
Camden Gas Project: MP25

Environmental Assessment | Modification to DA 183-8-2004i

Prepared for AGL Upstream Investments Pty Ltd | 13 October 2011

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Camden Gas Project: MP25

Final

Report 1 | Prepared for AGL Upstream Investments Pty Ltd | 13 October 2011

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Date	13 October 2011	Date	13 October 2011

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1 Introduction

1.1 Background

The Camden Gas Project (CGP) is a major coal seam methane gas project within the Southern Coalfields of the Sydney Basin. The CGP currently comprises over 130 wells, low pressure gas gathering lines (GGL), access roads, the Rosalind Park Gas Plant and a high pressure gas sales pipeline.

Development consent 183-8-2004-i was granted for the Harness Racing Drilling Program of the CGP in 2004 by the NSW Minister Assisting the Minister for Infrastructure and Planning (Planning Administration) under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). This consent granted drilling and connection of 15 coal seam methane wells to the previously approved Rosalind Park Gas Plant and for the production of coal seam methane from these wells. A Statement of Environmental Effects (SEE) (Sydney Gas 2003) supported the application, which included the drilling of five wells and associated GGLs on the property of Menangle Park Paceway (the Paceway). The five wells on the Paceway are MP13, MP14, MP15, MP16 and MP17. The Paceway is within the existing approved Concept area (06_292) (refer to Section 3.1). The existing wells within the development consent and the proposed well are shown in Figure 1.1.

This report has been prepared to assess an application for a modification to the development consent. The modification is for the addition of a new production well, MP25 (the well), associated GGL, and upgraded and additional access tracks for construction access. The proposed well will be adjacent to the existing MP16 well, in order to minimise additional ground disturbance. The GGL will be approximately 10 m long and will connect to the existing GGL servicing MP16.

As discussed above, the previously approved Harness Racing Drilling Program is located on land owned by the Paceway, part of which was previously a sand quarry. The well will be located west of the training circuit and the Main Southern Railway, north of a former sand quarry which is being rehabilitated, east of the Nepean River and south of the racing circuit at the Paceway.

The location of the proposed well and proposed access tracks has been previously disturbed and modified through previous land uses including the area being previously sand mined as well as the construction of the existing MP16.

This document provides an assessment of the potential environmental impacts and prescribes mitigation measures, where required, to prevent or minimise identified impacts (see Section 5).

1.2 Site description

The site is located at Lot 10, DP 1022204, between the training circuit of the Paceway and the Nepean River, at an area which has been modified by past soil and sand mining activities. The landform at the site is a relatively flat alluvial floodplain, with a slight decline towards the Nepean River, which is approximately 50 m west of the proposed well.

The land to the east of the proposed well slopes gently downwards to it. Site vegetation comprises regrowth pasture and introduced grasses, dominated by the common couch (*Cynodon dactylon*) and kangaroo grass (*Themeda australis*), with some scattered regrowth wattle (*Acacia spp.*) and forest she-oaks (*Casuarina cunninghamia*), and narrow-leaved privet (*Ligustrum sinense*). At this location the bank of the Nepean River is vegetated with regenerating Sydney Coastal River Flat Forest, which is an endangered ecological community (EEC) under the NSW *Threatened Species Conservation Act 1995* (TSC Act). This

vegetation is approximately 30 m west of the proposed well and is fenced off to prevent access. There are existing formed tracks between the site and Menangle Road and Racecourse Avenue. The proposed well is approximately 170 m west of the training circuit of the Paceway.

Figure 1.2 shows the site in its local context.

1.3 Approvals framework

The existing development consent (183-8-2004-i) was approved by the Minister under Part 4 of the EP&A Act. The development was declared as state significant development by the Minister for Infrastructure and Planning on 13 June 2003 under s76A(7) of the EP&A Act (now repealed). Section 8J(8)(c) of Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) allows an existing development consent for a state significant development that was determined under Part 4 of the EP&A Act before 1 August 2005 to be modified under s75W of the EP&A Act. Therefore, the proposed modification will be assessed under section 75W of the EP&A Act.

Section 75W(2) states:

The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.

The proposed modification is for the construction of an additional well (MP25) and associated GGL on land owned by the Paceway. This is not considered to be consistent with the existing development consent. Therefore, the NSW Minister for Planning and Infrastructure's approval is required for the modification.

1.4 Justification for modification

The proposed modification is justified for the following reasons:

- Demand for natural gas in New South Wales is expected to increase from 90 petajoules (in 2007) to 230 petajoules (in 2015). The proposed additional gas well will add to supply and energy security.
- Natural gas is a preferred source of energy in respect to greenhouse gas emissions because it produces approximately 55% less greenhouse gas emissions compared to coal.
- The CGP is in the proximity of the Sydney market, and the Moomba – Sydney and Eastern Gas pipelines. Therefore, sourcing gas from this location does not require the construction of lengthy pipelines and associated infrastructure.

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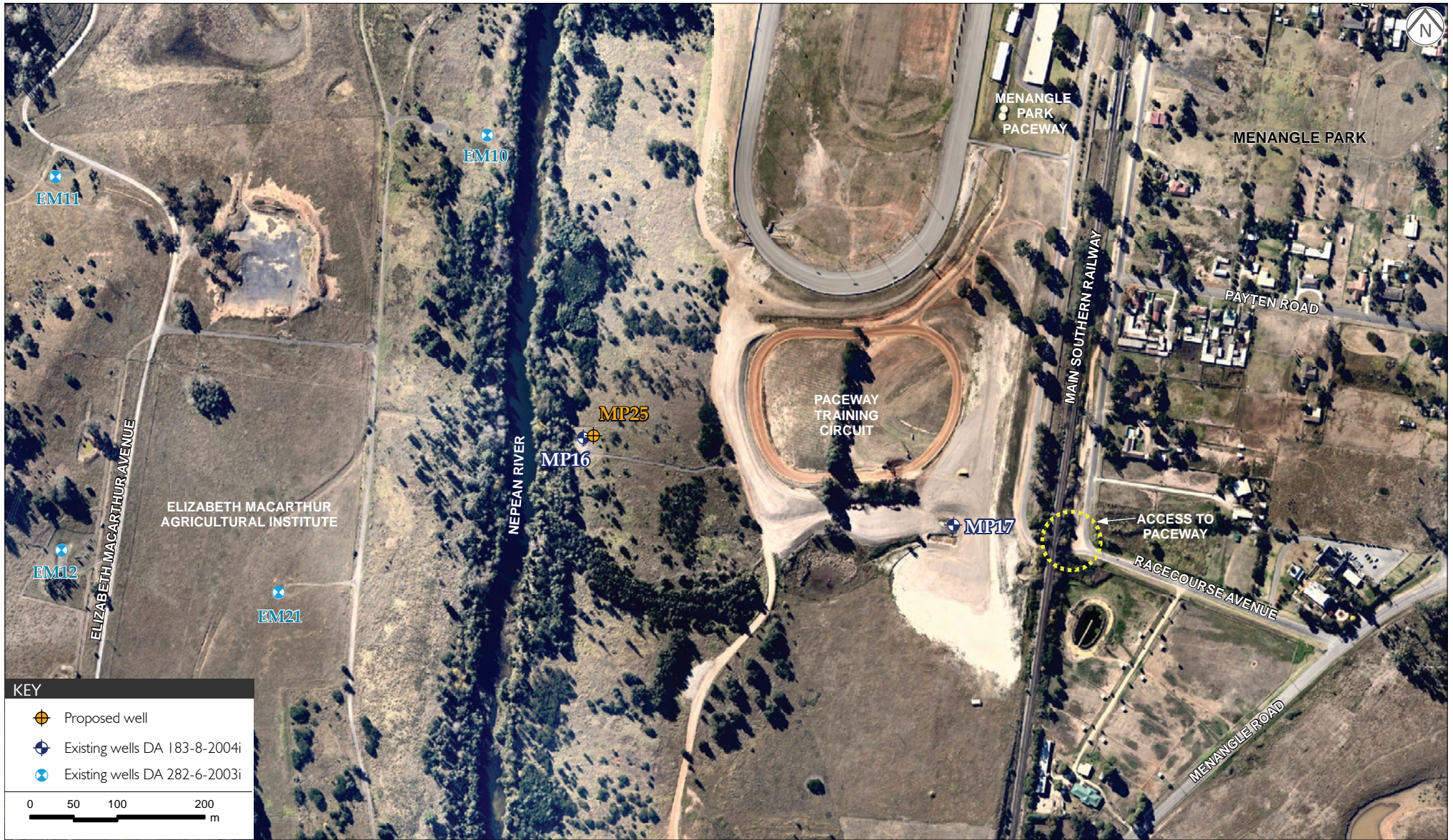
Aerial Imagery : BingMaps 2010

Existing wells and proposed well within DA183_8_2004i

Camden Gas Project: MP25 Modification to DA 183-8-2004i




FIGURE 1.1

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KEY

-  Proposed well
-  Existing wells DA 183-8-2004i
-  Existing wells DA 282-6-2003i

0 50 100 200 m

Aerial Imagery : BingMaps 2010

Local context

Camden Gas Project: MP25 Modification to DA 183-8-2004i

FIGURE I.2

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2 Project Description

2.1 Proposed modification

It is proposed to drill an additional production well at the Paceway, which will be linked to the existing GGL servicing MP16 by an additional GGL of approximately 5 to 10 m in length. An access track will be upgraded to allow all-weather construction access to the proposed well. Access to the proposed production well will be via existing internal roads within the Paceway property. The Paceway is accessed from Racecourse Avenue (refer to Figure 2.1) which goes under the Southern Railway line south of Menangle Park Railway Station. No additional works are required to this access as part of the proposed activities at MP25. Once inside the Paceway, the proposed production well will be accessed via existing internal access roads which are used to access MP16.

