

ENVIRONMENTAL ASSESSMENT

Duralie Extension Project

EXECUTIVE SUMMARY



GLOUCESTER
COAL



ResourceStrategies

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ES1 INTRODUCTION

This document is an Environmental Assessment (EA) for the Duralie Extension Project (the Project). The Project provides for the extension and continuation of open pit mining operations at the existing Duralie Coal Mine (DCM).

The DCM is located approximately 35 kilometres south of Gloucester and approximately 10 kilometres north of Stroud in the Gloucester Valley in New South Wales (NSW) (Figure ES-1).

Duralie Coal Pty Ltd (DCPL) is the owner and operator of the DCM. DCPL is a wholly owned subsidiary of Gloucester Coal Ltd (GCL).

The open pit mining operations at the DCM are supported by on-site facilities including a main infrastructure area, water management infrastructure/storages and rail infrastructure (Figure ES-2). Table ES-1 summarises the main components of the existing DCM.

Coal extracted from the open pit mining operations is hauled to the run-of-mine (ROM) pad and coal handling area (including a rotary breaker), at the main infrastructure area (Figure ES-2).

ROM coal from the DCM is loaded into wagons on a dedicated train that runs between the DCM and the Stratford Coal Mine (SCM) on the North Coast Railway (Figure ES-1).

Water management at the DCM is designed for no off-site controlled release to the Mammy Johnsons River and comprises on-site storages and beneficial use of water through irrigation within the Mining Lease (ML) 1427.

The DCM currently employs a workforce of approximately 120 people.

ES1.1 STATUTORY CONTEXT

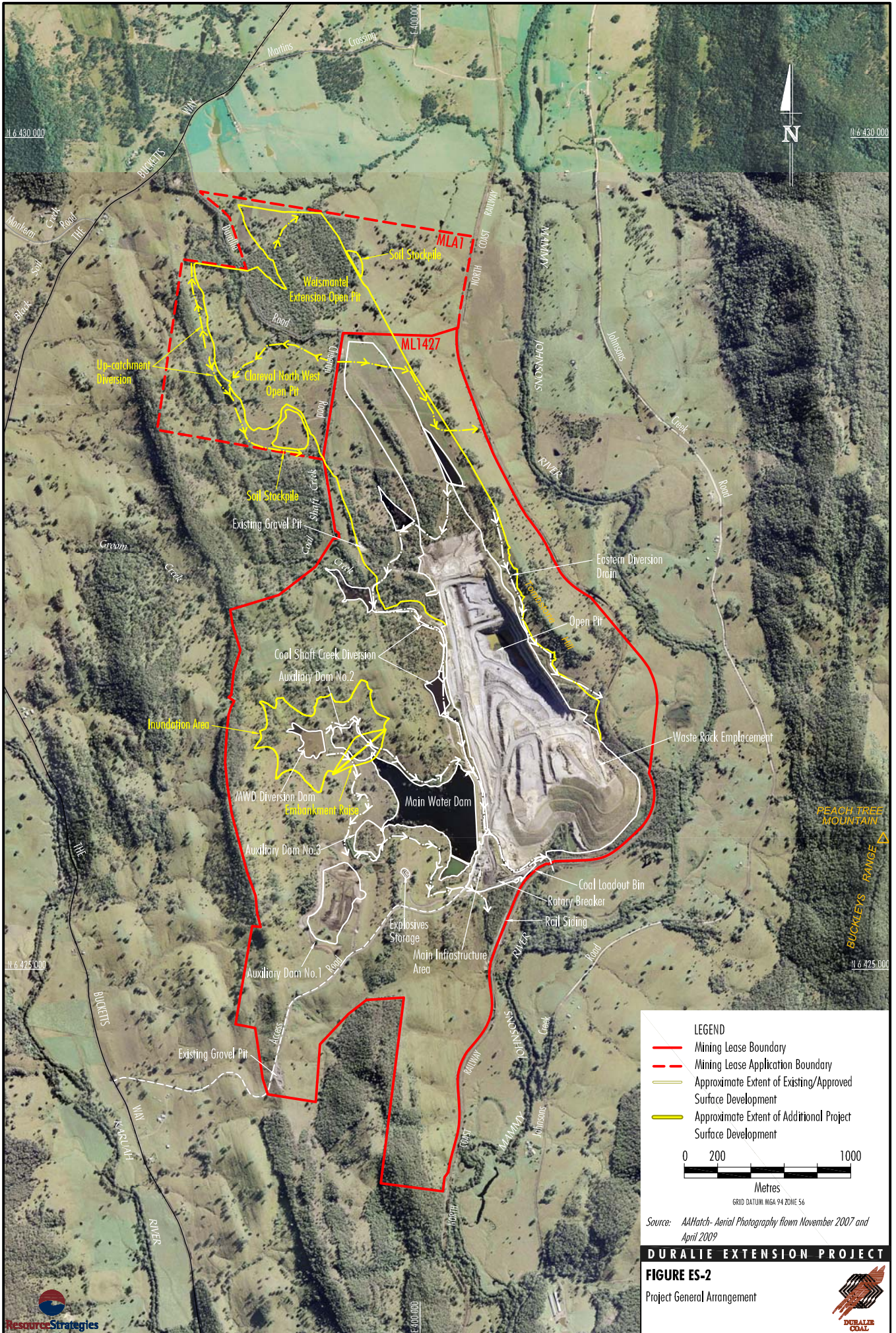
This EA has been prepared to accompany a Project Application made for the Project, in accordance with Part 3A of the NSW *Environmental Planning and Assessment Act, 1979*. Part 3A of the *Environmental Planning and Assessment Act, 1979* provides an approval process that is tailored to major projects.

