

Vickery Coal Project

## Environmental Impact Statement

### SECTION 7

### SUMMARY OF MANAGEMENT, MITIGATION, MONITORING AND REPORTING

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## 7 SUMMARY OF MANAGEMENT, MITIGATION, MONITORING AND REPORTING

In accordance with the DGRs, this section provides a summary of Whitehaven's commitments in relation to management, monitoring and reporting activities at the Project.

### 7.1 OVERVIEW

Section 4 of this EIS outlines proposed environmental management and offset measures for the Project.

These include measures relating to land resources, agricultural production, groundwater, surface water, noise, blasting, air quality, greenhouse gas emissions, ecology, road transport, visual character, Aboriginal heritage, non-Aboriginal heritage, socio-economics and hazard and risk. Where relevant, Project specific environmental monitoring programs are also proposed in Section 4.

Section 5 of this EIS describes how the Project would be progressively rehabilitated and integrated into the adjoining landscapes.

Whitehaven will prepare the management and monitoring plans listed in Table 7-1 for the Project and/or plans required by the Development Consent.

The existing monitoring program at the Vickery Coal Mine will be augmented to address the Project disturbance areas and activities. Figure 7-1 shows the location of environmental monitoring sites proposed to be maintained or added for the Project.

It is recognised that changes to the Project environmental management, monitoring and reporting proposals contained in this EIS may be considered necessary during government agency assessment of this EIS.

Environmental management, monitoring and reporting will be conducted in accordance with finalised Development Consent conditions, with the final monitoring details (locations, parameters and frequencies) to be provided in the relevant management plans/monitoring programs.

## 7.2 ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURES

Key environmental management and mitigation measures include:

- management of agricultural land in the Project area and on adjoining Whitehaven-owned lands;
- management of water resources including preparation of a water management plan and monitoring program;
- minimising operational noise emissions associated with the Project and preparation of noise and blasting management plans and monitoring programs;
- minimising operational air quality impacts associated with the Project and preparation of air quality and greenhouse gas management plans and monitoring programs;
- management of biodiversity in the Project area and biodiversity offset area;
- management of Aboriginal heritage at the Project;
- management of visual impacts in the vicinity of the Project (including night-lighting);
- population and community infrastructure management measures; and
- progressive rehabilitation of Project disturbance areas, including the reinstatement of key agricultural and ecological values, and implementation of a mine closure strategy.

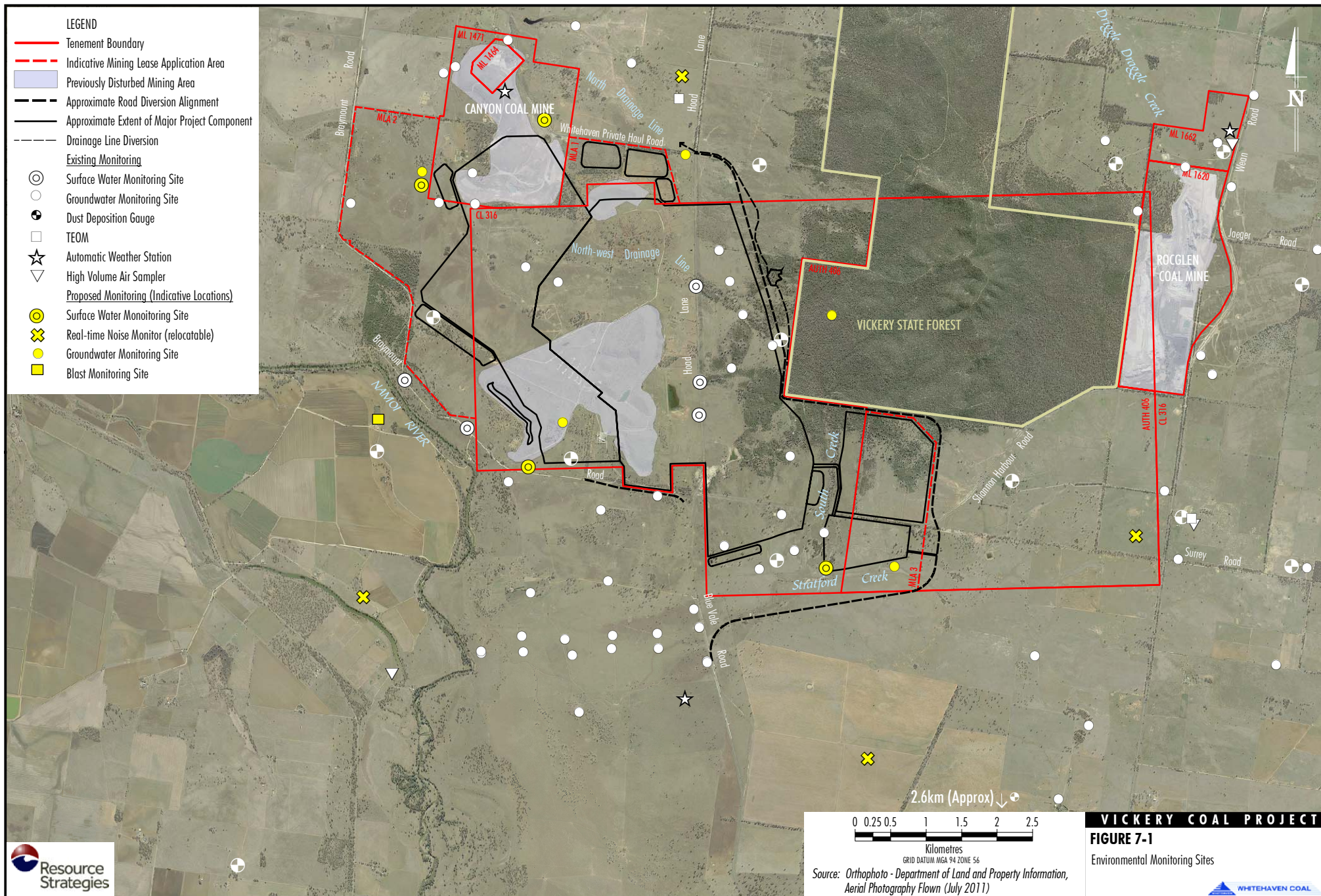
These are summarised in Table 7-2 and described below, with reference to the relevant sections of this EIS where further detail is available.

### 7.2.1 Agricultural Land

The rehabilitation and mine closure strategy for the Project includes restoration of approximately 780 ha of agricultural land suitable for grazing and some rotation cropping in parts (Sections 5 and 7.3.10).

A Farm Management Plan would be prepared by a suitably qualified person(s) to facilitate the management of agricultural land in the Project area and surrounding Whitehaven-owned land. The Farm Management Plan would include property, grazing and cropping management measures, as well as erosion, weed and pest controls to be applied.





