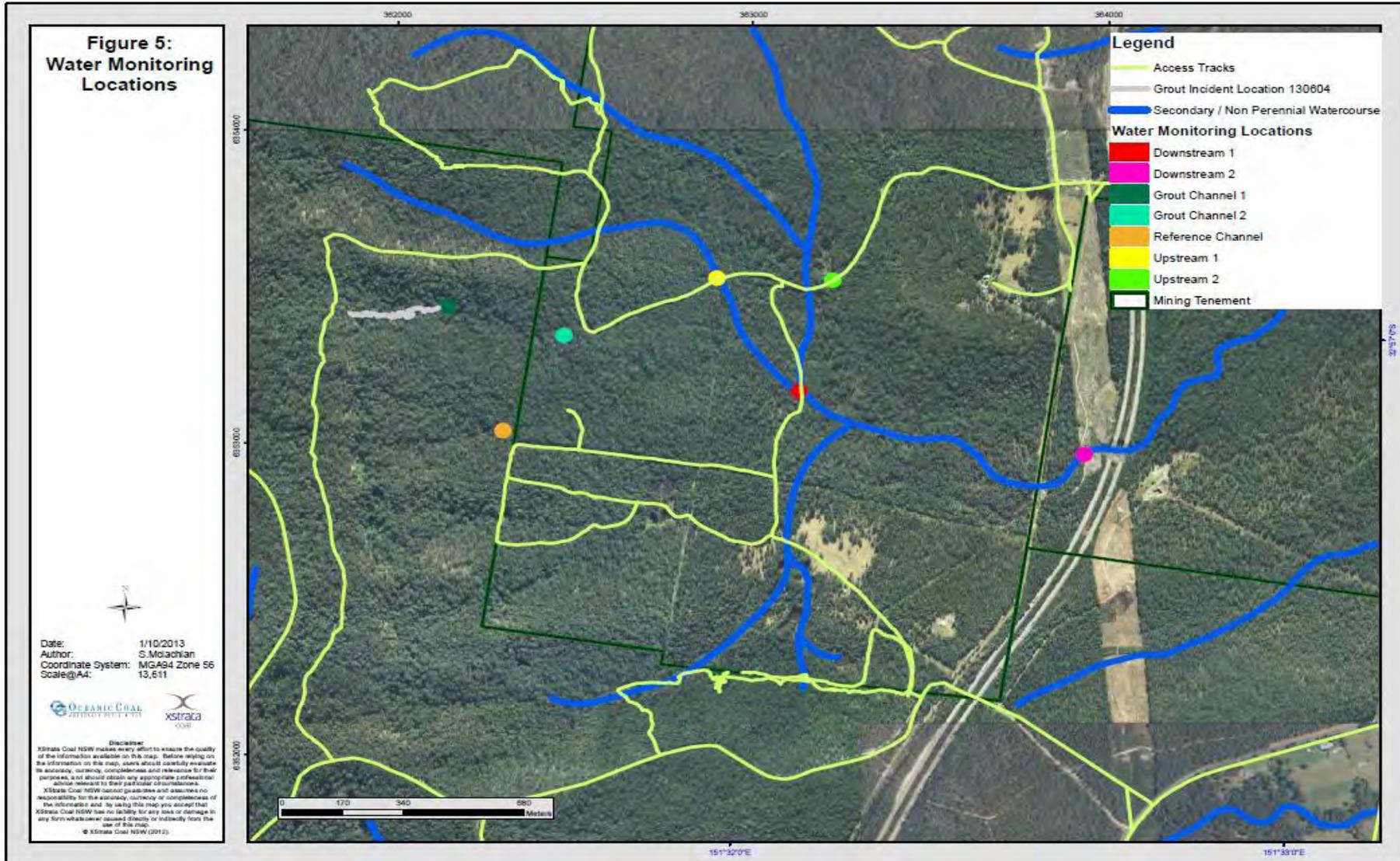
#### 5.1.3 Vegetation Monitoring

As outlined in **Section 4**, vegetation monitoring program has been established in consultation with a qualified ecologist and OEH for the affected drainage channel to assist with documenting the extent (and type) of vegetation growth in the drainage channel. This monitoring program has been designed assess the health of the surrounding flora potentially affected by the remediation activities. Results from the monitoring will be used to inform the post remediation plan and will be used to determine any future rehabilitation activities that may be required. Vegetation surveys are proposed to be undertaken every 3 months during grout removal and 6 monthly thereafter until sign off of the remediation project has been received.

#### 5.1.4 Erosion and channel stability monitoring

As outlined in **Section 4**, erosion and channel stability monitoring has been undertaken within the affected section of the drainage channel to identify the development of any erosion, or changes in channel morphology as remediation works progress. Monitoring will be undertaken every 3 months by a qualified specialist and after significant storm events (>50mm in a 24 hours period) that have resulted in surface water flows within the affected drainage line by site personnel. The monitoring will involve a formal walkover assessment of the affected sections of the drainage channel by a suitably qualified

specialist. Where monitoring identifies impacts that are attributable to the remediation activities, suitable controls/ remediation actions will be established to control or minimise any identified impacts in consultation with OEH.



### 5.1.5 Photo Monitoring Points

Photo monitoring points have been established along pre determined sections of the grout affected drainage channel. OCAL/Orica will undertake photo point monitoring of the work area to show changes over time and the results will be reported to OEHL regularly.

## 5.2 Stakeholder Consultation

OCAL and Orica are committed to adequately consulting with all affected stakeholders regarding the implementation of the Grout Remediation Plan. An overview of key external stakeholders that have been identified by OCAL and the likely consultation methods to be employed throughout the remediation activity program are outlined in **Table 5.1** below:

**Table 5.1**

Stakeholder	Consultation Method / Description	Frequency
Office of Environment and Heritage / Relevant Regulatory Authorities	Operational Status Report	Weekly
	GRP Cessation Report	Once Off (following completion of works)
	Updates to Operational Project Plan (OPP)	As required
	Site Inspections	As required
Local State and Federal Parliament Members	Operational Status Report	Weekly
	GRP Cessation Report	Once Off (following completion of works)
	Community Newsletter	6 Monthly
	Site Inspections	As required
Adjacent Landowners	Community Newsletter	6 Monthly
	Phone Calls / Emails	As required – based on operational status
	Site Inspections	As required
Aboriginal Stakeholder Groups	AAC Meetings	6 Monthly
	Community Newsletter	6 Monthly
	Site Inspections	As required

Stakeholder	Consultation Method / Description	Frequency
Local Community	CCC Meetings	6 Monthly
	Community Newsletter	6 Monthly
Wider Community / All Stakeholders	WWC Website Updates	Weekly during remediation activities
	WWC Annual Review	Annually
	Media Releases	As required

### 5.3 Reporting

OCAL will provide OEH and the Parliament Members with a weekly operational status report on remediation progress at the site. The report will include the following as a minimum:

- Update on the status of remediation activities against the operational project plan
- Overview of any safety or environmental incidents since the last report
- Summary of any previous monitoring results/reports received since the last report.
- Updated photos taken from designated photo monitoring points where relevant.