The well will be a 'surface to in-seam' (SIS) well. This drilling technique is in itself a form of reservoir stimulation which increases its drainage area without the need for fracture stimulation. Accordingly, no fracking will occur. The well will be drilled vertically from the surface, then will gradually angle to intersect the coal seam, near parallel with the seam dip angle. Following intersection of the coal seam, the well will be cased and cemented and a smaller hole will be drilled for up to 2,500 m through the coal seam. The technique requires continuous drilling, 24 hours a day, for a period of approximately 25 days.

The proposed modification has been designed to minimise the disturbance area of the proposal as far as possible while maintaining access to MP16. All drilling activities will take place within a previously cleared area at the edge of the MP16 construction pad (refer to Figure 2.1). A small amount of vegetation will be removed or relocated to allow room for the construction works and access tracks (refer to Section 5.3 of this report for a description of potential impacts to flora and fauna). This construction layout area has been designed specifically to utilise as much of the former MP16 construction pad as possible as well as land previously disturbed from sand mining activities. The layout area also maintains a minimum distance of 40 m to the Nepean River as well as maintaining a buffer to the fenced off area of Sydney Coastal River Flat Forest EEC.

The proposed construction layout area will be approximately 160 m long and between approximately 30 and 50 m wide, as shown in Figure 2.1. The layout area will include an area of approximately 50 m by 75 m previously disturbed during the establishment of MP16, and the existing MP16 infrastructure. An additional area to the north, approximately 25 m long and 40 m wide, will be used for stockpiling of removed topsoil.

Up to two pits will be constructed within this proposed disturbance area, with each pit being up to 10 m wide by 10 m long by 3 m deep. The pits will be polyethylene lined trenches to contain drilling debris and water produced during drilling. Drill cuttings, including coal fines, will be managed by diversion from the drill pits to a storage point next to the pits, where any excess water will be drained back into the pit. Coal fines will be stored and transported from the site for recycling at the Glenlee Coal Washery. The drill pits will be within the construction layout area and constructed to the specifications in the *Camden Gas Project – Environmental Management System (Soil and Water Management Sub Plan)* (AGL Gas Production Camden 2008).

Once the well has been drilled and completed, the construction pad is reduced to approximately 45 m x 45 m area and the surplus area is rehabilitated. As shown in Figure 2.2, the existing MP16 pad will be extended to the east to allow for maintenance and workover activities at MP25. The MP25 infrastructure will be enclosed in a final area approximately 10 m x 10 m – known as the production compound. The

production compound is defined as the restricted area surrounding the final wellhead following completion of construction and drilling activities.

Access track preparation for construction will be as follows, and as shown on Figure 2.1:

- minor upgrading of the existing shale gravel access track to MP16;
- widening of the shoulder at the intersection with the existing internal road by approximately 10 m; and
- two new shale gravel access tracks stemming from the existing one, being:
 - an approximately 25 m long, 3 m wide access route to the southern section of the site compound, which will remain following completion of drilling; and
 - an approximately 135 m long, 3 m wide access route to the northern section of the site compound.

Site preparation, drilling and well-head construction are expected to take approximately 30 days. As discussed above, the disturbance area will be rehabilitated at the conclusion of construction, leaving the existing access track to MP16 and the proposed MP25 in place.

2.2 Employment and public benefit

The construction of the well will contribute to the development of the CGP, which provides continued employment and revenue to the local area and greater region. The CGP has an existing workforce and the proposed modification will draw upon this workforce. The continued development of the CGP has the potential to stimulate demand for local goods and services. Approximately 45% of suppliers to the CGP are from the local area, and this use of local suppliers is anticipated to produce indirect economic benefit to the local economy by generation of extra demand from these businesses and increased household expenditure by individuals involved in these businesses. The proposed construction of an additional well adjacent to an existing one will not sterilise any significant area of land from potential public development.

The successful production of gas at the well will contribute to the supply of gas in the wider NSW market (CGP currently supplies up to 6% of NSW gas). Gas is a preferred energy source to coal due to its comparatively low greenhouse gas intensity. The expansion of the CGP enables market access to a valuable regional resource which will enhance the security of NSW's energy supply. Furthermore, additional well production is expected to increase the value of royalties paid to the state of NSW with respect to the CGP.

In summary, the proposal is expected to have positive economic and energy security effects. It will be a source of continued employment for the existing CGP workforce, is anticipated to provide direct and indirect stimulus to the local and regional economy, and may provide income to the state in the form of additional royalties. The supply of extra gas to the NSW market will produce a public benefit by enhancing the energy security of the state and reducing the greenhouse gas intensity of the energy supply. These predicted employment and public benefits can be achieved with minimal land use impacts, due to the siting of the proposal adjacent to existing CGP infrastructure.



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Aerial Imagery : NearMap Pty Ltd Sept 2010

Construction layout of MP25

Camden Gas Project: MP25 Modification to DA I83-8-2004i

FIGURE 2.1

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Aerial Imagery : NearMap Pty Ltd Sept 2010

Production layout of MP25

Camden Gas Project: MP25 Modification to DA 183-8-2004i

FIGURE 2.2

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3 Statutory Framework

3.1 Concept Plan Approval

The proposed modification is within the boundary of the approved Concept area for the CGP.

In 2008, the Minister for Planning approved a Concept Plan for the CGP (06_0292) under section 750 of the EP&A Act. For land within the concept area, Concept Plan approval 06_0292 allows the construction and operation of new wells and associated infrastructure within existing well fields, and production and transportation of gas from new wells to the Rosalind Park Gas Plant. Specifically, Appendix 2 of the Concept Plan approval states:

3. The location of new wells within the Stage 2 Concept area would be selected generally in line with the following:
 - Where possible, wells would be co-located at existing well platforms so as to minimise new land disturbance;
 - Supporting gas gathering lines would be located in existing disturbed areas wherever possible; and
 - Access roads would be located in existing disturbed areas wherever possible.

As described in Section 2, the location of the proposed production well (MP25) is adjacent to an existing well (MP16) to minimise new land disturbance with the supporting infrastructure (ie GGLs) and access road located in areas that have been previously disturbed.

Therefore, it is considered that the proposed modification to allow the construction and operation of a production well (MP25), including the transportation of gas to the Rosalind Park Gas Plant (via GGLs) is consistent with Concept Plan approval 06_0292.

3.2 SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)

Clause 7(2) of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) identifies development which can be carried out with consent and includes the following:

Petroleum production development for any of the following purposes:

- (a) Petroleum production on land which development for the purposes of agriculture or industry may be carried out (with or without consent),
- (b) Petroleum production on land that is, immediately before the commencement of this clause, the subject of a production lease under the *NSW Petroleum (Onshore) Act 1991*,
- (c) Facilities for the processing or transportation of petroleum on land which petroleum production may be carried out (with or without development consent), but if the petroleum being processed or transported was recovered from that or adjoining land.

The proposed modification to allow the construction and operation of a production well (MP25) including supporting infrastructure is considered to be consistent with the objectives of the Mining SEPP.

3.3 Local plans and policies

The proposed modification will be undertaken on land within the Campbelltown local government area (LGA). The land is zoned 1 (non urban) under Interim Development Order No. 15 – City of Campbelltown (IDO 15). No objectives are specified for this zone.

Clause 3 of the IDO 15 adopts the *Environmental Planning and Assessment (Model Provisions) 1980* (Model Provisions) for the purposes of the order. Under the Model Provisions, the proposed modification fits into the definition of a ‘public utility undertaking’, that is:

any of the following undertakings carried on or permitted or suffered to be carried on by or by authority of any Government Department or under the authority of or in pursuance of any Commonwealth or State Act:

- (a) railway, road transport, water transport, air transport, wharf or river undertakings,
- (b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services, and a reference to a person carrying on a public utility undertaking shall be construed as including a reference to a council, county council, Government Department, corporation, firm or authority carrying on the undertaking.

It is also relevant to note that as the proposal is for works to be carried out for the primary purpose of the supply of gas, authorised under the NSW *Petroleum (Onshore) Act 1991* (see ‘in pursuance of any ... State Act’ in the definition of public utility undertaking above). Thus, it satisfies this aspect of the definition.

Additionally, under the Model Provisions a ‘utility installation’ is defined as:

a building or work used by a public utility undertaking, but does not include a building designed wholly or principally as administrative or business premises or as a showroom.

As the proposed development is defined as a ‘public utility undertaking’ and the definition of a utility installation involves ‘a building or work used by a public utility undertaking’, it is considered that the proposed development may also be defined as a ‘utility installation’ under the Model Provisions.