**Table 7-1**  
**Summary of Project Management, Mitigation, Monitoring and Reporting**

| <b>Proposed Management, Monitoring and Reporting</b>   | <b>Key EIS Sections and Appendices</b>      |
|--|---|
| <b><i>Management and Monitoring</i></b>  |   |
| Water Management Plan  | Sections 4.4, 4.5 and Appendices A and B    |
| • Site Water Balance   | Section 4.5 and Appendix B                  |
| • Erosion and Sediment Control Plan  | Sections 4.3, 4.5 and 5 and Appendix B      |
| • Surface Water Management Plan  | Section 4.5 and Appendix B                  |
| • Groundwater Management Plan  | Section 4.4 and Appendix A                  |
| • Surface and Groundwater Response Plan  | Sections 4.4 and 4.5 and Appendices A and B |
| Noise Management Plan  | Section 4.6 and Appendix C                  |
| Blast Management Plan  | Section 4.6 and Appendix C                  |
| Air Quality and Greenhouse Gas Management Plan   | Section 4.7 and Appendix D                  |
| Biodiversity Offset Strategy   | Sections 4.9 and 4.10 and Appendix E        |
| Biodiversity Management Plan   | Sections 4.9 and 4.10                       |
| Farm Management Plan   | Section 4.3 and Appendix G                  |
| Aboriginal Heritage Management Plan  | Section 4.13 and Appendix K                 |
| Waste Management Plan  | Section 4.17                                |
| Rehabilitation Management Plan   | Sections 4.3, 4.9, 4.10, 5                  |
| Final Void and Mine Closure Plan   | Section 5                                   |
| Bushfire Management Plan   | Section 4.17                                |
| <b><i>Reporting Requirements</i></b>   |   |
| Annual Review and Mining Operations Plan or Rehabilitation and Environmental Management Plan | Section 6.3.1                               |
| Licences and Approvals   | Section 6.3.1                               |
| Greenhouse Gas Reporting   | Sections 4.8.2 and 4.8.3                    |

**Table 7-2  
Summary of Commitments**

|  |
|--|
| <b>Mining Operations</b>   |
| Whitehaven will operate the Project for up to 30 years, extracting up to 4.5 Mtpa of ROM coal, generally in accordance with the EIS.   |
| The private haul road and Kamilaroi Highway overpass will be constructed prior to the cumulative road haulage of ROM coal along the Whitehaven ROM coal road transport route (from all Whitehaven mines) exceeding the currently approved rate of 3.5 Mtpa, pending grant of the necessary land access requirements and other approvals. |
| No mining activities will be conducted on the western face or on the top of the Western Emplacement between 6.00 pm and 7.00 am.   |
| <b>Agricultural Land</b>   |
| A Farm Management Plan will be developed and implemented to facilitate the management of agricultural land in the Project area and surrounding Whitehaven-owned land.  |
| Approximately 780 ha of agricultural land suitable for grazing and some rotation cropping in parts will be included in the rehabilitated mine landform.  |
| <b>Water Resources</b>   |
| Whitehaven will obtain and hold appropriate WALs for the Project at all stages of the mine life and following mine closure.  |
| Surface water and groundwater monitoring networks will be developed for the Project to detect changes in surface water and groundwater quality and groundwater levels as a result of mining. The surface water and groundwater monitoring networks are summarised in Table 7-3.  |
| A Water Management Plan will be developed and implemented and will incorporate the site water balance, erosion and sediment controls, surface water and groundwater monitoring and surface water and groundwater response protocols.   |
| A permanent flood bund will be constructed around the southern extent of the open cut to prevent inundation during operations and following mine closure.  |
| Whitehaven will provide mitigation/compensation/offset measures commensurate with the level of impact for any privately-owned bore which is determined to be impacted by the Project.  |
| The site water balance will be periodically reviewed and revised over the life of the Project.   |
| <b>Noise</b>   |
| A real-time noise and meteorological monitoring network and a meteorological forecasting system will be developed and implemented. The real-time noise and meteorological monitoring network is summarised in Table 7-3.   |
| The pro-active noise management system (as described in Section 4.6.2) will be implemented so that predicted noise levels at sensitive receivers are not exceeded.   |
| Sound attenuated plant (as described in Table 4-15) will be used during the life of the Project.   |
| The outer batters of the Western Emplacement will be developed during daytime only.  |
| A Noise Management Plan, including a Construction Noise Management Plan will be developed and implemented.   |
| <b>Blasting</b>  |
| Blast controls to achieve compliance with relevant criteria at receiver locations will be implemented.   |
| Blast monitoring will be conducted at nearby private receivers. Blast monitoring is summarised in Table 7-3.   |
| Roads will be closed when blasting within 500 m.   |
| Landholders on a blast notification list will be notified prior to blasts.   |
| <b>Air Quality</b>   |
| A meteorological monitoring network, a real-time air quality monitoring network and a meteorological forecasting system will be developed and implemented. The meteorological monitoring network, real-time air quality monitoring network and meteorological forecasting system is summarised in Table 7-3.                             |
| A real-time pro-active air quality management system will be developed and implemented such that predicted air quality impacts at sensitive receivers are not exceeded.  |
| An Air Quality and Greenhouse Gas Management Plan will be developed and implemented.   |

Note: Any cross-references in this table refer to the Vickery Coal Project Environmental Impact Statement.



**Table 7-2 (continued)**  
**Summary of Commitments**

|  |
|--|
| <b>Biodiversity</b>  |
| The Winged Peppercreep population will be managed in accordance with the EPBC Act Notification of Referral Decision (EPBC 2012/6263).  |
| The mine design will avoid the high quality remnant patch of Box-Gum Woodland EEC located along South Creek (between the open cut and the Eastern Emplacement).  |
| The residual impacts of the Project on flora and fauna will be offset to maintain or improve the biodiversity values of the region in the medium to long-term.   |
| Revegetated areas and other parts of the mining tenements will be monitored to identify and demarcate areas of any noxious and environmental weeds and pests. Weed and pest monitoring is summarised in Table 7-3.   |
| A biodiversity offset strategy and a Biodiversity Management Plan will be developed and implemented.   |
| <b>Aboriginal Heritage</b>   |
| A record of known Aboriginal heritage sites will be maintained.  |
| Known Aboriginal heritage sites will be avoided during construction and operational works where practicable. Where avoidance of known Aboriginal heritage sites is not practicable, site(s) will be subject to baseline recording in consultation with the registered Aboriginal stakeholders prior to disturbance and artefacts will be salvaged for safekeeping in accordance with the stakeholders' wishes. |
| A Heritage Management Plan will be developed and implemented.  |
| <b>Visual Character</b>  |
| The Western Emplacement, Eastern Emplacement and open cut will be progressively rehabilitated to reduce the contrast between the Project and surrounding landforms.  |
| Night-lighting will be restricted to the minimum required to for operations and safety requirements.   |
| Visual screening such as vegetative screens will be used to reduce potential visual impacts from sensitive viewpoints.   |
| Upon receiving a written request from an owner of any privately-owned dwelling with significant direct views of the Project, Whitehaven will implement reasonable and feasible visual mitigation measures (e.g. vegetation screening) in consultation with the owner to minimise visibility of the Project.  |
| <b>Population and Community Infrastructure</b>   |
| Local residents will be employed preferentially (where they have the required skills and experience and demonstrate a cultural fit with the organisation).   |
| Local non-labour inputs to production will be purchased preferentially where local producers can be cost and quality competitive.  |
| A code of conduct for construction workers with regard to behaviour in the contractor induction program will be developed and implemented.   |
| Whitehaven's current donations which support education, health and community causes will continue.   |
| Whitehaven will enter into planning agreements with the Gunnedah Shire Council and the Narrabri Shire Council.   |
| <b>Rehabilitation and Mine Closure</b>   |
| Disturbance areas will be progressively rehabilitated and revegetated.   |
| The cover and connectivity of native woodland across the Project mining area will be enhanced, while retaining areas of agricultural land capable of supporting cattle grazing and cropping in rotation.   |
| The Project final landform will provide for a combination of approximately 1,360 ha of native woodland/forest and some 780 ha of agricultural land (i.e. native grassland).  |
| Monitoring of rehabilitated areas will be conducted to track the progress of revegetation and determine the requirement for intervention measures. Rehabilitation monitoring is summarised in Table 7-3.   |
| A Rehabilitation Management Plan and a Final Void and Mine Closure Plan will be developed and implemented.   |