OEH will be responsible for distributing the weekly operational status reports to the relevant agencies as required under this plan.

OCAL will continue to develop a Grout Remediation Progress Plan which will be updated weekly and will be uploaded onto the West Wallsend Colliery website ([www.westwallsendcolliery.com.au](http://www.westwallsendcolliery.com.au)). The Plan will be designed to provide a visual representation of the remediation work progress over time.

In accordance with the OEH Direction, OCAL will submit a final report on remediation activities within 14 Days of the grout removal works being completed to the Office of Environment and Heritage and the relevant government authorities.

OCAL will also provide an update on the grout remediation activities undertaken during future Community Consultative Committee (CCC), Aboriginal Advisory Committee (AAC) meetings and in the operations annual review in accordance with the site Project Approval.

### 5.4 Remediation Timeline

The following table, **Table 5.2**, provides an estimated project timeline which outlines major tasks and milestones associated with the remediation program. This timeline has been updated based on the outcomes from the Trial Phase. It should be noted that this timeline is indicative only and should not be used for auditing or tracking purposes due to the associated unknown variables that cannot be predicted. The timeline is dependent on approvals being received as outlined in the below **Table 5.2**. Any changes to approval timeframes will push project timelines out by the same period.

As outlined in **Section 3.2.1**, OCAL has developed, updated and will continue to maintain an Operational Project Plan (OPP) for the remediation activities in consultation with OEH throughout the duration of the remediation program. The initial OPP has been updated following the outcomes of the grout removal trial phase.

**Table 5.2**

<b>Task or Milestone</b>	<b>Estimated date of Completion</b>	<b>Status</b>
Submission of Final G.R.P. to OEH for approval	01/10/2013	Completed - Submitted to OEH on 01/10/2013
Approval of G.R.P. by OEH	14/10/2013	Complete – OEH Approval received 14/10/2013 via Revised Direction (Ref DOC13/71656)
Submit OPP for Trial Grout Removal Phase	18/10/2013	Complete – Submitted to OEH on 17/10/2013
Undertake Grout Removal Trial Phase (Ancillary Activities and Grout Removal)	15/11/2013 (Extended to 06/12/2013)	Request for extension to trial phase due date to 6 December 2013 approved by OEH.  Trial Phase commenced 21/10/2013 and was completed 29/11/2013
Submit OPP for remainder of remediation area following outcomes of Trial Phase	26/11/2013 (Extended to 06/12/2013)	Complete – Revised OPP submitted 04/12/2013
Submit Report on Trial Phase	10/12/2013	Complete – Report submitted on 04/12/2013
Submit revised Grout Remediation Plan for OEH Approval	15/12/2013	Complete – Revised report sent to OEH on 06/12/2013
OEH Approval of revised GRP	16/12/2013	Awaiting Approval.
Complete remainder of Grout Remediation Activities in accordance with revised GRP	Refer to Operational Project Plan	Awaiting approval of revised GRP.

## 5.5 Evaluation

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Throughout the remediation activities, the effectiveness of the remediation activities will be evaluated along with the suitability and practicality of the equipment and remediation team sizing. The Operational Project Plan (as outlined in **Section 3.2.1**) will be updated in consultation with OEH as works progress.

Should a significant change to the operational plan need to occur, consultation and notification to the Office of Environment and Heritage will be managed as described in **Section 3.5**.

As outlined in **section 3.2.3**, following the removal of grout from each work section the area will be inspected by a representative of OEH and OCAL. Provisional signoff will be sought from OEH once OEH representatives confirm that grout removal has been undertaken to a suitable standard. OCAL has developed a sign off checklist in consultation with OEH which assists with assessing each remediation section against agreed remediation criteria.

If at any stage it is deemed required by OEH, Orica will engage a suitably qualified independent expert to supervise and evaluate the remediation works.



Commitment	Indicative Timing	Status
<p>Due to the complex and unique nature of the remediation activities and the associated unknown in regards to appropriate utilisation of tools, extent of clearing works required, team sizes and the effectiveness of the preferred grout remediation option, it is proposed that an initial trial phase be undertaken in consultation with OEH for the first 40m of the grout affected drainage channel (Sections 1 and 2 respectively).</p>	<p>23 October - 15 November 2013.</p>	<p>Complete</p>
<p>Each bag of grout material that is removed from the affected area will be transported to a licensed waste disposal facility by a licensed waste contractor. The volumes and tonnages of the waste material will be recorded and tracked in accordance with the OEH Direction.</p>	<p>Ongoing throughout program.</p>	<p>Ongoing.</p>
<p>OCAL / Orica will undertake Ancillary activities in accordance with the Grout Remediation Plan</p>	<p>Staged throughout program.</p>	<p>Ongoing</p>
<p>OCAL, in consultation with Orica and the Office of Environment and Heritage will determine if any post remediation activities are required for the site upon remediation completion. These activities may include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Additional weed control activities</li> <li>• Identification and supplementary planting of endemic species if required</li> <li>• Channel embankment stabilisation activities ( E.g. Include use of Coco Logs, Brush Matting, Jute Mesh, Endemic Seeding, Coir Cells)</li> <li>• Rehabilitation of access tracks established for the remediation works</li> <li>• Removal of all safety barriers/demarcation</li> </ul>	<p>Upon completion of grout removal</p>	<p>Yet to be completed</p>