Therefore, the activities for the proposed modification are defined as either a ‘public utility undertaking’ or as a ‘utility installation’. The relevant zone within IDO 15 is 1 – Non Urban (40ha). Within this zone, public utility undertakings and utility installations are permissible with consent as provided by clause 4 of the IDO 15. It is noted that even if the proposed modification were not permissible within this zone, the proposed modification could be carried out under the Mining SEPP (refer to Section 3.2).

3.4 State planning controls

3.4.1 Environmental Planning and Assessment Act 1979

The proposed modification is permissible under section 75W of the EP&A Act (see Section 1.2). A request for the Minister’s approval must be lodged with the Department of Planning and Infrastructure (DP&I), as per section 75W(3) of the EP&A Act. The Director-General of DP&I may notify the proponent of Director-General requirements (DGRs) that must be complied with before the proposed modification will be considered by the Minister. However, it is not expected that this modification will require DGRs due to the minor nature of the environmental impacts.

3.4.2 Other relevant legislation

State legislation relevant to the proposed modification includes the following.

i NSW Petroleum (Onshore) Act 1991

The CGP lies within Petroleum Production Lease 4 (PPL4). The proposed modification satisfies the lease conditions. Section 41 states the following:

The holder of a production lease has the exclusive right to conduct petroleum mining operations in and on the land included in the lease together with the right to construct and maintain on the land such works, buildings, plant, waterways, roads, pipelines, dams, reservoirs, tanks, pumping stations, tramways, railways, telephone lines, electric powerlines and other structures and equipment as are necessary for the full enjoyment of the lease or to fulfil the lessee's obligations.

ii NSW Threatened Species Conservation Act 1997

No threatened or endangered species listed in the TSC Act will be impacted by the proposed modification (refer to Section 5.3).

iii NSW Water Management Act 2000

The site is within the boundary of the Water Sharing Plan (WSP) for the Greater Metropolitan Region Groundwater Sources 2011, made under the *NSW Water Management Act 2000* (WM Act). The WSP commenced on 1 July 2011. The drilling of wells involves the interception of aquifers, which results in the taking of some water during the drilling and the dewatering process once the well is operational. An access licence for groundwater extraction is required together with, a works approval for the site and a use approval for the intended use. Clause 56 of the WM Act outlines the provisions for access licences:

- (1) An access licence entitles its holder:
 - (a) to specified shares in the available water within a specified water management area or from a specified water sources (the share component), and
 - (b) to take water
 - (i) at specified times, at specified rates or in specified circumstances, or in any combination of these, and
 - (ii) in specified areas or from specified locations (the extraction component).

Prior to the start of the WSP for this area, AGL applied for a production bore licence for the gas well at this MP25 drill site. Bore licence 10BL604888 was issued for the site under the *NSW Water Act 1912*. As a valid bore licence is held for the site, new licence applications under the WM Act are not required. It is understood that all AGL's bore licences (including the licence for this site) issued under the Water Act will transition to the WM Act with the implementation of the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011.

In addition, section 91 of the WM Act requires that activity approvals be obtained for activities that interfere with aquifers ('aquifer interference approval'), and for any work which is proposed to occur on waterfront land ('controlled activity approval'). 'Controlled activity' is defined within the WM Act to include the carrying out of a work within the meaning of the EP&A Act, and waterfront land is defined as land within 40 m of the highest bank of a river. The proposed well and the western boundary of the

proposed pad will be located approximately 60 and 40 m east, respectively, of the bank of the Nepean River and therefore no controlled activity approval is required.

The proposed drilling will intercept an aquifer, and therefore an aquifer interference approval would be required if it was a new project or extraction volumes were more than 3 ML per year. However, under section 75U of the EP&A Act, WM Act section 91 approvals do not apply to projects approved under Part 3A of the EP&A Act. As discussed in Section 1.3 of this report, the development consent is taken to be an approval under Part 3A of EP&A Act in accordance with the requirements of clause 8J(8) of the EP&A Regulation.

Therefore, as the modification is treated as an approved project under Part 3A of the EP&A Act, WM Act section 91 approvals do not apply.

iv NSW Protection of the Environment Operations Act 1997

Under the NSW *Protection of the Environment Operations Act 1997* (POEO Act) it is an offence, for which there are penalties, to cause water, air or noise pollution without authorisation for such under an Environment Protection Licence (EPL). Additionally, Schedule 1 of the POEO Act identifies 'scheduled activities' which are required to be licensed by the Office of the Environment and Heritage (OEH). The CGP is operated under a premises based EPL to permit petroleum refining and waste generation activities. The proposed well, if approved, would be incorporated into the existing EPL for the CGP.

3.5 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) contains an assessment and approvals framework for actions that are likely to have significant impact on matters of National Environmental Significance (NES).

Under the EPBC Act there are seven matters of NES. The original assessment for MP16 (Sydney Gas 2003) and the site inspection conducted by EMM on 25 July 2011 found that no Commonwealth listed threatened species, populations or communities would be impacted by the construction of the well surface location. Therefore, the proposed modification does not need to be referred to the Commonwealth Minister for the Environment for assessment under the EPBC Act.

3.6 Existing environmental licences and relevant approvals

3.6.1 Environment Protection Licence

The CGP is subject to EPL No. 12003 for its operations under the NSW POEO Act. EPL (L12003) covers the entire CGP area, and therefore applies to the proposed modification.

4 Consultation

The CGP has an existing Community Consultative Committee (CCC) which was established as a requirement of a previous development consent and includes representatives of each of the local councils, the community, a local environment group, and AGL.

The location of the proposed modification was chosen in consultation with the landowner. The construction activities of the existing wells on the property were scheduled around the operations of the local harness racing facility (ie the Paceway), where hundreds of horses were coming and going for training every day. This training facility is considered a first class racing facility. The landowner has given approval in principle to the construction and operation of MP25 at the proposed location and amendments to the existing agreement with the landowner are to be drafted.

Consultation regarding the proposed modification will include the CCC members and the landowner. Notification regarding the proposed well location will be issued to the community via the project web site, and advertisements in AGL's advertorials in the local papers. Advertorials regarding the project's current and future works regularly appear in the two main local papers for the area.

Prior to commencement of works, houses within the local area will be notified via a letter box drop, with information in regards to the proposed commencement and completion dates of the works. Further notifications will be issued upon commencement of the works.

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5 Environmental Assessment

5.1 Soil and water quality

5.1.1 Existing environment

The proposed well will be constructed at a relatively flat grassed area with a gentle incline to the Nepean River, which is located approximately 60 m west. The proposed access routes are at a moderate, grassed slope.

The area of the proposed well has been previously disturbed due to previous land uses, including sand mining, as well as the construction of MP16. A previous environmental assessment of the vicinity (NSW Archaeology 2003) stated that:

The site is located on a rehabilitated area previously used for soil and sand extraction; the site is not an original land surface.

5.1.2 Environmental considerations

The following potential soil and water quality impacts have been considered:

- site access and the preparation and upgrading of access tracks could lead to erosion which may be carried by runoff to the Nepean River and cause sedimentation;
- drill water and water produced from the well could flow over land and cause soil erosion if it is not contained;
- drill water and water produced from the well could flow into the Nepean River and cause sedimentation;
- spills or leaks of fuels or lubricants from vehicles or working equipment could reach and contaminate the Nepean River; and
- deep aquifers could cross-contaminate shallow aquifers during drilling.

5.1.3 Environmental management

The potential impacts outlined above are routinely managed by the CGP with the implementation of established environmental practices.

The following environmental management measures will be implemented during the works to prevent or minimise potential soil, surface and groundwater impacts:

i General soil and water management:

- the environmental management measures in the *Camden Gas Project – Environmental Management System (Soil and Water Management Sub Plan)* (AGL Gas Production Camden 2008), *Managing Urban Stormwater – Soils and Construction* (Landcom 2004) and the *Waste Classification Guidelines* (OEH 2008) will be implemented during the works.

ii Access track construction:

- access will be restricted to existing formed tracks and two new tracks of approximately 135 and 25 m long and 3 m wide; and
- the following measures will be implemented if access upgrading is required:
 - topsoil will be stripped;
 - track grades will be less than 10°;
 - tracks will have crowning or outfall drainage; and
 - outlets of culverts will be directed away from areas susceptible to erosion.

iii Drill pad and drilling:

- diversion drains will be constructed upslope of disturbed areas if necessary to divert surface water drainage away from soil stockpiles, drill pits and other disturbed areas;
- silt fences will be installed at the downslope perimeter of disturbed areas. These will be used for low energy flows when filtering is the objective. Silt fences will be installed according to the guidelines at Section 3.2.2 of the *Camden Gas Project – Environmental Management System (Soil and Water Management Sub Plan)* (AGL Gas Production Camden 2008);
- hay bales will be installed at the downslope perimeter of disturbed areas. These will be used when water ponding for settling of sediments and energy loss is the objective;
- soil stockpiles will have a maximum height of 3 m and will be battered to a maximum slope of 2 (horizontal) to 1 (vertical). Soil stockpiles will be moistened if the material is being transported by wind;
- up to two pits will be constructed, with each pit being up to 10 m wide by 10 m long by 3 m deep, to contain drilling debris and associated water. The pits will be lined with polyethylene, a geotechnical liner. The pits will be bunded on the upslope and downslope sides and one other side. Drill cuttings will be taken offsite for recycling. Coal fines will be stored then transported from the site to Glenlee Coal Washery for recycling. Drill water will either be transported from the site and used at other drilling sites or disposed at a facility licensed to receive such water; and
- during drilling, gas wells will be completed with American Petroleum Institute pressure rated steel casing which is cemented in place. This achieves zonal isolation of all the formations down to the coal seams which AGL are interested in producing coal seam methane from.

