

Visual Impact Assessment

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GOAF GAS DRAINAGE PROJECT

VISUAL IMPACT ASSESSMENT

PREPARED FOR ASHTON COAL OPERATIONS LIMITED | 7 MAY 2012

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EXECUTIVE SUMMARY

AECOM Australia Pty Ltd (AECOM) has been commissioned by Ashton Coal Operations Limited (ACOL) to prepare a Visual Impact Assessment (VIA) for the proposed Goaf Gas Drainage Project (the Project) 14 km north of Singleton in the Hunter Valley, New South Wales. This report addresses the potential visual impact of the above-ground (visible) elements for the Project.

The Project comprises a system to safely drain and manage methane gas from the underground workings, consisting of:

- A series of gas bores drilled into the targeted coal seams, each to be fitted with a gas well head;
- A connecting pipeline to collect and transport gasses;
- A central gas drainage plant, including flares and a vent stack; and
- A mobile gas drainage plant.

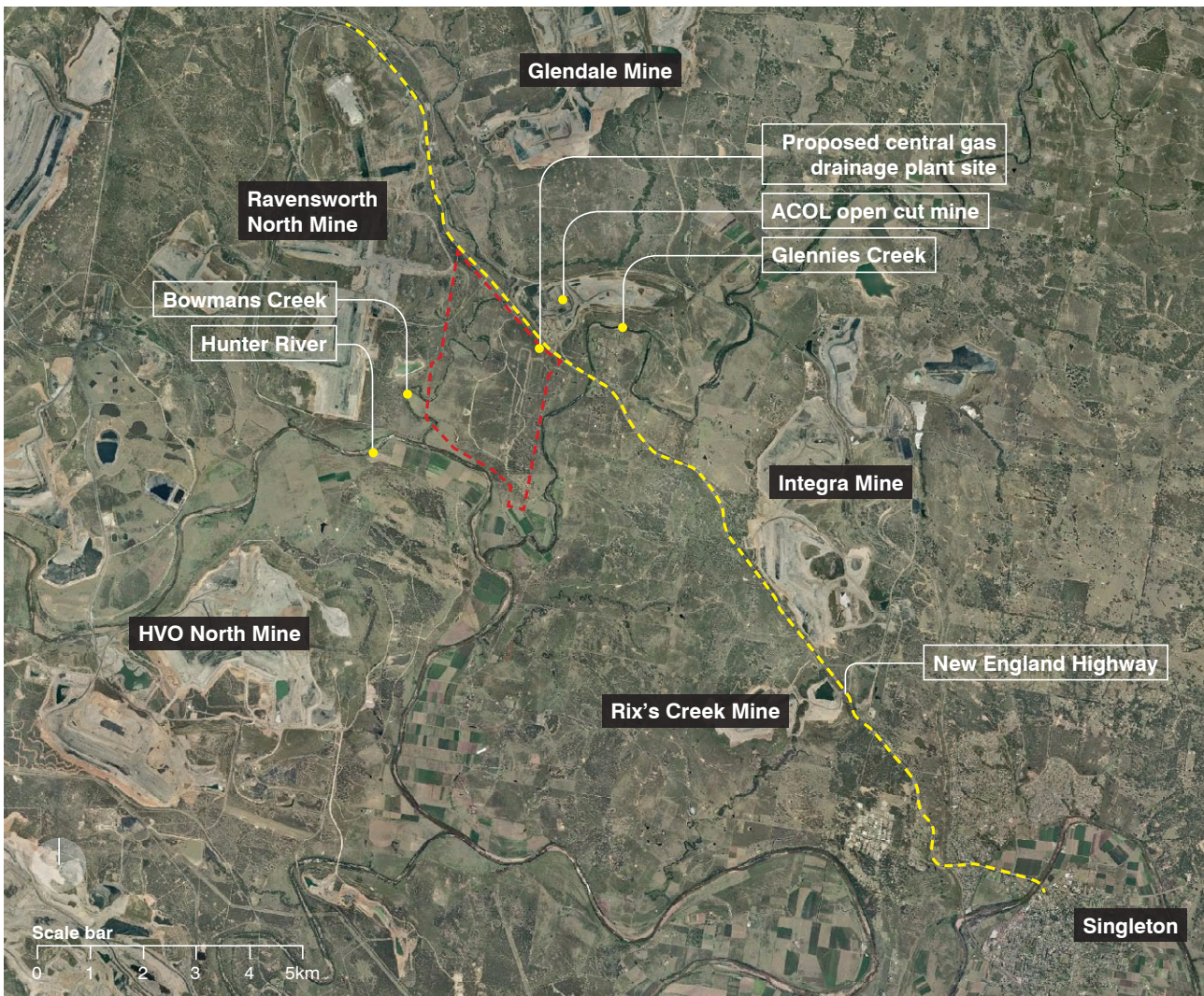


Figure 1: Aerial photo of the Site of the proposed gas drainage infrastructure, showing proximity to surrounding open cut mines in the area (Source: Google Earth)

Site Context

The landscape surrounding the Project reflects the major industries of mining, power generation and distribution, agriculture and transport (road and rail) in the area. The landscape visually comprises large, undulating, open fields of agricultural land with pockets of forest vegetation. A number of open cut mines are highly visible in the landscape surrounding the Project (refer Figure 1), with the underground mining operations subtly visible on the ground surface due to minor surface infrastructure.

Project Description

To provide for the safe management of gas from within the underground workings, ACOI propose to construct a series of gas drainage holes, connected to a central gas drainage plant and ventilation stack by a pipeline network over the underground area. A mobile gas drainage plant will be temporarily used to undertake the initial gas extraction process while the central gas drainage plant, pipeline and flares are under construction.

