

Tasman Extension Project Environmental Impact Statement

EXECUTIVE SUMMARY

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ES 1 OVERVIEW

The Tasman Underground Mine is an underground mining operation located approximately 20 kilometres west of the Port of Newcastle in New South Wales (Figure ES-1).

The Tasman Underground Mine is owned and operated by Newcastle Coal Company Pty Ltd, a wholly owned subsidiary of Donaldson Coal Pty Limited (Donaldson Coal).

Donaldson Coal also owns and operates the Donaldson Open Cut Mine and Abel Underground Mine, which are located approximately 10 kilometres north-east of the Tasman Underground Mine (Figure ES-2).

Donaldson Coal is a wholly owned subsidiary of Gloucester Coal Ltd.

The Tasman Underground Mine commenced operations in 2006 and currently employs over 100 people. The mine is approved to produce up to 975,000 tonnes of run-of-mine (ROM) coal from the Fassifern Seam. Coal is recovered using bord and pillar underground mining methods, which uses continuous miners for first workings and secondary total and partial extraction.

The underground mining operations at the Tasman Underground Mine are supported by an existing pit top facility (Plate ES-1) located off George Booth Drive (Figure ES-2).

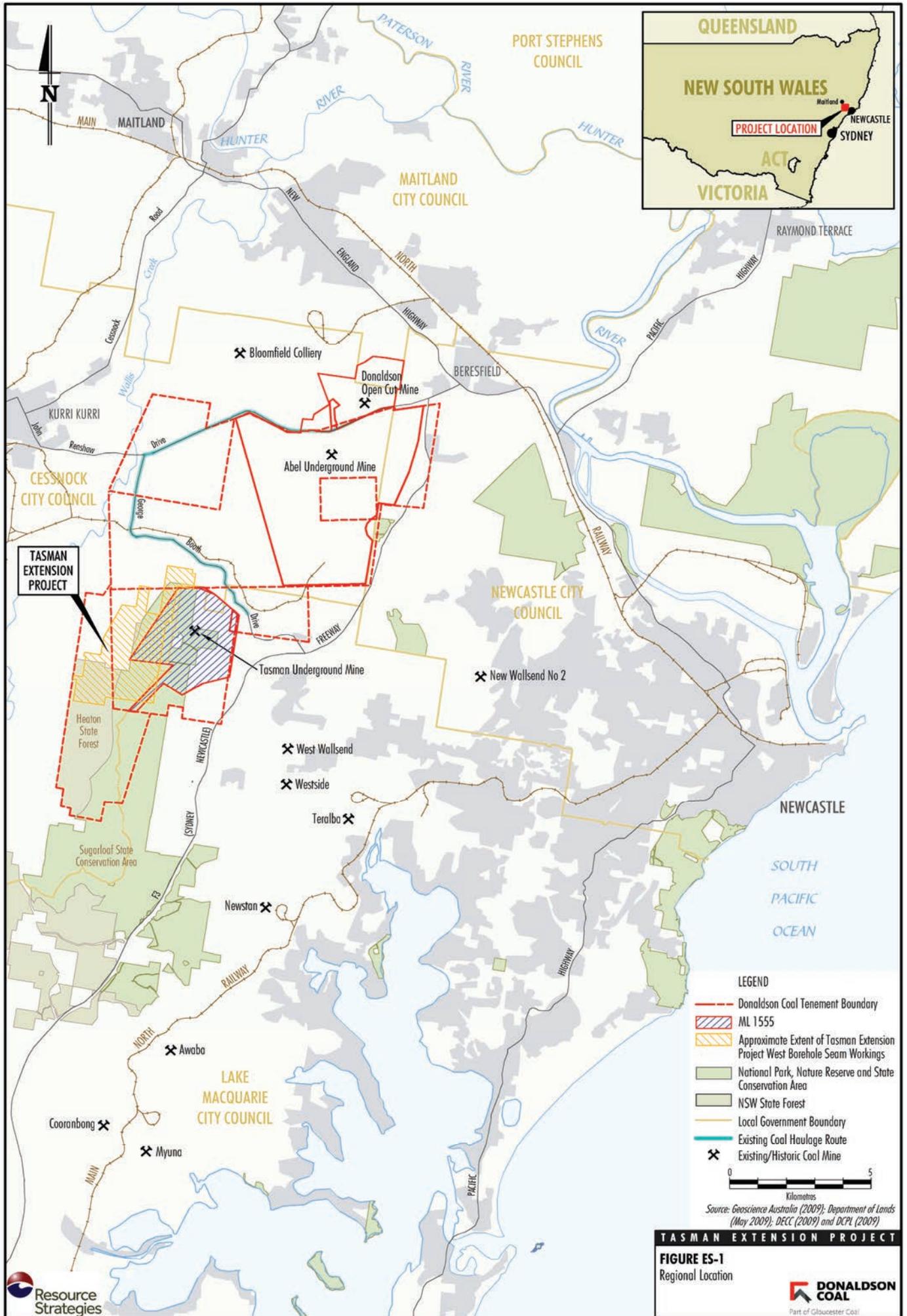
The existing pit top facility comprises ROM coal handling infrastructure, administration facilities, worker amenities and stores buildings, workshop compound, bunded fuel tank area, transformer, water management systems and mine infrastructure.

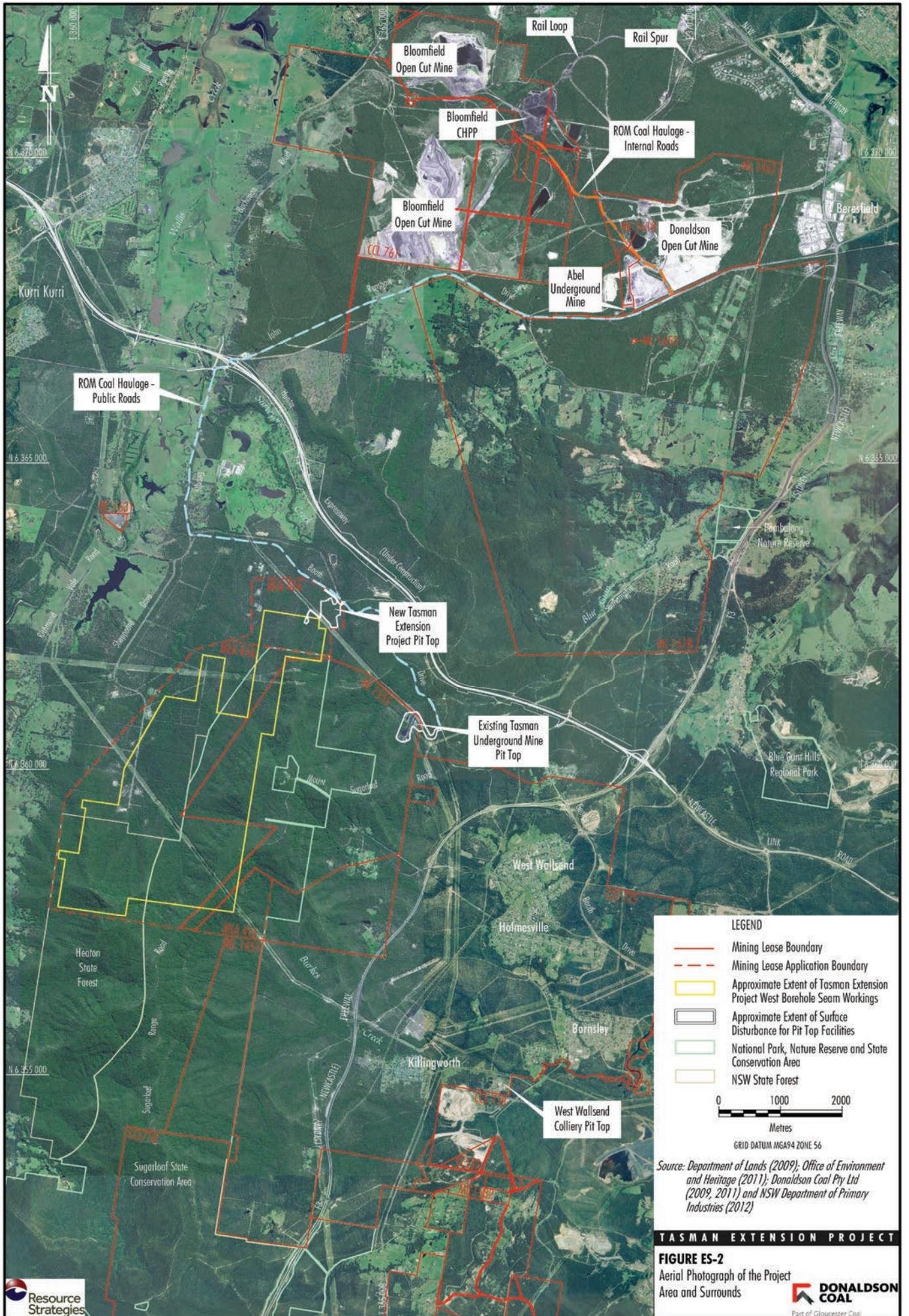
ROM coal mined at the Tasman Underground Mine is transported on weekdays via approximately 16 kilometres of public roads (George Booth Drive and John Renshaw Drive) to the Bloomfield coal handling and preparation plant (CHPP) to the north of the Project (Figure ES-2). Bloomfield Collieries Pty Limited (Bloomfield) owns and operates the Bloomfield CHPP.