Commitment	Indicative Timing	Status
<p>A site specific induction/training package will be developed outlining the key environmental/ safety hazards and controls identified in the risk assessment, SOP's and the Grout Remediation Plan as well as providing basic environmental awareness information. It will be a site requirement that any contractor/employee undertaking remediation activities on the site will be inducted prior to any works commencing. Regular tool box talks on safety and environmental matters will be provided as required by the Orica Crew Supervisor and or OCAL Project Supervisor.</p>	<p>Prior to and throughout program</p>	<p>Complete</p>
<p>Orica will have a full time dedicated supervisor with experience in managing multiple crews who is also familiar with the grouting product. The Orica remediation team will also be supervised by an OCAL Project supervisor who will have training in environmental management and will have the necessary skills to ensure that the remediation activities are carried out in accordance with the Plan.</p> <p>Specialist advice or services will be engaged by Orica where the skills or knowledge required to undertake a specific task fall outside Orica's or OCAL's knowledge or skills set.</p>	<p>Prior to and throughout program.</p>	<p>Complete</p> <p>Ongoing</p>
<p>All active work areas will be clearly demarcated and appropriate signage will be installed advising the Public not to enter these areas.</p>	<p>Prior to remediation works commencing.</p>	<p>Complete</p>
<p>Any changes to remediation activities outside the approved Remediation Plan will be thoroughly assessed in accordance with <b>section 3.5</b>.</p>	<p>Prior to and throughout program.</p>	<p>Ongoing</p>

Commitment	Indicative Timing	Status
OCAL/Orica to ensure that mitigation measures as outlined in Section 4 are implemented	Prior to, throughout and following remediation program.	Ongoing
As outlined in <b>Section 4</b> , OCAL is proposing that a surface water quality monitoring program be implemented for the site to monitor water quality in the surrounding catchment. OCAL has identified 7 sample locations which will be sampled during flow conditions for pH, EC, TSS and alkalinity.	Prior to, throughout and following remediation program.	Complete/Ongoing
OCAL/Orica will source and install samplers at surface water monitoring locations as outlined in <b>Figure 5</b> . OCAL will obtain approval from the relevant agencies for the installed samplers to be used prior to their installation. Where safe to do so, standard grab samples will continue to be collected for analysis following rainfall events that result in surface water flows within the drainage channels until the alternative method is approved.	Prior to, throughout and following remediation program.	Complete
As outlined in <b>Section 4</b> , Prior to grout removal works commencing, OCAL/Orica will arrange for a suitably qualified specialist to undertake a field survey up to 2km downstream of the affected drainage channel and the reference channel (Refer to <b>Figure 5</b> ) to identify any permanent water bodies. Should permanent water bodies be identified during this assessment OCAL/Orica, in consultation with OEHL, will arrange for Macroinvertebrate monitoring to be undertaken at a frequency agreed to by OEHL in these areas by a suitable qualified specialist.	Prior to grout removal and ongoing at a frequency agreed to by OEHL.	Complete

Commitment	Indicative Timing	Status
<p>As outlined in <b>Section 4</b>, it is proposed that a vegetation monitoring program will be established in consultation with a qualified ecologist and OEH for the affected drainage channel to assist with documenting the extent (and type) of vegetation growth in the drainage channel. It is anticipated that this monitoring program will include quantitative surveys of the area prior to, during and post remediation activities.</p>	<p>Prior to grout removal and ongoing at a frequency agreed to by OEH.</p>	<p>Complete/Ongoing</p>
<p>As outlined in <b>Section 4</b>, it is proposed that erosion and channel stability monitoring will be undertaken within the affected section of the drainage channel to identify the development of any erosion, or changes in channel morphology as remediation works progress. Monitoring will be undertaken quarterly by a qualified specialist and after storm events (&gt;50mm in a 24 hours period) that have resulted in surface water flows within the affected drainage line by site personnel.</p>	<p>Bi Monthly formal walkover Inspections after storm events</p>	<p>Complete/Ongoing</p>
<p>Photo monitoring points will be set up prior to remediation activities occurring along pre determined sections of the grout affected drainage channel. OCAL will undertake photo point monitoring of the work area to show changes over time and the results will be reported in the weekly status reports.</p>	<p>Prior to Grout Remediation Activities</p>	<p>Complete/Ongoing</p>
<p>OCAL will ensure that consultation with stakeholders is undertaken in accordance with the Stakeholder Consultation Strategy as outlined in <b>Section 5.2</b>.</p>	<p>Ongoing throughout program.</p>	<p>Complete/Ongoing</p>
<p>OCAL will provide OEH and the relevant government agencies with a weekly</p>	<p>Weekly.</p>	<p>Complete/Ongoing</p>



Commitment	Indicative Timing	Status
<p>Throughout the remediation activities, the effectiveness of the preferred technique will be evaluated along with the suitability and practicality of equipment and remediation team size. The Operational Project Plan (as outlined in <b>Section 3.2.1</b>) will be updated in consultation with OEH as works progress.</p> <p>Following the removal of grout from each work area the area will be inspected by a representative of OEH, OCAL Project Supervisor and Orica Crew Supervisor. A sign off checklist will be developed to assist with managing this process as works progress which will be based on the outcomes and expectations from the initial trial phase.</p> <p>If at any stage it is deemed required by OEH, Orica will engage a suitably qualified independent expert to supervise and evaluate the remediation works.</p>	Ongoing	Ongoing

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## 6. REFERENCES

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### 6.1 Legislation

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- National Parks and Wildlife Act, 1974.
- Protection of the Environment Operations Act, 1997.
- Threatened Species Conservation Act, 1995.
- Work Health and Safety Act, 2011.
- Work Health and Safety Regulations, 2011.
- Environmental Planning and Assessment Act, 1979.
- Water Management Act.

### 6.2 Miscellaneous

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- Office of Environment and Heritage (2007) Mitchell Landscapes with per cent cleared estimates, listed by CMA, Updated November 2007, OEH Website:  
<http://www.environment.nsw.gov.au/projects/biometrictool.htm>.
- Thackway, R. and Cresswell, I.D. (1995). An interim biogeographic regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program Canberra. Report to the Australian Nature Conservation Agency, Reserve Systems Unit, Canberra.
- Department of Primary Industries (Office of Water) – Guidelines for in stream works on water front land (July 2012)
- Department of Primary Industries (Office of Water) – Guidelines for watercourse crossings on water front land (July 2012)
- WWC Grout Remediation Trial Phase Report – December 2013 (WWC SD PLN 0105)

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## 7. APPENDICES

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## 7.1 Appendix 1 – Ecological Monitoring Report

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## Vegetation Pre-clearance Survey – Land Remediation within Sugarloaf State Conservation Area



**Glencore Xstrata**

12 August 2013



# Vegetation Pre-clearance Survey – Land Remediation within Sugarloaf State Conservation Area

**Kleinfelder Report Number: WB13R\_405-1194**

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**Prepared for:**

**GLENCORE XSTRATA**

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Only Glencore Xstrata, its designated representatives or relevant statutory authorities may use this document and only for the specific project for which this report was prepared. It should not be otherwise referenced without permission.