Construction of gas bores would be carried out on a campaign basis, staged with the progression of underground mining. Bores to be drained using the mobile gas drainage plant would be contained within a 25 x 15 m pad. Gas bores not requiring the mobile drainage plant will require a smaller pad, of approximately 5 m x 5 m.

A series of pipes connecting each gas bore and well head to the central gas drainage plant would be constructed as required. Pipes will be buried, and will surface close to the well heads.

The Project would appear as a series of small scale construction activities spreading from east to west over the Site, then repeated as bores are drilled into lower coal seams. At the conclusion of mining, the bores would be filled, infrastructure removed and the surrounding land rehabilitated.

Observer Locations

The Project Site is relatively isolated, with no residential neighbours receiving close, uninterrupted views to proposed infrastructure. The most impacted observers of the proposed development would be users of the New England Highway and Brunkers Lane.

Visual Impact Assessment

Overall, the proposed Project would have a **Low to Moderate Visual Impact**, due to the following:

- Observers most impacted would be:
 - drivers on the New England Highway approaching the Site from the west, of which there would be high numbers of viewers, but each receiving only short periods of exposure to the view, and
 - users of Brunkers Lane, who would obtain close, unobstructed views to a number of gas bores, situated very close to the road corridor;
- Although the construction period of each individual gas bore is short, the overall project would potentially be spread over a period of up to 14 years, with occasional intermittent campaign based construction, in line with the development of successive seam longwalls, where required.

While the Project is situated within a predominantly agricultural landscape setting, mining and power generation infrastructure feature substantially in the broader landscape, with a number of large elements (such as open cut mines and power stations). Within the context of this local mining history, the proposed development would not be out of place.

The main visual impacts would likely be associated with the construction of the gas bores and pipe lines nearest to the western stretch of the New England Highway, adjacent to the Site and Brunkers Lane. Once the bores had been drilled and the pipes laid, and the disturbed areas surrounding the sites rehabilitated, the gas bores themselves would constitute a number of small elements within the landscape. The visual impact of these individual elements could be further diminished by strategic planting of vegetation, where required.

1 INTRODUCTION

1.1 Scope

AECOM Australia Pty Ltd (AECOM) has been commissioned by Ashton Coal Operations Limited (ACOL) to prepare a Visual Impact Assessment (VIA) for a proposed Goaf Gas Drainage Project (the Project) at the Ashton Coal Project (ACP), about 14 km north-west of Singleton in the Hunter Valley, New South Wales.

This report addresses the potential visual impact of the above-ground (visible) elements for the Project. The Project consists of the construction of gas extraction infrastructure, as proposed in Figure 2.

1.2 Project Overview

The approved ACP comprises an open cut coal mine, an underground multi-seam longwall mining operation, a coal handling and preparation plant, rail siding and additional surface support facilities.

Detailed investigations have identified the need for additional infrastructure to adequately manage gas from the underground mining operations to allow for the safe operation of new longwall mining areas.

To fulfil these requirements, a system to safely drain and manage the gas is proposed (referred to as the Project in this report).

For more detailed information on the Project, refer to the Environmental Assessment (EA) prepared by Wells Environmental Services Pty Ltd (WES).



Figure 2: Proposed Goaf Gas Drainage Project infrastructure (Source: WES)

1.3 Project description

The proposed infrastructure would be positioned within mining lease ML1533, over the underground area as shown in Figure 2. The Project would comprise the following infrastructure:

- Up to approximately 80 gas bores, drilled into the goaf zone of targeted coal seams, each fitted with a gas well head;
- A reticulated pipeline to collect and transport gasses;
- A central gas drainage plant;
- A mobile gas drainage plant (to assist drainage); and
- Flares and a vent stack.

Visually, the Project would comprise the following:

Central Extraction Plant and Pipeline

Construction of a central gas drainage plant (refer Figure 3) and flare / vent stacks (refer Figure 4) would occur during daylight hours, up to 7 days a week. The central gas drainage plant would be contained within an open structure under which the plant elements would be protected. The plant would sit within a flat, 20 x 75 m fenced compound, which would be surfaced with road base (gravel). Once operational, the plant site would be sufficiently lit to provide safe working conditions.

Mining would progress west, starting from the eastern most longwall (Longwall 1). Extracted gas will be transported via a series of pipes to the central gas drainage plant, situated on a hillside in the north-eastern corner of the Site (refer Figure 2). Potentially up to eight flares, each approximately 8 m tall, and one ventilation stack (approximately 8 m tall) would be constructed, connected to the central gas drainage plant by a buried pipeline. The flares and vent stack will sit within the 25 x 75 m compound.

While the drainage plant is under construction, a mobile gas drainage plant would be used to drain gas from gas bores drilled during this time.

Preliminary Drainage

Construction of gas bores would be carried out on a campaign basis, per longwall panel. During construction of the central gas drainage plant, a mobile gas drainage plant will be required to drain the initial gas bores developed in Longwall 1 of the Upper Liddell Seam, while the plant, pipeline and flares are under construction. Where required, bores to be drained using the mobile drainage plant would be situated

on a flat pad approximately 25 x 15 m surfaced in road base, similar to that previously approved for Pikes Gully Seam Longwalls 6, 7 and 8. An example of what these well head sites would look like is shown in Figure 5.

Progressive Drainage

Goaf gas drainage bores would be constructed prior to each longwall being mined, therefore construction of the bores would be systematic. The gas bores to be connected to the central gas drainage plant would be built on a 5 x 5 m pad (if the mobile extraction plant is not required to assist drainage) rather than the larger compound (refer Figure 6).

A series of pipes connecting each gas bore and well head to the central gas drainage plant would be systematically constructed as required to connect each gas bore as it becomes operational. These pipes would be buried within a 5 m wide corridor. Generally the pipes would be completely buried to improve gas transmission efficiency and to avoid damage in the event of ground fires. From a distance (at a minimum at the boundary of ACOL property) no pipes would be seen during operation, only the well heads fenced on their 5 x 5 m pad.

