

MANGOOLA OPEN CUT

GLENORE



Conservation Management Strategy

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1.0	March 2013	Xstrata Mangoola/ Umwelt	Development of CMS
2.0	July 2014	Mangoola/DPE	Review following Mod.6 approval and general update
3.0	July 2015	Mangoola Coal	Significance detail included for Sites 20, 21 and 22.
4.0	June 2018	Mangoola Coal	<p>Inclusion of additional sites (identified during site archival recording) in body of Conservation Management Strategy:</p> <ul style="list-style-type: none"> - Umwelt letter dated 16 June 2011 (Surveyor's blaze) - Umwelt letter dated 22 August 2013 (Sites associated with ETL relocation) - Umwelt letter dated 02 October 2013 (Timber structure associated with Site 8) - Umwelt letter dated 16 July 2015 (Sites 20, 21, 22) <p>Simplification of Section 4 to remove duplication and provide clear and concise obligations for managing relevant heritage sites.</p> <p>Inclusion of figure depicting location of heritage sites, status and 5 mm/s blast affectation zone.</p> <p>Update to legislation and related documents (to ensure consistency of management measures).</p> <p>Updated consultation with OEH and relevant landholders.</p>
5.0	September 2018	Mangoola Coal	Update to s1.5 to reflect consultation outcomes with OEH and relevant landholders.
6.0	November 2018	DPE	CMS approved by DP&E.
7.0	May 2020	Mangoola Coal	<p>Removal of demolished sites from Figure 2 and Table 2 as per 2019 Independent Environmental Audit finding.</p> <p>Update to template.</p> <p>Reviewed legislation and related documents to ensure they are still</p>

			<p>relevant (to ensure consistency of management measures).</p> <p>Updated consultation with BCD and relevant landholders.</p>
8.0	September 2020	Mangoola Coal	<p>Update to Table 4 'Management of Historical Heritage Sites' with advice from updated modelling with regards to vibration limit for Site 17 (Castle Hill).</p> <p>Addition of a 'Related Report' and 'Reference' - Castle Hill Blasting Ground Vibration Limit (Terrock 2020).</p> <p>Updated consultation with Heritage NSW, Department of Premier and Cabinet (formally OEH and then BCD) and relevant landowners.</p>

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1. Introduction

Mangoola Coal Operations Pty Limited (Mangoola Coal) operates an open cut coal mine located near Wybong, approximately 20 kilometres west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area (refer to **Figure 1**).

1.1 Background

A detailed description of the Mangoola Coal Project and subsequent modifications under the Project Approval 06_0014 (PA) are provided in Chapter 3 of the Modification 6 Environmental Assessment (EMGA Mitchell McLennan 2013). A Historical Heritage Assessment (Umwelt 2006) was undertaken as part of the Environmental Assessment (EA) for the Anvil Hill Coal Mine Project (Umwelt 2006) to provide an assessment of the impact of the proposed development on historical heritage within and surrounding the proposed disturbance area. The assessment identified a total of 19 heritage items within the study area, 11 of which will be directly impacted by the mining operation.

The remaining eight sites within the blast affectation zone are Amaroo (Site 12), Charcoal Retorts (Site 13), Springvale (Site 14), Angle Vale (Site 15), Old Angle Vale (Site 16), Castle Hill (Site 17), Anvil Rock (Site 18) and the Book Formation (Item 19). Four of these sites have since been demolished following local council approval: Amaroo, Spring Vale, Angle Vale, Old Angle Vale; and are not discussed further in this strategy. None of these four sites were State registered or listed in the Muswellbrook Shire Council Local Environment Plan as having local historical significance.

A second Historical Heritage Assessment (Umwelt 2010) was undertaken as part of the Environmental Assessment - Modifications to Mangoola Coal Mine Plans and Relocation of 500 kV Electricity Transmission Line (ETL). The assessment identified three additional potential sites located inside and outside the Mangoola Coal project disturbance boundary and the ETL project boundary. The sites comprise a former windmill (Site 20), a timber post and eight wire fence (Site 21) and a former mortise and tenon timber post and one rail fence (Site 22). At the time of the EA (Umwelt 2010), these sites had not been formally assessed. Further assessment of the three sites was conducted in 2013 and they are considered to have nil heritage significance and therefore no further management is required.

Concurrent with the EA (Umwelt 2010), an Archival Recording of Heritage Sites and Structures within Mangoola Disturbance and Blast Affectation Areas (Umwelt 2010) was being developed. As part of this process, Mangoola Coal identified and numbered three new sites within the Project Disturbance Boundary (being a Survey Mark (Site 20), Furnace (Site 21) and a Cottage (Site 22) which were subsequently included in that Archival Recording. As such, to prevent confusion for the purpose of this Conservation Management Strategy (CMS), sites identified as part of the EA (Umwelt 2010) will be numbers 20A, 21A and 22A. Further significance assessment of these sites was completed in 2015 with two of the sites (Site 20 and 22) identified as having local heritage significance with Site 21 assessed as having no heritage significance (Umwelt 2015).

This CMS outlines the management strategies (as required) for the heritage items of significance, as identified by Heritage Studies completed at Mangoola Coal during the course of the project and mine operation phases detailed in Section 4.

All land within the currently approved disturbance area is currently owned by Mangoola Coal. Similarly, all of the heritage sites addressed by this document are situated on land owned by Mangoola Coal with the exception of Castle Hill (Site 17). Castle Hill is currently privately owned.

Of all the identified sites that fall within the approved mine disturbance boundary, only site 8A is yet to be impacted. Mining activities are likely to impact this site within 2020.