This Environmental Impact Statement (EIS) is for the Tasman Extension Project (the Project), which involves the continuation and extension of the existing Tasman Underground Mine into the West Borehole Seam.



Plate ES-1 – Existing Tasman Underground Mine Pit Top





Nature of the Project

Underground mining currently occurs in the Fassifern Seam within the Newcastle Coal Measures. The Project would involve the extension of underground mining operations into the West Borehole Seam to the north and west of the approved Fassifern Seam workings (Figures ES-2 and ES-3).

The West Borehole Seam is the basal unit of the Newcastle Coal Measures and is located approximately 175 metres below the Fassifern Seam.

Mining in the West Borehole Seam would involve bord and pillar underground mining methods, with partial and total pillar extraction, at an increased production rate of up to 1.5 million tonnes per annum. The Project would provide approximately 15 years of additional operational life (i.e. until approximately 2029) and would increase the operational workforce to approximately 150 people.

The Socio-Economic Assessment indicates that at peak production the Project would contribute up to 404 direct and indirect jobs in the Newcastle economy and up to 736 direct and indirect jobs in the New South Wales economy.

Subsidence Management

The Project underground mining areas include portions of the Sugarloaf State Conservation Area and Heaton State Forest, as well as a limited number of private rural residential properties and infrastructure items.

Subsidence control zones have been developed and adopted for the Project to manage potential subsidence impacts on principal residences, surface infrastructure, cliff lines, steep slopes, streams and relevant vegetation communities. The Project subsidence control zones have been designed to achieve subsidence performance measures for significant surface features (i.e. to minimise potential impacts to these features).

The Project subsidence control zones would involve a combination of partial extraction (i.e. extracting less coal to reduce subsidence effects) or limiting extraction to first workings only (i.e. limited coal extraction and nonsubsiding) in some areas.

An example of the application of subsidence control zones to achieve subsidence performance measures at significant surface features (in this example a principal residence) is provided in Box ES-1.

Box ES-1 Principal Residences - Subsidence Management



Private Residence East of Sheppard Drive*

Project subsidence performance measures:

- Maintain safety.
- Serviceability to be maintained and/or fully compensated.
- Damage must be fully repaired or compensated.

Project subsidence control zone:

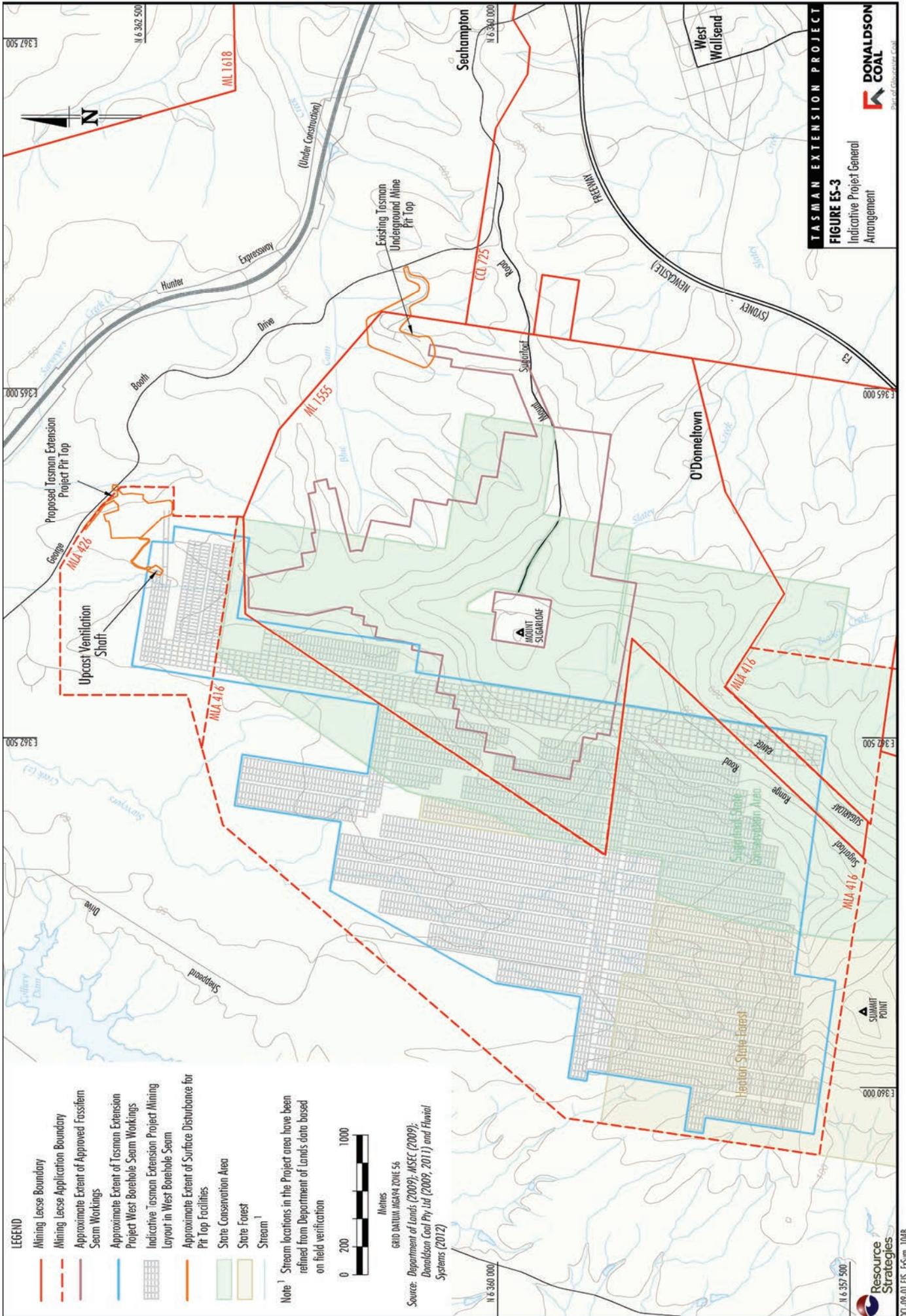
- First workings only within 26.5° angle of draw resulting in less than 20 millimetres (mm) subsidence, 5 millimetres per metre (mm/m) tilt and 2 mm/m strain (may be relaxed if agreement reached with the owner).

Project subsidence control outcomes:

- No more than minimal impact on the residence, unless otherwise agreed by the owner.
- Long-term stable pillar (i.e. non-subsiding) left under each principal residence, unless otherwise agreed by the owner.

Refer to Table ES-1 for details.

*Ditton Geotechnical Services Pty Ltd, 2012.



New Pit Top Facility

A new pit top facility would be developed off George Booth Drive to allow access to the West Borehole Seam. The new pit top facility would reduce the ROM coal haulage return trip to the Bloomfield CHPP on the public road network by approximately 6 kilometres. A roundabout would be constructed on George Booth Drive for access to the new pit top facility.

Assessment Process

The Project is “State Significant Development” to which Division 4.1 of Part 4 of the New South Wales *Environmental Planning and Assessment Act, 1979* applies.

This EIS has been prepared to accompany a Development Application made for the Project. This EIS addresses the Director-General’s Requirements issued by the New South Wales Department of Planning and Infrastructure.