On the whole, between 2012 and 2017, the Project would appear as a series of intermittent small scale construction activities moving from east to west over the Site.

Gas bores would be drilled for lower seams over the same area, beginning at Longwall 1 and progressing westwards over the Site to Longwall 8, where required. As with the first phase of drilling, there would be intermittent small scale construction activity moving across the Site, with the number of fenced well head sites slowly increasing. (Note: wherever possible existing bores would be extended to drain the goaf of deeper coal seams).

At the end of mining the gas drainage infrastructure would be decommissioned, gas bores sealed and the Site rehabilitated in accordance with relevant development consent and mining lease requirements.

Drilling of gas bores and construction of well heads

Each gas bore would take on average between 3 and 5 weeks to drill, depending on the depth of the coal seam. The gas bores would be constructed as follows:

- The gas bore site is prepared - a level pad (either 25 x 15 m for well heads prior to the commissioning

- of the central gas drainage plant, or 5 x 5 m in size once the central gas drainage plant is in operation) is constructed and surfaced with road base material;
- A temporary sump is constructed (alternatively, temporary above ground sumps would be used to limit disturbance);
- The bore is drilled using a drilling rig (refer Figure 7);
- The drill hole is cased and a shut-off valve installed; and
- A 1.8 m high perimeter security fence is erected around the pad.

During construction of the gas bores, the following vehicles and equipment would be required:

- Front end loader;
- Drill rig and support vehicle;
- Water cart;
- Grader;
- Excavator; and
- A small number of light vehicles and delivery trucks.

The reticulated pipe network is connected to the well head (or mobile gas drainage plant moved to each site for initial bores) as it comes into operation (i.e. as the longwall is mined beneath it). Generally, each well head would be operational for about two months



Figure 3 (top): Example of a central gas drainage plant used at the Whitehaven Narrabri North Mine (source: ACOL)

Figure 4 (middle): Example of a set of flare stacks (Source: Gasco)

Figure 5 (bottom): Example of a gas bore on a 25 x 15 m pad, with the mobile gas drainage plant seen to the left of frame (Source: ACOL)

Figure 6 (top): Small pad with a gas bore (5 x 5 m compound) for bores that are connected to the central gas drainage plant (Source: ACOL)

Figure 7 (bottom): Example of a drilling rig (Source: WES)

1.4 Site Context

The ACP is situated 14 km north-west of Singleton in the Hunter Valley, NSW (refer Figure 1).

The landscape surrounding the Project reflects the major local industries of mining, power generation and distribution, agriculture and transport (road and rail). The landscape visually comprises large, undulating, open fields previously cleared for agricultural grazing with pockets of bushland dotted throughout. A number of open cut mines are highly visible in the landscape surrounding the Project (refer Figure 1), with the underground mining operations subtly visible on the ground surface due to minor surface infrastructure.

The Site comprises a gently undulating series of hillsides sloping to the south-west, vegetated with pasture grass and occasional stands of trees (refer Figure 2). The Site is bounded on the north-east by the New England Highway. However, the Highway is cut into the hillside behind the Project, effectively screening it from direct, detailed views to the proposed infrastructure (refer Figure 8).

On the northern side of the New England Highway adjacent to the Project, lies the ACOL open cut mine (refer Figure 2), parts of which are visible from the Project site.



Figure 8: The view from Brunckers Lane looking south towards the Site, showing the New England Highway situated north of the Site. The New England Highway is cut into a hillside, effectively screening much of the Site from view as vehicles pass it.

The eastern boundary of the Site runs broadly parallel to a ridge line, which runs the length of the Site, effectively screening views to and from the Site from the east (refer Figure 2). A band of trees runs along the ridge line from the northern-most point of the Site (refer Figure 9), finishing in the dense vegetation of the VCA in the south (refer Figure 10). Glennies Creek runs to the east beyond the ridge line, and is not visible from the Project site.

From the higher points on the Site, (i.e. along the ridge line), views from the Site to the surrounding landscape are available between gentle undulations in the hillsides (refer Figure 9).

The western portion of the Site is quite flat, roughly bounded by the Hunter River to the south and Bowmans Creek in a gully along the north western side of the Project site, which is seen in the landscape as a band of taller, dark vegetation against the pale pastures on either side in the floodplain (refer Figure 8).

The southern portion of the Site contains many large patches of taller vegetation, including the VCA (refer Figure 10) which lies in the south eastern corner. In addition, much of the Site contains considerable stands of revegetation, which consist primarily of Casuarinas (refer Figure 11). If these stands of regeneration are left uncleared, the mature trees would help to screen any development which takes place during the time frame of the Project.

Other industrial elements are visible in the landscape surrounding the Project, including a power station (Figure 12), power lines (Figure 8) and isolated mining infrastructure.

Although parts the Site are very open and seemingly exposed, there are in fact a very limited number of locations that would allow viewers detailed, uninterrupted views to the Project. These are discussed in Section 2.2 - Observer Locations.



Figure 9: Panorama of the view from the Site of the proposed central gas drainage plant. Note that the plant would be sitting in a natural 'basin', with the ridge line on the eastern site boundary blocking views to and from east of the Site, and views to and from north of the Site blocked by landform. South of the Site, the VCA is only just visible, with the only unimpeded views to this part of the Site seen to the south-west.