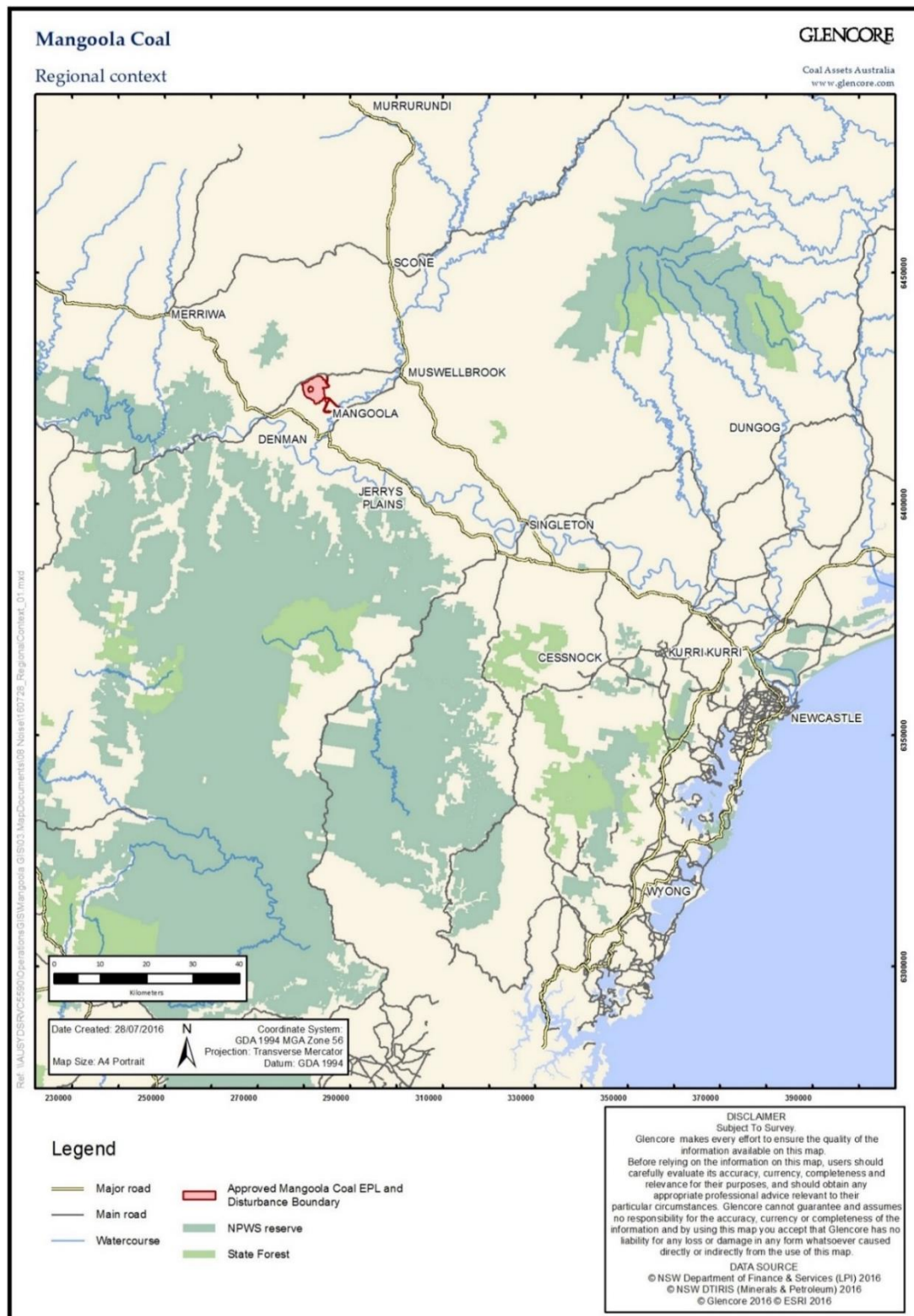


Figure 1: Locality plan

1.2 Purpose and Scope

This Conservation Management Strategy (CMS) addresses the historical heritage management issues associated with Mangoola Coal. It does not include a detailed heritage management strategy with regards to Aboriginal Cultural Heritage which are addressed separately in the Mangoola Coal Aboriginal Cultural Heritage Management Plan (ACHMP).

The CMS has been prepared to address Schedule 3, Condition 43 of PA 06_0014 (refer to Section 1.3) and addresses the identified heritage sites/items within the blast affectation zone including those sites/items outside of the actual project disturbance boundary. Where required, it includes:

- a program for baseline dilapidation surveys of the heritage items;
- a program to monitor the effects of blasting on the heritage items;
- a description of the measures that would be implemented to protect relevant heritage items (particularly Castle Hill) from the effects of blasting; and
- a description of the measures that would be implemented to protect Anvil Rock and 'The Book' rock formations from the effects of blasting.

Note: For the purposes of these conditions the blast affectation area includes all properties predicted to exceed the 5 mm/sec ground vibration criteria as shown in the EA (2009) (see **Figure 2**).

In accordance with Schedule 3, Condition 42 of PA 06_0014, Mangoola Coal has previously submitted a report to the Department of Planning Industry and Environment (DPIE) of the outcomes of a detailed historical research and oral history for all the land within the 40 dB(A) noise contour as outlined in the EA (Umwelt 2006).

However, heritage sites/items located outside of the disturbance and blast affectation areas have not been specifically addressed within this CMS.

1.3 Regulatory Requirements

The PA for Mangoola Coal was assessed under the Environmental Planning and Assessment Act 1979 (EP&A Act). Approval for Mangoola Coal was gained from the Minister for Planning on 7 June 2007. Since this time, eight modifications to the project approval have been granted. A full list of the modified project approval conditions relating to this CMS and where they are addressed within this document is provided in **Appendix A**.