Note: Any cross-references in this table refer to the Vickery Coal Project Environmental Impact Statement.

Management measures under the Farm Management Plan would be implemented progressively on properties under licence agreement with Whitehaven, consistent with the terms of the licence and in consultation with the licensee.

### **7.2.2 Water Resources**

Sections 2.9, 4.4.3 and 4.5.3 describe the Project water management measures. Key components of the proposed Project water management are summarised below.

#### ***Up-catchment Runoff Control***

Temporary and permanent up-catchment diversion dams/bunds/drains would be constructed over the life of the Project to divert runoff from undisturbed areas around the open cut and waste emplacements.

Up-catchment diversions would be designed to be stable (non-eroding) at the design flows. Stabilisation of the upslope diversion works would be achieved by design of appropriate channel cross-sections and gradients and the use of channel lining with grass or rock fill.

The primary up-catchment diversion structure would be the permanent north-west drainage diversion to prevent clean up-catchment runoff flowing west from the Vickery State Forest entering the advancing open cut. The diversion system would consist of an 80 ML diversion dam (DD-1) and two contour drains (one upslope of DD-1 and one downslope) that would run in a northerly direction parallel to the Blue Vale Road realignment and ultimately discharging into the north drainage line.

Water captured in DD-1 would either be pumped from the storage for use as mine make-up water, or would overflow into the contour drain and be diverted by gravity around the Project mining area.

A smaller temporary up-catchment diversion dam (DD-2) would be constructed further west along the north-west drainage line to capture any clean runoff from the undisturbed catchment downstream of DD-1. Runoff captured in DD-2 would be pumped to the north and released into the north drainage line when not required for use on-site. DD-2 would be mined through after approximately Year 20.

#### ***Surface Water Runoff Collection***

Surface water runoff from the waste rock emplacements would be separated through the use of contour banks and collection drains.

Runoff from active waste rock emplacement areas would be directed towards sediment basins or the open cut.

#### ***Open Cut Water Storage and Dewatering***

Mine-affected water captured in the open cut, comprising runoff and infiltration from active mining and emplacement areas and groundwater inflows, would be allowed to settle in in-pit collection sumps. Where the potential for higher open cut groundwater inflows is identified during the life of the Project, advance dewatering may also be conducted using appropriately licensed temporary bores ahead of the open cut mining operation.

Mine-affected water collected in-pit would be pumped to one of the three Mine Water Dams (MWD-1, MWD-2 and MWD-3) over the life of the Project. During extended wet weather periods, mine-affected water collected in the open cut would be transferred to one of two mine water surge storages (MWSS-1 or MWSS-2) to allow continued open cut dewatering.

#### ***Flood Bunds***

A permanent flood bund would be constructed around the southern extent of the open cut to prevent inundation of the open cut during operations and post-mining. It would be designed to a height that would provide protection against the peak flood height associated with a Probable Maximum Precipitation rainfall event. The width and geometry of the permanent flood bund would be such that it is stable under these extreme flow conditions.

The permanent flood bund would consist of an engineered clay fill core, which would be excavated into the natural surface. Rock fill armouring would be placed on the southern side of the clay fill core. The bund would then be topsoiled for revegetation.

#### ***Water Management Plan***

A Water Management Plan would be developed for the Project and would incorporate the site water balance, erosion and sediment controls, surface water and groundwater monitoring and surface water and groundwater response protocols.



### *Site Water Balance*

Periodic review and revision of the site water balance would be undertaken over the life of the Project to record and document the status of inflows (water capture), storage and consumption (e.g. dust suppression and crushing activities) and to optimise water management performance. Monitoring would be undertaken over the life of the Project to provide data for refinement of the site water balance, including:

- records of pumped water volumes;
- storage levels in mine water dams and other containment storages;
- dust suppression water usage rates;
- crusher and vehicle washdown usage rates; and
- irrigation usage rates on rehabilitation areas.

### *Surface Water Management Plan*

A Surface Water Management Plan would be prepared and included in the Water Management Plan. It would describe monitoring (Section 7.4.2) and measures/procedures that would be implemented over the life of the Project to respond to any potential exceedances of surface water related criteria and contingency measures.

Erosion and sediment control plans would be progressively developed and approved over the life of the Project. The plans would be updated periodically and the effectiveness of the plans would also be assessed through monitoring.

### *Groundwater Management Plan*

A Groundwater Management Plan would also be prepared and implemented as part of the Water Management Plan. It would include, but would not necessarily be limited to, the following:

- baseline data of groundwater levels, yield and quality in the region, and privately owned bores that could be affected by the Project;
- details of the groundwater monitoring program including monitoring locations, parameters and frequency of sampling;

- details of the proposed final voids and the methods to be used to place coal rejects and acid forming material within the mine waste rock emplacements;
- groundwater assessment criteria for investigating any potentially adverse groundwater impacts; and
- a program to validate the regional numerical groundwater model for the Project.

It would also describe the contingent mitigation/compensation/offset options that would be enacted in the unlikely event that other groundwater users are adversely affected by the Project.

### **7.2.3 Noise**

Sections 2.8.1 and 4.6.3 describe the Project noise management measures. Key components of the proposed Project noise management are summarised below.

#### ***Operational Noise Mitigation Measures***

Whitehaven would implement the noise management and mitigation measures documented in Table 4-15 and summarised below:

- use of XQ mobile plant;
- enclosure of coal handling infrastructure at the MIA (i.e. primary crusher/screen);
- installation of 10 m high bunds along exposed sections of the haul road routes;
- design of the alignment of the main truck haul road running from the open cut area to the MIA so that it minimises noise projection to the south-west;
- development of the exposed areas (i.e. outer batters) of the Western Emplacement during daytime only; and
- cessation of the rehabilitation fleet during evening and night-time periods.