This EA considers the potential environmental impacts of the Project in accordance with the Director-General's Environmental Assessment Requirements issued by the NSW Department of Planning on 5 November 2009.

**Table ES-1
Summary of the Existing DCM**

| Component | Description |
|---|--|
| Open Pit Mining and ROM Coal Production | <ul style="list-style-type: none"> Conventional open pit mining methods and equipment. ROM coal production of approximately 12.3 million tonnes. |
| Coal Seam/Pits | <ul style="list-style-type: none"> Mining of the Weismantel Seam (Weismantel open pit). |
| ROM Coal | <ul style="list-style-type: none"> Production of approximately 1.8 million tonnes per annum (Mtpa) of ROM coal. |
| Waste Rock Management | <ul style="list-style-type: none"> Backfill within Weismantel open pit. Out-of-pit waste rock emplacement. |
| Total Waste Mined | <ul style="list-style-type: none"> Approximately 40 million bank cubic metres (Mbcm). |
| ROM Coal Rail Transport | <ul style="list-style-type: none"> Train haulage hours 7.00 am to 10.00 pm. Annual average of approximately three train movements per day. |
| Water Management | <ul style="list-style-type: none"> Water management system comprises of water management storages, runoff diversions and control, sediment control, open pit dewatering and sewage treatment. Disposal of excess water through on-site irrigation within ML 1427. Water management system designed for no release of water to Mammy Johnsons River. |
| Rehabilitation | <ul style="list-style-type: none"> Progressive rehabilitation of waste rock emplacement areas and other surface disturbance areas. |
| Employment | <ul style="list-style-type: none"> The existing number of operational employees is approximately 120. |





LEGEND

- Mining Lease Boundary
- - - Mining Lease Application Boundary
- Approximate Extent of Existing/Approved Surface Development
- Approximate Extent of Additional Project Surface Development

0 200 1000
Metres
GRID DATUM: MGA 94 ZONE 56

Source: AAHatch- Aerial Photography flown November 2007 and April 2009

DURALIE EXTENSION PROJECT

FIGURE ES-2
Project General Arrangement



ES1.2 STRATFORD COAL MINE INTERACTION

At the SCM, DCM ROM coal is unloaded and processed in the SCM Coal Handling and Preparation Plant. Product coal from the SCM is then transported by rail to the Port of Newcastle for export and domestic customers.

The SCM is owned and operated by Stratford Coal Pty Ltd (SCPL), also a wholly owned subsidiary company of GCL. Future alterations to existing SCM approvals that would be required to receive and process additional Project coal would be subject to separate environmental assessment and approval, for which SCPL would be the proponent.

This EA does not seek approval for any modification to the approved SCM.

ES1.3 PROJECT DESCRIPTION

The Project would involve the continuation of open pit mining operations at the DCM within ML 1427 and Mining Lease Application Area (MLA) 1, and would extend the current operation by approximately nine years.

The general arrangement of the Project has been designed to maximise the utilisation of existing infrastructure at the DCM (Figure ES-2). Project general arrangements for Years 3 and 8 are shown on Figures ES-3 and ES-4.

The main activities associated with the development of the Project would include:

- continued development of open pit mining operations to facilitate a ROM coal production rate of up to approximately 3 Mtpa, including:
 - extension of the existing approved open pit in the Weismantel Seam to the north-west (i.e. Weismantel Extension open pit) within ML 1427 and MLA 1; and
 - open pit mining operations in the Clareval Seam (i.e. Clareval North West open pit) within ML 1427 and MLA 1;
- mining of approximately 114 Mbcm of additional waste rock and progressive backfilling of the open pits;