1.4 Conservation Management Strategy Methodology

This CMS has been prepared with consideration of the recommendations of the following reports:

- Historical Significance Assessment of Sites 20, 21 and 22 at Mangoola Coal (Umwelt 2015).
- Archival Recording of "The Book" Heritage Site (Umwelt 2015).
- Archival Recording of Heritage Sites and Structures within Mangoola Disturbance and Blast Affectation Area (Umwelt 2010).
- Historical Heritage Assessment – Modifications to Mangoola Coal Mine Plans and Relocation of 500 kV Electricity Transmission Line (Umwelt 2010).
- Historical Heritage Assessment – Anvil Hill Project (Umwelt 2006).
- Anvil Hill Project Noise and Vibration Assessment (Wilkinson Murray 2006).

- Mangoola Coal Blast Management Plan.

This CMS has also been prepared with regards to the principles contained in The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 2013 (Australia ICOMOS 2013). It also draws on information provided by Heritage NSW, Department of Premier and Cabinet on the preparation of Conservation Management Plans (CMPs) and Conservation Management Strategies (CMSs), a Guide to the Preparation of Conservation Management Plans for Places of European Cultural Significance (Kerr 2006). A CMS is a briefer version of a CMP intended to provide a broad overview of conservation approaches and management guidance.

1.5 Stakeholder Consultation

As per Schedule 3, Condition 43(a) of PA 06_0014, the CMS is to be prepared in consultation with the relevant landowners and Heritage NSW, Department of Premier and Cabinet NSW (formally Office of Environment and Heritage (OEH) and then Biodiversity Conservation Division (BCD)).

There is only one relevant landholder requiring consultation. A copy of the CMS outlining the updates was sent to the landowner via email for comment with follow up phone calls made. The consultation was as follows:

- An email containing the CMS and a cover letter outlining the updates to the CMS was sent via email on 3 September 2020 requesting comments back by 17 September 2020. A voice message was left as well. No comments were received by 17 September 2020.
- A follow up phone call was made on 17 September 2020. A voice message was left. An email was also sent requesting the landowner make contact by 18 September 2020.
- An email was received from the landowner on 18 September requesting a few days to look over the CMS. Mangoola requested the landowner provide comment by 22 September 2020.
- Mangoola contacted landowner on 22 September 2020 however the landowner had not yet had a chance to review the CMS. Mangoola requested comments by 24 September 2020.
- A phone call was made to the landowner on 24 September 2020 requesting a call back with comments by COB that day.
- No comments were received.

It is to be noted that various requests have been made to gain access to undertake a baseline dilapidation assessment of the Castle Hill slab hut (Site 17) located on this private property, which to date has not been granted. This will be continued to be offered.

In addition, consultation with the Department of Premier and Cabinet, Heritage NSW was undertaken through the DPIE portal on 28 September 2020. A response dated 12 October 2020 (Reference DOC20/797207) was received with no comments made.

2. Historical Context

2.1 Introduction

As part of Heritage NSW Department of Premier and Cabinet assessment procedures it is essential to have a full understanding of a site or an item based on its historical and physical context. This section summarises the historical context of the project area prepared as part of the Historical Heritage Assessment – Anvil Hill Project (Umwelt 2006) and subsequent modifications.

2.2 Land tenure and early settlement

Wybong Valley was first reported by the European settler Henry Dangar in 1824. Dangar was dismissed from the Survey Department and replaced by George Boyle White in 1827. Boyle surveyed many individual holdings as well as towns including Muswellbrook (Turner 1995:15). Robert Dixon, Assistant Surveyor was also important at this time and surveyed 'many purchases as well as completing surveys of most of the watercourses and many of the main roads in the Upper Hunter' (Turner 1995:15). Small holdings were rare in the Upper Hunter Valley up until the mid to late nineteenth century due to land grants only being granted to settlers by the Crown on 'the basis of 640 acres for each 500 pound sterling they possessed in cash or goods' or by leasehold 'so that, by means of grant, purchase and lease, some settlers were able to build up very large estate' (Turner 1995:16). Large estates in the Wybong Valley at this time included Yarraman, Callatoota and Pickering.

The advent of the Free Selections Act in 1861 did not have a high impact on the Muswellbrook area, including the Wybong Valley. The Free Selections Act was intended to make land available to would-be farmers and allowed selectors to purchase an acre for a pound, from 40 to 640 acres 'of any Crown land including land held on leasehold' (Turner 1995:16). The land suitable in the locality for farming was already in 'private hands and existing landholders managed to forestall the selection of their leaseholds' (Turner 1995:16).

The development of a closer settlement policy in 1884 in NSW was carried out due to 'new market opportunities for farmers arising from the invention of refrigeration and contemporary theories about land policy' (Turner 1995:16). These policies included increased land taxes on large estates to encourage large estate owners to reduce their holdings, assistance programmes to encourage settlers to chosen areas which continued after World War I and World War II for soldiers returning home from the war. These policies in the mid-1880s coincided with commercial dairying in the Muswellbrook area and lead to the early success of closer settlement. Soldier settlement did not succeed as many farmers were inexperienced and living on land which was harsh and difficult to manage. Settlement within the Wybong Valley has increased within the last thirty years with hobby farmers taking up small holdings. There are over ninety landholders on Wybong Creek now compared to five families 40 years ago (Peter and Aileen Hogan pers. comm.).