iv Gas gathering line:

- spoil from the trench will be temporarily stockpiled on the upslope side of the trench;
- silt fencing will be installed around the trench if working in close proximity to waterways;
- if the trench is not back filled on the day of the excavation, cut-off drains or silt fencing will be installed upslope of the spoil to divert surface water; and

- stormwater contained in the trench will not be released into any existing waterways. It can be discharged across vegetated areas where the groundcover is sufficient to act as a natural filter.

v Drilling fluids:

- drilling will use a circulation fluid of water containing approximately 5% potassium sulphate by weight;
- no petroleum based drilling fluids or additives will be used;
- the drilling fluids will be contained in above ground tanks. Start-up water will be carted by trucks to the site from an external source;
- drilling fluids will be removed from site and disposed at a licensed facility or reused on future drilling operations;
- the water level in the pits will be checked on a daily basis during drilling. If the water level approaches approximately 80% of either of the pits' holding capacity, arrangements will be made for water to be removed from the pit(s); and
- no drilling fluids will be discharged to land.

vi Spills or leaks of fuels or lubricants:

- vehicles and equipment will be adequately maintained to minimise leaks of fuels or lubricants;
- spill response equipment will be kept on-site and will be replaced as required. This equipment will include, but not be limited to, absorbent materials, shovels, and sand bag sacks; and
- used spill recovery materials will be disposed of to appropriately licensed facilities.

5.1.4 Impact assessment

The proposed works and access are unlikely to produce erosion, subject to the implementation of the erosion control measures given above.

Potential sedimentation and stormwater runoff and spills or leaks generated by the works and access are not likely to impact the Nepean River due to its distance from the works and the relatively flat terrain. The implementation of the environmental management measures described above will further reduce this likelihood.

The steel casing and cementing of the drill hole will prevent contamination of groundwater by isolating the drill hole from any aquifers at the location.

5.2 Flooding

5.2.1 Existing environment

The proposed modification is located at an alluvial floodplain of the Nepean River and is therefore subject to inundation from Nepean River-sourced flooding. The adjacent existing well MP16 is classified as a Flood Group 1 (high risk) well under the *Field Production Flood Management Procedure* (AGL 2010), and site flooding has occurred during minor flood events in the past. The flood risk for MP16 was assessed in the

Camden Gas Project Preliminary Flood Risk Assessment Draft Report (Bewsher Consulting 2007). According to the flood risk analysis, MP16 could be flooded to a depth of 5.4 m during 20 year average recurrence interval flooding and to a depth of 6.7 m during 100 year average recurrence interval flooding, with a probable maximum flood event depth of 10.3 m.

The *Field Production Flood Management Procedure* (AGL 2010) generally accords with the flood risk management planning and land use guidelines given in the Camden Council *Flood Risk Management Policy* (Camden Council 2006). Council's policy has regard to the requirements of the NSW *Floodplain development manual* gazetted in 2005 and applies to all flood prone land within the Camden LGA. AGL's procedure provides a strategy for effective warning time and recovery of mobile equipment and evacuation of personnel in the case of a flood event, and prohibits the use of access tracks in high risk flood prone land when the Nepean River water level approaches flooding height.

5.2.2 Environmental considerations

The following potential flooding impacts have been considered:

- damage to the drill rig and other equipment by water infiltration, movement, and/or flood-borne debris;
- risk of injury or death to personnel from flood-borne debris or drowning;
- reduction of the flood storage capacity of the Nepean River floodplain by creation of barriers to the movement of floodwaters; and
- contamination of the Nepean River by fuels, lubricants, or drill water.

5.2.3 Environmental management

The potential impacts outlined above are managed by the CGP through the *Field Production Flood Management Procedure* (AGL 2010). The aim of this procedure is to detail steps taken by the Production Team in the event of severe weather leading to flooding of areas surrounding the Nepean River and connecting waterways to reduce risk of damage to assets and prevent exposure of personnel to risks.

The adjacent existing well MP16 is classified as a Flood Group 1 (high risk) well under the procedure, and accordingly the proposed MP25 will be treated as a Flood Group 1 well. The *Field Production Flood Management Procedure* (AGL 2010) will be updated to include MP25. The procedure for Flood Group 1 wells is summarised below.

- In the event of continued inclement weather, field roads shall be assessed by AGL personnel and a decision on the suitability of roads broadcast to all employees. In the event of inclement weather personnel are to stay on gravel/shale road surfaces at all times to minimize environmental impacts.
- In the event of sustained severe weather the water level of the Nepean River is to be observed. When it is observed to be rising and approximately 2 m below the 68 m above sea level flood marker located under the Menangle Road Bridge, the Flood Response Coordinator (Rosalind Park Gas Plant Operator) is to be informed and placed on standby. The Flood Response Coordinator must prepare for a Flood Response Level 1, considering road access, personnel available and repercussions to plant throughput.
- The Field Production Supervisor will nominate one or more Field Production Operators to regularly monitor river levels and report back to the Field Production Supervisor, initially on an hourly basis

(or more frequently if required.) It will be the responsibility of the Flood Response Coordinator (Rosalind Park Gas Plant Operator) to continuously review the water level at the Menangle Road Bridge and alert Field Production Operators and the Production Leader in charge (chiefly the Plant Supervisor, or if unavailable, Production Engineer/Production Manager) if the flood response level is triggered.

- If the water level under the Menangle Road Bridge reaches the 68 m flood marker, the Flood Group 1 wells are to be remotely shut-in and field production operators advised not to travel on the roads in proximity to these wells. This means that the access roads to MP25 will not be used. Any mobile equipment at MP25 is to be recovered if access to the lease is considered safe, at the discretion of the Field Production Operator.
- When the flood waters have receded, on the advice of the Flood Response Coordinator the following must occur:
 - all access roads to various wells are to be checked and graded as passable/impassable and reported back to the Plant Operator;
 - all well leases are to be inspected for flood damage; and
 - all valve pits are to have water pumped out of them immediately.
- A close out meeting reviewing the flood response will be integrated into the production meeting following the flood.

In addition, temporary fencing used during site rehabilitation will be of a form which does not obstruct the free flow of floodwaters. Where feasible having regard to site rehabilitation objectives, the temporary fencing used will be of a type which does not become moving debris during flooding.

5.2.4 Impact assessment

The proposal will not reduce the flood storage capacity of the Nepean River floodplain as no barriers to flood water movement are proposed.

Potential transfer of fuels, lubricants or drill water from the works to the Nepean River during flooding is not likely to have a significant impact on water quality, as any such transfers will be minor in comparison to the total volume of the river in flood.

The potential for damage to the drill rig and other equipment by water infiltration, movement, and/or flood-borne debris will be reduced by the implementation of the *Field Production Flood Management Procedure* (AGL 2010). This procedure has been designed to minimise the risk of injury or death to personnel from flood-borne debris or drowning.

5.3 Noise

A noise assessment was conducted by EMM to assess the potential environmental noise impact from drilling and general operation of the well (refer to Appendix A). The findings of this report are summarised below, and the proposed management measures are described.

5.3.1 Existing environment

MP25 is located between the Nepean River and the Paceway. Existing noise sources in the general area comprise the Main Southern Railway and the Hume Highway, which are approximately 0.5 and 2 km east, respectively, of MP25. The Paceway is an occasional noise source.

Potential noise receivers in the area comprise the Paceway and residences in Menangle Park, which are at a minimum of approximately 0.5 km east of MP25. The potentially most exposed noise sensitive receivers are residences at 22 Racecourse Avenue and 190 Menangle Road. The topography between MP25 and potential sensitive receivers is relatively flat. Existing background noise levels (rating background levels, known as RBLs) for potentially affected residences have been previously measured at a nearby representative residential location at 44 Cummins Road, Menangle Park, and are presented in Table 5.1.

Table 5.1 Background logging data for potentially affected residences

Location	Measured Noise Level RBL ¹ , dB(A)		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
44 Cummins Road, Menangle Park	37	37	35

Note: 1 Rating background level (RBL)

Source: Appendix A

5.3.2 Environmental considerations

The noise assessment considered potential noise impacts to nearby sensitive receivers from construction and operation of MP25. The cumulative impact of the operation of MP25 in conjunction with the operation of existing surrounding wells was also considered.

The construction component of the project will include site preparation, establishment and drilling. Of these activities, the potentially highest noise emitting activity is the drilling of the well.

Noise generated by operational activities will be relatively quiet in comparison to well construction activities. Noise generating activities comprise free-flowing wells, pump operated wells and periodic maintenance. EMM’s noise assessment considered a worst case scenario, being the ‘pump assisted’ operation of the well. Expected sound power levels for this operation are typically 95 dB(A) prior to any mitigation strategies being implemented.