#### ***Noise Management and Affection Zones***

Private receivers where noise emissions are predicted to exceed the Project-specific criteria can be divided into a Noise Management Zone and a Noise Affection Zone (Table 4-13).

Proposed management procedures, in addition to the mitigation and management measures described below, for receivers in these zones would include:

- prompt response to any landowner issues of concern or complaints;
- discussions with relevant landowners to assess concerns;
- refinement of on-site noise mitigation measures and mine operating procedures;
- implementation of feasible and reasonable acoustical mitigation at receivers; and
- entering into negotiated agreements with landowners (including acquisition for receivers identified to be in the Noise Affection Zone)

### ***Real-time Monitoring and Meteorological Forecasting***

The noise management system for the Project would include a real-time noise and meteorological monitoring network, as well as a meteorological forecasting system.

Real-time noise monitors would be installed in locations that would provide representative noise levels at the most sensitive receivers surrounding the Project (e.g. to the south-west and to the north).

Real-time meteorological data would be recorded at the Project AWS.

A meteorological forecasting system would also be implemented for the Project to anticipate upcoming periods of adverse weather conditions (e.g. based on wind speed, direction and atmospheric stability). The predictive meteorological forecasting system would be used in conjunction with the real-time noise monitoring system and would provide an alert for mine personnel to review the real-time data and manage mining activities for that day as may be required.

### ***Pro-Active Noise Management System***

The pro-active noise management system would be implemented to manage noise levels from the Project at receiver locations (i.e. such that Project noise levels do not exceed predicted operational noise levels at receiver locations).

The system would involve modifying mining operations if adverse meteorological conditions are predicted (i.e. by the meteorological forecasting system) or if real-time noise monitoring results exceed specified trigger levels.

For example, to achieve compliance with Project-specific noise criteria at private receivers to the south-west of the Project when the meteorological forecasting system predicts adverse weather conditions relevant to these receivers, the Western Emplacement waste fleet would be relocated to the northernmost portion of the Western Emplacement. Once the waste emplacement fleet has been relocated, real-time noise monitoring would still be used to manage Project noise at all privately-owned receiver locations (i.e. additional mitigation measures would be implemented should real-time noise monitoring show that Project noise levels exceed the specified trigger levels).

Prior to the commencement of each mining shift, the mining operator would review meteorological forecasting data. If favourable conditions are predicted, then typical operations would be conducted. If unfavourable conditions are predicted, the mining operations would be modified (i.e. additional mitigation measures would be implemented).

Adverse conditions would be identified, using the real-time noise and meteorological monitoring network, during the initial ramp-up of the Project when a reduced Project fleet is operational (i.e. Year 1) using a combination of real-time noise and meteorological monitoring.

In addition, adverse conditions would be identified using a Project noise model, which would be validated against the real-time noise monitoring results.

During operations, if noise from the Project exceeds specified trigger levels, mine personnel would be alerted and additional mitigation measures would be implemented until noise levels reduce below the trigger levels. This would occur even if mining operations have already been modified due to predicted unfavourable meteorological conditions prior to the commencement of the mining shift.

The trigger levels would be specified such that the equivalent noise level at the closest receivers would be below predicted operational noise levels.

If a trigger level is exceeded during operations, the corresponding meteorological conditions would be recorded to inform future predicted adverse conditions.

The pro-active noise management system would be used during all stages of the Project.

### **Noise Management Plan**

A Noise Management Plan would be prepared for the Project, which would describe the noise management system for the Project, including details of:

- the noise mitigation measures for the Project;
- real-time noise and meteorological monitoring locations;
- supplementary attended noise monitoring locations;
- the predictive meteorological forecasting system;
- the pro-active noise management system;
- specified trigger noise levels for the implementation of additional mitigation measures;
- protocols for the implementation of additional mitigation measures; and
- complaint response protocols.

#### **7.2.4 Blasting**

Section 4.6.3 describes the Project blasting management measures. Blast and vibration management would be conducted in accordance with a Blast Management Plan which would include:

- safety control measures and notification/closure procedures in relation to blasting within 500 m of Blue Vale Road, Braymont Road and the Vickery State Forest;
- procedures for the management of livestock in close proximity to blast events;
- blast controls and/or blast optimisation measures to enable compliance with relevant criteria at receiver locations; and
- a blast notification list (nominally landowners within 2 km of the Project).

#### **7.2.5 Air Quality**

Section 4.7.3 describes the Project air quality management measures. Key components of the proposed Project air quality management are summarised below.

### **Real-time Air Quality Monitoring and Pro-active Management**

A network of real-time dust monitors in the vicinity of the Project would continuously log short-term particulate concentrations and report the data to a web based recording system.

When specified short-term trigger levels are reached or exceeded, a message would be delivered to a Whitehaven representative, alerting them to the elevated short-term dust levels. The Project meteorological station would report wind conditions at the time, allowing personnel to evaluate the likely origin of the elevated dust levels enabling appropriate mitigation and response measures to be implemented.

An additional component of the dust management system would be a meteorological forecasting system to predict what the meteorological conditions would be, enabling short-term mine planning to be conducted in consideration of potential upcoming weather conditions with the potential to exacerbate air quality impacts (e.g. increasing the levels of controls or limiting mining activities in certain areas).

### **Air Quality and Greenhouse Gas Management Plan**

An Air Quality and Greenhouse Gas Management Plan would be prepared for the Project and would include:

- details of the air quality mitigation measures to be implemented for the Project;
- the real-time air quality monitoring program;
- details of trigger levels for the investigation of additional mitigation measures;
- response protocols during adverse conditions; and
- details of the meteorological forecasting system.

#### **7.2.6 Biodiversity**

Sections 4.9.3, 4.9.4, 4.10.3, and 4.10.4 describe the proposed management of biodiversity and the biodiversity offset strategy for the Project. Key components are summarised below.

### ***Biodiversity Management Plan***

Whitehaven would prepare and implement a Biodiversity Management Plan for the Project which would include details of the following:

- protection measures for vegetation and soil outside of the Project disturbance areas;
- procedures for the conservation and re-use of topsoil;
- weed control measures;
- clearing strategies to minimise impacts on fauna;
- salvage and re-use of material from the site for habitat establishment;
- strategies to minimise the removal of hollow trees, logs and stags;
- strategies for managing artificial lighting;
- feral animals control measures;
- maximum speed limits;
- fauna monitoring during clearing activities, fauna rescue and relocation of micro-habitat features; and
- monitoring and performance evaluation of fauna micro-habitat management actions.

### ***Management of the Winged Peppercress Population***

Management of the Winged Peppercress population would be conducted in accordance with the EPBC Act Notification of Referral Decision (EPBC 2012/6263) (Section 4.9.3).