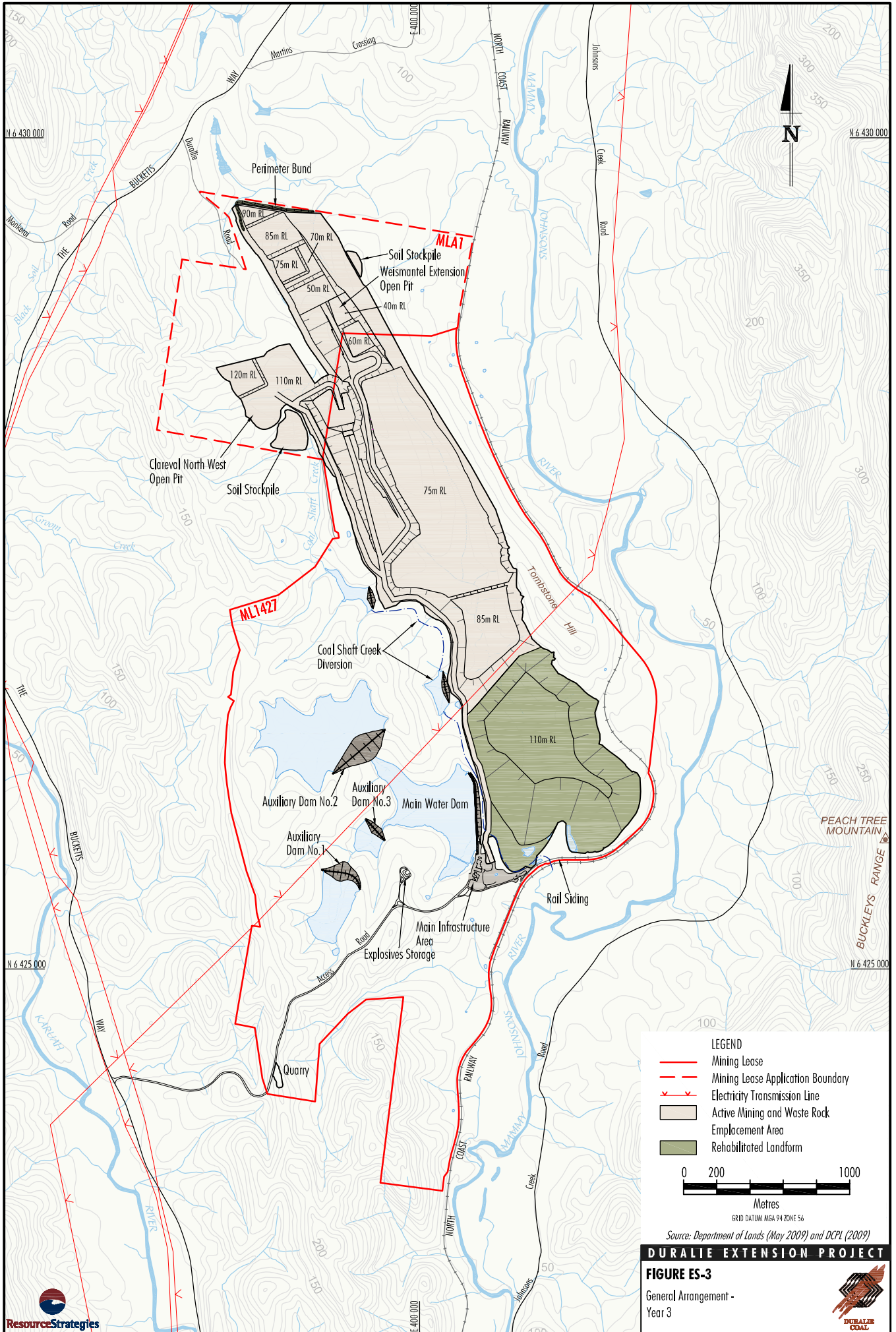
- ROM coal rail transport movements increased to an annual average of four train movements per day and extension of rail transport hours (7.00 am to 2.00 am);
- continued beneficial use of excess water through irrigation (including development of new irrigation areas within ML 1427 and MLA 1);
- raising of the approved Auxiliary Dam No. 2 to provide significant additional on-site storage capacity to manage excess water on-site;
- progressive development of dewatering bores, pumps, dams, irrigation infrastructure and other water management equipment and structures;
- development of new haul roads and internal roads;
- upgrade of existing facilities and supporting infrastructure in line with increased ROM coal production;
- continued development of soil stockpiles, laydown areas and gravel/borrow pits;
- establishment of a permanent Coal Shaft Creek alignment adjacent to the existing DCM mining area;
- employment of approximately 135 people for nine years;
- ongoing monitoring and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

The Project water management system would not include off-site controlled mine water release to the Mammy Johnsons River.

The Project would secure the future of the DCM and GCL's ongoing contribution to employment, the economy and the local community.

The Project Socio-Economic Assessment indicates that operation of the Project is likely to result in an average annual stimulus of approximately 166 direct and indirect jobs in the local region and some 1,004 direct and indirect jobs in NSW.

A net benefit of approximately \$336 million would be forgone if the Project is not implemented. In addition, the Project would generate total royalties to the state of NSW in the order of \$157 million over the life of the Project.



LEGEND

- Mining Lease
- - - Mining Lease Application Boundary
- x x Electricity Transmission Line
- Active Mining and Waste Rock Emplacement Area
- Rehabilitated Landform