In addition to the noise sources mentioned above, intermittent activities such as hammering using hand tools or metal to metal contact associated with drilling could cause sleep disturbance. A typical emission level for such intermittent noise is 115 dB(A).

5.3.3 Environmental management

The environmental management objectives of the proposed activity are to ensure that regulatory noise limits are not exceeded and hence that no noise pollution is experienced by nearby sensitive receivers. The relevant regulatory noise limits and the proposed noise management measures are described below.

i Regulatory noise limits

a. Construction noise management

The OEH Interim Construction Noise Guideline (ICNG) (OEH 2009) for residential receivers was used to determine acceptable noise management levels to apply during construction. The ICNG recommends the standard construction hours of 7am to 6pm, Monday to Friday, and 8am to 1pm, Saturday. The drilling activity for the well will be required to occur day and night due to the preferred drilling method, well conditions and integrity, and safety considerations.

The management level for noise measured within 30 m of a residence during recommended standard hours is RBL plus ten; outside recommended standard hours it is RBL plus five. Accordingly, the proposed noise management levels for construction have been determined with reference to the RBLs given in Table 5.1. These criteria are presented in Table 5.2 below.

Table 5.2 Residential construction noise criteria

Location	$L_{eq, 15min}$ Noise Criterion, dB(A)
Menangle Park residences, east of site	47 (recommended hours day– 7am-6pm)
	43 (evening – 6pm-10pm)
	40 (night – 10pm-7am)

Source: Appendix A

b. Operational noise management

The Project Specific Noise Levels (PSNL) or operational criteria for noise levels received at nearby residential receivers during day, evening and night periods have been based on OEH’s (2000) Industrial Noise Policy (INP) and are shown in Table 5.3.

Table 5.3 Project Specific Noise Levels for operational noise

Location	$L_{eq, 15min}$ Noise Criterion, dB(A)		
	Day (7am-6pm)	Evening* (6pm-10pm)	Night (10pm-7am)
Menangle Park residences, east of site	42	42	40

*The evening background and resulting criteria level has been reduced to that of the daytime, consistent with the INP’s application notes.

Source: Appendix A

c. Sleep disturbance

The OEH’s current position on sleep disturbance is that maximum noise from a source should not exceed the existing background noise level by more than 15 dB(A) during the defined night period of 10pm to 7am. It is noted that both the PSNL and the construction noise criteria give a night noise level of 40 dB(A), which is stricter than the OEH sleep disturbance criterion.

ii Management measures

The following management measures will be implemented during the proposed activity to prevent and/or minimise potential noise impacts:

- implementation of the environmental management measures in the *Camden Gas Project – Environmental Management System (Noise Management Sub Plan)* (AGL Gas Production Camden 2008);

- if possible, the use of a low noise emission level drill rig and ancillary equipment;
- all personnel will be made aware that noise generating activities are to be minimised between 10pm and 7am;
- if possible, orientation of the drill rig and ancillary equipment to take advantage of directional noise characteristics for the closest residences (22 Racecourse Avenue and 190 Menangle Road);
- the use of physical barriers, eg commercially available temporary walls or shipping containers. In combination with careful design of the site layout, barriers could be expected to result in a 10 dB(A) reduction in received noise levels;
- the use of noise monitoring during initial drilling to affirm and calibrate noise predictions;
- community consultation regarding the works, including provision of written notice well in advance of proposed activities; and
- employment of all reasonable and feasible work practices to minimise noise impacts.

5.3.4 Impact assessment

The summarised predicted received construction noise levels without mitigation for 22 Racecourse Avenue and 190 Menangle Road will be 30 and 28 dB(A), respectively. These levels are beneath the proposed day, evening and night noise level management criteria, and will be further reduced by implementation of the proposed management measures. These residences are representative of the potentially worst affected receivers, and therefore it can be predicted that there will be no noticeable noise impact to residential receivers from the proposed construction (ie, drilling).

With the proposed management measures, the predicted maximum noise level from intermittent noisy activities at the most affected residential receivers is 41 dB(A). A difference in noise levels of 1 dB(A) is not perceptible in practice, and therefore the construction and operation night noise level management criterion of 40 dB(A) is satisfied.

The predicted cumulative operational noise levels of MP25, MP17, and MP16 will satisfy ICNG and INP criteria at the potentially most affected residential receivers. These levels are presented in Table 5.4 below.

Table 5.4 Predicted operational noise levels

Source	Receiver		Leq Noise Level Criteria, dB(A)		
	22 Racecourse Avenue	190 Menangle Road	Day time	Evening	Night
Well MP16	31	30	-	-	-
Well MP17	36	30	-	-	-
Well MP25	31	30	-	-	-
Cumulative Total	38	35	42	42	40

Source: Appendix A

Given predicted construction and operational noise levels satisfy criteria at the closest and most exposed residential receivers, impacts at other types of neighbouring land uses are not considered likely as sensitive areas within these land uses are located further from the site and have less strict criteria than residences, and it therefore follows that relevant criteria for these land uses will also be satisfied.

In summary, subject to the implementation of the mitigation measures proposed in this report and the *Camden Gas Project – Environmental Management System (Noise Management Sub Plan)* (AGL Gas Production Camden 2008), the proposal is not predicted to have any significant noise impact on sensitive receivers.

5.4 Ecology

5.4.1 Existing environment

The well will be at the edge of the MP16 construction pad, at an area which has been previously cleared and disturbed by sand mining. The area is vegetated with pasture and introduced groundcover, predominantly couch grass and kangaroo grass (see Figure 2.1). There are scattered regrowth wattles, forest she-oaks and narrow-leaved privets at the site. The Nepean River is located approximately 60 m west of the proposed well. A narrow strip of regenerating Sydney Coastal River Flat Forest EEC occurs approximately 30 m west of the proposed well, along the bank of the Nepean River. This vegetation is currently fenced off to the east to prevent access allowing regeneration of the community.

5.4.2 Environmental considerations

The proposed areas of disturbance are as follows:

- an approximately 150 m long and between 30 and 50 m wide site compound;
- an approximately 25 m long and 40 m wide topsoil stockpiling area to the north of the site compound;
- widening by approximately 10 m of the approximately 30 m long shoulder at the intersection with the existing internal road; and
- two new access tracks stemming from the existing access track, being:
 - an approximately 25 m long, 3 m wide access track to the southern section of the site compound; and
 - an approximately 135 m long, 3 m wide access track to the northern section of the site compound.

An approximately 50 m by 75 m area within the proposed site compound has been previously disturbed during establishment of MP16, and the existing MP16 infrastructure area is approximately 15 m wide by 30 m long. The majority of the vegetation to be disturbed comprises pasture and introduced groundcover. Preparation of the proposed access route to the northern section of the site compound will require removal of dead wattles (see Figure 2.1). Approximately five wattles and one narrow-leaved privet will be removed as part of the preparation of the site compound and access routes (see Figure 2.1). In addition, four wattles to the east of the proposed well will be relocated approximately 30 m further east to allow room for the construction pad (see Figure 2.1). Photo 5.1 shows the four wattles to be relocated. The high level of modification to the existing environment as well as the existing access track to MP16 can be seen in the foreground of the photo.

The following potential ecological impacts have been considered:

- aquatic flora and fauna in the Nepean River could be impacted by drill water and sediment run-off from drill water and water produced from the well;
- the regenerating Sydney Coastal River Flat Forest EEC, including forest she-oaks which have seeded behind the fence line, could be inadvertently disturbed during preparation of the site compound;
- vegetation removal and disturbance could reduce available potential habitat for native fauna and aid weed colonisation of the site; and
- removal of cleared weeds from the site could result in the spread of these weeds off-site. This includes removal of narrow-leaved privet, which is a Class 4 declared noxious weed in the nearby Campbelltown LGA.



Photograph 5.1 **Wattles proposed to be relocated.**

5.4.3 Environmental management

The following environmental management measures will be implemented during the works to prevent or minimise potential ecological impacts:

- the management measures proposed in the *Camden Gas Project – Environmental Management System (Flora and Fauna Management Sub Plan)* (AGL Gas Production Camden 2008) will be implemented;
- all personnel will be made aware that vegetation disturbance is to be limited to the areas marked on Figure 2.1;
- the forest she-oaks within the site compound will be marked to indicate that they are to remain, and all personnel will be informed during their site induction that these trees are not to be impacted;
- all personnel will be informed during their site induction that the fenced-off vegetation to the west is an EEC and that it is not to be accessed or otherwise impacted;
- the dead wattles removed by the preparation of the site compound and the northern access route will be placed in a nearby area so that potential native fauna habitat in the vicinity is not reduced;
- cleared weeds will be bagged on-site and disposed of at an appropriately licensed facility;
- the health of the relocated four wattles identified in Photo 5.1 will be monitored following relocation and during site rehabilitation. Practicable measures to restore the health of the trees will be applied, as necessary; and
- site rehabilitation will be in consultation with the landowner and in accordance with the *Camden Gas Project – Environmental Management System (Landscape and rehabilitation management Sub Plan)* (AGL Gas Production Camden 2008). The following steps will be undertaken:
 - the drill pits will be dewatered and backfilled with the stockpiled soil excavated during pit construction;
 - the geotechnical liner will be removed from the site;
 - topsoil will be pushed back across the completed site area;
 - the shale gravel used for the hardstand and the additional access tracks will be removed. The shale gravel on the access track to MP16 will be left in place; and
 - erosion and sediment controls will be removed once the site is adequately rehabilitated.