This EIS will be placed on public exhibition and comments from the community and government agencies will be addressed by Donaldson Coal. The Project will be determined by the New South Wales Minister for Planning and Infrastructure (or delegate).

Donaldson Coal lodged a Referral for the Project under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*. A delegate of the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities decided that the Project is “not a controlled action” and therefore does not require further assessment and approval under the *Environment Protection and Biodiversity Conservation Act, 1999* before it can proceed.

ES 2 KEY FEATURES OF THE PROJECT

Project Description

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

- continued underground mining of the Fassifern Seam using a combination of total and partial pillar extraction methods within Mining Lease 1555;
- underground mining of the West Borehole Seam using a combination of total and partial pillar extraction methods;
- production of ROM coal up to 1.5 million tonnes per annum;
- development of a new pit top facility, associated ROM coal handling infrastructure and intersection with George Booth Drive (Figure ES-2);
- development of ventilation surface infrastructure;
- continued transport of Fassifern Seam ROM coal from the existing Tasman Underground Mine pit top to the Bloomfield CHPP via truck on public and private roads (Figure ES-2) to approximately 2015 (inclusive);
- transport of West Borehole Seam ROM coal from the new pit top to the Bloomfield CHPP via truck on public and private roads;
- progressive development of sumps, pumps, pipelines, water storages and other water management equipment and structures;
- ongoing exploration activities;
- ongoing surface monitoring, rehabilitation and remediation of subsidence effects; and
- other associated infrastructure, plant, equipment and activities.

Approximately 19 million tonnes of ROM coal would be mined from the West Borehole Seam during the life of the Project.

Subsidence Performance Measures and Subsidence Control Zones

The bord and pillar mining method allows for subsidence impacts to be controlled by increasing or decreasing the amount of coal extracted in particular areas.

Project subsidence performance measures for significant surface features, such as principal residences, surface infrastructure, cliff lines, steep slopes, streams and some vegetation communities are described in Table ES-1.

**Table ES-1
Proposed Subsidence Performance Measures and Subsidence Control Zones¹**

Surface Feature	Subsidence Performance Measure	Subsidence Control Zone ²
Communication Towers on Mount Sugarloaf	Maintain safety and serviceability. No damage to structures or loss of service.	First workings only within 45° angle of draw resulting in less than 2 mm subsidence and 10 mm horizontal displacement.
Fibre Optic Cables	Maintain safety and serviceability. Damage must be fully repaired or compensated.	Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence (unless fibre optic cables can be relocated by agreement with the infrastructure owner or is suspended on electricity transmission towers).
TransGrid Towers	Maintain safety and serviceability. Damage must be fully repaired or compensated.	First workings only within 26.5° angle of draw resulting in less than 20 mm subsidence, 5 mm/m tilt and 2 mm/m strain (may be relaxed if cruciform footings can be installed and agreement reached with the infrastructure owner).
Ausgrid Towers	Maintain safety and serviceability. Damage must be fully repaired or compensated.	Maximum extraction (except where within another subsidence control zone).
Principal Residences	Maintain safety. Serviceability to be maintained and/or fully compensated. Damage must be fully repaired or compensated.	First workings only within 26.5° angle of draw resulting in less than 20 mm subsidence, 5 mm/m tilt and 2 mm/m strain (may be relaxed if agreement reached with the owner).
Cliff Lines	Minor impact resulting in negligible environmental consequence. No additional risk to public safety.	First workings only within 30 metres of a cliff line greater than 20 metres in length resulting in less than 150 mm subsidence. Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence for all other cliff lines.
Steep Slopes	Minor impact resulting in negligible environmental consequence. No additional risk to public safety.	Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence beneath slopes greater than 1 in 2. Maximum extraction beneath slopes between 1 in 3 and 1 in 2 (except where within another subsidence control zone).
3 rd Order Streams ³ or above	Negligible environmental consequences (that is, negligible diversion of flows and negligible change in the natural drainage behaviour of pools). Negligible connective cracking to underground workings.	First workings only within 26.5° angle of draw resulting in less than 20 mm subsidence at the edge of the bank.
1 st and 2 nd Order Streams ³	Not more than minor environmental consequences. Negligible connective cracking to underground workings.	Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence where the depth of cover to the stream is less than 80 metres.
Coastal Warm Temperate – Sub Tropical Rainforest and Alluvial Tall Moist Forest (Groundwater Dependent Ecosystems) and Hunter Lowlands Redgum Forest on 3 rd Order Streams ³	Negligible environmental consequence.	Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence.

1. Proposed subsidence performance measures and subsidence control zones are subject to further consultation with surface feature owners and relevant government agencies.

2. Proposed subsidence control zones may be modified through the adaptive management process.

3. In accordance with the Strahler stream order system.

Note:

Cliff Lines - a continuous rock face with minimum height of 10 metres and minimum slope of 2 to 1.

Steep Slopes - an area of land having gradient between 1 in 3 and 2 in 1.

Minor - relatively small in quantity, size and degree given the relative context.

Negligible - small and unimportant.

The Project subsidence control zones (Figure ES-4) may involve partial extraction or limiting extraction to first workings (i.e. nonsubsiding extraction) in some areas.

The proposed design parameters for the subsidence control zones (Figure ES-4) to meet the performance measures are also presented in Table ES-1.

An example of the Project cliff line and steep slope subsidence management measures and resulting environmental outcomes is provided in Box ES-2.

Detailed Extraction Plans would be prepared progressively prior to mining in an area to demonstrate the mine design is such that the subsidence performance measures would be achieved.

Donaldson Coal would implement an adaptive management approach to ensure that subsidence performance measures are achieved for the Project.

Box ES-2 Cliffs and Steep Slopes - Subsidence Management



Cliffs within the Project Area*

Project subsidence performance measures:

- Minor impact resulting in negligible environmental consequence.
- No additional risk to public safety.

Project subsidence control zone:

- First workings only within 30 metres of a cliff line greater than 20 metres in length resulting in less than 150 mm subsidence.
- Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence for all other cliff lines and steep slopes greater than 1 in 2 slope.

Project subsidence control outcomes:

- No more than minor impact on the topographic feature, and negligible environmental consequence.

Refer to Table ES-1 for details.
*Ditton Geotechnical Services Pty Ltd, 2012.

Adaptive management would involve the monitoring and periodic evaluation of environmental consequences against the subsidence performance measures, and adjustment (if necessary) of the subsidence control zones (i.e. mine design and extent) to achieve the adopted performance measures.

Project Development Activities

The Project would use the existing Tasman Underground Mine pit top and supporting surface infrastructure until the completion of mining in the Fassifern Seam.

Additional infrastructure and upgrades to existing infrastructure are required to support the Project and would progressively be developed in parallel with ongoing mining operations, including (Figure ES-5):

- development of the new pit top, including box cut and drift access to West Borehole Seam and ROM coal handling infrastructure;
- development of the roundabout and access road to the new pit top;
- development of ventilation surface infrastructure; and
- underground mining equipment upgrades.