2.3 Dairying

Dairying was one of the initial impetuses for the division of large estates in the Upper Hunter and by the 1890s became an important industry in the area. This importance coincided with the 'development of the mechanical separation of milk and refrigeration causing a re-shaping of the pattern of farming' in Muswellbrook Local Government Area, including the Wybong Valley, due to the increased demand for dairy products in Australia and overseas (Turner 1995:19). In 1893 there was a creamery at Kayuga, the creamery at 'Overton' was set up in 1903 by Thomas Blunt, and the Denman Co-operative Dairy Company was founded in 1907. These are the earliest creameries within the locality. The Muswellbrook Dairy Co-operative Factory was built in Aberdeen Street in 1919 (Turner 1995:19). Various amalgamations lead to the creation of the Oak Co-operative.

2.4 Religion and education

Religion was the most important aspect of social life in the nineteenth century. Four years after the gazettal of Muswellbrook the Church of England and Presbyterian Church both officiated church services in the town and it was these two religious bodies which were first to build churches in the town in 1843 (Turner 1995:36-37). In 1844 Roman Catholic residents in the locality were active but the first Catholic Church, St James, was not constructed until 1862 (Turner 1995:37). The

establishment of the churches lead to the opening of the first schools in the locality in the late 1830s to early 1850s.

2.5 Railways

In the Wybong Valley and Muswellbrook locality, roads were the most important means of transport until 1869 when the Great Northern Railway reached Muswellbrook (Turner 1995:32). The Great Northern Railway greatly extended communications into the locality and increased the population of Muswellbrook and associated rural areas, including Wybong, from 1869. In 1912 a branch railway from Muswellbrook to Merriwa was commenced and reached Denman in 1915 and Merriwa in 1917. In 1918 a route for a railway line between Maryvale and Sandy Hollow was surveyed and construction started in 1941, but stopped and started throughout World War II, only to completely stop in 1950. Work recommenced on the construction of the railway after a government inquiry in 1970 in relation to the exploitation of coal in Ulan. The first coal train to Ulan colliery left to travel to Newcastle in 1982. This railway runs to the southeast of the Mangoola Mine area.

2.6 Other industries within Wybong Valley

Other forms of industry were prevalent in the Wybong Valley during its history from mid nineteenth century to the present. Timber clearing and use of timber for mining props and commercial sale was important. This trend was common in the Upper Hunter Valley where dense timber had been felled in accessible areas and large regions of open forest thinned and/or ringbarked (Heritage Office and DUAP 1996:46). Timber was also used for charcoal retorts during World War II on the northern bank of Big Flat Creek. Charcoal was used to fuel early cars during the War years and the operation of these retorts is remembered by locals, including Pat Hogan and Roger McTaggart. A small amount of burnt timber remains are the only tangible evidence of these retorts. A hood which was once part of the retorts is reused by Peter and Aileen Hogan on their property Old Angle Vale.

Rabbiting was also an important industry from the beginning of the 20th century during the depression years and until the introduction of myxomatosis in the 1950s. Rabbits were destructive to the environment within the Mangoola Mine area and increased erosion of the natural topsoil. Ripping for rabbits also lead to the destruction and disturbance of the natural environment. Rabbit canning and freezing works were established in Muswellbrook during the early 20th century.

Vineyards are an important early industry which still remains visible in the Wybong area. Vineyards existed in the Upper Hunter Valley in 1829 with the vineyards at Pickering and Bengalla. Vineyards declined when the larger estates were broken up and changed hands in the 1850s. Free selectors were mainly graziers and did not continue the vineyards, the exception being the Brecht Brothers who developed a large vineyard at Rosemount near Myambat. This industry was destroyed by an outbreak of an insect called Phylloxera in 1910 which lead to vineyards being dug up to destroy the bug from spreading. It was not until the 1960s that winemaking was redeveloped and earlier traditions revived including the development of the Penfolds estate at Dalwood (Turner 1995:22). The Yarraman Vineyard is believed to have produced the first Chardonnay planted in the Upper Hunter, the first Gewurztraminer, the first Chambourcin and the 'only vineyard in Australia with the Alsace clone' (Anvil Hill Project Watch Association, 2005:20).

2.7 Development of coal mining

Coal was known to exist in Muswellbrook and its surrounding areas since early exploration but was not exploited until the 1890s. Mining was small until local businessman formed the Kayuga Coal Mining Company Limited to develop the Kayuga mine and two years later the No.1 Colliery of the Muswellbrook Coal Company was also established (Turner 1995:26). Coal mining and electricity

generation have become major industries in the Muswellbrook area since the 1950s with the first wave of collieries built to meet export demand, particularly in Japan, at Liddell, Foybrook and Liddell State. In 1964 the State Electricity Commission commenced construction for the Liddell power station, a project which changed the lifestyle of Muswellbrook LGA's residents by affecting employment, population, housing, commerce and character of the locality.

2.8 Historical themes

A historical theme is a research tool, which can be used at the national, state or local level to aid in the identification, assessment, interpretation and management of heritage places (AHC 2001:1). Nine national historical themes have been identified by the Australian Heritage Council. The NSW Heritage Council has identified 35 historical themes for understanding the heritage of NSW. In accordance with the framework of historic themes and as identified in the Historical Heritage Assessment – Anvil Hill Project (Umwelt 2006) the themes in **Table 1** are relevant to the Mangoola Mine area.

National Theme Group	Themes	Sub Themes	Local Themes/Application
Developing local, regional and national economies	Developing primary production Utilising natural resources	Grazing stock Developing agricultural industries Mining	Dairying Development of coal mining
Building settlements, towns and cities	Making settlements to serve rural Australia Remembering significant phases in the development of settlements, towns and cities	-	Land tenure and early settlement including the history of selection
Working	Working on the land Organising workers and workplaces	-	Development of coal mining Railways Other industries within Wybong Valley – charcoal retorts, vineyards, timber clearing and rabbiting
Educating	Establishing schools	-	Religion Education
Governing	Defending Australia	Providing for the common defence	World War II

National Theme Group	Themes	Sub Themes	Local Themes/Application
Developing Australia's Cultural Life	Worshipping	Founding Australian religious institutions	Religion Education Death

Table 1: Historical Themes

3. Evaluation of Heritage Sites

3.1 Identified historical heritage sites

Heritage sites identified through various heritage studies and other investigations at Mangoola Coal as discussed in **Section 1.1** are shown in **Figure 2**. Their heritage significance is briefly described in **Table 2**.