Panorama continues from page 12



Figure 10 (top left): Vegetation in the VCA

Figure 11 (top right): Stands of regenerating Casuarinas on the Site

Figure 12 (middle): Detail view from the Site of the proposed central gas drainage plant to a power station on the western horizon

2 METHODOLOGY

2.1 Methodology

The visual impact of the proposed development has been assessed using the following method;

1. Describe the Site and Project
 - Site context
 - Project elements
 - Project character
2. Describe the proposed development
3. Identify the main observer locations to the Project - map and photograph
4. Define a range of criteria against which the relative importance of each observer location can be assessed, e.g.:
 - Heritage significance
 - Distance to view
 - Observer type (e.g. tourist, site-seeing, other recreational user, resident, local user)
 - Number of observers
 - Duration of observation
 - Visibility / visual prominence of the development (including skyline view / backdrop / screening / etc.)
 - Land use (public open space / private ownership / road)
 - Change from existing
 - Specific issues

5. Assess the visual impact for each key observer location
6. Provide a conclusion and recommendations

Observer Locations

Observer locations were chosen using a combination of aerial photograph interpretation and exploration of the Site and surrounding area by car. Observer locations comprised of representative, publicly accessible places which encapsulated the potential for views to the proposed development site (e.g. from nearby privately-owned dwellings and public roads).

Observer locations that were not included in this report were either deemed not significant due to very low observer numbers, or the proposed development site being substantially obscured from view by landform or by other factors (e.g. housing, trees), so no clear view to the development would be possible.

Photographs

For each observer location, a photograph (or number of photographs, stitched together to make a panorama) were taken using 25 mm digital focal length. This equates to 50 degrees in 35 mm film format, which approximates the view as seen unaided by the human eye. Each photo or panorama shows the approximate width of the Project Site relative to the observer location. For observer locations that were on private property, a photograph (or panorama) was taken from the Site looking back to the property, and the view seen from that property of the Site was approximated.

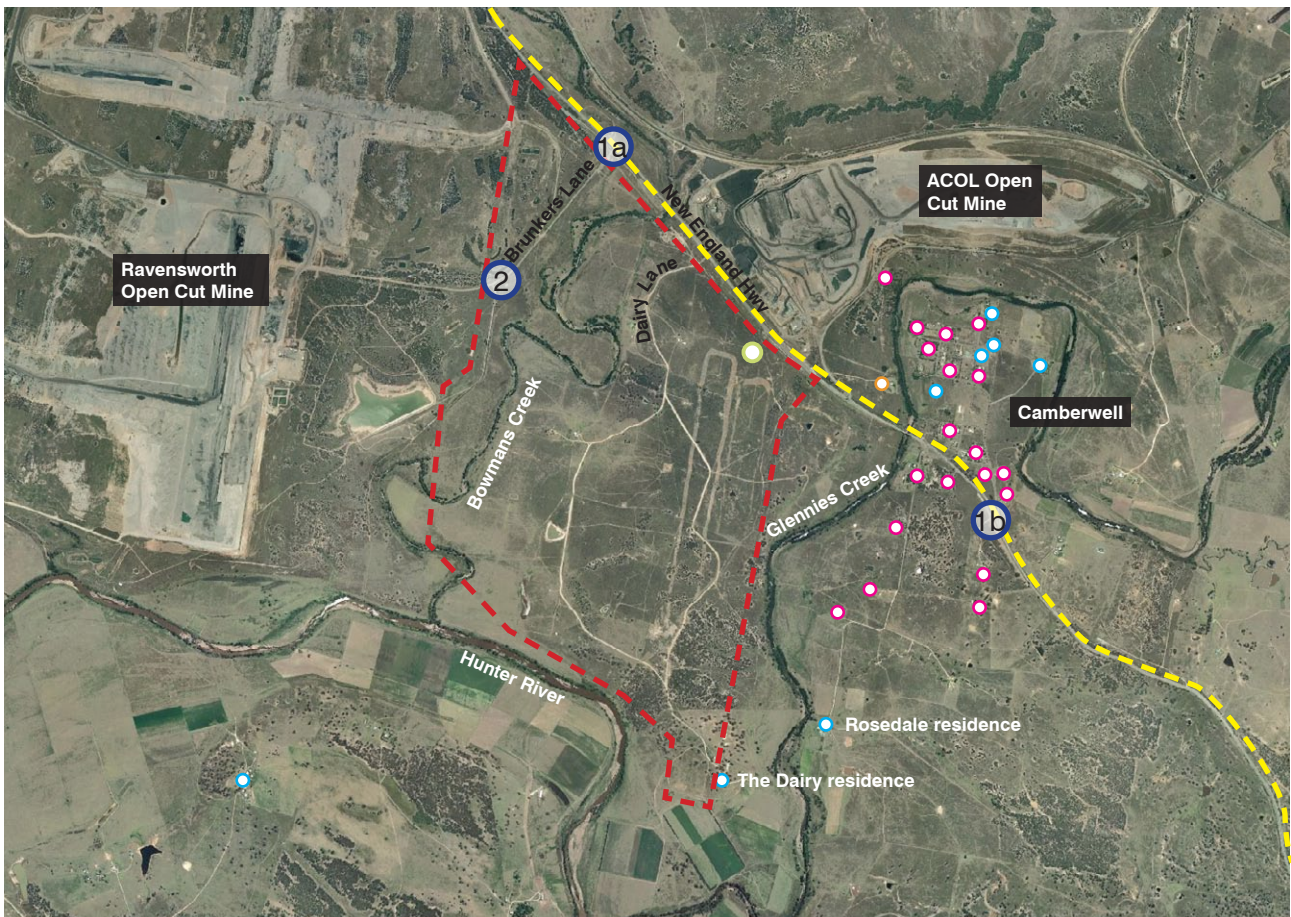


Figure 13: View to the south west from an old quarry situated near the VCA on the Site

2.2 Observer Locations

The Project Site is relatively isolated, with no residential neighbours receiving close, uninterrupted views to proposed infrastructure. A majority of the Site has a south-westerly aspect, facing away from the New England Highway. This aspect protects the Project Site from any views to the proposed infrastructure from observers on the northern side

of the Highway at Camberwell. The lower portions of the Site (near the southern and western boundaries) are low and flat, with riparian corridors running across or adjacent to the Site boundaries. Bowmans Creek runs roughly parallel to the western boundary, and the Hunter River runs just south of the southern boundary of the Project.