### ***Biodiversity Offset Strategy***

Whitehaven commits to offset the residual impacts of the Project on flora and fauna and maintain or improve the biodiversity values of the region in the medium to long-term.

The biodiversity offset area (Figure 7-2) covers approximately 1,671 ha, and comprises approximately 1,396 ha of existing forest/woodland, 248 ha of derived native grasslands and 27 ha of erosion/scald (which would be actively managed and rehabilitated as part of the proposal). The 248 ha of derived native grassland would be restored to a woodland/forest habitat (in the medium to long-term) via active management (e.g. regeneration and revegetation).

A biodiversity offset strategy would be prepared by a suitably qualified person(s) to facilitate the management of the biodiversity offset area. The biodiversity offset strategy would be developed within 12 months of the Development Consent being granted.

Based on the findings of the detailed flora and fauna survey of the biodiversity offset area (Appendix F), a number of management measures are proposed to enhance its flora and fauna value. These measures would be detailed in the biodiversity offset strategy and would include:

- promotion of natural regeneration and revegetation;
- habitat enhancement;
- control of weeds;
- pest management; and
- fire management.

### ***Monitoring and Completion Criteria***

The biodiversity offset strategy would also include a program to monitor the effectiveness of the management measures and to evaluate performance against specified completion criteria. The monitoring would be undertaken by a suitably qualified person(s), and independent audits would be performed as necessary.

Completion criteria would be developed in consultation with the relevant government agencies to define the required condition of the offset before it could be added to the Mt Kaputar National Park.

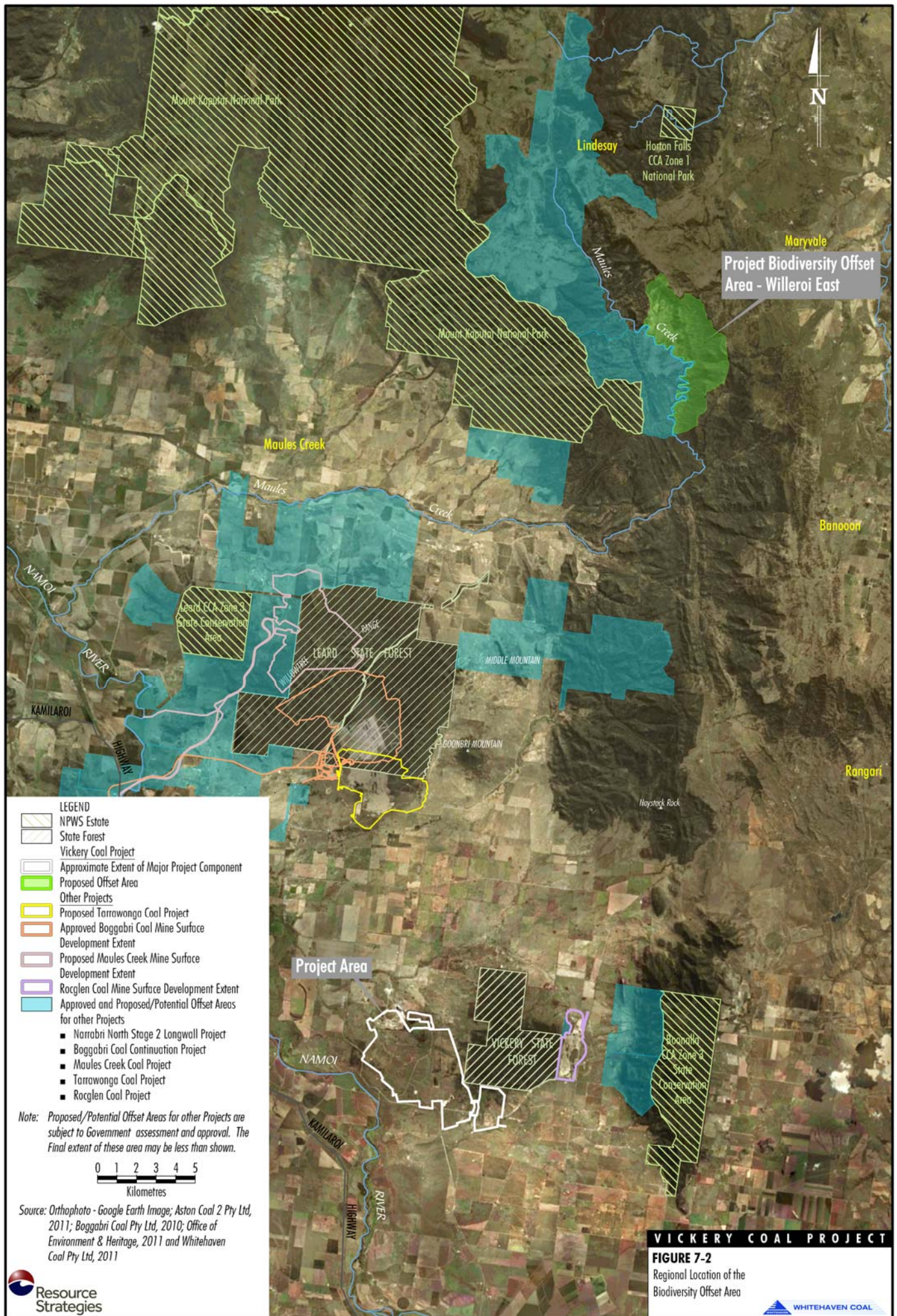
### ***Security of the Biodiversity Offset***

Whitehaven intends to reach an agreement with the NSW Government so that the biodiversity offset can be permanently added to the adjoining Mount Kaputar National Park. However, Whitehaven recognises that the formal process of incorporating the area into the National Park may take some time, and as a result an interim conservation arrangement would be made to ensure protection and management of the biodiversity offset (e.g. a voluntary conservation agreement with the NSW Minister for the Environment).

### **7.2.7 Aboriginal Heritage**

Section 4.13.3 describes the Project Aboriginal heritage management measures. Key components of the proposed Project Aboriginal heritage management are summarised below.







Whitehaven would maintain a record of known Aboriginal heritage sites (including on-site plans and in relevant Project documentation).

Where practicable, known Aboriginal heritage sites would be avoided during Project construction and operation works.

Where avoidance of known Aboriginal heritage sites is not practicable, site(s) would be subject to baseline recording in consultation with the registered Aboriginal stakeholders prior to disturbance and artefacts would be salvaged for safekeeping in accordance with the stakeholders' wishes.

A Heritage Management Plan would be developed in consultation with the Aboriginal community and OEH. The Heritage Management Plan would be developed prior to any works which would harm Aboriginal cultural heritage sites in the Project area.

#### 7.2.8 Visual Character

Section 4.13.3 describes the Project visual character management measures. Key components are summarised below.

Progressive rehabilitation of the Western Emplacement, Eastern Emplacement and open cut infill areas would be undertaken and would assist in reducing the contrast between the Project landforms and the surrounding environment. The design of the mine waste rock emplacements would assist with the visual shielding of the active open cut operations.