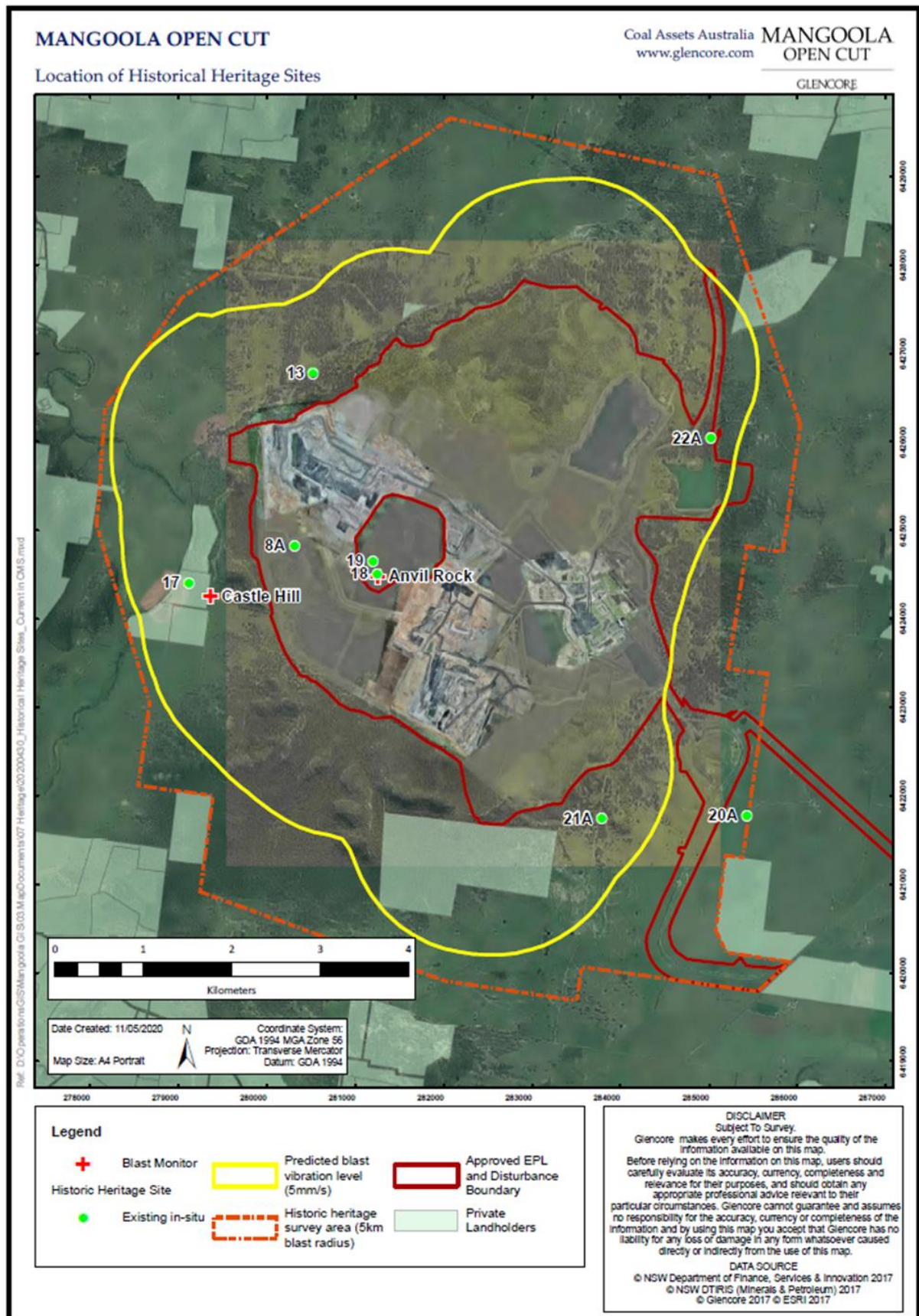


Figure 2 – Location of Historical Heritage Sites

Site I.D.	Site Name	Description	Significance	Location	Management
Site 8A	Post and Rail Fences, Timber structure	Post and rail fences were found across the Mangoola Coal disturbance area concentrated along Anvil Creek.	Local Significance	Within disturbance boundary	Nil*
Site 13	Charcoal Retorts	Charcoal on ground surface.	Local significance	Not within disturbance boundary	See Table 3
Site 17	Castle Hill	Extended slab hut and outbuildings.	Local significance	Not within disturbance boundary	See Table 3
Site 18	Anvil Rock	Natural geological formation.	Local significance	Not within disturbance boundary	See Table 3
Site 19	The Book Formation	Natural geological formation.	Local significance	Not within disturbance boundary	See Table 3
Site 20A	Windmill	Derelict and collapsed metal windmill and associated moveable farm equipment.	Nil	Within disturbance boundary	No mining impacts, identified during 500kV ETL Relocation MOD
Site 21A	Timber post and eight wire fence	North to south aligned timber post and eight wire fence.	Nil	Within disturbance boundary	No mining impacts, identified during 500kV ETL Relocation MOD
Site 22A	Mortise and tenon timber fence	Mortise and tenon timber post and one-rail fence.	Nil	Within disturbance boundary	Nil, partially within RWD inundation area
Note: *Sites within the disturbance boundary will be destroyed by mining when required as approved by Project Approval 06_0014.					