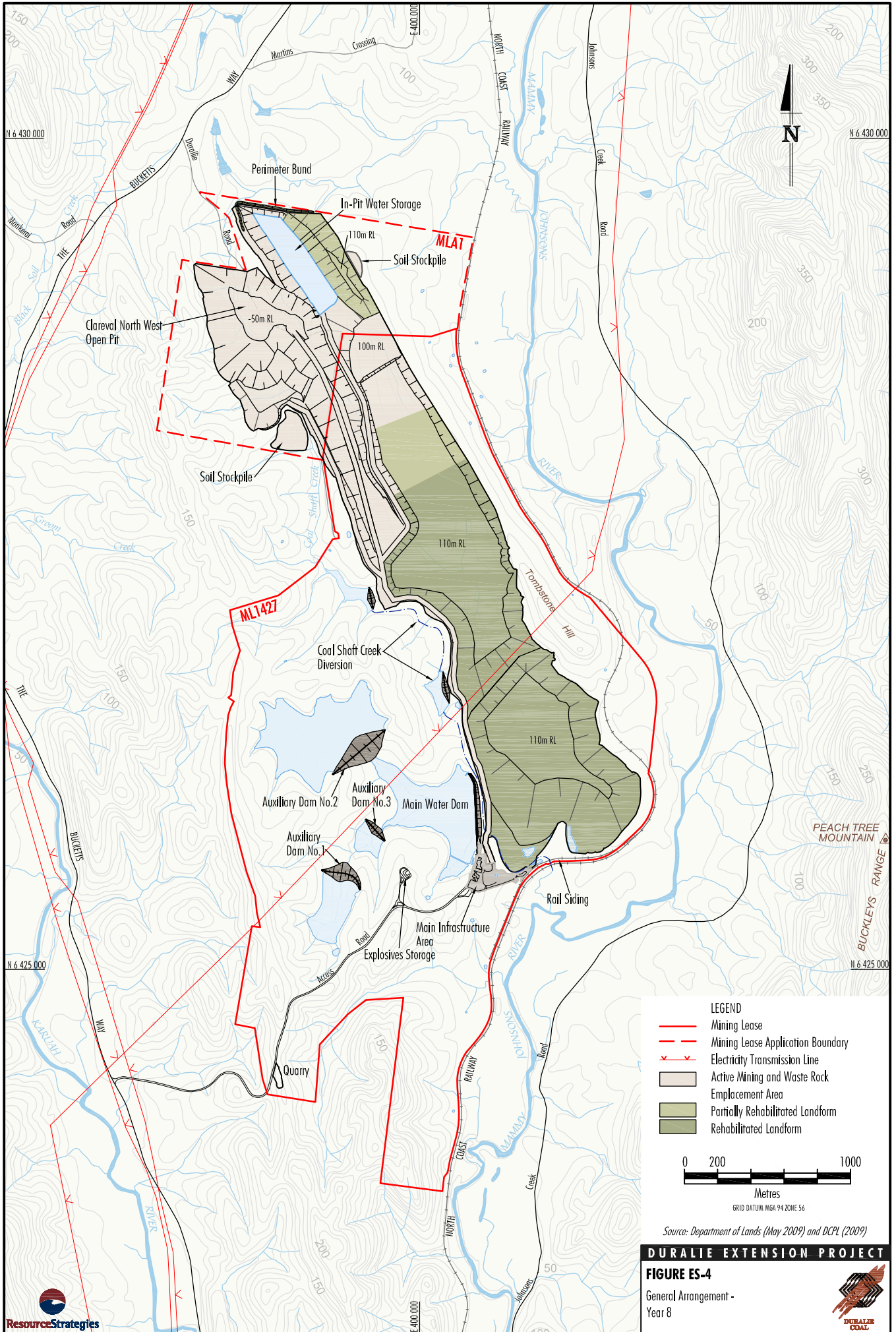
0 200 1000
Metres

GRID DATUM: MGA 94 ZONE 56
Source: Department of Lands (May 2009) and DCPL (2009)

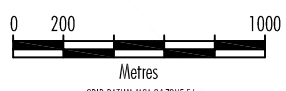
DURALIE EXTENSION PROJECT

FIGURE ES-3
General Arrangement -
Year 3





- LEGEND**
- Mining Lease
 - - - Mining Lease Application Boundary
 - x x x Electricity Transmission Line
 - Active Mining and Waste Rock Emplacement Area
 - Partially Rehabilitated Landform
 - Rehabilitated Landform



Source: Department of Lands (May 2009) and DCPL (2009)

DURALIE EXTENSION PROJECT

FIGURE ES-4

General Arrangement -
Year 8



ES2 CONSULTATION

During preparation of this EA, Project consultation has been undertaken with a range of government and non-government agencies, including:

- state and local government agencies;
- service providers; and
- the public.

The consultation conducted during the preparation of this EA has provided the opportunity to identify issues of concern or interest to stakeholders and to consider these issues. This EA describes the consultation undertaken, key issues raised, and GCL/DCPL community involvement.

ES3 ENVIRONMENTAL ASSESSMENT

An Environmental Risk Assessment undertaken for the Project identified key environmental issues which have been addressed in this EA.

ES3.1 GROUNDWATER

A number of groundwater studies and monitoring programmes have been undertaken in the Project area, including Project hydraulic permeability testing. Examination of the hydrogeological data has facilitated an understanding of the existing groundwater systems and the scale and nature of the existing effects of the DCM on groundwater systems. The DCM open pit acts as a groundwater sink, and groundwater nearby maintains a flow direction towards the pit.

A conceptual model of the hydrogeological regime was developed based on review of the hydrogeological data. The data supports two separate groundwater systems:

- shallow groundwater system – associated with alluvium (restricted in extent) and regolith; and
- deeper groundwater system – associated with coal bearing strata.

Alluvial deposits (silty sands and silts with lenses of gravelly sands and sandy, coarse gravel) are associated with Mammy Johnsons River to the east of the Project area.

The shallow alluvial groundwater system in which the Mammy Johnsons River sits, is hydraulically disconnected from the deeper groundwater system.

Dewatering of the deeper groundwater system by mining is not expected to affect the shallow alluvial groundwater system. The Groundwater Assessment concluded that there would be negligible effect on the Mammy Johnsons River.

The numerical model developed as part of the Groundwater Assessment would be used as a management tool for the review and calibration of the prediction of groundwater impacts throughout the Project life.

ES3.2 SURFACE WATER

The Project area is situated within the Mammy Johnsons River catchment, a tributary of the Karuah River. The existing DCM is situated in the catchment of Coal Shaft Creek, a small tributary which flows into the lower reaches of Mammy Johnsons River.

Coal Shaft Creek is generally more saline than the Mammy Johnsons River and the Karuah River due to its ephemeral nature and the outcropping of coal seams within the catchment. Coal Shaft Creek has been diverted around the current DCM workings and the diversion comprises an approved, purpose-built channel.

The Project would result in expansion of DCM surface development areas (Figure ES-2) and capture and re-use of water that drains from these operational areas.

DCM erosion, sediment and land contamination controls would be applied. DCPL would maintain the current approach of beneficial use of water collected from operational areas for on-site irrigation.