New Pit Top Facility

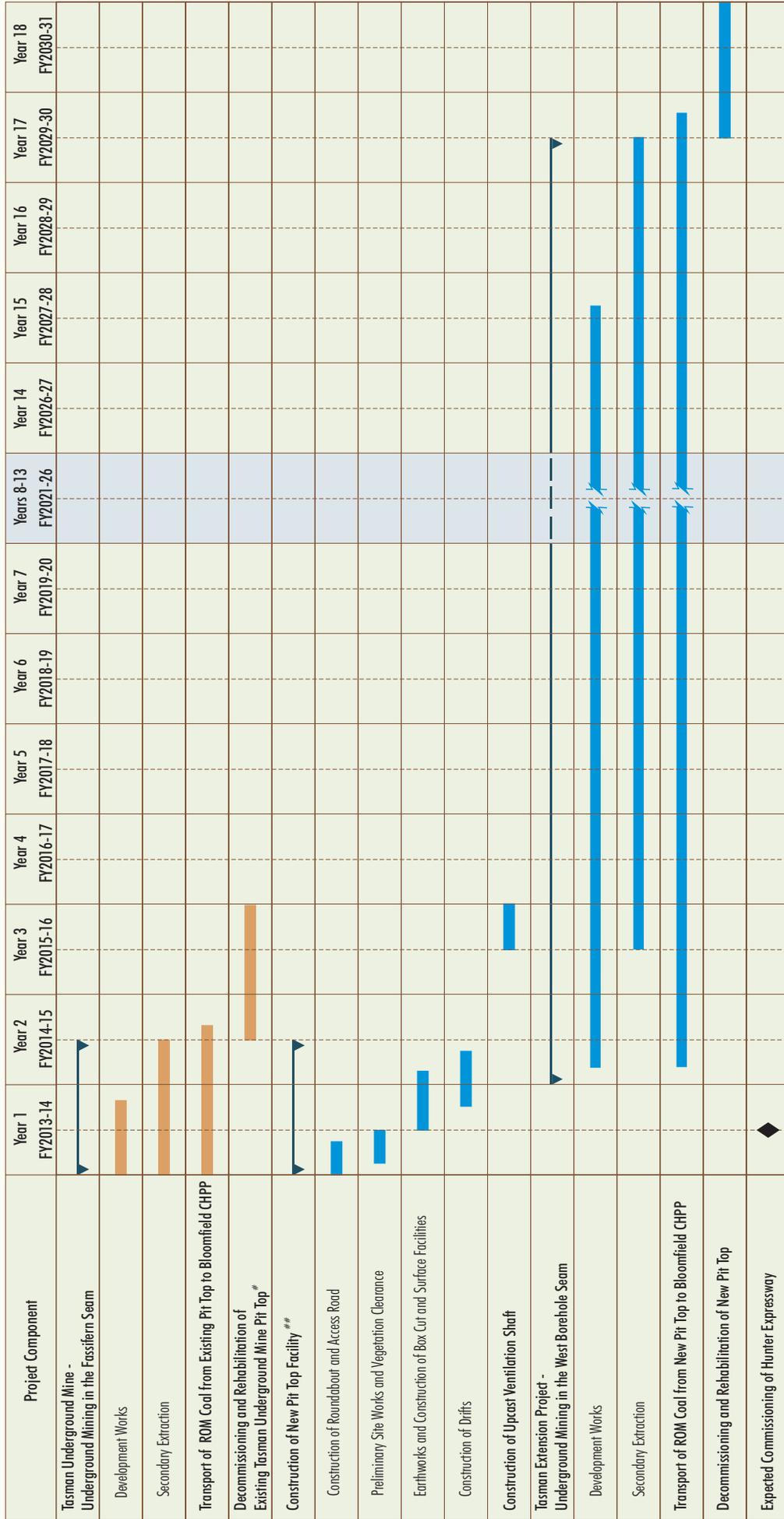
The new pit top would be developed during the first 18 months of the Project. Construction activities would generally be restricted to daytime hours (i.e. 7.00 am to 6.00 pm).

The new pit top would comprise ROM coal handling infrastructure, administration facilities, worker amenities and stores buildings, workshop compound, bunded fuel tank area, electricity reticulation, water management equipment and structures and other associated infrastructure (Figure ES-6).

The new pit top facility has been designed to achieve a number of environmental outcomes, including:

- avoidance of a known population of *Tetratheca juncea* (a threatened flora species);
- avoidance of Hunter Lowlands Redgum Forest vegetation (an endangered ecological community);
- avoidance of a known roost tree for the Yellow-bellied Glider (a threatened fauna species);
- limiting clearance of the Lower Hunter Spotted Gum – Ironbark Forest (an endangered ecological community) as far as practicable; and
- limiting clearance of *Rutidosia heterogama* (a threatened flora species) as far as practicable.

Indicative Project Schedule



Existing/Approved Tasman Underground Mine (DA-274-9-2002)

Tasman Extension Project - Additional Components

Decommissioning and rehabilitation of the pit top may be delayed and the pit top placed under care and maintenance subject to necessary approvals under the *Mining Act, 1992*.

Construction of the new pit top facility would start in early 2013 subject to all necessary approvals being in place.

Source: Donaldson Coal (2012) and Acliff Payne & Partners (2012)

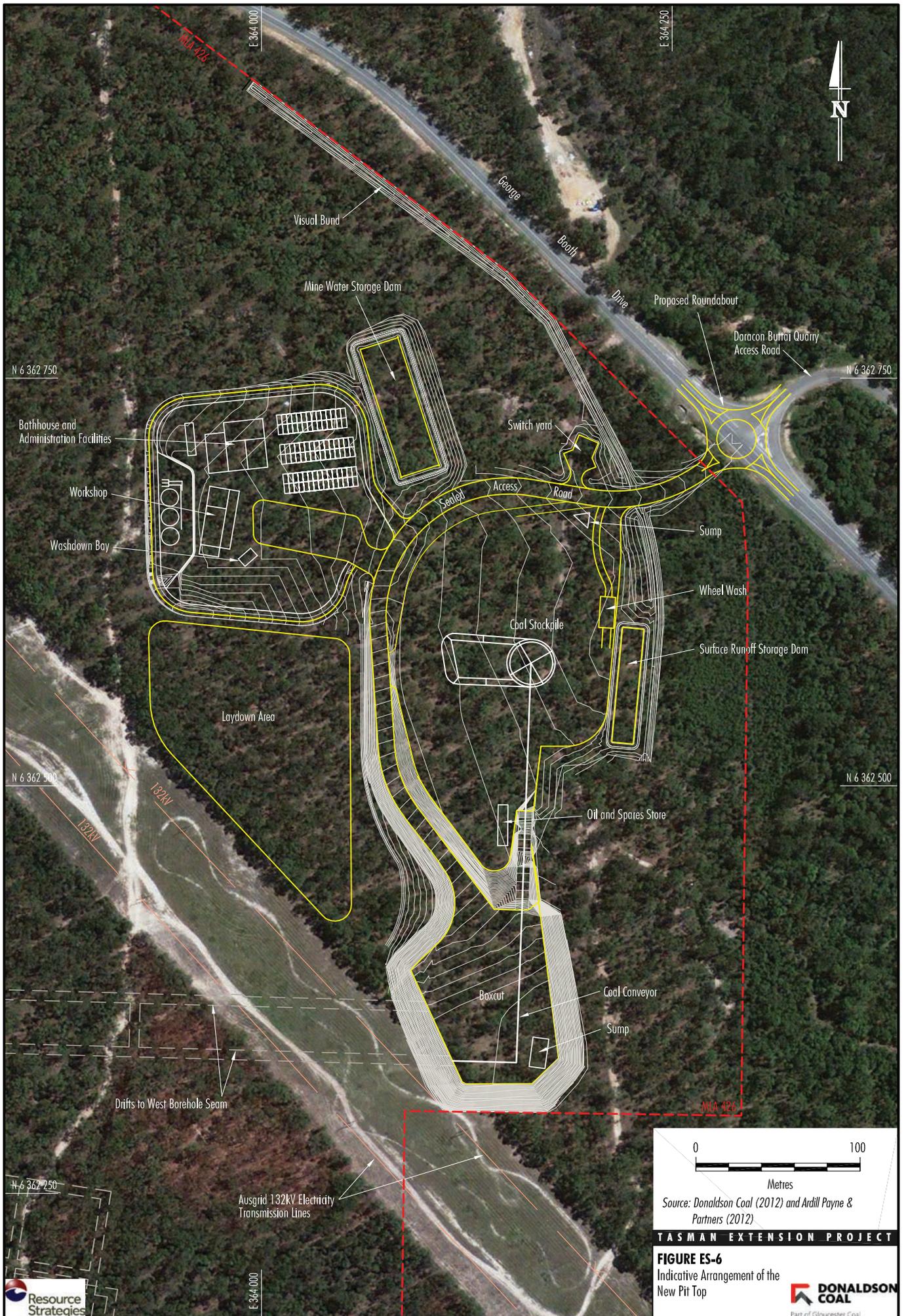
TASMAN EXTENSION PROJECT

FIGURE ES-5

Indicative Project Schedule



Part of Gloucester Coal



0 100
Metres
Source: Donaldson Coal (2012) and Ardill Payne & Partners (2012)

TASMAN EXTENSION PROJECT

FIGURE ES-6
Indicative Arrangement of the New Pit Top



ROM Coal Transport

ROM coal mined from the existing Tasman Underground Mine is stockpiled at the existing pit top. ROM coal is then reclaimed from the stockpiles by front end loader and loaded onto trucks (up to 19 metre long Stag B-Doubles) for transport to the Bloomfield CHPP. Plate ES-2 shows a B-Double truck being loaded at the Tasman Underground Mine.