Table 2: Identified Heritage Sites

3.2 Potential physical impacts to historical heritage

The heritage sites presented in **Table 2** which are not directly impacted by mining and have been identified for further management by Mangoola Coal. A summary of potential impacts to the sites is further described in **Table 3**.

Site ID	Site Name	Impacts
Site 13	Charcoal Retorts	This site is outside the Mangoola Coal approved disturbance area and within an offset area for cultural heritage and will not be directly disturbed. <i>Note – this site has not been re-discovered and it is suspected the 2007 floods washed it away.</i>
Site 17	Castle Hill	Potential impact by blasting as a result of vibration.
Site 18	Anvil Rock	Potential impact by blasting as a result of vibration.
Site 19	“The Book” Formation	Potential impact by blasting as a result of vibration.

Table 3: Potential Impacts to Heritage Sites

3.3 Related reports

Several reports with relevance to the project have previously been prepared. These are briefly discussed below.

a) Historical Heritage Assessment – Anvil Hill Project (Umwelt 2006)

The Historical Heritage Assessment was prepared to gain an understanding of the history and historical heritage values in the area proposed for impact by open cut mining and associated activities (the proposed disturbance area) and in adjacent areas which are potentially susceptible to indirect impacts such as vibration from blasting (the blast affectation area).

b) Anvil Hill Project Noise and Vibration Assessment (Wilkinson Murray 2006)

The Noise and Vibration Assessment was prepared to identify the potential noise and vibration impacts associated with the operation. The report identifies the predicted blast affectation zone and also predicts vibration levels at the Anvil Rock and The Book rock formations as well as the identified heritage structures.

c) Historical Heritage Assessment – Modifications to Mangoola Coal Mine Plans and Relocation of 500 kV Electricity Transmission Line (Umwelt 2010)

The Historical Heritage Assessment was prepared to gain an understanding of the history and historical heritage values in the area proposed for impact by open cut mining and the relocation of the 500 kV ETL.

d) Archival Recording of Heritage Sites and Structures within Mangoola Disturbance and Blast Affection Areas (Umwelt 2010)

This archival recording was prepared in accordance with Schedule 3, Condition 42 (b) of PA 06_0014 for all items of heritage value within the project disturbance area and blast affection area that were able to be identified and accessed.

e) 2884_Mangoola_Piggford_20110616_ltr (Umwelt 2011)

This heritage significance advice letter was provided in line with the approved CMS in the event that previously unidentified European heritage sites/items are uncovered. The significance assessment was completed to establish the associated historical heritage value of these sites within the project disturbance boundary and any relevant management measures, if any, that would be required by Mangoola Coal.

f) 2884_Transgrid_Clarke_20130822a_ltr (Umwelt 2013)

This heritage significance advice letter was provided in line with the approved CMS in the event that previously unidentified European heritage sites/items are uncovered. The significance assessment was completed to establish the associated historical heritage value of these sites within the project disturbance boundary and any relevant management measures, if any, that would be required by Mangoola Coal.

g) 2884_Mangoola_Bragg_20131002a_ltr (Umwelt 2013)

This heritage significance advice letter was provided in line with the approved CMS in the event that previously unidentified European heritage sites/items are uncovered. The significance assessment was completed to establish the associated historical heritage value of these sites within the project disturbance boundary and any relevant management measures, if any, that would be required by Mangoola Coal.

h) Historical Significance Assessment of Sites 20, 21 and 22 at Mangoola Coal (Umwelt 2015)

This significance assessment was completed to establish the associated historical heritage value of these sites within the project disturbance boundary and any relevant management measures, if any, that would be required by Mangoola Coal.

i) Archival Recording of “The Book” Heritage Site (Umwelt 2015)

This archival recording was prepared in accordance with Schedule 3, Condition 42 (b) of PA 06_0014 for “The Book” Formation.

j) Castle Hill Blasting Ground Vibration Limit (Terrock 2020)

This report conducted a review of blasting ground vibration limits for the Castle Hill site as well as a review of the structural damage limits presented in Australian Standard Explosives – Storage and Use Part 2: Use of explosives (AS2187.2-2006) as specific ground vibration limits for this site have not been determined due to access by landowner not being granted. A frequency-based blasting ground vibration limit of 20mm/s was recommended.

4. Management of historical heritage sites

Mangoola Coal has identified various management measures through the specialist reports and studies described in **Section 3.5** for the identified historical heritage sites listed in **Table 4**.

Site I.D.	Site Name	Monitoring & Management of Identified Heritage Sites
Site 13	Charcoal Retorts	<p>The charcoal retorts are located in an offset area for cultural heritage, however, have been unable to be relocated since the initial heritage assessment undertaken for the original EIS.</p> <p>Prior to any potential disturbance activities within any offset areas, a Ground Disturbance Permit must be completed. This process includes specific checks for heritage listed sites within the site GIS database.</p> <p>Should the charcoal retorts be re-identified, archival recording shall be undertaken in accordance with the requirements of Schedule 3, Condition 42 (b) of PA 06_0014.</p>
Site 17	Castle Hill	<p>Existing management measures include:</p> <ul style="list-style-type: none"> Consulting with the landholder to gain access to Castle Hill to undertake a baseline dilapidation survey as required by Schedule 3, Condition 42 of PA 06_0014; Undertake representative blast vibration monitoring to inform ground vibration impacts to the Castle Hill slab hut structure; and Current modelling by Terrock (2020) confirms blast vibration is not modelled to exceed the 20mm/s limit for any future blasting activities. <p>Should an agreement be reached to gain access to Castle Hill (privately owned) the following management measures shall be undertaken:</p> <ul style="list-style-type: none"> A detailed recording of the buildings and associated features to the NSW Heritage Office's standard for archival recordings of local heritage significance by a qualified heritage consultant shall be undertaken in accordance with the requirements of Schedule 3, Condition 42 (b) of PA 06_0014; A site specific historical investigation including further detailed historical research concerning the construction date and history of settlement with the property; and Further assessment, monitoring and review of the structures by a qualified heritage architect with the input of a noise and vibration engineer qualified in understanding the potential impacts of blasting on historical structures.