5.4.4 Impact assessment

The proposed disturbance of introduced groundcover, regrowth pasture and approximately five wattles will not have any significant ecological impacts as the existing site vegetation has low habitat value for native fauna, the area of disturbance is small, and it is adjacent to an existing disturbed area. A further four wattles will be relocated rather than removed, and the proposed monitoring and maintenance will reduce the likelihood of their health failing due to this relocation. While the site is also adjacent to a regenerating Sydney Coastal River Flat Forest EEC, site vegetation does not comprise this EEC. The original

SEE for MP16 (Sydney Gas 2003) assessed the potential flora and fauna impacts from construction of the well surface location. The SEE concluded that neither an '8 part test' (now '7 part test') nor species impact statement were required because no threatened flora or fauna were predicted to be impacted. Given the proximity of MP25 to MP16 and the contiguity and similarity of the site vegetation, it can be concluded that no 7 part test or species impact statement is required. The implementation of the measures detailed in Section 5.3.3 of this report will ensure that there are no impacts to the regenerating EEC and that there are no indirect impacts to native flora or fauna from the proposed works.

Following site rehabilitation, wattles and native pasture will be naturally regenerated from existing seed stock in the vicinity. The implementation of the rehabilitation measures contained in the *Camden Gas Project – Environmental Management System (Landscape and rehabilitation management Sub Plan)* and *(Flora and Fauna Management Sub Plan)* (AGL Gas Production Camden 2008) will prevent the colonisation of the site by weeds following rehabilitation.

Additionally, flora and fauna in the Nepean River will not be impacted if the sediment and drainage controls detailed in this report and the *Camden Gas Project – Environmental Management System (Soil and Water Management Sub Plan)* (AGL Gas Production Camden 2008) are implemented.

5.5 Other environmental considerations

This section provides an assessment of other environmental considerations regarding the construction and operation of MP25. These are described in Table 5.5 below.

Table 5.5 Other environmental considerations

Environmental aspect	Existing environment and issue description	Impact assessment and management measure
Air quality	Vehicle use of the access route, construction of the GGL, drill pits and drill pad, and topsoil stockpiling could generate short term dust impacts from vehicle movements, the operation of construction equipment and earthworks, and wind erosion of the stockpile.	Dust generation will be minimal if the environmental management measures in the <i>Camden Gas Project – Environmental Management System (Air Quality Management Sub Plan and Soil and Water Management Sub Plan)</i> (AGL Gas Production Camden 2008) are implemented.
Traffic safety	Work vehicle access will be via the existing MP16 access route. The access route is via internal roads at the Paceway, which join Racecourse Avenue. Additional access routes for construction will branch off this existing route (refer to Figure 2.1). No works are required to the access at Racecourse Avenue.	The existing and proposed access routes are on private property and do not experience through traffic. The existing access route is already used by AGL and additional vehicle movements will be small in quantity and infrequent, and therefore will not significantly impact use of this track by the Paceway, especially during well production. The exception to this will be during the rig move on and offsite, during which time, close consultation will take place with the Paceway to minimise impact. Potential impacts can be reduced by implementation of the <i>Camden Gas Project – Environmental Management System (Traffic Management Sub Plan)</i> (AGL Gas Production Camden 2008).

Table 5.5 Other environmental considerations

Environmental aspect	Existing environment and issue description	Impact assessment and management measure
Aboriginal heritage	There is potential for the works to impact places or items of Aboriginal heritage significance.	<p>The Aboriginal heritage assessment in the SEE (Sydney Gas 2003) concluded that the areas near MP16 and along the GGL that connects it to the CGP had low archaeological potential due to the past use of the area for sand quarrying. Given the proximity of MP25 to MP16 this conclusion would also apply to MP25. Figure 2.1 shows the extent of ground disturbance at the area.</p> <p>Notwithstanding the low likelihood that any Aboriginal Objects would be present at the site, if any potential Aboriginal Object is discovered during construction, the procedures listed in the <i>Camden Gas Project – Environmental Management System (Aboriginal Cultural Heritage Management Sub Plan) (AGL Gas Production Camden 2008)</i>, will be followed:</p> <ul style="list-style-type: none"> • All works within the immediate vicinity should cease until the potential Aboriginal Object(s) can be assessed and recorded by a qualified archaeologist. • The extent and significance of the Aboriginal Object(s) will be determined. • The Aboriginal Object(s) will be recorded and collected, and later relocated to an appropriate location at the completion of works. Immediately after collection, construction may then continue. • Should any of these Aboriginal Object(s) be deemed culturally significant, then further investigation with a qualified archaeologist should be undertaken to determine the need for further archaeological investigation. If the Aboriginal Object(s) are not regarded to be significant, these will be collected for analysis, and relocation.
European and non-Aboriginal heritage	<p>The following heritage items are in the general vicinity of the well:</p> <ul style="list-style-type: none"> • ‘Camden Park Estate and Belgenny Farm’, including ‘Camden Park’, on Elizabeth Macarthur Avenue, Camden, which is approximately 115 m west, on the opposite bank of the Nepean River (State Heritage 	<p>No additional measures related to Aboriginal heritage are required.</p> <p>The proposed works will not involve access or other impacts to any of the heritage items listed described in this table.</p> <p>Whilst the works are located within the same cadastral boundary as the Paceway, there will be no access or impacts to racecourse infrastructure or public use of</p>

Table 5.5 Other environmental considerations

Environmental aspect	Existing environment and issue description	Impact assessment and management measure
	<p>Register, Register of the National Estate, National Trust of Australia register, Wollondilly Local Environmental Plan 2011).</p> <ul style="list-style-type: none"> • ‘Menangle Weir’ (Campbelltown Local Environmental Plan 193), which is approximately 1.35 km south-east. • ‘The Pines’ estate on Menangle Road, Menangle (Campbelltown Local Environmental Plan 2002), which is approximately 670 m south-east. • ‘Menangle Park Racecourse/Paceway’ on Racecourse Avenue, Menangle Park (Campbelltown Local Environmental Plan 193), which is within the same cadastral boundary. • ‘Menangle House’ on Menangle Road, Menangle Park (Campbelltown Interim Development Order 15 and Register of the National Estate), which is approximately 815 m south-east. • ‘Menangle Railway Viaduct’ near Menangle Road, Menangle Park (Campbelltown Local Environmental Plan 193 and Register of the National Estate), which is approximately 1.25 km south-east. 	<p>the Paceway. The racetrack and grandstand area are approximately 280 m and 615 m north-east, respectively, of MP25. Therefore, the works will not impact the heritage characteristics of the Paceway, that is, its use a racecourse for over 100 years and its importance as a community focal point as the site for the Campbelltown Show.</p> <p>Consequently, no management measures are required in respect of European and non-Aboriginal heritage.</p>
Visual amenity	<p>The following potential visual receivers are in the general area of the well:</p> <ol style="list-style-type: none"> 1. ‘Menangle Park Paceway’- MP25 will be within the same cadastral boundary as the Paceway. 2. ‘Camden Park’- approximately 410 m west. <p>Residences at:</p> <ol style="list-style-type: none"> 3. 12A Racecourse Avenue- approximately 585 m east. 4. 32 Racecourse Avenue- approximately 600 m north-east. 5. 12B Racecourse Avenue- approximately 590 m east. 6. 180 Menangle Road- approximately 620 m south-east. 7. 190 Menangle Road- approximately 670 m south-east. 8. 170 Menangle Park Road- approximately 815 m south-east. <p>The works could be viewable from nearby residences, the Paceway and Camden Park.</p>	<p>MP25 is not viewable from the grandstand at receiver 1 because the grandstand does not face MP25. MP25 is viewable from the racetrack and training circuit at receiver 1. However, these areas are mostly used for horse racing and training and are not sensitive to the viewscape.</p> <p>MP25 is not viewable from areas within receiver 2 nearest MP25 because there are stands of vegetation in the foreground. MP25 could be viewable from higher areas within receiver 2. However, the higher areas are approximately 700 m from MP25. MP25 will blend into the viewscape, which is dominated by the Paceway and Menangle Park village.</p> <p>The proposed well is located west of the raised training circuit of the Paceway. The raised training circuit will shield the proposed well from the viewscape of receivers 3 to 5.</p> <p>MP25 is not viewable from receivers 6, 7 or 8 because it is shielded from view by the raised Main Southern Railway corridor. Therefore, no management measures are required in respect to visual amenity.</p>

6 Conclusion

AGL propose to construct a new production well, MP25, an associated GGL, and upgraded and additional access tracks for construction access, as part of the existing CGP. The proposed works are not consistent with the existing development consent, 183-8-2004-i. Therefore, a modification to the consent is required. The modification can be assessed under s75(w) of the EP&A Act by virtue of section 8J(8)(c) of the EP&A Regulation, because the original consent was declared to be state significant development.