Visual screening such as the use of vegetation screens consisting of native plants that are compatible with the existing surrounding vegetation would be used to reduce potential visual impacts from local sensitive viewpoints. These could potentially include sections along the realigned Blue Vale Road and Shannon Harbour Road.

In addition, upon receiving a request from an owner of any privately-owned dwelling which has significant direct views of the Project, Whitehaven would implement reasonable and feasible visual mitigation measures (e.g. vegetation screening) in consultation with the owner to minimise the visibility of the Project from the dwelling.

#### 7.2.9 Population and Community Infrastructure

Some population growth would occur as a result of the Project employment and associated flow on effects. Impacts to community infrastructure demand are anticipated to be small as a result of the Project alone, however cumulative impacts with other mining operations in the region would be more significant.

Whitehaven would work in partnership with the Narrabri and Gunnedah Shire Councils and the local community so that the benefits of the projected economic growth in the region are maximised and impacts minimised.

In this respect, a range of general and specific social impact mitigation and management measures are proposed and would include:

- Continuation of the current donations policy which supports education, health and community causes.
- Employ local residents preferentially (where they have the required skills and experience and demonstrate a cultural fit with the organisation), as the employment of local residents reduces potential population effects.
- Purchase local non-labour inputs to production preferentially where local producers can be cost and quality competitive.
- Include a code of conduct for construction workers with regard to behaviour in the contractor induction program.

#### 7.2.10 Rehabilitation and Mine Closure

Section 5 describes the rehabilitation and mine closure goals for the Project. Key components are summarised below.

The Project would disturb a total area of approximately 2,242 ha, consisting of approximately 1,284 of grassland, 464 ha native woodland/forest, 405 ha of rehabilitated land associated with the previous Vickery Coal Mine and approximately 89 ha of existing dams, tracks, roads and infrastructure areas. The disturbance areas associated with the Project would be progressively rehabilitated and revegetated.

The overall rehabilitation goal for the Project mining area is to enhance the cover and connectivity of native woodland across the Project area, while retaining areas of agricultural land capable of supporting cattle grazing and cropping in rotation with sown pastures. The Project final landform and revegetation program would provide for a combination of approximately 1,360 ha of native woodland/forest and some 780 ha of agricultural land (i.e. native grassland). Figure 7-3 illustrates the proposed Project final landform, land use and revegetation of the Project mining area.

A Rehabilitation Management Plan would be developed and implemented for the Project. It is expected that the Rehabilitation Management Plan would include the following:

- a description of the nature and timing of the progressive rehabilitation works (i.e. new areas) and rehabilitation management activities (i.e. maintenance of existing areas) that would be undertaken within the Project area;
- a description of how the planned rehabilitation works have been developed in consideration of the rehabilitation and mine closure goals for the Project;
- rehabilitation performance objectives, parameters and completion criteria;
- the rehabilitation monitoring program to be used to evaluate the performance of rehabilitation against the completion criteria;
- the mechanisms to be used to regularly report on the status of the rehabilitation works and the rehabilitation monitoring results; and
- a description of how the Rehabilitation Management Plan integrates with the other management plans required for the Project (i.e. Biodiversity Management Plan and MOP).

Whitehaven would develop a Final Void and Mine Closure Plan for the Project which would include details of the mine closure strategy.

The Final Void and Mine Closure Plan would be developed giving due consideration to relevant strategic land use policies, and would include details of the funding and maintenance requirements for the site and give consideration of amelioration of potential adverse socio-economic effects due to the reduction in employment at Project closure.

## 7.3 ENVIRONMENTAL MONITORING

Environmental monitoring to be implemented for the Project is described in Section 4. Table 7-3 provides an overview of the Project environmental monitoring regime. Figure 7-1 depicts the locations of key existing and proposed environmental monitoring sites.

The Project would expand the existing environmental monitoring network including:

- installation of new groundwater monitoring/sampling sites (Figure 7-1);
- installation of new surface water sampling sites (Figure 7-1);
- installation of new noise monitoring sites (Figure 7-1);
- installation of new air quality monitoring sites (Figure 7-1);
- adoption of predictive meteorological forecasting;
- biodiversity monitoring measures;
- monitoring of biodiversity offset area; and
- monitoring of rehabilitation and revegetation.

These measures are described further below.