Plate ES-2 – Loading of ROM Coal into a B-Double Truck at the Tasman Underground Mine

ROM coal dispatch from the existing Tasman Underground Mine to the Bloomfield CHPP is undertaken between 7.00 am to 10.00 pm Monday to Friday.

Total road haulage (including ROM coal transport and waste rock from the new pit top construction) for the Project would be maintained at the existing maximum of 4,000 tonnes per day prior to commissioning of the Hunter Expressway.

Following commissioning of the Hunter Expressway, the Project would involve ROM coal transport of up to 6,200 tonnes per day along George Booth Drive and John Renshaw Drive.

The new Project pit top facility location would reduce the ROM coal haulage return trip by approximately 6 kilometres.

Project movement of ROM coal would be restricted to 7.00 am to 10.00 pm Monday to Friday and 7.00 am to 6.00 pm Saturday, except in the case of exceptional circumstances¹. ROM coal transport would be limited to no more than 26 Saturdays in a financial year and would not occur on Sundays or public holidays.

1. Exceptional circumstances include unexpected events such as a significant disruption to the haulage route. Hours would be extended in accordance with a contingency plan in the Road Transport Protocol with the agreement of the New South Wales Department of Planning and Infrastructure.

Interaction with the Bloomfield Coal Handling and Preparation Plant

Bloomfield owns and operates the Bloomfield CHPP. The Bloomfield CHPP is approved to operate under the Abel Underground Mine Project Approval (05_0136). Donaldson Coal has existing commercial arrangements with Bloomfield regarding the use of the Bloomfield CHPP.

ROM coal from the Project would continue to be processed at the Bloomfield CHPP. In addition to ROM coal from the Project, the Bloomfield CHPP would continue to process ROM coal from the Abel Underground Mine, Donaldson Open Cut Mine, Bloomfield Colliery and other sources in accordance with Project Approval 05_0136.

Donaldson Coal is separately seeking approval for the receipt, internal transport, handling, processing and rail loadout of coal from the Project, and management of associated rejects as part of the Abel Upgrade Modification (05_0136 MOD 3).

Commercial arrangements between Donaldson Coal and Bloomfield regarding handling and processing of coal from the Project would be reviewed and revised throughout the life of the Project, as required.

Water Supply and Water Management

The proposed water management system for the new pit top facility would operate independently from the water management system at the existing pit top area.

Rainfall runoff collected from disturbed areas (e.g. ROM coal stockpile) at the new pit top facility would be stored in a surface runoff dam (Figure ES-6). Water stored in the surface runoff dam is not proposed to be discharged off-site. As a contingency (e.g. following extreme weather events), water from the surface runoff dam would be transferred to historic underground workings in the West Borehole Seam.

Water required for surface operations at the new pit top area (e.g. for dust suppression on roads and the ROM coal stockpile) would be preferentially sourced from the surface water storage dam (Figure ES-6).

Groundwater inflows at mining areas would be captured in sumps, and piped to a mine water storage dam for use in underground mining operations (e.g. for cooling and underground dust suppression) (Figure ES-6). Water stored in the mine water storage dam would not be discharged off-site, rather it would be returned directly into historic workings in the West Borehole Seam.

The existing Site Water Management Plan would be revised to incorporate the construction and operation of the new pit top facility.

Benefits of the Project

The Project would provide for the continuation of the Tasman Underground Mine and direct employment of approximately 20 construction personnel and 150 operational personnel at maximum production.

The Project would involve the production of up to 1.5 million tonnes per annum of ROM coal until approximately 2029, in a manner that minimises potential subsidence impacts through the implementation of subsidence control zones.

The Project would produce a combination of thermal and coking coal that would be sold domestically or exported for electricity generation and steel production and other manufacturing overseas.

Project coal production would contribute to New South Wales export income, State royalties and State and Commonwealth tax revenue, as well as contributing to electricity supply and manufacturing in Australia and other countries that purchase Project coal.

The Socio-Economic Assessment indicates that operation of the Project is likely to result in an average annual stimulus of up to approximately 404 direct and indirect jobs in the Newcastle region and some 736 direct and indirect jobs in New South Wales at peak production. The Project would also make contributions to regional and New South Wales business turnover and household income.

The Socio-Economic Assessment indicates a net benefit of between \$57 million and \$94 million would be forgone if the Project is not implemented.

Rehabilitation and Mine Closure

The Project rehabilitation and decommissioning program would include:

- decommissioning of the existing pit top facility or placement under care and maintenance (following completion of mining of the Fassifern Seam) and subsequent closure and rehabilitation;
- closure and rehabilitation of the new pit top facility and upcast ventilation shaft site (following completion of mining of the West Borehole Seam);
- progressive rehabilitation of minor Project surface disturbance areas, such as disturbance from exploration and monitoring activities;
- remediation of subsidence impacts on natural surface features; and
- relinquishment of mining leases.

The final land use of Project surface disturbance areas would be primarily native vegetation conservation.

A Rehabilitation Management Plan would guide rehabilitation planning for the Project to achieve the final use and relinquishment of Project areas. Rehabilitation and mine closure goals would be based on Donaldson Coal's rehabilitation experience at the Donaldson Open Cut Mine.



ES 3 CONSULTATION AND COMMUNITY INITIATIVES

The Project consultation program has been comprehensive and has included:

- Regular meetings and briefings with key State government agencies for feedback on environmental assessments and key mitigation measures, including the Department of Planning and Infrastructure, Office of Environment and Heritage, New South Wales Office of Water and Roads and Maritime Services.
- Ongoing consultation with the Cessnock City Council and Lake Macquarie City Council, including representation of these councils on the Tasman Underground Mine Community Consultative Committee.
- Consultation with the Commonwealth Department of Sustainability, Environment, Water, Population and Communities under the *Environment Protection and Biodiversity Conservation Act, 1999*.
- Consultation with the community and affected landholders through the Tasman Underground Mine Community Consultative Committee and other Project-specific consultation mechanisms.
- Involvement of and consultation with the Aboriginal community through the Aboriginal Cultural Heritage Assessment in accordance with relevant guidelines, including participation in surveys, site inspections and meetings to discuss cultural matters.
- Dialogue with infrastructure owners and service providers with facilities in the vicinity of the Project that could be potentially affected by mine subsidence or would have interactions with the Project.

Community information sheets have been distributed by Donaldson Coal to inform the local community of the Project and to provide updates on progress of the EIS and specialist studies in November 2011, January 2012 and June 2012 (Plate ES-3).

Community information evenings were held locally in February 2012 to provide an opportunity for the local community to ask Donaldson Coal and specialists preparing the EIS studies, any specific queries or issues of concern relating to the Project (Plate ES-4).

Letters were also distributed to residents in the vicinity of the proposed West Borehole Seam workings in February 2012 providing individual information on their property in relation to the mine plan and providing the opportunity to have a one-on-one meeting with representatives from Donaldson Coal.



Plate ES-3 – Project Community Information Sheets



Plate ES-4 – Project Community Information Session

ES 4 KEY ENVIRONMENTAL ASSESSMENT ISSUES AND MANAGEMENT

Where relevant to the Project, the issues raised by stakeholders during the consultation program have been considered during the preparation of this EIS.

For example, Donaldson Coal commissioned a review of driveway safety along George Booth Drive following feedback from the local community during the Project community information sessions.

Additional community information sessions are planned for June 2012 to communicate the outcomes of the EIS studies and Donaldson Coal's environmental management and monitoring commitments.

Donaldson Coal plays an active role in local communities through financial contributions to facilities, including the Gloucester Coal Community Support Program, Donaldson Job Creation Trust, the Donaldson Community Welfare Trust and the Donaldson Conservation Trust, in summary:

- The Community Support Program provides assistance to local initiatives. The aim of the Community Support Program is to help benefit a wider range of community needs such as education, environment, health, infrastructure projects, arts, leisure and research.
- The Job Creation Trust was established to assist the local community achieve its goals by providing training opportunities and experience.
- The Community Welfare Trust is a charitable trust which supports the local community to promote the education needs, community works or other activities of benefit to the local community, such as the "News in Education" program.
- The Conservation Trust funds environmental education, research, environmental management works or activities within State Conservation Area lands or other environmentally valuable lands.

An environmental risk assessment was conducted for the Project to identify key potential environmental issues for further assessment in the EIS. The environmental risk assessment involved a workshop with a number of specialists that contributed to the EIS.