**Document Control:**

Version	Description	Date	Author	Technical Reviewer	Peer Reviewer
1.0	Draft for client review	13/08/2013	Dr. G Whyte	A.Mulcahy	

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## ABBREVIATIONS

<b>AHD</b>	Australian Height Datum
<b>DP</b>	Deposited Plan
<b>DSEWPaC</b>	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
<b>EEC</b>	Endangered Ecological Community (category of Threatened Ecological Community)
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>GIS</b>	Geographic Information System
<b>GPS</b>	Global Positioning System
<b>ha</b>	hectares
<b>KTP</b>	Key Threatening Process
<b>LEP</b>	Local Environmental Plan
<b>LGA</b>	Local Government Area
<b>MU</b>	Map Unit
<b>OEH</b>	NSW Office of Environment and Heritage
<b>TSC Act</b>	<i>Threatened Species Conservation Act 1995</i>

# 1. INTRODUCTION

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## 1.1 SCOPE

Kleinfelder was engaged by Glencore Xstrata to conduct an ecological pre-clearance survey within Sugarloaf State Conservation Area. This survey was undertaken as per a requirement issued by the NSW Office of Environment and Heritage (OEH) prior to land remediation works which are proposed within the Conservation Area.

## 1.2 BACKGROUND

Sugarloaf State Conservation area was created in July 2007 and covers an area approximately 3,937 hectares. The Conservation Area extends from Seahampton in the North to Awaba in the south (**Figure 1**). The area is predominately vegetated with forest consisting of several vegetation community types.

The underground mine workings of Glencore Xstrata occur beneath portions of Sugarloaf State Conservation Area and disturbance due to mine subsidence has occurred within some areas. Subsidence is caused by the movement of the ground surface as a result of readjustments of overburden due to collapse or failure of underground mine workings. Surface subsidence features usually take the form of either sinkholes or troughs.

Glencore Xstrata is currently implementing management measures to remediate land that has been affected by mine subsidence within Sugarloaf State Conservation Area. Approved materials such as grout are used to stabilise subsurface cracking. The grout material (Minova®) is pumped into cracks to fill voids and stabilise strata.

An accidental spillage of grout recently occurred during land remediation works within the Conservation Area. The grout was spilled within a natural drainage channel and affected an area approximately 250m in length.

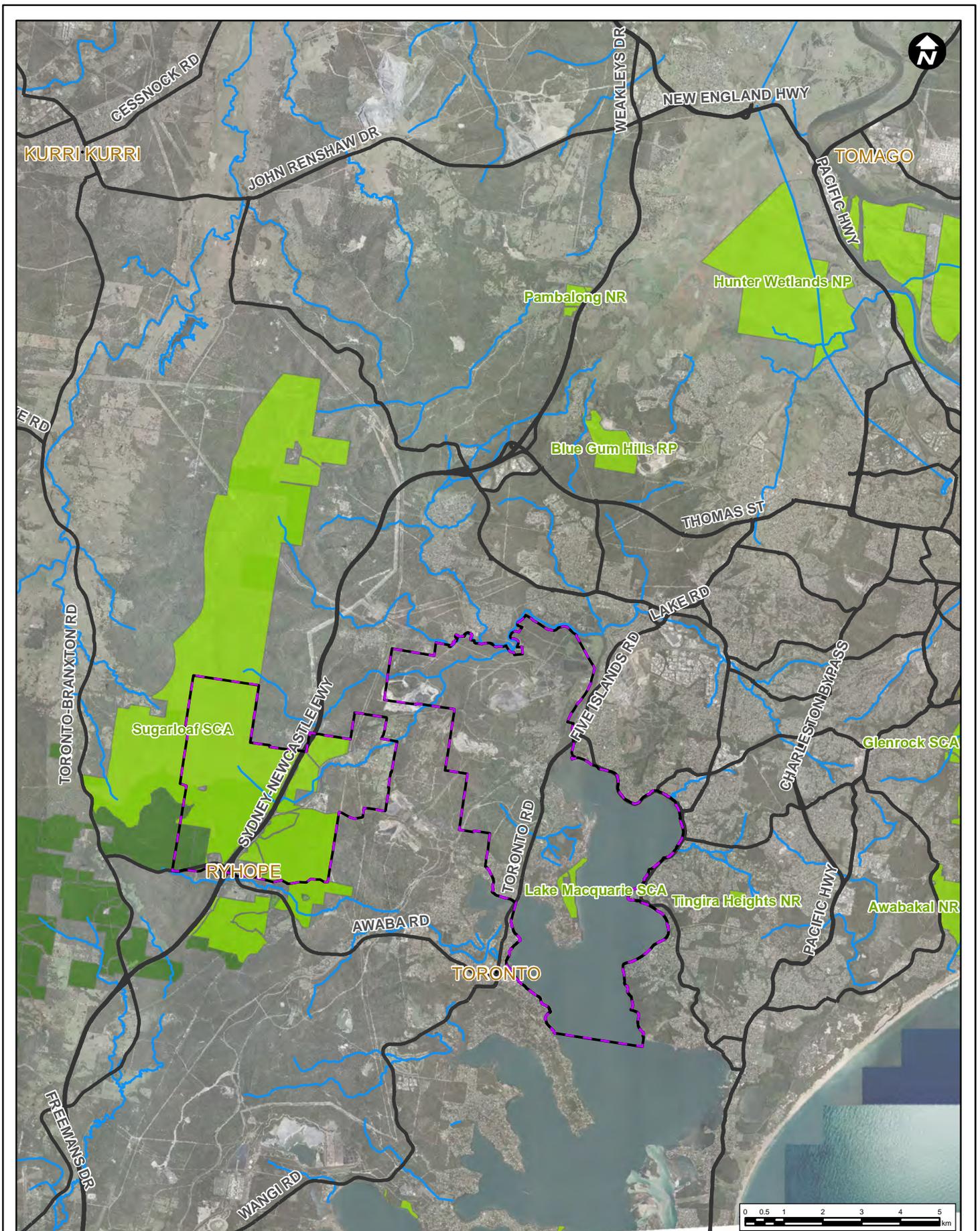
An investigation by the NSW Office of Environment and Heritage has concluded that all of the grout material is to be removed from the affected area.