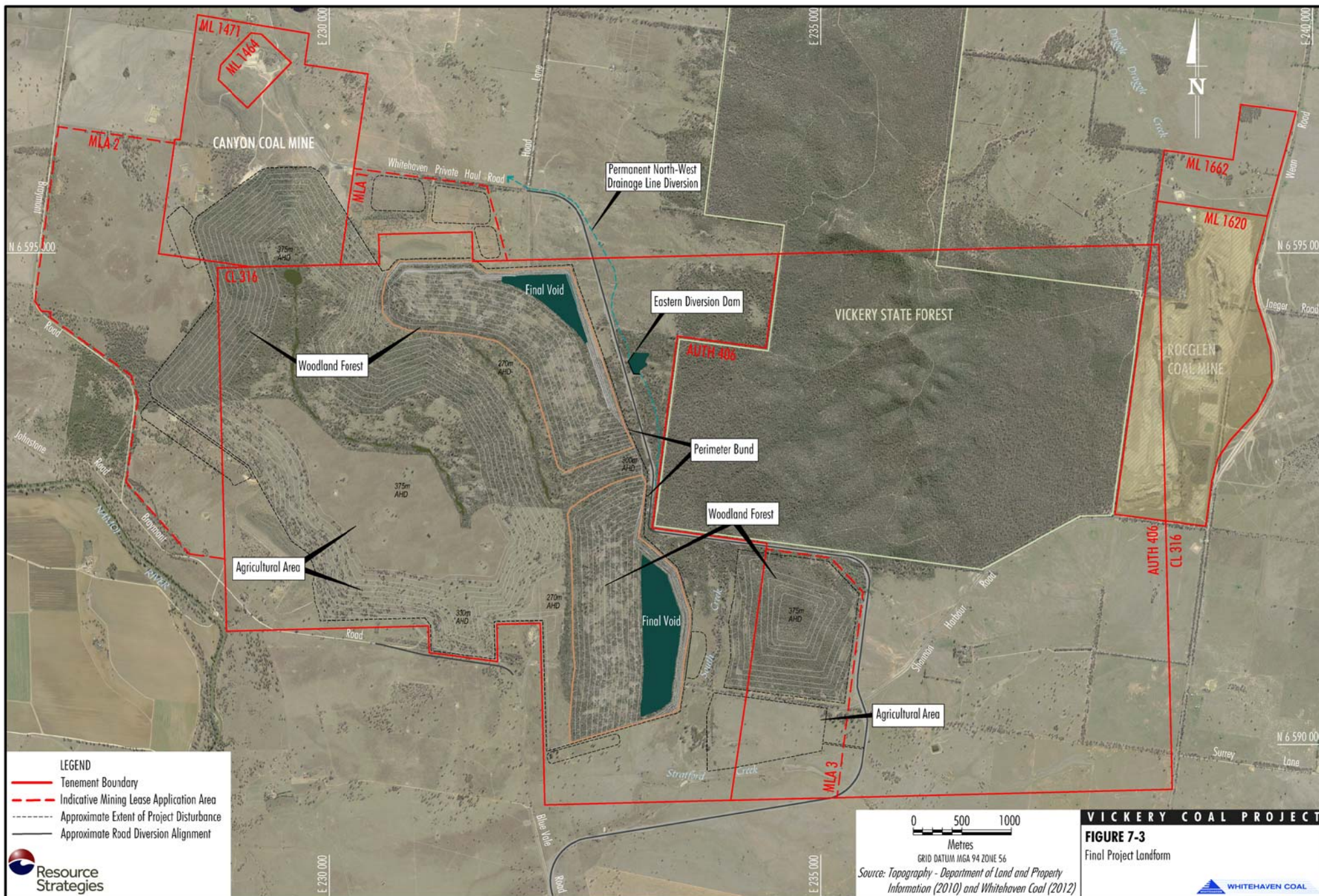
### 7.3.1 Groundwater

Section 4.4.3 describes the proposed Project groundwater monitoring measures. Key components are summarised below.

The groundwater monitoring program for the Project would be designed to detect changes in groundwater levels and quality as a result of mining and improve knowledge of aquifer definition and interactions. The groundwater monitoring program would augment the existing Vickery groundwater monitoring network and use the results of other mine groundwater monitoring programs in the vicinity of the Project.

Additional piezometers would be installed to monitor groundwater levels within the Upper Namoi Alluvium (adjacent to the Western and Eastern waste Emplacements) and in the Maules Creek Formation groundwater system. Piezometers would also be installed in mine waste rock behind the advancing open cut to provide information on recharge rates and mine waste rock permeabilities and to validate groundwater modelling assumptions and predictions with respect to the emplacements.







**Table 7-3**  
**Summary of the Project Environmental Monitoring Regime**

| Environmental Aspect         | Environmental Monitoring <sup>#</sup>   | Frequency <sup>#</sup>   |
|------------------------------|---|--|
| Meteorology                  | <ul style="list-style-type: none"> <li><i>Meteorology</i> – On-site meteorological station located at the Canyon Coal Mine and implementation of a meteorological forecasting system.</li> </ul>  | <ul style="list-style-type: none"> <li>Continuous.</li> </ul>  |
| Groundwater                  | <ul style="list-style-type: none"> <li><i>Groundwater levels (vibrating wire piezometers)</i> – VKY3033, VKY3041, VKY3053, VS048, VS054, VS056, VS058, VS059 and VS062.</li> <li><i>Groundwater levels and quality (standpipe piezometers)</i> – VKY3034, VKY3035, VKY3036, VKY3042, VKY3043, TR7, TR18, TR26, TR35, GW-1, GW-2, GW-4, GW-5, GW-7, GW-8, GW-9, GW-10, GW-11, VNW221, VNW223 and additional sites to be installed during Project life.</li> <li><i>Groundwater extraction</i> – sumps within the open cuts.</li> </ul> | <ul style="list-style-type: none"> <li>Continuous.</li> <li>Quarterly.</li> <li>Quarterly.</li> </ul>  |
| Surface Water                | <ul style="list-style-type: none"> <li><i>Surface water quality</i> – VUS, VUD, VUD OR, BR, JR and additional sites to be installed during Project life.</li> <li><i>Structural integrity of dams</i> – all sediment basins and contained water dams.</li> <li><i>Culverts</i> – debris and plant growth.</li> <li><i>Up-catchment diversions</i> – integrity/stability.</li> <li><i>Erosion and sediment control structures.</i></li> </ul>  | <ul style="list-style-type: none"> <li>Following sufficient rainfall to gather a sample.</li> <li>Quarterly.</li> <li>Annually.</li> <li>Monthly and following 50 mm of rainfall in 24 hours.</li> <li>Quarterly.</li> </ul> |
| Noise                        | <ul style="list-style-type: none"> <li><i>Attended noise monitoring</i> – monitoring at neighbouring residences as required.</li> <li><i>Real-time</i> – monitoring and recording at neighbouring residences and other locations as required. The Project real-time noise monitoring system would complement the real-time monitoring systems to be implemented at the Tarrawonga, Boggabri and Maules Creek Coal Mines.</li> </ul>   | <ul style="list-style-type: none"> <li>Quarterly.</li> <li>Continuous 24 hours.</li> </ul>   |
| Blasting                     | <ul style="list-style-type: none"> <li><i>Blasting</i> – residence 127b.</li> </ul>   | <ul style="list-style-type: none"> <li>Per blast.</li> </ul>   |
| Air Quality                  | <ul style="list-style-type: none"> <li><i>Dust deposition</i> – dust gauges within the Project mining area and surrounds.</li> <li><i>PM<sub>10</sub></i> – existing HVASs to the south-west of the Project and north and south of the Rocglen Coal Mine.</li> <li><i>Real-time PM<sub>2.5</sub> and PM<sub>10</sub></i> – existing TEOMs to the north of the Project and to the south of the Rocglen Coal Mine.</li> </ul>   | <ul style="list-style-type: none"> <li>Monthly.</li> <li>Continuous six day cycle.</li> <li>Continuous 24 hours.</li> </ul>  |
| Biodiversity/ Rehabilitation | <ul style="list-style-type: none"> <li><i>Weeds and pests</i> – Whitehaven owned land.</li> <li><i>Rehabilitation, Biodiversity Offset Area</i> – revegetation/flora.</li> <li><i>Rehabilitation, Biodiversity Offset Area</i> – fauna usage.</li> </ul>  | <ul style="list-style-type: none"> <li>Annually.</li> <li>Annually.</li> <li>Three yearly.</li> </ul>  |

<sup>#</sup> As required by management plans under the Development Consents, EPLs, MLs and Water Licence conditions and on-site investigations.

Indicative locations of these additional groundwater monitoring sites are shown on Figure 7-1, however their exact location would be determined during development of the Groundwater Management Plan.

Groundwater monitoring results would be reported in the Annual Review.

### 7.3.2 Surface Water

Section 4.5.3 describes the proposed Project surface water monitoring measures. Key components are summarised below.

A Water Management Plan would be developed for the Project and would incorporate the site water balance, an erosion and sediment control plan, surface water and groundwater monitoring and a surface water and groundwater response plan.

#### Site Water Balance

Periodic review and revision of the site water balance would be undertaken over the life of the Project to record and document the status of inflows (water capture), storage and consumption (e.g. dust suppression and crushing activities) and to optimise water management performance. Monitoring would be undertaken over the life of the Project to provide data for refinement of the site water balance, including:

- records of pumped water volumes;
- storage levels in mine water dams and other containment storages;
- dust suppression water usage rates;
- crusher and vehicle washdown usage rates; and
- irrigation usage rates on rehabilitation areas.