Based on the application of relevant proposed risk management treatments (e.g. subsidence control zones and minimisation of disturbance of key habitats at the new pit top), all of the potential environmental issues were ranked as low or as low as reasonably practicable by the risk assessment team.

The key environmental assessment issues for the Project are summarised below.

Subsidence Impacts on Principal Residences and Other Built Features

A Subsidence Assessment has been completed for the Project to determine the potential cumulative impacts associated with subsidence above the proposed panels in the Fassifern Seam and West Borehole Seam. The Subsidence Assessment demonstrates that potential subsidence impacts can be appropriately mitigated and managed.

There are three principal residences within the West Borehole Seam mining area. Subsidence impacts to principal residences would be minimal as a result of the subsidence control zones (Box ES-1). This would also reduce impacts to structures located adjacent to principal residences (e.g. water tanks).

Other built features that may be affected by subsidence from the West Borehole Seam include other residential structures, TransGrid and Ausgrid electricity transmission lines, telecommunication infrastructure (i.e. fibre optic cables and copper telecommunication cables), a local road (Sheppard Drive) and associated drainage infrastructure and fire trails and other minor tracks and roads.

Project key infrastructure subsidence control zones and resulting environmental outcomes are provided in Box ES-3.

Mitigation measures, management and monitoring of subsidence impacts on built features would be documented in Built Features Management Plans (which would be developed as part of a progressive Extraction Plan process) in consultation with the relevant owners.

Box ES-3 Key Infrastructure - Subsidence Management



Ausgrid 132 kilovolt Transmission Line Easement*

Project subsidence performance measures:

- Maintain safety and serviceability.
- No damage to structures or loss of service for communication towers on Mount Sugarloaf.
- Damage must be fully repaired or compensated for fibre optic cables, TransGrid and Ausgrid towers.

Project subsidence control zone:

- First workings only within 45° angle of draw resulting in less than 2 mm subsidence and 10 mm horizontal displacement for communication towers on Mount Sugarloaf.
- Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence for fibre optic cables (unless cables can be relocated by agreement with the infrastructure owner or is suspended on electricity transmission towers).
- First workings only within 26.5° angle of draw resulting in less than 20 mm subsidence, 5 mm/m tilt and 2 mm/m strain for TransGrid towers (may be relaxed if cruciform footings can be installed and agreement reached with the infrastructure owner).
- Maximum extraction for Ausgrid towers (except where within another subsidence control zone).

Project subsidence control outcomes:

- Maintenance of key infrastructure safety and serviceability and repair or compensation for any subsidence related damage.
- Implementation of management measures agreed with infrastructure owners in advance of associated subsidence.

Refer to Table ES-1 for details.
*Ditton Geotechnical Services Pty Ltd, 2012.

The Extraction Plan process would involve the review and evaluation of subsidence monitoring results and would apply an adaptive management approach to the subsidence control zones to achieve the subsidence performance measures.

Water Resources and Stream Geomorphology

The West Borehole Seam mining area lies predominantly within the Surveyors Creek catchment. The ephemeral tributaries of Surveyors Creek located within the Project area converge to the north of the Project area and Surveyors Creek then joins Wallis Creek, which drains to the Hunter River near Maitland.

Groundwater in the Project area occurs within the fractured rock aquifer system in the coal measures, and a shallow aquifer system in the unconsolidated sediments of the colluvium associated with incised channels of Surveyors Creek. No alluvium is present in the Project area.

No licensed extractions of surface water have been identified on Surveyors Creek, and beneficial groundwater use in the vicinity of the Project is negligible, as there are no significant useable aquifers underlying, or close to, the Project area.

Key potential impacts of the Project on stream geomorphology and water resources include potential subsidence impacts on streams and dewatering of the West Borehole Seam during mining operations.

The mine layout would be designed to achieve negligible impacts to stream flow characteristics or water quality associated with potential subsidence impacts during the Project.

Project subsidence management measures for streams and resulting environmental outcomes are provided in Box ES-4. The Subsidence Assessment concluded that the use of partial pillar extraction areas beneath streams would provide a high level of protection from continuous fracturing from surface to seam.

Detailed groundwater modelling and assessment determined that while the West Borehole Seam and overburden overlying the mining area would be dewatered during mining, potential impacts to groundwater levels within the colluvium associated with the Surveyors Creek catchment would be insignificant. The Surface Water Assessment concluded that Project predicted changes to baseflow would have a negligible impact on the surface flow regime.

Box ES-4
Streams - Subsidence Management



1st Order Stream*

Project subsidence performance measures:

- Negligible connective cracking to underground workings.
- Not more than minor environmental consequences for 1st and 2nd order streams.
- Negligible environmental consequences (that is, negligible diversion of flows and negligible change in the natural drainage behaviour of pools) for 3rd order streams or above.

Project subsidence control zone:

- Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence where the depth of cover to the stream is less than 80 metres for 1st and 2nd order streams.
- First workings only within 26.5° angle of draw resulting in less than 20 mm subsidence at the edge of the bank for 3rd order streams or above.

Project subsidence control outcomes:

- Maintenance of stream water quality, geomorphic character, flows and ecological function.

Refer to Table ES-1 for details.
*Fluvial Systems, 2012.

The Geomorphology Assessment concluded that with the implementation of Project subsidence control zones, the potential risk to geomorphic character associated potential subsidence impacts would be insignificant for approximately 99% of total stream length within the West Borehole Seam mining area.

Proposed subsidence monitoring for the Project (i.e. survey lines and visual inspections before and after mining) would provide relevant information for the monitoring of potential impacts to the geomorphic character for streams in the West Borehole Seam mining area.

Potential impacts to water resources would be managed through Water Management Plans prepared for the Project as part of the Extraction Plan process. This would include the installation of additional surface water and groundwater monitoring sites, which would expand the existing monitoring network currently operated by Donaldson Coal.

Step Slopes and Cliff Lines

Steep slopes are present along the Sugarloaf Range within the Project area. The slopes along the Sugarloaf Range include a variety of forms including continuous cliff lines, overhangs, cliff terraces, discontinuous rock outcrops, talus slopes and other vegetated steep slopes.

Distinctive cliff lines are formed within sandstone of the Triassic Narrabeen Group along the Sugarloaf Range (Plate ES-5).

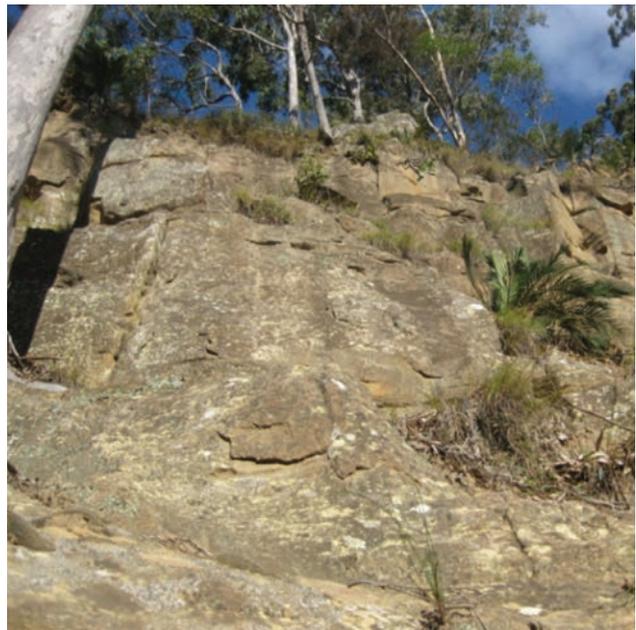


Plate ES-5 – Sandstone Cliff on Sugarloaf Range

Source: Ditton Geotechnical Services, 2012.

Subsidence performance measures for cliff lines and steep slopes would be implemented for the Project to have no more than minor impact on the topographic feature, and negligible environmental consequence (Box ES-2). The cumulative Project subsidence effects along the steep slopes and cliff line areas are unlikely to result in cracking, toppling or slope instability after completion of mining in the Fassifern and West Borehole Seams.

Slope instability and rock fall occur naturally along steep slopes and cliff lines areas due to natural weathering and tree root wedging processes. In some circumstances it may be difficult to differentiate between natural and mining induced processes.

Terrestrial and Aquatic Ecology

The majority of the Project area is well vegetated and includes open heath, dry sclerophyll forest, wet sclerophyll forest and rainforest. The Project area provides habitat for a number of threatened flora and fauna species.