## 1.3 PROPOSED VEGETATION CLEARING

Vegetation clearing is required to create an access track to the grout spillage area (**Figure 2**). This track is to be sufficiently wide to allow for access of personnel and their equipment; approximately 4m wide and 400m in length.

A series of heli-lift locations are also required to allow for the removal of grout filled bags via helicopter from the affected channel. Several heli-lift locations are proposed. Vegetation clearing for these areas will consist of removal of the groundcover and midstorey within an area approximately 3-4 m<sup>2</sup>.

All vegetation clearing will be restricted to narrow tracks. Only groundcover and midstorey species will be removed. Large trees and logs will be avoided where possible to reduce impacts to significant ecological features.



**Figure 1 - Locality Map**

**Legend**

- Drillhole Locations
- CCL 718
- Forests NSW
- National Park
- Watercourse



**Map Projection:**

GDA 1994 MGA Zone 56

**Data Sources:**

LPMA - 2011  
ecobiological - 2011

**Project Ref:** 458 - 1046

**Plot Date:** 9/08/2012 11:54

**Revision:** 001 (gayle.j)

Disclaimer: This is not an official or a legal map but is for informational use only. All data was compiled from the best sources available. All boundaries, scale and geographic points are approximate.

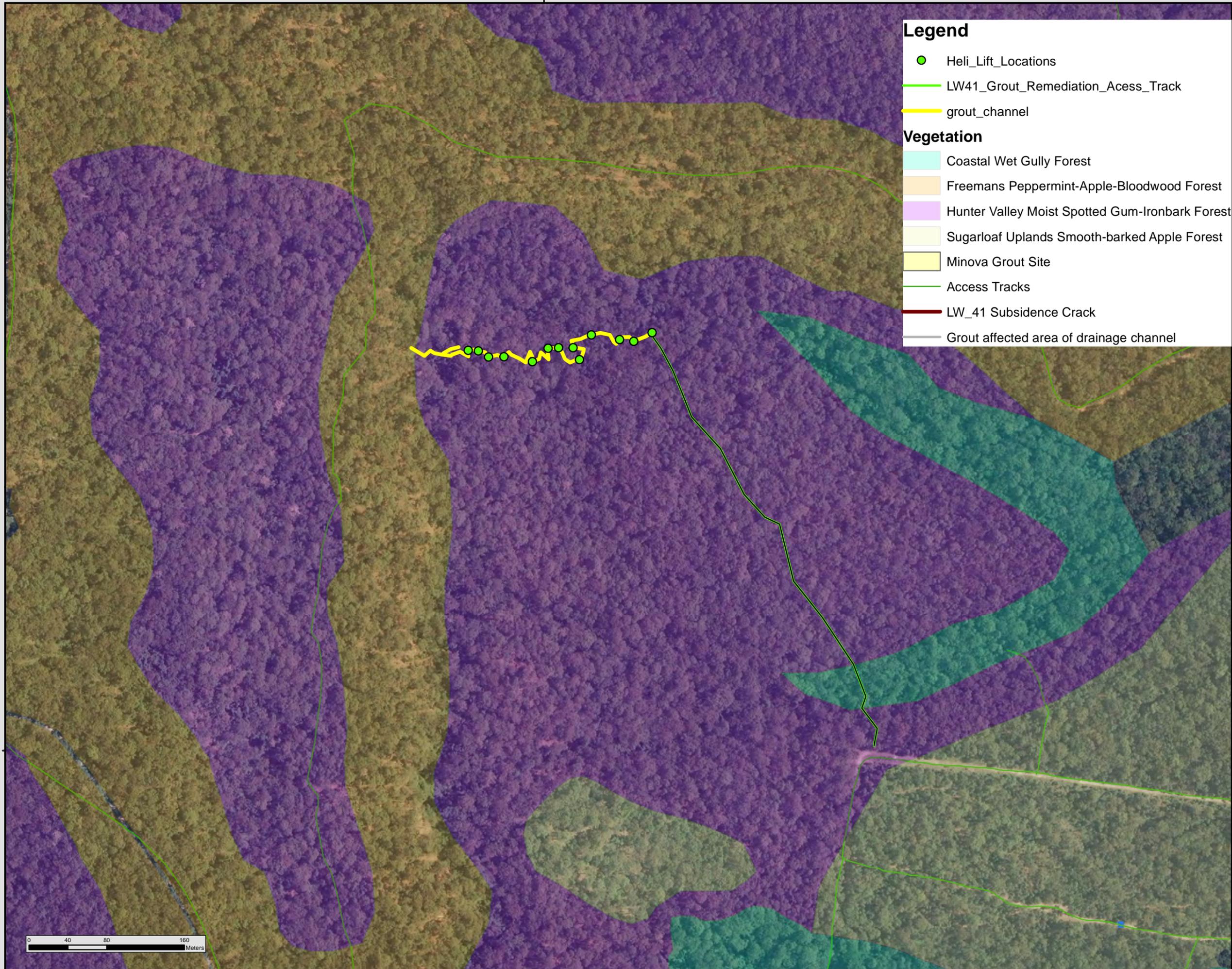
West Wallsend Colliery Ecology Due Diligence Assessment - Grout Remediation

Legend

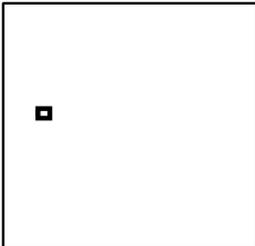
-  Heli\_Lift\_Locations
-  LW41\_Grout\_Remediation\_Access\_Track
-  grout\_channel

Vegetation

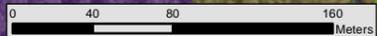
-  Coastal Wet Gully Forest
-  Freemans Peppermint-Apple-Bloodwood Forest
-  Hunter Valley Moist Spotted Gum-Ironbark Forest
-  Sugarloaf Uplands Smooth-barked Apple Forest
-  Minova Grout Site
-  Access Tracks
-  LW\_41 Subsidence Crack
-  Grout affected area of drainage channel



Date: 12/08/2013  
 Author: Stewart McLachlan  
 Coordinate System: MGA94 Zone 56  
 Scale@A4: 3,536



**Disclaimer**  
 XStrata Coal NSW makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances.  
 XStrata Coal NSW cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that XStrata Coal NSW has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.  
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## 2. METHODOLOGY

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### 2.1 SITE ASSESSMENT

A site assessment was conducted on 9 August 2013. The following survey methodologies were used to compile information on the existing vegetation, and potential habitat for locally occurring threatened flora and fauna species within the subject site.