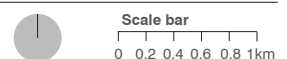


Legend

- Approximate site boundary
- Site of proposed central gas drainage plant
- Nearby ACOL owned residences (or groups of residences)
- Nearby private residences
- Nearby community infrastructure

- 1a Observer Location 1a: New England Highway, View from the North-west
- 1b Observer Location 1b: New England Highway, View from the South-east
- 2 Observer Location 2: Brunkers Lane

Figure 14: Map of observer locations (Source: Google Maps)



South of the New England Highway (but east of the eastern boundary of the Site) there are a number of rural-residential properties within a 2 km radius of the Site (many owned by ACOL), as shown in Figure 14. Of these, the properties on the eastern side of Glennies Creek are protected from view by the vegetation adjacent to the creek and surrounding landform.

The closest residential properties (not owned by ACOL) to the Project Site are located to the north-east (in Camberwell), east and south of the Site (shown in Figure 14). The closest private residence to any component of the development is to the south (the Dairy Residence), however views from this residence would be screened by vegetation and landform.

The property to the east of the Site (Rosedale), would have views to the eastern edge of the VCA where the ridge line leaves the Site boundary and travels west from the Site boundary in the VCA area (refer Figure 15). No views to any of the infrastructure is anticipated to be seen by residents of this property, as the development will either occur on the other side of the ridge line or will be obscured by existing vegetation. Figure 15 shows a detailed photo of the Rosedale residence (east of Glennies Creek, refer Figure 14) through the vegetation of the VCA, showing the distance over which a view would be obtained.

Properties south of the Hunter River are generally protected from views to a majority of the Site by vegetation associated with the Hunter River, but where they would have views to parts of the Site, detailed views of the proposed infrastructure would be limited due to the extensive viewing distance up to 2 km from the boundary of the Site (refer Figure 13, which shows views to the south west from a location approximately 500 m from the Hunter River).

There would be no views from the private residences in Camberwell as the site is obscured by landform.

Views to the Project Site would be available from users of the New England Highway, therefore these are included as Observer Locations 1a and 1b.

Brunkers Lane was chosen as Observer Location 2 as this road is being upgraded as part of the proposed Lemington Road realignment (Ravensworth Operations Project Environmental Assessment, 2010). Lemington Road connects the New England Highway with the Golden Highway, as well as providing access to a number of local mining operations.



Figure 15: Glimpse view to the Rosedale residence through the vegetation of the VCA near the southern border of the Project Site.

3.0 VISUAL IMPACT ASSESSMENT

3.1 Observer Location 1a: New England Highway, View from the North-west

Existing Situation

This observer location approximates the view to the Project Site as seen by road users of the New England Highway, travelling in a south-easterly direction.

Travellers on the New England Highway pass through the landscape at an approximate speed of 80 to 100 km per hour, obtaining extensive views to the greater landscape but fleeting views of detailed individual elements within it. The predominant view experienced would be one of the rolling, agricultural landscape dotted with stands of darker vegetation associated with remnant bushland or riparian corridors. Periodic exposure to mining sites and isolated infrastructure are visible as observers travel through the landscape.

The Project Site is seen as a series of hillsides on the southern side of the Highway, predominantly covered with pasture grass, and with the dark band of vegetation

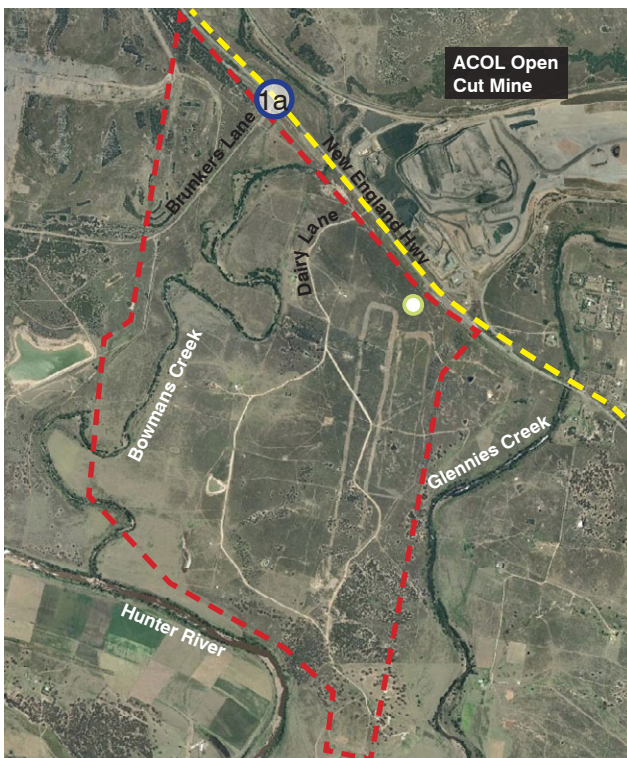


Figure 16: Key plan (Source: Google Maps)

associated with Bowmans Creek seen in the foreground on the lower portion of the Site. 66 kV and 132 kV electrical transmission lines traverse the landscape in the foreground to middle ground of the view, running parallel with the New England Highway (refer Figure 17).

Detail in the landscape (e.g. access tracks) in the northern corner of the Project Site is not distinguishable from this location, due to the distance of viewing and the partial screening of the hillside by the Bowmans Creek vegetation. Fleeting views to the higher parts of the Site would be visible as the driver approached the unnamed 'Dairy Lane' (refer Figure 16), but no views to the Site would be seen as the driver passed the north-eastern corner of the Site, as the Highway is cut into the hillside, blocking views onto the Site with landform.