#### Erosion and Sediment Controls/Diversions

The proposed sediment control storages would have sufficient capacity to manage disturbed area runoff in accordance with design criteria recommended in the *Managing Urban Stormwater: Soils & Construction Guidelines* (Landcom, 2004).

The integrity of up-catchment diversion channels/bunds would be visually checked on a monthly basis or after significant rainfall (50 mm or more rainfall in a 24 hour period) to check for any signs of visible erosion or instability to trigger corrective actions.

### Surface Water Monitoring Program

Surface water monitoring would be conducted at existing water quality monitoring sites, discharge points at licensed discharge locations around the Project and additional monitoring points on watercourses which drain from the Project area (monitoring locations would be selected during development of the Water Management Plan).

Water quality monitoring would be conducted when sufficient rainfall has fallen to allow a sample to be collected, and during discharge events. Parameters that would be monitored include pH, EC, TDS, TSS, turbidity, oil and grease and total organic carbon.

### 7.3.3 Noise

Section 4.6.3 describes the proposed Project noise monitoring measures. Key components are summarised below.

The noise management system for the Project would include a real-time noise and meteorological monitoring network, as well as a meteorological forecasting system.

Real-time noise monitors would be installed in locations that would provide representative noise levels at the most sensitive receivers surrounding the Project. Possible locations for these monitors are shown on Figure 7-1, however, it is expected that the actual locations would be determined once operations commence and in consultation with the relevant government agencies and local landowners.

The meteorological forecasting system would be used to anticipate upcoming periods of adverse weather conditions (e.g. based on wind speed, direction and atmospheric stability). The predictive meteorological forecasting system would be used in conjunction with the real-time noise monitoring system and would provide an alert for mine personnel to review the real-time data and manage mining activities for that day as may be required.

### 7.3.4 Blasting

Section 4.6.3 describes the proposed Project blast monitoring measures. Key components are summarised below.

Blast monitoring would be conducted at nearby private receivers. Exact locations would be determined in consultation with landholders and government agencies, however indicative locations are shown on Figure 7-1.

### 7.3.5 Air Quality

Section 4.7.3 describes the proposed Project noise monitoring measures. The existing air quality monitoring network would continue to be implemented and augmented for the Project. Key components are summarised below.

Air quality monitoring for the Project would be conducted at several dust gauges throughout the Project mining area and surrounds, at a TEOM installed approximately 1 km north of the Project and at a HVAS located approximately 4 km south-west of the Project (Figure 7-1).

The network of real-time dust monitors in the vicinity of the Project would continuously log short-term particulate concentrations and report the data to a web based recording system.

The real-time air quality monitoring would complement the existing and proposed monitoring systems for other mining operations in the area (e.g. the Tarrawonga, Rocglen and Boggabri Coal Mines and the Maules Creek Coal Project).

### 7.3.6 Biodiversity

Sections 4.9.3, 4.9.4, 4.10.3, 4.10.4 and 5.6 describe the proposed Project biodiversity monitoring measures. Key components are summarised below.

#### **Weed and Pest Monitoring**

Revegetated areas and other parts of the mining tenements would be regularly inspected to identify and demarcate areas of noxious and environmental weeds. Local landholders and relevant government agencies would be consulted with regard to the spread and management of weeds within the local area.

Areas treated for weed control would have follow up inspections to evaluate the effectiveness of the weed control programs.

Follow-up monitoring of feral animal control measures would be conducted to evaluate the effectiveness of the control programs.

### **Biodiversity Offset Area**

A biodiversity offset strategy would be developed for the biodiversity offset area and would include a program to monitor the effectiveness of the management measures and to evaluate performance against specified completion criteria. The monitoring would be undertaken by a suitably qualified person(s), and independent audits would be performed as necessary.

### 7.3.7 Rehabilitation

Section 5.6 describes the proposed Project rehabilitation monitoring. Key components are summarised below.

The rehabilitation monitoring program for the Project would be designed to track the progress of revegetation and to determine the requirement for intervention measures such as thinning to reduce the density of revegetated areas, or additional plantings in areas where vegetation establishment has been sub-optimal.

The Project rehabilitation monitoring program would be documented in the Rehabilitation Management Plan.

Annual revegetation surveys would be undertaken by an appropriately qualified and experienced person to identify the success of rehabilitation and identify any additional measures required to achieve ongoing rehabilitation success.

The annual monitoring program would include the use of satellite imagery obtained on a regular basis over the life of the Project to document trends in rehabilitation over time. This process would compliment on-ground survey work.

## 7.4 REPORTING

### 7.4.1 Annual Review

Whitehaven would produce an Annual Review of the environmental performance of the Project for a 12 month reporting period. Copies of the Annual Review would be made available on the Whitehaven website.

Environmental monitoring results as described in Section 7.3. would be compared against relevant statutory requirements, monitoring results of previous years and relevant predictions of this EIS. Biodiversity management, biodiversity offsets and rehabilitation monitoring results and various environmental activities planned for the next 12 months would also be discussed in the Annual Review.

#### **7.4.2 Development Consent Requirements**

Whitehaven would provide regular reporting of environmental performance of the Project on the Whitehaven website, in accordance with the reporting arrangements in any plans or programmes approved under the conditions of the Project Development Consent and associated licences and approvals.

#### **7.4.3 Independent Environmental Audit**

Consistent with contemporary reporting requirements for mining operations in NSW, Whitehaven would commission an independent environmental audit of the Project every three years.

Upon completion of the independent environmental audit, Whitehaven would submit responses to the DP&I and where necessary, revise environmental management plans.

#### **7.4.4 Other Reporting**

##### ***Annual Return***

A summary of monitoring required by an EPL for the Project (including the recording of complaints) and a Statement of Compliance would be reported in Annual Returns and submitted to the EPA.

##### ***Water Licences - Annual Reporting***

Whitehaven would report (including monitoring data, interpretation and discussion relating to groundwater and salinity) in accordance with the conditions of existing and any future water licences to the NOW.

##### ***Greenhouse Gas Reporting***

Under NGERS requirements, relevant sources of greenhouse gas emissions and energy consumption must be measured and reported on an annual basis, allowing major sources and trends in emissions/energy consumption to be identified.

##### ***Commonwealth Government EEO Program***

Whitehaven is also a participant in the Commonwealth Government's EEO Program. Whitehaven would assess energy usage from all aspects of its operations, including the Project, and publicly report the results of energy efficiency assessments, and the opportunities that exist for energy efficiency projects with a financial payback of up to four years.

##### ***NPI Reporting***

Whitehaven would provide annual NPI reports to the EPA. Emissions data for the Project would be made publicly available on the Federal Government's NPI website ([www.npi.gov.au](http://www.npi.gov.au)) and would also be reported in the Annual Review.

##### ***Community Complaints Register***

A community complaints register is maintained by Whitehaven. Complaints and subsequent actions undertaken are reported in the Annual Review and on the Whitehaven website.

A complaints register would be maintained for the Project.