The modification is for construction and operation of a new well and GGL at the edge of an existing well's (MP16) construction pad. The area is cleared of vegetation and there has been substantial ground disturbance due to previous land uses. An environmental assessment has been undertaken and concluded that it is unlikely that the modification will have any significant environmental impact, due to the low levels of ground disturbance proposed, the distance from sensitive receivers, and the implementation of existing management measures employed by the CGP. These measures are described in the *Camden Gas Project – Environmental Management Plan* (AGL Gas Production Camden 2008), *Managing Urban Stormwater – Soils and Construction* (Landcom 2004) and the *Waste Classification Guidelines* (OEH 2008).

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Appendix A

Noise Assessment

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23 August 2011

Adam Lollback
Land & Approvals Manager – Upstream Gas
AGL Energy Limited
L20, 101 Miller Street
North Sydney NSW 2060

Re: Well MP25 – Environmental Noise Assessment

Dear Adam

1 Introduction

EMGA Mitchell McLennan Pty Ltd (EMM) has been engaged by AGL to conduct an environmental noise assessment for the proposed modification to add an additional gas well at the MP16 location to be named MP25 as part of the Camden Gas Project (CGP).

This report assesses the potential environmental noise impact from drilling and general operation of the well. It is understood that fracture stimulation (fracking) is not required at this well, as the well will be drilled utilising the surface to in-seam (SIS) technique, and therefore this process has not been assessed in this report.

Construction of the well will involve drilling and earthmoving activities such as trenching for the gas gathering system.

Noise generated by operational activities will be relatively quiet in comparison to well construction activities. Noise emissions from free-flowing wells, pump operated wells and periodic maintenance will be the potential noise generating activities associated with the operation of the well. Nonetheless, a noise impact assessment has also been undertaken of proposed operations.

2 Project description

The project description detail is provided in the environmental assessment prepared to support a modification application under section 75(w) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). From a noise perspective, the key elements include:

- Site establishment and preparation of well pad areas. As this location has an existing well site (MP16) established and access track, there will be minimal noise impact from site establishment.
- Drilling. Drilling of the well is typically undertaken with a trailer or truck mounted drill rig. The type of drill rig to be used is typical of rigs used for coal seam gas drilling. Given the location of the well with respect to surrounding residences the quieter 'Ensign Rig' has been adopted in our assessment. It is expected that drilling will be conducted on a 24 hour basis for the duration of well construction for up to 25 days, dependant on confounding factors such as mechanical failure and weather disruptions. The drilling activity will be conducted at an area which has been previously disturbed during establishment of another well, MP16. The proposed site compound will be approximately

150 m long and between 30 to 50 m wide, with an additional stockpiling area of approximately 25 m by 40 m to the north.

3 Noise goals

3.1 Construction noise

The construction component of the project will include site preparation, establishment and drilling before gas can be extracted. Of these activities, the potentially highest noise emitting activities is the drilling of the well.

3.1.1 Interim construction noise guideline

The NSW Office of Environment and Heritage (OEH), formerly the Department of Environment Climate Change and Water (DECCW), provides the Interim Construction Noise Guideline (ICNG) (OEH 2009) for the assessment and management of noise from construction works.

The ICNG provides two methodologies for the assessment of construction noise emissions:

- quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- qualitative, which is suited to short term infrastructure maintenance (less than three weeks).

The resultant methodology for a quantitative assessment requires a more complex approach, involving noise emission predictions from construction activities to the nearest sensitive receivers, whilst the qualitative assessment methodology is a more simplified approach that relies more on noise management strategies.

The proposed construction duration could be in excess of three weeks (up to 25 days) with activities expected to occur during day and night time periods. The quantitative assessment methodology is the most suitable assessment methodology. Table 3.1 is an extract from the ICNG, providing guidance for residential receivers only.

In addition, the OEH suggests the following time restriction for the construction activities where noise is audible at residential premises:

- Monday to Friday 7:00 am to 6:00 pm;
- Saturday 8:00 am to 1:00 pm; and
- no construction work is to take place on Sundays or public holidays.

Table 3.1 ICNG residential criteria

Time of Day	Management Level $L_{Aeq} (15 \text{ min})^*$	How to Apply
Recommended standard hours: Monday to Friday 7:00am to 6:00pm Saturday 8:00am to 1:00pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <p>Where the predicted or measured $L_{Aeq} (15 \text{ min})$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</p>
	Highly noise affected 75 dB(A)	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:</p> <ul style="list-style-type: none"> i) times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences ii) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times
Outside recommended standard hours	Noise affected RBL + 5 dB	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</p> <p>For guidance on negotiating agreements see section 7.2.2.</p>

To establish appropriate construction noise criteria, the existing background noise levels need to be quantified for potentially affected residences. Background logging data for the Menangle Park area was undertaken for the Menangle Park Project Area (as part of the Project Approval 06_0291) and is provided in Table 3.2. It should be noted that the raw data used to establish the quoted levels in Table 3.2 is more recent and relevant to the proposed MP25 site than the previous Statement of Environmental Effects (Sydney Gas 2003) undertaken for the DA subject to this modification. The data have not been field verified by EMM. However, the documented methodology used by the source authors for a project application approved by the Department of Planning appears consistent with the relevant policy, the Industrial Noise Policy, or INP (OEH 2000).

Table 3.2 Background logging data

Location	Measured Noise Level RBL ¹ (dBA)		
	Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm-7am)
44 Cummins Road, Menangle Park	37	37	35

Note: ¹ Rating Background Level (RBL)

Source: Wilkinson Murray, Report 06151

The location from which this data has been collected is considered representative of the existing ambient noise levels for the assessment area.

Based on the ICNG and Table 3.2 above, the noise criteria that will be adopted for residential receptors during construction activities are provided in Table 3.3.

Table 3.3 Residential construction noise criteria

Location	L _{eq, 15min} Noise Criterion, dB(A)
Noise Assessment Locations (refer to Figure 1)	47 (recommended hours day– 7:00am to 6:00pm) 43 (evening – 6:00pm to 10:00pm) 40 (night – 10:00pm to 7:00am)

As per the ICNG, out of hours construction works proposed to OEHL must be accompanied by a strong justification.

3.2 Operational noise

3.2.1 Project specific noise levels

The INP requires that both the intrusiveness and amenity criteria are satisfied. However, the more limiting of the two becomes the Project Specific Noise Levels (PSNL) or operational criteria. The PSNL have previously been determined in the original Construction and Operational Noise Assessment and have also been used for this assessment (Wilkinson Murray 2007). The intrusive criteria have been deemed as the more stringent of the two and have therefore been adopted as the PSNL. The PSNL for this assessment are shown in Table 3.4.

Table 3.4 Project Specific Noise Levels for Operational Noise

Location	L _{eq, 15min} Noise Criterion, dB(A)		
	Day (7am – 6pm)	Evening* (6pm – 10pm)	Night (10pm-7am)
Menangle Park residences, east of site	42	42	40

*The evening background and resulting criteria level has been reduced to that of the daytime, consistent with the INP's application notes.

Source: Wilkinson Murray, Report 06151

3.3 Sleep disturbance criteria

The aforementioned criteria, which consider the average noise emission of a source over a specified time, are appropriate for assessing noise from relatively steady-state sources, such as drilling noise and other

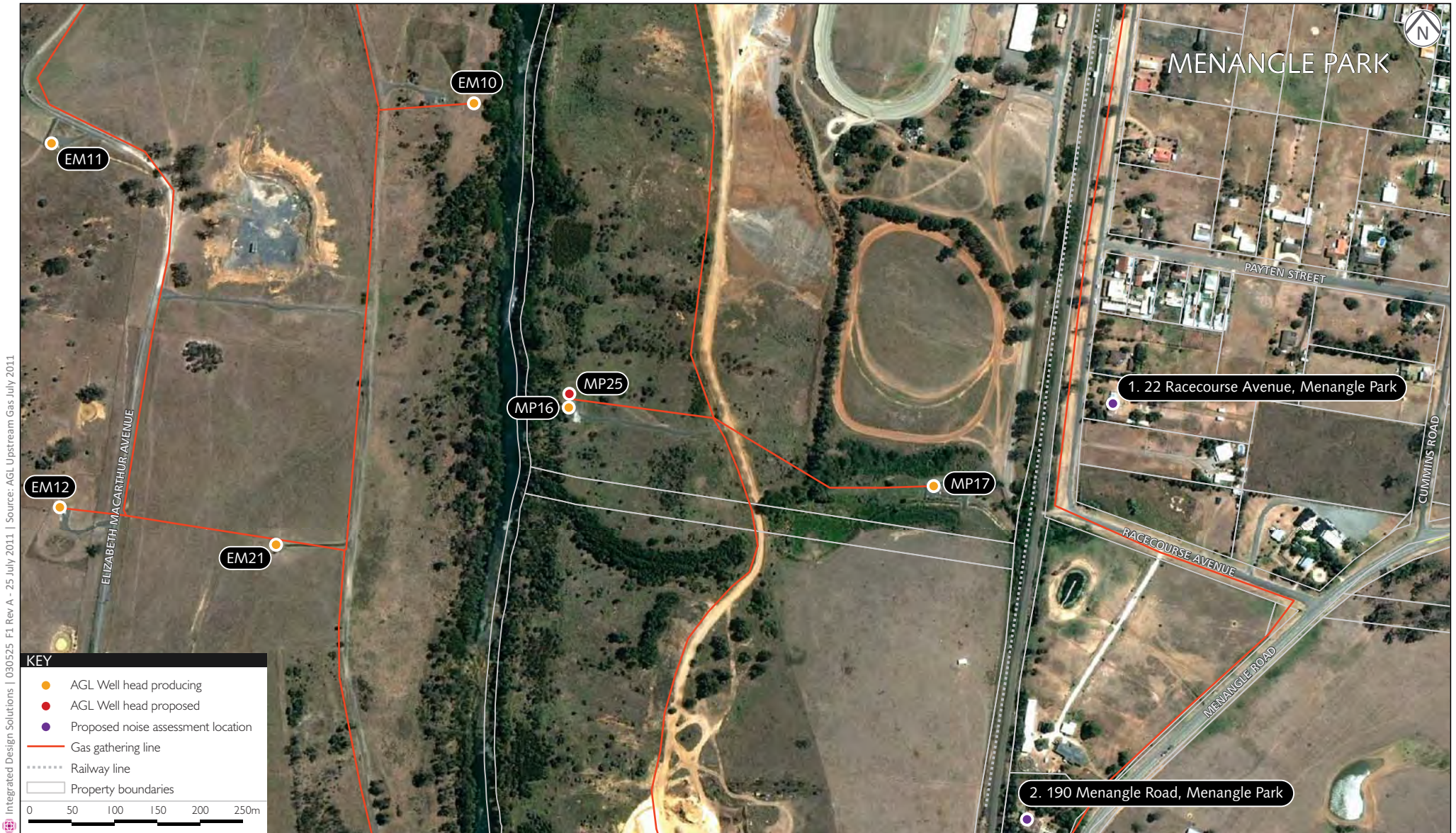
equipment. However, on-site sources such as truck reversing alarms and hand tool clangs are intermittent (rather than continuous) in nature, and as such, need to be assessed using the L_1 or L_{max} noise metrics.