The approved Irrigation Management Plan first flush protocol would continue to be implemented to capture any initial runoff with elevated salinity levels from Project irrigation areas during rainfall events.

A final void water balance for the Clareval North West and Weismantel Extension final voids, including a water quality analysis, was conducted as part of the Surface Water Assessment. The final voids would not overflow to downstream watercourses.

DCPL would maintain and extend current water management measures (e.g. on-site water storage and beneficial use of contained water for irrigation) in accordance with the conditions of the Project Approval and Environment Protection Licence.

ES3.3 NOISE AND BLASTING

The DCM is an existing industrial facility that has been operating in the local area since 2003.

A Noise and Blasting Impact Assessment has been undertaken for the Project in accordance with the requirements of the NSW *Industrial Noise Policy*.

Operational Noise

An acoustic model was developed that simulates the Project components using noise source information (i.e. sound levels and locations) and predicts noise levels at relevant receiver locations.

Three noise scenarios were assessed representing key periods in the Project development and the assessment included a number of iterative steps to develop noise mitigation measures for the Project, including:

1. Preliminary noise modelling of scenarios representative of the maximum noise emissions from the Project to identify the potential for noise exceedances.
2. Evaluation of various combinations of noise management and mitigation measures to assess their relative effectiveness.
3. Review of the effectiveness of these measures and assessment of their feasibility by DCPL.
4. Adoption by DCPL of a range of noise management and mitigation measures (discussed below) to appreciably reduce noise emissions associated with the Project.

With the implementation of the Project mitigation measures, the operational noise assessment indicates:

- Noise levels from the Project are predicted to exceed the Project-specific criteria by marginal levels (1 to 2 A-weighted decibels [dBA]) at 12 privately owned receivers (Noise Management Zone).
- Noise levels from the Project are predicted to exceed the Project-specific criteria by moderate levels (3 to 5 dBA) at five privately owned receivers (Noise Management Zone).

- Noise levels from the Project are predicted exceed the Project-specific criteria by appreciable levels (>5 dBA) at 15 privately owned receivers (Noise Affection Zone).
- Of the 15 receivers that are predicted to be noise affected, nine are already identified in the DCM Development Consent due to predicted noise criteria exceedances from the existing/approved operations.
- The majority of noise exceedances are predicted to occur during Year 5.
- Due to the noise enhancing meteorological conditions, the number of predicted noise exceedances is highest at night.

DCPL commits to adopting the following noise management and mitigation measures:

- additional mobile equipment necessary to meet Project increased ROM coal production would be low noise emission standard, including up to 16 new CAT 785XQ haul trucks and attenuation of other new plant items (i.e. dozer, excavator, drill and grader);
- the use of two existing CAT 789 haul trucks would be restricted to daytime operations only;
- waste rock emplacement activities on elevated/exposed portions of the waste rock emplacement would be restricted to daytime only; and
- the height of the waste rock emplacement would be restricted to relative level 110 metres (m).

For private residences within the Noise Management Zone, where compliance noise monitoring shows Project noise levels are 3 to 5 dBA above Project-specific noise criteria, DCPL would implement reasonable and feasible acoustical mitigation in consultation with the relevant landowner (which may include measures such as enhanced glazing, insulation and/or air-conditioning).

For private residences within the Noise Affection Zone the following additional noise management procedures would be implemented for the Project:

- implementation of reasonable and feasible acoustical mitigation at receivers; and
- negotiated agreements with landowners where required.

Rail Noise

As a component of the Project the existing locomotives that service the DCM would be replaced by quieter locomotives, the number of train movements would increase and the rail transport hours would be extended.

Assessment of rail noise changes indicates the following:

- 24 hour average rail noise levels would remain the same.
- A reduction in maximum pass-by rail noise would occur.

DCPL commits to replacing the existing locomotives on the DCM ROM coal transport train with GL class locomotives (or equivalent) which are quieter than the existing DCM locomotives from Year 2 of the Project (or sooner, subject to contract arrangements).

Prior to the introduction of the quieter locomotives, DCM rail movements would continue to be restricted to the existing DCM ROM train hours (7.00 am to 10.00 pm).

Blasting

To minimise blasting effects at nearby receivers, DCPL would vary the Maximum Instantaneous Charge (MIC) or other relevant blasting parameters according to the location of blasts and the proximity of nearby private receivers.

The Noise and Blasting Assessment assessed potential Project blasts against applicable building damage and human comfort criteria.

In summary, the blasting assessment concluded that with the application of reduced MIC (400 kilograms [kg]) for blast locations nearest to private receivers:

- the blast emission levels are predicted to be below the applicable building damage vibration and airblast criteria at all private receivers;
- the vibration velocities are predicted to be below the vibration human comfort criteria at all private receivers; and
- airblast levels are predicted to be equal to or below the airblast human comfort criteria at all except six nearest privately owned receivers.

ES3.4 TERRESTRIAL ECOLOGY

The DCM is located in a rural area characterised by cattle grazing on native and improved pastures. Almost all of the pre-European forest and woodland which once occurred in the Project area has been extensively cleared and/or logged at least once.

The additional surface disturbance associated with the Project would involve the clearance of approximately 87 hectares (ha) of native vegetation communities, 109 ha of derived grasslands and 11 ha of cropping land, and associated fauna habitat.

DCPL proposes an ecological offset which is located on freehold GCL-owned land located in the south and to the east of the Project area (Figure ES-5). The offset land is currently managed for pastoral purposes.