#### 2.1.1.1 Flora Sampling (Random Meander)

A floristic list was compiled during a random meander within the proposed access track and grout affected drainage channel.

#### 2.1.1.2 Floristic Identification and Nomenclature

Floristic identification and nomenclature was based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on PlantNet (<http://plantnet.rbgsyd.nsw.gov.au>).

#### 2.1.1.3 Vegetation Community Identification

The identification of vegetation communities was based on the dominant species present in the overstorey, midstorey, shrub and ground layers. The species composition of each vegetation community was compared to vegetation community types as defined by the Lower Hunter and Central Coast Regional Environmental Management Strategy 2000 (LHCCREMS; NPWS, 2000) in order to arrive at an accepted community identity.

#### 2.1.1.4 Fauna Survey (Opportunistic Sightings)

The presence of all fauna species and potential habitat was recorded. The meandering route was used to undertake targeted surveys for threatened fauna species identified as potentially occurring in the region.

The availability of habitat for threatened fauna was also examined by noting the presence of the following habitat features:

- Presence of woody debris (fallen timber);
- Presence of tree hollows;
- Availability of nectar resources; and
- Other species specific habitat requirements.

## 3. RESULTS

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### 3.1 THREATENED FLORA AND FAUNA

No threatened flora or fauna species were identified during the assessment.

### 3.2 VEGETATION COMMUNITY IDENTIFICATION

#### 3.2.1 Hunter Valley Moist Forest - Dry Variant

**Distribution:** This community occurs along the entire length of the proposed access track from the clearing in the south to the grout spill area in the north (**Plate 1**).

**Floristic Description:** The dominant canopy species are *Corymbia maculata* (Spotted Gum) and *Corymbia gummifera* (Red Bloodwood). Other canopy species which occur to a lesser extent include *Eucalyptus punctata* (Grey Gum) and *Eucalyptus acmenoides* (Red Mahogany). A sparse midstorey of *Allocasuarina torulosa* (Drooping Sheoak) and *Glochidion ferdinandi* (Cheese Tree) also occurs. Shrub species include *Leptospermum trinervium* (Flaky-barked Tea-tree), *Leptospermum polygalifolium* (Lemon-scented Tee-tree), and *Pittosporum undulatum*. The upper ground layer is dominated by *Pteridium esculentum* (Bracken Fern) and *Lomandra longifolia* (Spiny-headed Mat-rush). Other ferns include *Adiantum aethiopicum* (Common Maidenhair). The dominated grass species include *Imperata cylindrica* (Blady Grass), *Entolasia stricta* (Wiry Panic) and *Themeda australis* (Kangaroo Grass).

**Threatened Flora:** No threatened flora species were identified.

**Vegetation Community:** MU12 Hunter Valley Moist Forest (NPWS, 2000).

**Ecological Community Conservation Status:** Not listed.

**Fauna Habitat Value:** Several stags, hollow bearing trees and logs were identified.

**Rehabilitation Measures:** Control of *Lantana camara* within 10m of the proposed access track is recommended prior to vegetation clearing.



**Plate 1** Hunter Valley Moist Forest – Dry Variant

### 3.2.2 Hunter Valley Moist Forest - Mesic Variant

**Distribution:** This community occurs within the drainage channel and the immediate gully spill area (**Plate 2**).

**Floristic Description:** The dominant canopy species are *Corymbia maculata* (Spotted Gum) and *Eucalyptus punctata* (Grey Gum). A mesic midstorey occurs which is dominated by species such as *Acmena smithii* (Lilly Pilly), *Eupomatia laurina* (Bolwarra), *Pittosporum revolutum* (Rough-fruit Pittosporum), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Commersonia fraseri* (Brush Kurrajong) The ground layer is dominated by *Pteridium esculentum* (Bracken Fern), *Lomandra longifolia* (Spiny-headed Mat-rush) and *Adiantum*

*aethiopicum* (Common Maidenhair). Other ferns include *Asplenium australasicum* (Birds Nest Fern) and *Doodia aspera* (Rasp Fern).

**Threatened Flora:** No threatened flora species were identified.

**Vegetation Community:** MU12 Hunter Valley Moist Forest (NPWS, 2000).

**Ecological Community Conservation Status:** Not listed.

**Fauna Habitat Value:** Several stags, hollow bearing trees and logs were identified.

**Rehabilitation Measures:** Control of *Lantana camara* within 10m of the grout spill area is recommended prior to vegetation clearing.



**Plate 2      Hunter Valley Moist Forest – Mesic Variant**

## **3.3 SUMMARY OF ECOLOGICAL IMPACTS**

### **3.3.1 Direct Impacts: Vegetation Clearing**

The assessment revealed that the ecological impacts associated with the proposed works are directly related to the amount of vegetation to be cleared (i.e. midstorey and groundcover species).

### **3.3.2 Threatened Flora and Fauna Species**

No threatened species were identified during the assessment.

### **3.3.3 Endangered Ecological Communities**

No endangered ecological communities were identified during the assessment.

## **3.4 ASSESSMENT OF SIGNIFICANCE**

Section 94 of the TSC Act and section 5A of the EP&A Act, as amended by the Threatened Species Conservation Amendment Act 2002, provides for the application of an 'Assessment of Significance' in consideration of the likely impact of any development on a threatened species, populations or habitat.

No threatened species, populations or ecological communities (or potential habitat for locally occurring threatened species), were identified within the disturbance area; therefore, an Assessment of Significance has not been applied.

## **3.5 ASSESSMENT OF SIGNIFICANCE (EPBC ACT)**

No threatened species or ecological communities (or potential habitat for locally occurring threatened species) listed under the EPBC Act were identified; therefore a separate EPBC Act Assessment of Significance is not required. A referral to the Commonwealth Minister for the Environment is not required.