The most important impact of such intermittent noises would be to disturb the sleep of nearby residents during the OEH defined night period of 10:00pm to 7:00am.

The OEH's Environmental Criteria for Road Traffic Noise (CRTN) policy indicates that levels below 50 dB(A) to 55 dB(A) inside residences are unlikely to wake sleeping occupants. The likely number of noise events per night should also be considered. If bedroom windows are open, this corresponds to an external maximum noise level of approximately 60 dB(A) to 65dB(A) at a residence. However, this is considerably higher than the OEH's current position on sleep disturbance which is that L_1 or L_{max} noise from a source should not exceed the existing background noise level by more than 15 dB and hence the proposed night time criterion for the adopted representative locations becomes:

- 50dB(A) L_{max} , for intermittent type of events from the well site alone.

For the purpose of this assessment, the descriptors L_1 or L_{max} may be considered interchangeable.



Proposed well and noise assessment locations
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FIGURE 1

4 Predicted noise levels and impact assessment

The prediction of noise from the construction and operations was undertaken using mathematical calculations based on provided sound power level data and sound level loss through air over distance. This calculation methodology is considered appropriate due to the relatively flat topography and short distance between the source and receiver.

4.1 Noise assessment locations

The closest and potentially the most exposed noise sensitive receivers to the well site are residences as listed in Table 4.1. The proposed well and noise assessment locations are shown in Figure 1.

Table 4.1 Noise assessment locations

Location (Figure 1 Ref.)	Address
1	22 Racecourse Avenue, Menangle Park
2	190 Menangle Road, Menangle Park

4.2 Construction noise levels

The drilling activity for the well is expected to occur for up to 25 days. It is proposed that drilling will be required to occur day and night for this period due to the local geology, well conditions and integrity, and for safe operations.

Once the well is drilled, completed and cemented, selected coal seams will be perforated, and the dewatering pumps run in the well to ready it for production testing. It is understood that fracture stimulation method will not be undertaken for the construction of this well and therefore it has not been considered in this assessment.

Whilst preparatory and other activities occur prior to and in between site establishment and drilling, the noisiest construction activities are drilling. Hence these activities were not assessed in detail.

4.2.1 Sound emission input data

For the assessment of noise from the proposed drilling operations, sound emission or power levels used to predict received noise levels are provided in Table 4.2. The data were extracted from previous noise audits conducted by SLR Heggies for the Ensign Rig (SLR Heggies 2010).

Table 4.2 Mitigated drill and optimised plant layout sound power levels for the Ensign Rig

Source	Octave Band Centre Frequency Noise Level, dB											Overall SWL, dB(A)
	16	31.5	63	125	250	500	1k	2k	4k	8k	16k	
Drilling Compound (SW)	97	120	106	104	98	93	94	91	88	84	73	99

Source: SLR Heggies report (2010)

Note 1: Drill orientation as measured at MP12 on 17 August 2010.

The Ensign drilling configuration includes a purpose designed plant layout to ensure noise leaving the site is minimised. The proponent has had a detailed noise monitoring report undertaken for the mitigated drilling arrangement (SLR Heggies 2010). The report shows that noise emanating from the drilling compound varies from one side to the other and the derived sound power levels are 98 dB(A), 99 dB(A), 106 dB(A) and 106 dB(A) for the north west, south west, south east and north east areas of the compound respectively. This directional noise characteristic was incorporated into the calculation to predict received noise levels for each of the receivers. In each case the arrangement was such that the quieter side of the compound faced the closest receiver to achieve maximum benefit for the potentially worst exposed location.

Another form of noise mitigation that has been considered is physical barriers which could include commercially available temporary walls or shipping containers. With careful design of the site layout, barriers could be expected to result in a 10 dB reduction in received noise levels.

4.2.2 Predicted construction noise levels

A summary of predicted noise levels for drilling and well construction activities for the two identified residential assessment locations are presented in Table 4.3. These residences are representative of the potentially worst affected.

Table 4.3 Mitigated drill and optimised plant layout sound power levels for the Ensign Rig

	Receiver		Leq Noise Level Criteria, dB(A)		
	1	2	Day time	Evening	Night
All Drilling plant (without barriers)	30	28	47	43	40

4.2.3 Discussion of results

The predicted drilling noise levels are expected to satisfy daytime, evening and night criteria at the two closest and potentially worst case residential locations. Hence, noise impact from proposed activities is not expected.

4.3 Sleep disturbance noise predictions

Noise from possible intermittent activities include hammering using hand tools, metal to metal contact associated with out of hours drilling and similar activities. A typical source sound power (emission) level of

115 dB(A) was used to predict maximum L_{max} noise at receivers. Table 4.4 presents the predicted L_{max} noise levels assessed against the sleep disturbance criterion (50 dB(A)).

Table 4.4 Predicted L_{max} noise levels, dB(A)

Activity	Receiver		L_{max} Sleep Disturbance Criterion, dB(A)
	1	2	
Well Construction (No Barriers)	51	50	50

Noise emitted from these activities should be controlled and managed by appropriate measures. The results do not include the benefits of barriers, which if designed appropriately would reduce levels to satisfy criteria at all locations (i.e. 51 dB(A) minus 10 dB for barrier, results in a 41 dB(A) L_{max} level). It is important to note that a difference in noise levels of 1 dB is not perceptible in practice. In our experience, at this noise level internal noise impact is not likely.

4.4 Operational noise levels

Operational noise emissions for the proposed well MP25 have been derived by information provided by the proponent and as a worst case scenario the ‘pump assisted’ operation of the well has been considered in this assessment. Expected sound power levels for this operation are typically 95 dB(A) prior to any mitigation strategies being implemented. In comparison to drilling and construction activities, this is a relatively quiet activity.

Table 4.5 details the predicted noise emissions from MP25 during pump assisted operation and the cumulative noise emissions of MP16 and MP17, again assuming the noisier pump assisted operation for all wells.

Table 4.5 Predicted operational noise levels

Source	Receiver		L_{eq} Noise Level Criteria, dB(A)		
	1	2	Day time	Evening	Night
Well MP16	31	30	-	-	-
Well MP17	36	30	-	-	-
Well MP25	31	30	-	-	-
Cumulative Total	38	35	42	42	40

Based on the predicted operational noise levels listed in Table 4.5, worst case pump assisted operation of all wells is expected to meet the relevant criteria at the two potential most affected residential receivers.

5 Conclusion and Recommendations

EMM has completed a construction and operation noise impact assessment of the proposed additional production well at Menangle Park, NSW. This assessment recommends mitigation of noise by adoption of the proponent's quieter drill rig and optimised plant layout at the site of MP25 to shield these noise sources and reduce impacts at residences.

The assessment also finds that sleep disturbance issues at night can be mitigated to satisfy OEH criteria at one of the two assessed residential locations predicted to experience marginal (1 dB) exceedance of criteria. As discussed previously, a 1dB difference in noise level is not perceptible in practice.

Other good practice noise management measures that should be considered include the following:

- use noise monitoring during initial drilling to affirm and calibrate noise predictions;
- orientate the drill rig to take advantage of directional noise characteristics for the closest residence for the given well site as described in this report;
- ensure the community is consulted and provide them with written notice well in advance of proposed activities;
- where possible obtain a drill rig with lower noise emission levels; and
- employ all reasonable and feasible work practices to minimise any impacts.

We trust that the above information satisfies your needs and if you have any further questions please contact the undersigned.

Yours sincerely



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