To the north-east of the New England Highway, elements of the ACOL open cut mine can be seen in the middle ground, including conveyors, stockpiles, cut hill faces and corrugated metal clad buildings.

Other elements indicating the industrial nature of much of the landscape can be seen, including power poles and signage.

The number of viewers at this location is expected to be high, as many people use the New England Highway every day. Users travelling along this road would be expected to be concentrating on the road ahead, with only the larger elements in the landscape commanding their attention as they quickly move through the landscape. Many of these observers could be anticipated to be regularly using the highway and would be used to seeing mining infrastructure as they travel on their daily journeys.

Proposed Development

During the early stages of development, only a limited amount of construction activity would be seen from this location, as most of the work would be contained to the eastern edge of the Site, between 1.75 and 4 km from this observer location.

The central gas drainage plant site is approximately 1.75 km from the observer location, situated on a cleared, pasture covered hillside. This is the largest piece of infrastructure that would be constructed for the Project, but is situated in a natural basin in the landscape, and it is unlikely that this would be seen from this observer location (Figure 18 shows

the view out from the proposed central gas drainage plant site, showing that no views to the New England Highway can be seen from this location).

The flare and ventilation stacks would be the tallest elements constructed on the Site. The top of these structures may just be visible over the top of the hillside at completion, but due to the viewing distance and the relatively small diameter of the flares and stacks, are unlikely to be readily discernible against the sky line.

Gas bores drilled and constructed for the northern ends of Longwalls 1, 2 and 3 would be situated on this elevated portion of cleared hillside, and may be visible to people at this observer location, although due to the viewing distance and partial screening from the Bowmans Creek riparian vegetation, the development would not be seen in any detail.

Gas bores constructed over the southern portion of Longwalls 1, 2 and 3 are situated amongst patches of dense remnant vegetation, and regenerating Casuarina groves. This screening vegetation, coupled with the landform and distance of viewing, means it is unlikely that this development would be seen by users of the New England Highway.

For those areas where the development itself is unlikely to be seen, vehicular traffic to and from these sites (using the unnamed 'Dairy Lane' as an access point) may be visible to drivers on the New England Highway heading south east.

During daylight hours, it would be difficult for drivers on the New England Highway to discern moving vehicles traversing the hillside due to partial screening from vegetation, and the distance of viewing. Any vehicular movement after the sun



Figure 17 (top): Panorama showing the view to the Project Site looking from the north-west on the New England Highway. Note the vegetation associated with Bowmans Creek in the middle ground is partially screening the view to the Project Site. The ACOL open cut mine is seen to the left of frame.

Figure 18 (bottom): Near 360 degree panorama showing the view from the Site of the proposed central gas drainage plant to the landscape beyond. Note that the landform screens the Highway from view completely.

had gone down would be seen as headlights traversing the field, and would be a visible element seen in the landscape. Traffic generation during operations will be for inspection and maintenance of equipment.

There are a number of gas bores that would be potentially visible to drivers on the New England Highway travelling south east, situated above Longwalls 4B, 6B and 7B. These gas bores are between 250 m and 1 km from the road corridor, with views to these elements of infrastructure unimpeded by any landform or vegetation. Bores in this area would likely be contained within 5 x 5 m pads and be seen as small, visually recessive elements within the landscape, due to the muted colours and open structure of the equipment (refer Figure 6).

It is anticipated that bores constructed over Longwalls 5, 6A,

7A and 8 would not be visible to drivers on the New England Highway, due to viewing distance, landform or screening from vegetation in the Bowmans Creek riparian corridor.

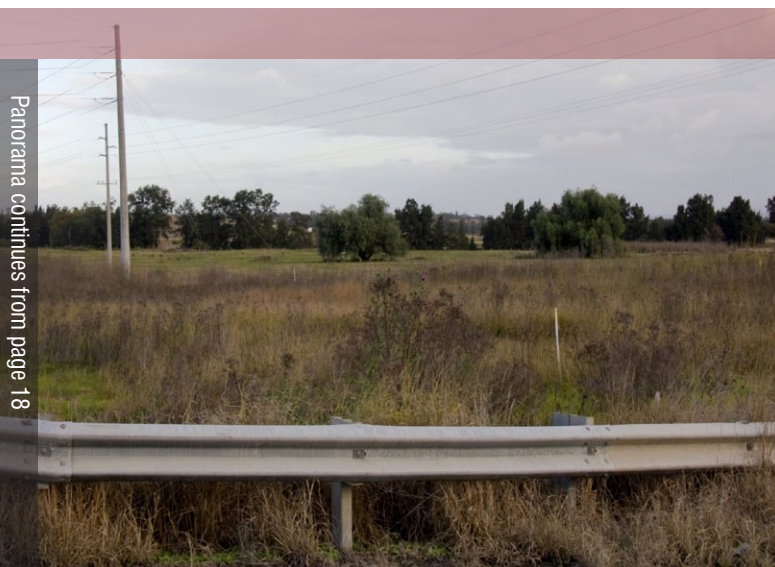
As the drilling and construction of gas bores over the Site would be spread over the operating life of the underground mining operation, drivers on the New England Highway travelling south east would occasionally obtain views to small pockets of construction while the bores are being installed, then a view of the finished bore once construction was finished. It would be likely that the construction period of each bore would be more noticeable to passers-by than when in operation, due to the presence of vehicles and activity associated with construction, including the mobile drilling rig, which would be a tall element in an otherwise relatively flat landscape.

The finished gas bores would appear as small, fenced pads amongst the pasture grass. The well heads and fencing surrounding the equipment would be a pale grey colour, which would blend with the muted colours in the landscape.