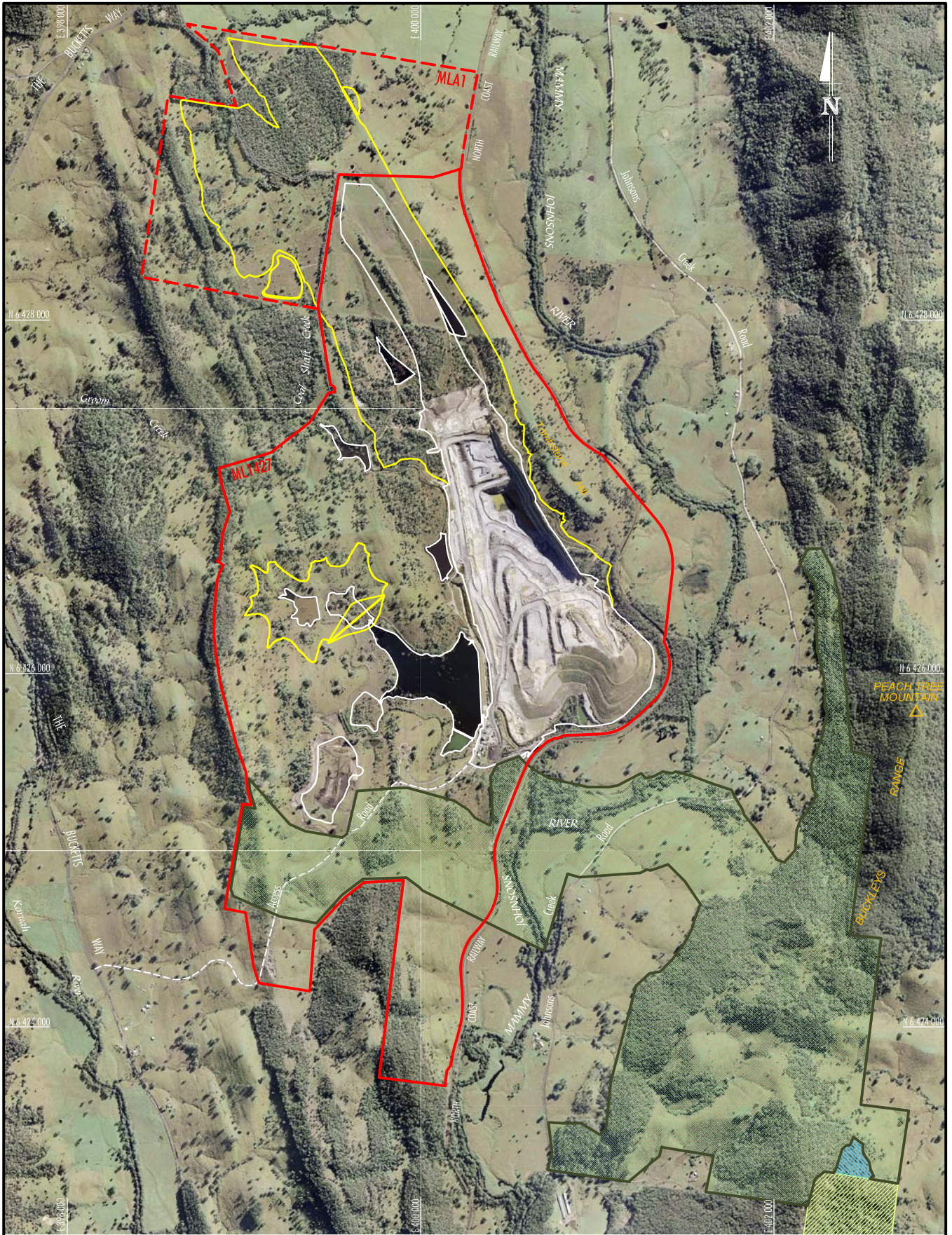
The offset area comprises approximately 444 ha including significant areas of existing native vegetation communities that would be enhanced (some 214 ha) and areas of derived grasslands that would be revegetated (some 230 ha).

The offset would provide for a range of benefits in the medium to long-term including:

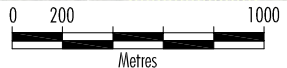
- an increase in the area of vegetation/habitat;
- conservation and/or enhancement of similar vegetation communities/fauna habitats as those that would be disturbed by the Project;
- conservation of Endangered Ecological Communities that occur in the offset area;
- enhancement of riparian habitat along approximately 1.7 kilometres of the Mammy Johnsons River; and
- enhanced connectivity to existing fauna habitat areas via linkages with the Mammy Johnsons River and the rehabilitated final Project landforms.

The conservation of the proposed offset area would be secured in perpetuity through a voluntary conservation agreement with the NSW Minister for the Environment.

An Offset Management Plan would be prepared to facilitate the revegetation and regeneration of native vegetation and habitats and provide a framework for continued management and monitoring of the offset area.



- LEGEND**
- Mining Lease Boundary
 - - - Mining Lease Application Boundary
 - Approximate Extent of Existing/Approved Major Surface Development
 - Approximate Extent of Additional Project Major Surface Development
 - Land Under Existing Conservation Agreement
 - Existing Duralie Coal Mine Offset Area
 - Duralie Extension Project Offset Area



Source: AAHatch- Aerial Photography flown April 2009; DCPL (2009) and Cenwest Environmental Services & Resource Strategies (2009)

DURALIE EXTENSION PROJECT

FIGURE ES-5
Duralie Extension Project
Offset Area



ES3.5 OTHER SPECIALIST STUDIES

The Project EA includes a comprehensive range of specialist environmental studies.