		<p>If blasting results confirm 20 mm/s vibration levels have been approached or exceeded at the representative monitoring location, the following actions will be undertaken:</p> <ul style="list-style-type: none"> • Contact the landholder to advise of their rights under Schedule 3, Condition 14 of PA 06_0014 to request a property investigation.
Site 18	Anvil Rock*	<p>Completed management and conservation works to date include:</p> <ul style="list-style-type: none"> • archival recording completed in 2010; • specialist advice/assessment from geotechnical/engineering consultant regarding impact assessment; • six monthly site survey completed with performance reported in annual review; • blast monitoring and data review; and • visual assessment. <p>Existing management measures include:</p> <ul style="list-style-type: none"> • Representative blast monitoring to inform ground vibration impacts at the structure; • Limiting blast designs to minimise vibration; • Undertake an annual review of safe blasting limits (currently 50mm/s but may be subject to change based on reviews) for rock formations and heritage structures by a suitably qualified consultant, based on an analysis of blast monitoring results and six monthly structural integrity monitoring; and • Six monthly structural integrity monitoring as described in the Blast Management Plan (BMP). <p>Public access to these formations during the life of the mine shall be supervised by Mangoola Coal.</p>
Site 19	"The Book" Formation *	<p>Completed management and conservation works to date include:</p> <ul style="list-style-type: none"> • Archival recording completed in 2015; • Specialist advice/assessment from geotechnical/engineering consultant regarding impact assessment; • Six monthly site survey completed with performance reported in annual review; • Blast monitoring and data review; and • Visual assessment. <p>Existing management measures include:</p> <ul style="list-style-type: none"> • Representative blast monitoring to inform ground vibration impacts at structure;

		<ul style="list-style-type: none"> Limiting blast designs to stay below vibration limit; Undertake an annual review of safe blasting limits for rock formations and heritage structures (currently 50mm/s but may be subject to change based on reviews) by a suitably qualified consultant, based on an analysis of blast monitoring results and six monthly structural integrity monitoring; and Six monthly structural integrity monitoring as described in the Blast Management Plan (BMP). <p>Public access to these formations during the life of the mine shall be supervised by Mangoola Coal.</p>
All other sites identified in Table 2 which have heritage significance	N/A	<p>As per Schedule 3, Condition 42 (b) of PA 06_0014, an archival recording is to be completed in accordance with the requirements and guidelines of the NSW Heritage Office for all items of identified heritage value within the project disturbance area and blast affectation area.</p> <p>Archival recording of these heritage sites has been completed as detailed in section 3.5 of this management strategy.</p>
<p><i>*Advice received from suitably qualified consultants is that any structural supports could only be temporary, and still have the potential to cause further damage to the rock formations (Terrock 2013).</i></p>		

Table 4: Management of identified heritage sites

4.1 Other Conservation Management Measures

4.1.1 Heritage searches

Prior to any ground disturbing works, the GDP process shall be undertaken. This process involves checks for known heritage sites identified within the Mangoola GIS database. If flagged, specific control measures for the protection of the heritage sites will be required to be included in the GDP conditions. Any such controls shall be captured within the GDP and communicated to the relevant personnel who will work under the approved GDP.

4.1.2 Mapping of heritage sites

The Ground Disturbance Process will identify heritage sites that have been assessed as having heritage significance, with drawings and plans to be supplied to all relevant personnel and contractors who may be working within close proximity to these identified sites if there is potential for damage to occur. Any remaining European heritage sites assessed as having heritage significance must also be considered as part of the Ground Disturbance Permit process.

4.1.3 Management of unknown heritage sites/items

If during the course of mining any previously unknown potential historical archaeological material or heritage sites/items are uncovered, all work in the area of the item(s) shall cease immediately and NSW Heritage Council, DPIE and a qualified heritage consultant will be consulted, in accordance with Section 146 of the Heritage Act 1977 (NSW), to determine an appropriate course of action prior to the recommencement of work in the area of the item.

5. Reporting and review

All internal and external reporting will be undertaken in accordance with the Mangoola Coal Environmental Management System (EMS).

5.1 Internal reporting

The Mangoola Coal Environment and Community Manager will report any instances of the following to the Mangoola Coal Management Team:

- Any complaints relating to European Heritage items or their management (as well as outcomes of any investigation);
- Of monitoring results have triggered, significant further action is necessary for the prevention of blast damage to sites (e.g. structural support or significant change to blasting practices that may have operational impacts); or
- Any incident relating to European Heritage sites (and investigation outcomes).

5.2 External reporting

The Annual Review prepared each year by Mangoola Coal as per Schedule 5, Condition 6 of PA 06_0014.

Mangoola Coal will implement measures with the aim of preventing damage to the European Heritage sites outlined in this plan. If, however, there is an incident where damage has been caused, this will be reported as per Schedule 5, Condition 4 of PA 06_0014.