Visual Impact Assessment

There would be a **Low to Moderate Visual Impact** during the life of the mining operation, due to the following;

- The New England highway has a high usage rate and would therefore provide a high number of observers for visible infrastructure associated with this project;
- Gas bores associated with Longwalls 4, 6B and 7B would be clearly visible adjacent to the highway, as they are in close proximity to the road corridor and not screened by vegetation or landform;
- Gas bores associated with the northern end of Longwalls 1, 2 and 3 may be visible, although many of these would be partially screened by landform and



vegetation;

- The top of the ventilation stacks and flares may just be visible over the top of the hillside, although due to viewing distance and the small diameter of the stacks, these would not be visually prominent; and
- The project spans over the remaining lifetime of the underground mine, meaning the small scale construction activity would be spread over this time frame.

However, the visual impact of the Project would be reduced by the following:

- A majority of gas bores and the central gas drainage plant would be screened from view of passing motorists by landform, vegetation of Bowmans Creek and the VCA, and distance of viewing, although vehicular traffic associated with construction would be visible travelling to and from the Highway via the unnamed 'Dairy Lane';
- Much of the change in traffic on the access road would probably not be readily discernible from this observer location due to distance of viewing and partial screening by the vegetation between the Project Site and the observers. At night, an increased number of headlights may be visible on the hillside, but would not be an unusual element of the view to a driver, whose main concern would be the traffic on the road in front

of them;

- Users of the New England Highway travelling south east would obtain only fleeting glimpses to the new infrastructure as they approach the Site. High numbers of observers would travel along the Highway, but within the context of the greater mining landscape, these relatively small elements of infrastructure would appear as visually diminutive, especially considering the open cut mine to their left, and power lines to their right, as they approached the Site.
- The duration of viewing would be very short, as the driver travels south along the Highway past the proposed development;
- The relatively short construction period of each of the gas bores provides a 'worst case' scenario to passers-by for each bore, in that the most vehicular traffic and seen elements would be partially visible during construction, but would drop back to a lesser level of visual prominence during operation; and
- Within the context of the greater mining landscape, small pieces of mining infrastructure (such as the proposed bores) are relatively diminutive when compared to larger elements within the landscape, such as open cut mines and power plants.

Targeted screen planting would substantially reduce the visibility of the structures to passing motorists.



Figure 19: Panorama showing the view to the Project Site from the New England Highway, as seen from the south-east.

3.2 Observer Location 1b: New England Highway, View from the South-east

Existing Situation

This observer location approximates the view to the Project Site as seen by road users travelling north on the New England Highway (refer Figures 19 and 20). This view is also seen by a small number of rural residential properties located south of the New England Highway, although these are owned by ACOL in this location and have therefore not been assessed.

As with Observer Location 1a, travellers on the Highway pass through the landscape at around 80 to 100 kms per hour, obtaining extensive views to the greater landscape but fleeting views of detailed individual elements within it. The predominant view experienced would be one of the rolling, agricultural landscape dotted with stands of darker vegetation associated with remnant bushland or streams. Periodic exposure to mining sites, and power generation and distribution infrastructure are visible as observers traverse the landscape.

The foreground of the view from this observer location comprises the immediate road and road verge, and an open, agricultural grazing landscape up until the vegetated line of Glennies Creek.



The Project Site



Figure 20 (top): Key plan (Source: Google Maps)

The edge of the Project Site is seen as a vegetated ridge line, seen in relief against the skyline as the driver travels towards the Project Site (Figure 19). Most of the proposed infrastructure sits on the western side of the ridge, and would not be seen from this location.

Glennies Creek can be seen in the middle ground, viewed as a line of dark trees in the gully, screening the ridge line of the Site in some locations (refer Figure 19).

The view to the right (north-east) of the Highway comprises further views to the open, agricultural grazing landscape. The ACOL open cut mine and associated infrastructure lies over a slight ridge and therefore cannot be seen from this location.

As with Observer Location 1a, the number of viewers at this location is expected to be high, as many people use the New England Highway every day. Users travelling along this road would be expected to be concentrating on the road ahead, with only the larger elements in the landscape commanding their attention as they quickly move through the landscape. Many of these observers could be anticipated to be locals or workers in the surrounding mines, who would be used to seeing mining infrastructure as they travel on their daily journeys.

Proposed Development

Views to the gas bores from this observer location would be unlikely due to the distance of viewing, landform, and screening vegetation. There are approximately three bores that are positioned near the crest of the ridge, meaning that there is a small chance that these would be visible during construction and operation. However, due to the large amount of mature vegetation on and around the ridge line and viewing distance, any views to the bores would be likely to be at least partially screened from view from this location, or seen against a backdrop of vegetation, which would reduce visibility (compared to being seen as a skyline view for example).

During construction, views of the bores would be a 'worst case' scenario, as the activity during the short construction period of each bore would render the bore more noticeable than when the bore would be in operation, or after operation.

During operation of the gas bores, the viewing distance, coupled with the fact that the view would be fleeting, would render the visual impact as negligible to passers-by.

The top of the vent stacks and flares may be visible over the top of the vegetation on the ridge line, but due to viewing distance and the ragged tree line that is seen in relief against the sky line, these would not be seen as a prominent element on the hillside.

Visual Impact Assessment

There would be a **Very Low Visual Impact**, due to the following;

- Most of the proposed infrastructure would be screened by existing vegetation or lost from view behind the hillside;
- The top of the vent stacks and flares may be visible, but would not be visually prominent due to the skyline being punctuated by tree tops and the distance of viewing;
- The distance of viewing would make the development hard to see in any detail, if direct views to gas bores were available;
- The duration of viewing would be very short, as the driver travels north along the Highway past the proposed development;
- The project is visually compatible within the context of the greater mining landscape; and
- The small portion of the overall view that would be seen of the development.