In addition to the key studies described above, specialist studies in this EA include:

- air quality (including greenhouse gas generation);
- aquatic ecology;
- road transport;
- heritage;
- socio-economics;
- geochemistry;
- preliminary hazard analysis; and
- visual amenity.

The findings of these studies are described in this EA.

ES4 REHABILITATION

ES4.1 DURALIE COAL MINE REHABILITATION PRINCIPLES

Rehabilitation of the existing DCM is undertaken progressively with the following general principles:

- to create physically and chemically stable landforms which are consistent with the local surrounding environment;
- to minimise land disturbance through progressive rehabilitation and mine planning;
- to provide visual amenity through tree and shrub establishment, mounding and/or bunding;
- to create flora and fauna corridors and habitats;
- to establish permanent, self-propagating vegetative cover; and
- to achieve final land uses that meet community and regulatory expectations and infrastructure needs in consideration of the pre-mining land use (i.e. predominately grazing) and conservation values.

The above principles would continue to be applied for the Project.

Rehabilitation activities to date have focused on the southern portion of the DCM out-of-pit waste rock emplacement that was constructed at the commencement of mining (Plate ES-1).

ES4.2 PROJECT REHABILITATION

The major final landforms at the completion of the Project would consist of waste rock emplacements (including backfilled open pits) consistent in elevation with the existing/approved DCM waste rock emplacement, and final voids in the Weismantel Extension and Clareval North West open pits (Figure ES-6).

The existing DCM Rehabilitation Management Plan would be updated to include monitoring programmes to assess the performance of the Project rehabilitation areas, subject to the conditions of any Project Approval.

Revegetation

Endemic plant species would be used for revegetation. Selection of tree and pasture species would include consideration of the adjacent vegetation, site features (i.e. slope, anticipated ground conditions, availability of water), sowing season and prevailing weather conditions, seed availability, advice from seed suppliers and success or otherwise of earlier sowings.

Existing rehabilitated areas on the DCM waste rock emplacement are irrigated. This system would be extended as rehabilitation progresses to the north over the life of the Project. It is anticipated that irrigation of revegetation areas on the waste rock emplacements would assist with the early establishment of sown pasture and trees on rehabilitated areas.

The revegetation objective for the waste rock emplacement would be to provide areas of woodland and pasture. The woodland areas would be linked to a broader habitat enhancement strategy (Figure ES-6).



A Duralie Coal Mine Waste Rock Emplacement Revegetation Looking North-West



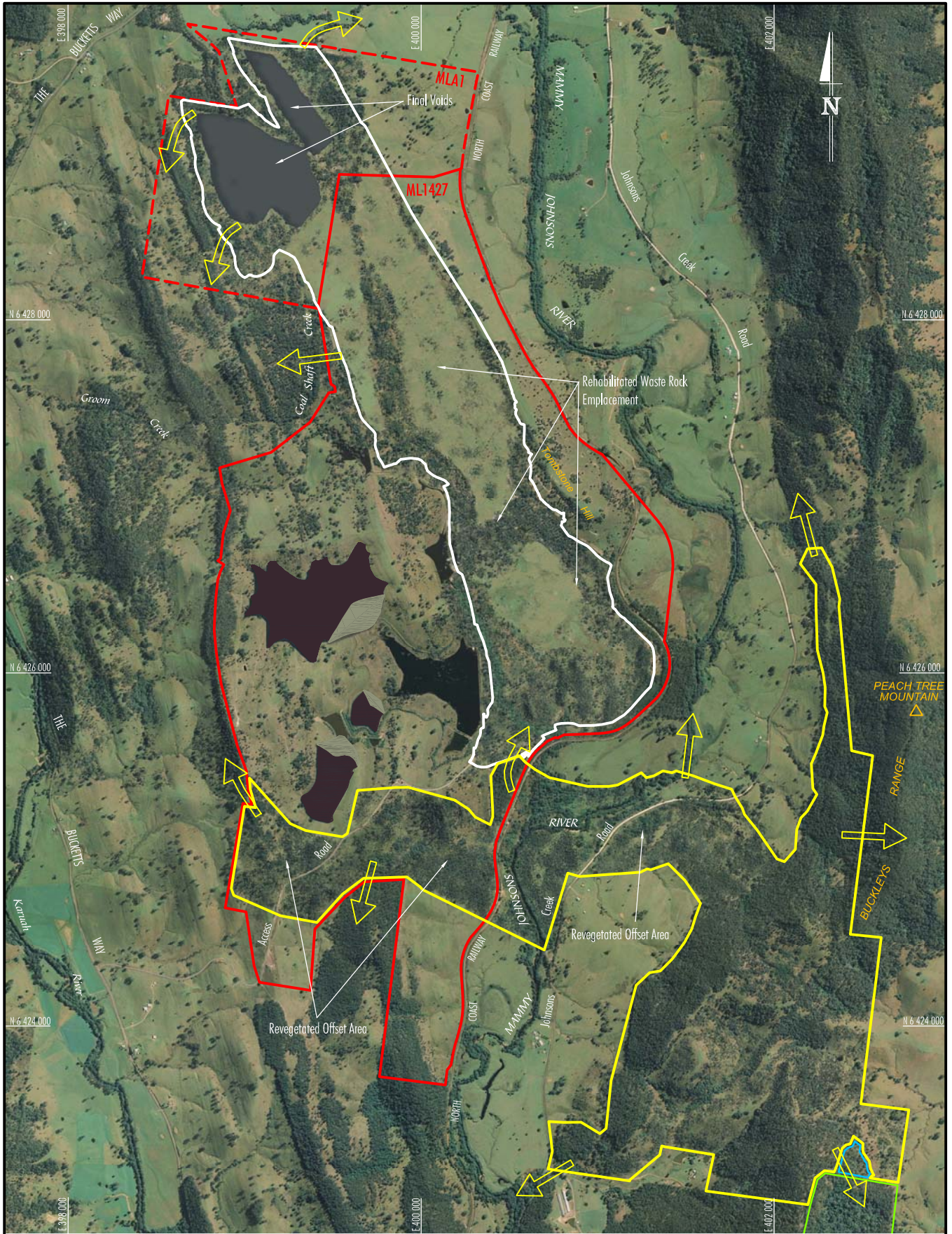
B Duralie Coal Mine Waste Rock Emplacement Looking North-East