Box ES-5

Key Endangered Ecological Communities - Subsidence Management



Alluvial Tall Moist Forest*

Project subsidence performance measures:

- Negligible environmental consequence.

Project subsidence control zone:

- Partial extraction with stable remnant pillars resulting in less than 300 mm of subsidence.

Project subsidence control outcomes:

- No more than negligible environmental consequence.

Refer to Table ES-1 for details.
*Hunter Eco, 2012.

The natural drainage systems in the survey area do not provide significant habitat for aquatic fauna. No threatened aquatic biota were identified by the aquatic surveys or are considered likely to occur in the Project area or surrounds.

Key potential impacts of the Project on ecology and habitat include vegetation clearing and subsidence.

Apart from very minor clearing associated with ongoing exploration, management and monitoring activities, the Project would result in the clearance of approximately 11.2 hectares for the new pit top facility and upcast ventilation shaft (Figures ES-4 and ES-6), including approximately 8.9 hectares of Lower Hunter Spotted Gum - Ironbark Forest (an endangered ecological community).

The Project surface facilities require the clearance of approximately 417 individual *Rutidosia heterogama* (a threatened flora species) plants from a local population of between approximately 4,200 and 11,300 individuals. Hunter Eco concluded that the clearance of *Rutidosia heterogama* plants would not result in the long-term decline of the population or threaten the species as a whole. This was supported by the determination that the Project was 'not a controlled action' by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities.

There would be no clearing in the underground mining areas that would lead to habitat fragmentation or isolation. Consequently, the corridor values of the Sugarloaf Range (including the Sugarloaf State Conservation Area) would be maintained.

The Project includes substantial commitments to limit consequences associated with subsidence. The commitments, in the form of proposed subsidence performance measures, greatly reduce the risk of subsidence consequences on ecology. Project subsidence management measures for Groundwater Dependent Ecosystems and Hunter Lowlands Redgum Forest on 3rd Order Streams (key endangered ecological communities) and resulting environmental outcomes are provided in Box ES-5.

The Flora, Terrestrial Fauna and Aquatic Ecology Assessments conclude that the Project is unlikely to have any lasting impacts on threatened species, habitats, Sugarloaf State Conservation Area or the Heaton State Forest.

Potential impacts on ecology would be managed through Biodiversity Management Plans prepared as part of the Extraction Plan process, and a revised Flora and Fauna Management Plan for the construction of the new pit top facility.

The Project would include either:

- establishment of at least 22.5 hectares of native bushland (ratio of 2:1) as compensatory habitat (including at least 18 hectares of the Lower Hunter Spotted Gum – Ironbark Forest); or
- provision of the land associated with the new pit top to the Office of Environment and Heritage following rehabilitation.

In addition, Donaldson Coal would fund research programs into the *Rutidosis heterogama*, including a translocation program, in consultation with the Office of Environment and Heritage.

Aboriginal Heritage

Modern Awabakal and Wonnarua people identify strong contemporary, historical and traditional associations with the Project area.

Significant traditional, historical and contemporary cultural values and associations have been identified within the Project surrounds by the registered Aboriginal stakeholders and are also known through ethnohistorical evidence. Mount Sugarloaf within the Project area is documented for its association with male initiation ceremonies and the presence of the supernatural spirit being 'Puttikan' and the supreme being 'Koe-in'.

A total of 100 Aboriginal heritage sites were identified within the Project area and surrounds, consisting of 38 open artefact sites, 35 grinding groove sites (e.g. Plate ES-6), one grinding groove/open artefact site and 26 rock shelters with potential archaeological deposits.



Plate ES-6 – Example Grinding Groove Site - Potential Subsidence Impacts would be Very Unlikely

Source: South East Archaeology, 2012.

There were no Aboriginal heritage sites identified within the new pit top facility and upcast ventilation shaft areas.

Potential impacts from subsidence on Aboriginal heritage sites include the cracking of rock-based features such as rock shelters and grinding grooves, and (where cracking occurs at rock shelter sites) potential isolated rock falls.

The potential impacts of the Project to Aboriginal sites and cultural areas have been significantly reduced by the implementation of subsidence control zones to achieve the various Project subsidence performance measures.

Many of the most significant cultural areas are located within the proposed subsidence control zones and potential subsidence impacts would be minimised in these areas.

A Heritage Management Plan would be developed for the Project in consultation with the registered Aboriginal stakeholders and the Office of Environment and Heritage to detail management and mitigation measures, including potential impacts to Aboriginal heritage from subsidence throughout the life of the Project.

Sugarloaf State Conservation Area

The Sugarloaf State Conservation Area was reserved in 2007 as part of the Lower Hunter Regional Conservation Plan, due to its location in the Watagan to Stockton Corridor. The New South Wales Government's intent in reserving the land under the State Conservation Area category was to allow economic coal resources to still be extracted through underground methods, as other conservation categories would prohibit mining occurring.

The Project would involve the continuation of underground mining in Sugarloaf State Conservation Area. The existing Tasman Underground Mine has been mining in the Sugarloaf State Conservation Area since it was reserved in 2007.

Subsidence control zones would be implemented to minimise potential impacts on the conservation and recreational values of the Sugarloaf State Conservation Area, so as to achieve subsidence performance measures for streams, cliffs, steep slopes and groundwater dependent ecosystems (as described above and illustrated in Boxes ES-2, ES-4 and ES-5).

In the event that subsidence impacts require remediation within Sugarloaf State Conservation Area (e.g. due to surface cracking), there may be temporary closure of some areas to maintain public safety in consultation with relevant agencies.

Donaldson Coal would contribute \$25,000 per annum during the period when mining takes place in the Sugarloaf State Conservation Area for rehabilitation, revegetation and management works in the State Conservation Area.

Road Transport

The Tasman Underground Mine is located in an area that is generally well serviced by major roads and the main road transport related concerns that have been raised during the Project consultation program have particularly related to the proposed increase in public road haulage of ROM coal between the Project and the Bloomfield CHPP.

The Hunter Expressway is currently under construction and is scheduled for completion in 2013. The opening of the Hunter Expressway is expected to result in a decrease in traffic of over 90% on George Booth Drive. The predicted major reduction in the traffic on George Booth Drive is because the Hunter Expressway generally parallels George Booth Drive in the vicinity of the Project (Figure ES-2) and therefore will provide an alternative dual carriageway link for many motorists and heavy vehicles that currently use George Booth Drive as a through route to other destinations.

Total public road haulage for the Project would be capped at the existing approved maximum (4,000 tonnes ROM coal per day) prior to commissioning of the Hunter Expressway. Following commissioning of the Hunter Expressway, transport of up to 6,200 tonnes per day would be undertaken.

The Road Transport Assessment concluded that the Project's contribution to overall traffic conditions on George Booth Drive and John Renshaw Drive would be such that no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a direct result of the Project.

Notwithstanding, Donaldson Coal would implement a number of road transport management and mitigation measures including construction of a roundabout on George Booth Drive for access to the new pit top facility, continuation of the existing Road Transport Protocol, independent traffic audits and some intersection performance monitoring.

Donaldson Coal undertook upgrade works at a number of private driveways located on George Booth Drive between Richmond Vale Road and John Renshaw Drive including road shoulder widening and sealing as a component of the road upgrades for the existing Tasman Underground Mine.