3.3 Observer Location 2: Brunkers Lane

Existing Situation

This observer location approximates the view to the Site as seen by road users on Brunkers Lane (Figure 21). Brunkers Lane is being upgraded to the new Lemington Road alignment, which would connect the New England Highway with the Golden Highway, giving access to a number of mining operations. As such, it is anticipated that the road would be heavily used by commuters travelling to work at one of these facilities, or general public seeking to traverse between the two highways.

At present, Brunkers Lane comprises a minor private access road to the Ravensworth mining operation and provides no public view potential of the Project Site. However, with the realignment of Lemington Road, an increased amount of traffic would be expected, giving a moderate number of observer's views to the proposed infrastructure.



Figure 21: Key plan (Source: Google Maps)

The view from this location is to the open, rolling hills of the surrounding pastoral landscape, punctuated by dark stands of trees associated with Bowmans Creek. The cut batter faces of the ACOL open cut mine are visible in the background above the intervening vegetation (refer Figure 22).

Many road users are expected to be workers from a number of nearby coal mining operations, who would be used to views of mining infrastructure.

Proposed Development

Of the proposed development, most of the infrastructure is anticipated to be screened from view to users of this road by landform, distance of viewing, or vegetation associated with Bowmans Creek, the broader site, and the VCA:

- It is anticipated that any bores associated with Longwalls 1 to 5, 6A and 7A would be screened from view by the Bowmans Creek riparian vegetation;
- Glimpse views to gas bores constructed over the centre of Longwalls 2 and 3 may be obtained in breaks in riparian vegetation; and
- Bores associated with the southern portions of Longwalls 1 and 2 would be screened by stands of existing vegetation scattered across the higher parts of the southern portion of the Site, near the VCA.
- Furthermore, the vegetation corridor associated with Bowmans Creek would significantly increase with an approved realignment of the watercourse, thereby decreasing the extent of the already highly limited views to the Site.

Gas bores that are likely to be visible to road users are situated on the western side of Bowmans Creek, i.e gas bores associated with Longwalls 6B, 7B and 8.

Up to 8 new gas bores would be potentially visible to users of Brunkers Lane, although this would bring the total number of potential bores in this area to a maximum of 17, as there are a number of bores that are either existing or have been approved. (Note for example that of the 4 existing approved Pikes Gully Seam bores in Longwall 8 only 2 were required to be developed). Of the 8 new bores, it is likely that two of the bores to the west of Brunkers Lane would be hidden from view by landform, and two more would be at least partially screened by vegetation (where these bores are

required to be developed). It is anticipated that passers-by would have clear views to only four of the proposed bores between Bowmans Creek and the western boundary of the Site.

These bores would only potentially be visible as very short glimpses as road users travelled along the northern 1 km section of the realigned Lemington Road.

Road users would have close, unobstructed views to these bores, which would appear as small, fenced pieces of infrastructure, sitting on cleared 5 x 5 m pads amongst the pasture grass. The well heads would be visually recessive, seen amongst tall pasture grass and occasional stands of vegetation.

During the short construction period of each of the bores, the viewer would receive a 'worst case' scenario view of the development, as the bores would be more noticeable during construction due to the activity and vehicular visitation to each site.

Visual Impact Assessment

There would be a **Low to Moderate Visual Impact**, due to the following;

- Road users would obtain close, unobstructed views to a small number of the proposed gas bores, which would be constructed close to the road in a couple of locations;
- The duration of viewing would be very short, as the driver travelled past the bores along the road; and
- The project spans over 11 years, resulting in a low grade of construction activity would be observed over this time.



The Site

Figure 22: Panorama showing the view towards the Project Site from Brunkers Lane. Note the open cut coal mine visible in the background, on the horizon and to middle of frame. The band of dark green vegetation in the middle ground is Bowmans Creek. Up to 8 bores would be located between the Lane and Bowmans Creek, and to the left of the Lane.

The visual impact is diminished somewhat by the following:

- Many of the road users could be expected to be workers at a number of other coal mines, therefore mining infrastructure would be a familiar sight;
- Within the context of the greater mining landscape, small pieces of mining infrastructure such as the proposed bores, diminishes the visual impact of such structures, especially when compared to larger elements within the landscape, such as open cut mines and power plants; and
- The relatively short construction period of each of the gas bores provides a 'worst case' scenario to passers-by for each bore, in that the most vehicular traffic and seen elements would be partially visible during construction, but would drop back to a lesser visual prominence during operation.

Targeted screen planting would substantially reduce the impact of the structures to passing motorists.



4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Overall, the proposed Goaf Gas Drainage Project would have a **Low to Moderate Visual Impact**, due to the following:

- Observers most impacted would be:
 - those travelling south on the New England Highway, of which there would be high numbers of viewers, but each receiving only short periods of exposure to the view; and
 - users of Brunkers Lane (which is under construction to become the realigned Lemington Road), who would get close, unobstructed views to a number of gas bores, situated very close to the road corridor;
- Although the construction period of each individual gas bore is short, the overall project would be spread over a number of years commensurate with the development of longwalls in subsequent coal seams, meaning that intermittent, small scale industrial activity may be evident for the remaining life of the underground mine.

However, while the Project is situated within a predominantly agricultural (pastoral) landscape, mining and power generation infrastructure features substantially in the surrounding landscape, with a number of large elements (such as open cut mines, power plants and distribution infrastructure) in the locality. In context with this local mining history, the proposed development would not be out of place.

The main visual impacts would likely be associated with the construction of the gas bores and pipe lines. Once the bores have been drilled and the pipes laid, and the disturbed areas surrounding the Sites have been rehabilitated, the gas bores themselves would constitute a number of small elements within the broader landscape.

The visual impact of individual elements would be further diminished by strategic planting.

4.2 Recommendations

Although the visual impact at assessed viewing locations is generally low, screening of the visibility of some bores could be achieved by appropriately positioned vegetation planting, particularly for those bores in close proximity to the realigned Lemington Road and the New England Highway, near Bowmans Creek.