## 3.6 RECOMMENDATIONS

The following recommendations are provided to minimise potential impacts to native vegetation and fauna habitat associated with the proposed vegetation clearing:

- Vegetation clearing activity should be managed so that no accidental incursions occur into areas that are not part of the proposed access track and grout spill area;
- All vehicles and equipment should be thoroughly cleaned before entering the site to prevent the spread of soil, weed species or plant diseases;
- Weed control (i.e. *Lantana camara*) by a suitably qualified bush regenerator should be conducted within 10m of the proposed access track and grout spill area prior to commencing vegetation clearing;
- All large rocks and logs which are moved during construction of the track should be replaced following completion of the proposed remediation works; and
- The site should be re-examined for the presence of weeds six months after the proposed remediation works are complete.

## 4. REFERENCES

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Harden, G.J. (ed) (1992). Flora of New South Wales Volume 3. NSW University Press: Sydney.

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Harden, G.J. (ed) (2002). Flora of New South Wales Volume 2. NSW University Press: Sydney.

NPWS (2000). Vegetation Survey, Classification and Mapping Lower Hunter and Central Coast Region. Version 1.2. A project undertaken for The Lower Hunter and Central Coast Regional Environment Management Strategy CRA Unit Sydney Zone, National Parks and Wildlife Service.

Somerville, M. (2009). Hunter, Central & Lower North Coast Vegetation Classification & Mapping Project Volume 2: Vegetation Community Profiles. Report prepared by HCCREMS/Hunter Councils Environment Division for Hunter–Central Rivers Catchment Management Authority, Tocal, NSW.



## 5. STAFF CONTRIBUTIONS

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Name	Qualification	Title/Experience	Contribution
Gilbert Whyte	PhD	Senior Ecologist	Flora and fauna survey effort and report writing

## 6. LICENSING

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**Kleinfelder** employees involved in the current study are licensed or approved under the National Parks and Wildlife Act 1974 (License Number: SL100730, Expiry: 31st March 2014) and the Animal Research Act 1985 to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.

## 7.2 Appendix 2 – Remediation Direction

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OCEANIC COAL AUSTRALIA PTY LIMITED  
PO BOX 4186  
EDGEWORTH NSW 2285

Notice Number      DOC13/84676  
File number         FIL13/7070  
Date                  22 November 2013

### DIRECTION TO CARRY OUT REMEDIAL WORK

#### BACKGROUND

- A. The Office of Environment and Heritage ("OEH") within the Department of Premier and Cabinet ("DPC") has responsibility for the administration and enforcement of the *National Parks and Wildlife Act 1974* ("the Act") and its associated Regulations.
- B. Pauline McKenzie, holds the position of Director Coastal Branch, National Parks and Wildlife Service within OEH.
- C. Director, Coastal Branch, National Parks and Wildlife Service holds delegated authority on behalf of the Director-General of the Department of Premier and Cabinet for the purposes of section 91K of the *National Parks and Wildlife Act 1974* (NSW).
- D. Sugarloaf State Conservation Area ("the reserve") is land reserved under this Act.
- E. Oceanic Coal Australia Pty Limited ("Oceanic") being the operator of West Wallsend Colliery holds approval to extract coal from beneath Sugarloaf State Conservation Area (SCA) in accordance with Project Approval 09\_0203, Mining Lease CCL 718 and Environment Protection Licence (EPL1360). The Project Approval requires the project to be carried out generally in accordance with the project's Environmental Assessment (West Wallsend Colliery Continued Operations Project - Volumes 1 to 4, July 2010) and preparation and implementation of Extraction Plans. The Mining Lease requires preparation and implementation of Subsidence Management Plans.
- F. Oceanic have a consent issued by OEH under the NPW Regulation to undertake subsidence management works, including the remediation of surface cracking in the reserve ("the consent"). The consent was signed by Oceanic Coal on 25<sup>th</sup> July 2012.
- G. Surface cracks in remote and steep areas of the reserve are remediated by filling the cracks with an aerated concrete product known as grout. The grouting methodology employed by Oceanic is detailed in the Subsidence Management Protocol between Oceanic and "Director Coastal, National Parks and Wildlife" ("the protocol").

- H. Remediation of surface cracking adjacent to Longwall 41 using grout commenced in December 2012.
- I. On 4 June 2013 Oceanic notified authorities including OEH of a leak of the approved grouting product (Air-O-Cem) down slope of Longwall 41 into an ephemeral drainage channel within the Cockle Creek catchment and the reserve ("remediation area").
- J. On 21 June 2013 Oceanic provided OEH with a report titled "Detailed Incident Report – West Wallsend Colliery LW41 Grouting Incident" ("the report"). In that report Oceanic states that "the grout affected area extends approximately 250m down slope of the work area. The average width of the affected area is approximately 1.5m and the average depth of the grout is estimated to be around 200mm. It is estimated based on visual inspections that approximately 75 cubic meters of grout has travelled into the drainage channel".
- K. OEH inspected the site on 14 June 2013 and 17 July 2013.
- L. The leak of the grouting product into the remediation area has resulted in damage to the vegetation, rock, soil, sand and stone within the ephemeral drainage channel.
- M. Oceanic has breached condition 4.8 of the consent by causing contamination or pollution of the reserve and has committed an offence under section 156A((1)(b) of the Act by causing or permitting damage to vegetation, rock, soil, sand, stone or similar substance within the reserve.
- N. OEH issued a Remediation Direction under section 91K of the Act to Oceanic on 28 August 2013 in respect of the remediation area identified in **Attachment 1**. The Remediation Direction required Oceanic to submit a remediation plan to OEH for approval.
- O. Oceanic submitted a final remediation plan to OEH on 11 October 2013 ("the Oceanic remediation plan"). The Oceanic remediation plan is attached to this Direction as **Attachment 2**.
- P. OEH hereby approves the Oceanic remediation plan, subject to the modifications outlined in direction number 2 of this Direction.
- Q. OEH intends that on completion of the trial phase of remediation and receipt of Oceanic's report on the trial phase, a further variation to this Direction will be issued in relation to the remainder of the remediation works.
- R. The Remediation Direction issued on the 14 October 2013 (**Attachment 3**) set out the completion date for the trial phase of remediation works as the 22 November 2013. On the 18 November 2013 Oceanic wrote to the OEH to request an extension to the date as bad weather and unforeseen delays to aviation operations had caused substantial delays to their intended project schedule. Oceanic proposes that the completion date be extended by two weeks to the 6 December 2013.
- S. The OEH hereby approves Oceanic's request to vary the remediation direction to extend the trial completion date. The due date for the report of the trial phase is also extended by 2 weeks.