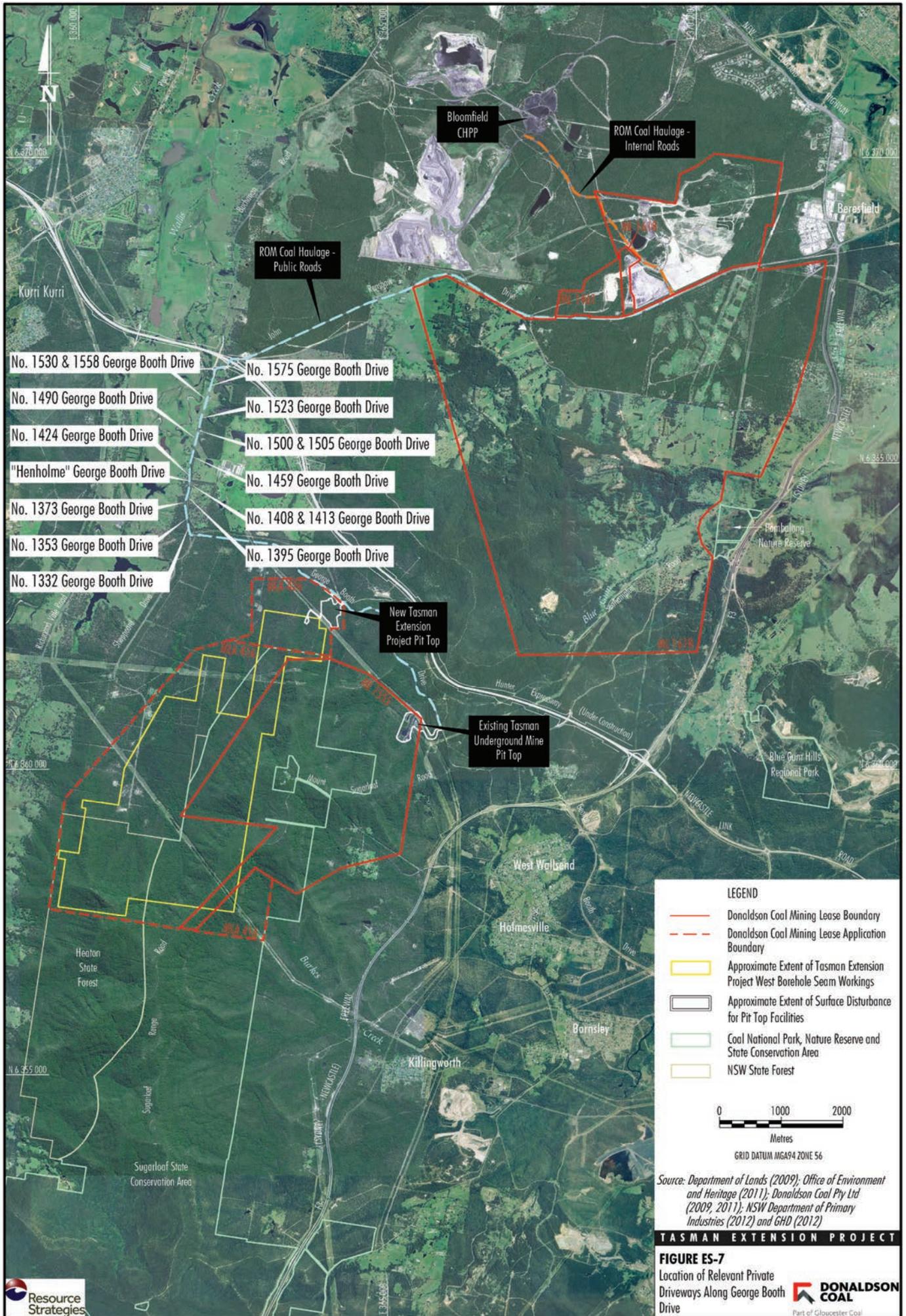
However, as an outcome of community consultation, Donaldson Coal commissioned an inspection and safety review of private driveways on George Booth Drive between John Renshaw Drive and Richmond Vale Road (Figures ES-7 and ES-8).

This review indicated that there were some safety improvements that could be made, including localised shoulder widening at some driveways (Table ES-2).

Donaldson Coal would implement the identified private driveway/George Booth Drive safety improvement works within one year of obtaining Development Consent for the Project, should it be approved.

Other Assessments

Assessments of potential impacts of the Project on noise levels, air quality, soil resources, agricultural land use, non-Aboriginal heritage, community infrastructure and visual character demonstrated that the impacts would be negligible, within acceptable levels or could be readily managed.





Address: No. 1575 George Booth Drive



Address: No. 1530 and 1558 George Booth Drive



Address: No. 1523 George Booth Drive



Address: No. 1500 and 1505 George Booth Drive



Address: No. 1490 George Booth Drive



Address: No. 1459 George Booth Drive



Address: No. 1424 George Booth Drive



Address: "Henholme" George Booth Drive



Address: No. 1408 and 1413 George Booth Drive



Address: No. 1395 George Booth Drive



Address: No. 1373 George Booth Drive



Address: No. 1353 George Booth Drive



Address: No. 1332 George Booth Drive

TASMAN EXTENSION PROJECT

Figure ES-8
Relevant Private Driveways
Along George Booth Drive



*Note: Refer to Figure ES-7 for Locations
Source: GHD (2012)*

Table ES-2
Proposed Private Driveway Upgrade Treatments

Location (Refer Figures ES-7 and ES-8)	Proposed Treatment
No. 1332 George Booth Drive	Provide sealed shoulder widening for the left turn into the property. Replace the Telstra pit with a trafficable pit and lid.
No. 1353 George Booth Drive	Provide sealed shoulder widening for the left turn into the property.
No. 1373 George Booth Drive	Provide additional shoulder widening for the property as required.
No. 1395 George Booth Drive	Provide additional widening for the right turn shoulder. Guide posts to be relocated to outside the sealed pavement.
No. 1408 & 1413 George Booth Drive	Consider the relocation of the power poles to outside of the clear zone for the road. These poles restrict the extents of the widened shoulders. Trim or remove vegetation on the southbound side of the road, north of the driveway into property No. 1408 to improve sightlines out of the driveway to approaching vehicles.
“Henholme” – George Booth Drive	It is considered that the issues associated with this driveway are due to the commercial nature of the property. Provide sealed shoulder widening for the left turn into the property.
No. 1424 George Booth Drive	Provide a sealed widened shoulder for the left turn into the property. Extend the existing widened sealed shoulder to approximately 20 metres past the driveway prior to tapering back to the existing.
No. 1459 George Booth Drive – “County Downs”	Provide sealed shoulder widening for the left turn into the property. Consider the relocation of the power pole to outside of the clear zone.
No. 1490 George Booth Drive	Provide a sealed widened shoulder for the left turn into the property. Relocate Hunter Expressway sign to outside of the clear zone for the road. Provide additional widening for the right turn shoulder.
No. 1500 & 1505 George Booth Drive	No improvements or modifications are proposed at these driveways.
No. 1523 George Booth Drive	Provide sealed shoulder widening for the left turn into the property.
No. 1530 & 1558 George Booth Drive	Extend the northbound shoulder widening to the south of property No. 1530. Provide sealed shoulder widening for the left turn into the property.
No. 1575 George Booth Drive	No improvements or modifications are proposed at these driveway.

Source: After GHD (2012).

ES 5 KEY MANAGEMENT AND COMPENSATORY COMMITMENTS

The Tasman Underground Mine environmental management system includes various environmental management plans and programs that have been developed and implemented since operations commenced in 2006.

Donaldson Coal would continue to implement the existing plans and programs at the Tasman Underground Mine, and where necessary would review and revise them (in consultation with the relevant regulatory authorities) for the Project.

Key management and compensatory measures would be implemented for the Project:

- Donaldson Coal would adopt subsidence performance measures and associated subsidence control zones to manage potential impacts on principal residences, surface infrastructure, cliff lines, steep slopes, streams and vegetation (i.e. coal extraction would be adjusted to achieve significantly reduced environmental impacts).
- Detailed Extraction Plans would be prepared progressively prior to mining in an area to demonstrate the mine design is such that the subsidence performance measures would be achieved.
- Donaldson Coal would implement an adaptive management approach to ensure that subsidence control zones are adapted as required to achieve the subsidence performance measures.
- The new pit top facility would be designed and constructed to avoid or minimise impacts on key ecological features.
- Total road haulage (including ROM coal transport and waste rock from the new pit top construction) would be maintained at the existing maximum of 4,000 tonnes per day prior to commissioning of the Hunter Expressway.
- Project coal haulage on the public road network would be limited to the hours of 7.00 am to 10.00 pm on weekdays and 26 Saturdays per year between the hours of 7.00 am and 6.00 pm (i.e. there would be no coal haulage on Sundays, public holidays, or at night).
- Donaldson Coal would continue to implement the Road Transport Protocol, including a Drivers Code of Conduct.
- Donaldson Coal would implement safety improvement works for private driveways along George Booth Drive.
- An Aboriginal cultural heritage educational documentation program would be undertaken in consultation with Aboriginal stakeholders specific to the Mount Sugarloaf area.
- The mine plan would be designed to achieve acceptable levels of risk for key Aboriginal heritage sites of cultural and archaeological significance.
- Donaldson Coal would implement research, offset and compensatory measures for Project impacts on ecological aspects.