5.3 Review

In accordance with Schedule 5, Condition 9 of PA 06_0014, Mangoola Coal will review and where necessary revise the CMS within three months of the submission of an audit, Annual Review, an incident report, or any modification to the conditions of the Project Approval. The CMS will further be subject to a 3 year periodic review. The review of the CMS will reflect changes in technology and operational procedures. In addition the document review table is to be completed as part of each review.

6. Accountabilities

Relevant accountabilities associated with the CMS are presented in **Table 5**.

Role	Responsibilities
Operations Manager	Provide sufficient resources for the implementation of this strategy.
Mine Manager	Implementation of this plan for mining operations to ensure compliance with consent requirements.
Environment and Community Manager (or delegate)	<p>Coordinating monitoring and systematically reviewing the outcomes of monitoring as part of ongoing mine planning;</p> <p>Ensuring that the plan is relevant to current operations;</p> <p>Oversee the implementation of this strategy;</p> <p>Ensure that monitoring results are used develop/trigger management measures for heritage sites;</p> <p>Coordinate the ongoing refinement of impact criteria for heritage sites using monitoring results; and</p> <p>Coordinate periodic reviews of this strategy.</p>

Table 5: Roles and Responsibilities

7. Related Documents

Related documents, listed in **Table 6** below, are internal documents directly related to this document.

Number	Title
MANOC-1772150304-4601	Mangoola Coal Blast Management Plan
CAA HSEC PER 0004	Ground Disturbance Permit

Table 6: Related Documents

8. References

- Anvil Hill Project Watch Association. Submission to Director General for Anvil Hill Project. Correspondence by Christine Phelps.
- Australia ICOMOS. 2013. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013, with associated Guidelines and Code on the Ethics of co-existence.

- Australian Heritage Commission (AHC), 2001. Significance Assessment of Heritage Places. Australian Heritage Commission, Canberra.
- Heritage Office and Department of Urban Affairs and Planning (1996). Regional Histories of New South Wales. Crown Copyright.
- Terrock 2013. XMC-1604_Structural Support Requirements of Aboriginal and European Cultural Heritage Sites_Final.
- Terrock 2018. XMC-1805_GV_Investigation_Castle Hill_Final.
- Turner, J W 1995. Historical Themes of the Shire of Muswellbrook, Unpublished report by Hunter History Consultants.
- Umwelt, 2006. Historical Heritage Assessment – Anvil Hill Project. In Environmental Assessment, Anvil Hill Project. A report prepared for Centennial Hunter Pty Limited.
- Umwelt 2010. Archival Recording of Heritage Sites and Structures within Mangoola Disturbance and Blast Affection Areas.
- Umwelt 2010. Historical Heritage Assessment – In Environmental Assessment. Modifications to Mangoola Coal Mine Plans and Relocation of 500 kV Electricity Transmission Line.
- Umwelt 2011. Historical Scarred Tree, Mangoola Coal.
- Umwelt 2013. Previously Unidentified Timber Structure – Mangoola Coal.
- Umwelt 2013. Potential Historical Heritage Site 21, 500kV Electricity Transmission Line Project.
- Umwelt 2015. Historical Significance Assessment of Sites 20, 21 and 22 at Mangoola Coal.
- Umwelt 2015. Archival Recording of “The Book” Heritage Site.
- Umwelt 2015. Historical Significance Assessment of Sites 20, 21 and 22 at Mangoola Coal.
- Wesley, R. 2007, Dunullimal’s Southern Cross Windmill Resurrected, National Trust Magazine Summer 2007.
- Terrock 2020. Castle Hill Blasting Vibration Limit.

Appendix A - Summary of Regulatory Requirements

Condition number	Condition	Relevant Section of this Document
14	<p>If the owner of any privately-owned land within 2km of the site (or on any other land where the Secretary agrees that a property investigation is warranted) claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent must:</p> <ul style="list-style-type: none"> a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to: <ul style="list-style-type: none"> • establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and • identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and b) give the land owner a copy of the property investigation report. <p>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent must repair the damage to the satisfaction of the Secretary.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, the either party may refer the matter to the Secretary for resolution.</p>	4.0
15(b)	<p>The Proponent must:</p> <ul style="list-style-type: none"> b) ensure that blasting on the site does not damage Aboriginal rock shelter sites, Anvil Rock and 'The Book' rock formations. 	4.0
42	<p>Prior to starting mining operations on site, the Proponent must prepare a report documenting the history of the Wybong community to the satisfaction of the Secretary.</p> <p>This report must:</p> <ul style="list-style-type: none"> a) be prepared in consultation with the Wybong community and OEH; and 	1.2, 2.0

	<p>b) include:</p> <ul style="list-style-type: none"> • detailed historical research and oral history for all the land within the 40dB(A) noise contour (see the EA); and <p>archival recording, in accordance with the requirements and guidelines of the NSW Heritage Office, for all items of heritage value within the project disturbance area and blast affectation area (including "Castle Hill")</p>	
43	<p>The Proponent must prepare and implement a detailed Conservation Management Strategy for all heritage items within the blast affectation area to the satisfaction of the Secretary.</p> <p>This strategy must:</p> <p>a) be prepared in consultation with the relevant landowners and the OEH;</p> <p>b) be submitted to the Secretary for approval prior to starting mining operations on site; and</p> <p>c) include a:</p> <ul style="list-style-type: none"> • program for baseline dilapidation surveys of the heritage items; • program to monitor the effects of blasting on the heritage items; and • description of the measures that would be implemented to protect relevant heritage items (particularly Castle Hill) from the effects of blasting; and <p>description of the measures that would be implemented to protect Anvil Rock and 'The Book' rock formations from the effects of blasting.</p>	<p>1.5</p> <p>1.5</p> <p>3.5, 4.0</p>

Appendix B - Authority Consultation

Nb: to be Inserted once received from DPIE