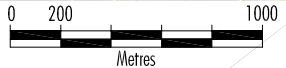
C Duralie Coal Mine Waste Rock Emplacement Revegetation Looking North



D Duralie Coal Mine Waste Rock Emplacement Revegetation Looking West



- LEGEND**
- - - Mining Lease Boundary
 - - - Mining Lease Application Boundary
 - Existing /Approved and Project Open
 - Pit/Waste Rock Emplacement
 - Disturbance Area
 - - - Project Offset Areas
 - Waterbodies
 - - - Land Under Existing Conservation Agreement
 - - - Existing Duralie Coal Mine Offset Area
 - Possible Wildlife Corridor



GRID DATUM: MGA 94 ZONE 56

Source: AAHatch - Aerial Photography flown November 2007 and April 2009

DURALIE EXTENSION PROJECT

FIGURE ES-6
Conceptual Final Landform Rehabilitation and Proposed Offset Areas



Final Voids

Following cessation of mining in the Weismantel Extension open pit, the remaining final void would be used to store mine water. At the end of the Project, the Clareval North West open pit would also store water (Figure ES-6).

Post-mining, the final voids would continue to fill until an equilibrium level is reached.

The results of the water balance for the final voids indicate that, post-mining, the two pit voids would become an integrated pit lake after 40 years and void water levels would continue to rise until an equilibrium level is reached (up to 120 years).

Coal Shaft Creek

The proposed design for the post-mining alignment of Coal Shaft Creek would comprise:

- a reworked section of the existing Coal Shaft Creek Diversion channel;
- a reconstructed meandering channel within a corridor over the in-pit waste rock emplacement; and
- a drop-down section in hard rock between the above two components.

The reconstructed meandering channel would be within a 50 m wide reconstruction corridor, which would generally replicate the original meandering geometry. The channel would include an engineered low permeability zone (e.g. clay liner) which would restrict the movement of water between Coal Shaft Creek and groundwater within the waste rock emplacement.

The longitudinal channel profile of Coal Shaft Creek would include habitat creation initiatives such as the provision of irregular pool and riffle sequences, use of material recovered from the existing channel or some other suitable source, placement of large boulders and/or timber to form pools upstream and promote aquatic habitat and planting of riverine vegetation on banks to enhance stability.

The performance of the existing diversion to date (Plate ES-2) is indicative of habitat and channel profile development likely to occur in the reconstructed creek.

Integration of the Offset Area with Project Rehabilitation

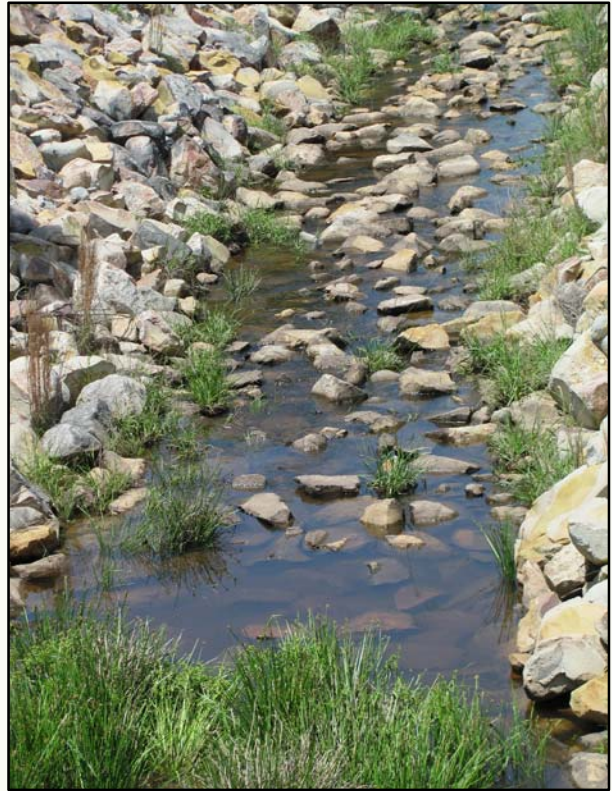
The proposed long-term integration of the Project offset area with the Project rehabilitation areas is shown on Figure ES-6.

ES5 STATEMENT OF COMMITMENTS

DCPL has prepared a Statement of Commitments for the Project which provides a summary of the proposed environmental management, monitoring, offset, reporting and specific environmental commitments made in relation to the Project. These commitments are described in this EA.



Coal Shaft Creek Diversion Looking Upstream



Coal Shaft Creek Diversion Looking Downstream



Coal Shaft Creek Diversion Looking Downstream to Dam 1



Coal Shaft Creek Diversion Looking Upstream from Haul Road Culvert