## OPINION

- T. I, Pauline McKenzie, Director Coastal Branch, National Parks and Wildlife Service, OEH am of the opinion that:
  - a) Damage has been caused to the reserve as a result of the commission of an offence under the Act.

## DIRECTION TO CARRY OUT REMEDIAL WORKS

U. I, Pauline McKenzie, Director Coastal Branch, National Parks and Wildlife Service, OEH, in order to:

- a) Control, abate or mitigate the damage to the reserve
- b) Maintain, remediate or restore the reserve

require that Oceanic perform the following remediation works on the land within the time specified for each work.

### Remediation works

1. Oceanic must submit to OEH an Operational Project Plan in respect of the trial phase of the works described in section 3.2 of the Oceanic remediation plan ("the trial phase"). The Operational Project Plan must be submitted to OEH by 21 October 2013 and must:
  - a. be in accordance with, and give effect to, the Oceanic remediation plan (as modified in paragraph 2 below); and
  - b. include clear timeframes for the completion of key steps of the trial phase to enable the trial phase to be completed by 6 December 2013.
2. Oceanic must undertake the trial phase in accordance with the Oceanic remediation plan, as modified in the following manner:
  - a. Oceanic is responsible for all decisions regarding selection and use of contractors. Oceanic must be satisfied that any contractor engaged has the relevant expertise and experience required for the task;
  - b. Responsibility for compliance with this Direction rests with Oceanic alone. That is, the obligation to carry out all of the works and measures referred to in the Oceanic remediation plan is an obligation on Oceanic, irrespective of whether it is expressed in the Oceanic remediation plan to be a work or measure to be carried out by Oceanic, Minova Australia Pty Ltd, or a contractor;
  - c. The steps and indicative timeframes referred to Table 5.2 are omitted and replaced with the steps and timeframes specified in this Direction;
  - d. For the avoidance of doubt, where the approved remediation plan refers to ancillary activities (for example, sediment and erosion control) and monitoring activities (for example, water monitoring) being undertaken prior to grout removal works commencing, these activities must also be undertaken prior to grout removal works commencing in the trial phase.
  - e. Oceanic must ensure that a net environmental benefit (as referred to in section 3.2.3) is achieved by ensuring that:
    - i. the removal process causes as little damage as possible to the drainage channel and the surrounding environment, and
    - ii. the natural processes of the drainage channel are restored;
    - iii. native vegetation surrounding the drainage channel and other affected areas (such as access track and heli-lift sites) is able to continue to regenerate naturally (following Oceanic's post-remediation activities);
    - iv. and that any remaining grout is no longer visually intrusive.

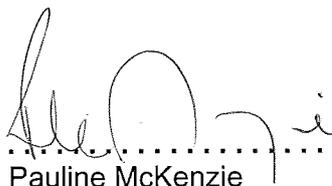
The Oceanic remediation plan, as varied by this paragraph, constitutes the approved remediation plan. For the avoidance of doubt, where there is any further inconsistency between the approved remediation plan and this Direction, this Direction prevails to the extent of that inconsistency.

3. Oceanic must complete the trial phase by 6 December 2013.

4. Oceanic must as soon as practicable notify OEH in writing when it has completed the trial phase.
5. Oceanic must submit a report to OEH of the trial phase by 10 December 2013. The report must assess the outcomes of the trial phase and make recommendations regarding remediation of the remainder of the remediation area.
6. All documents or notices required to be provided to OEH by this Direction must be sent to: Deon van Rensburg, Manager, Lower Hunter Area, National Parks and Wildlife Service, Sandgate Rd, Shortland NSW 2307.

#### **WARNING AND INFORMATION ABOUT THIS DIRECTION**

- It is an offence against section 91Q of the Act to fail to comply with this Direction. The maximum penalty that a court may impose for this offence is:
  - for a corporation, \$220,000 plus \$22,000 for each day the offence continues and
  - for an individual, \$110,000 plus \$11,000 for each day the offence continues.
- If you fail to comply with this Direction DECCW may authorise any other person to carry out the works and may then recover the cost from you (section 91O of the Act).
- This Direction is issued under section 91K of the Act.
- Under section 91K(3) of the Act this Direction may be varied or revoked by a further notice.
- Under section 91T(1) of the Act, if you are aggrieved by the decision to make this Direction you may appeal to the Land and Environment Court within 30 days of this Direction being served on you. However, even if an appeal is lodged, you must comply with this Direction, unless the Court orders otherwise.
- Under section 188E of the Act, your obligation to comply with the requirements of this direction continues until the direction is complied with, even if the due date for compliance is passed.
- OEH may conduct inspections to determine whether this Direction is being complied with.
- Words and expressions have the same meaning as words and expressions used in the Act, except where a word is specifically defined in this Direction.
- For the purposes of this Direction, "national parks legislation" means the Act and the regulations under the Act.
- A Remediation Direction will not negate the potential for prosecution. A Remediation Direction is separate to any potential prosecution.



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Pauline McKenzie

Director Coastal Branch  
(by Delegation)

#### **Attachments:**

1. Map of the Remediation Area
2. Grout Remediation Plan prepared by Oceanic Coal Australia Pty Ltd WWC SD PLN 0097 Version 2.0 Dated 11 October 2013
3. Direction to Carry Out Remedial Work; issued 14 October 2013

## 8. CONTROL AND REVISION HISTORY

### 8.1 Document information

Property	Value
Approved by	Environment & Community Manager
Document Owner	OCAL Grout Remediation Project Supervisor
Effective Date	06/12/2013
Keywords	Remediation, grout, subsidence

For a complete list of document properties, select **View Properties** from the document's context menu on the intranet.

### 8.2 Revisions

Version	Date reviewed	Review team (consultation)	Nature of the amendment
1	11/10/2013	E&C Dept	Final document
2	06/12/2013	E&C Dept	Updated to reflect existing operations and include findings from Trial Phase Report
3			