



Horsley Park Meter Station Upgrade

Preliminary Environmental impact Assessment

Prepared for:

Jemena

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Executive summary

The proposal

SGSP (Australia) Assets Pty Ltd and its group of subsidiary companies (Jemena) propose to upgrade an existing natural gas facility at Horsley Park, New South Wales (the Horsley Park Meter Station). The proposal involves the construction and installation additional flow conveyance and control apparatus, associated connecting pipework and masonry enclosures within the boundaries of the existing facility. The objective and purpose of the proposal is to increase natural gas deliverability from the Eastern Gas Pipeline into the Sydney natural gas distribution by 120 terajoules per day by winter 2016 to address gas supply constraints and increased demand. The proposal is referred to as the Horsley Park Meter Station Upgrade.

The Horsley Park Meter Station is located at 194-202 Chandos Road, Horsley Park within the Fairfield local government area. The existing facility is located on Lot 3 in Deposited Plan 1002746. The works associated with the proposal would occur within the boundaries of that property.

Need for the proposal

An analysis of the current gas supply situation on the eastern seaboard of Australia indicates that the future gas supply into the Sydney distribution network is constrained and that gas supply could fall significantly below gas demand as early as 2016 if nothing is done.

Around 95% of the gas supplied to Sydney distribution network comes from either the Moomba-Sydney Pipeline or the Eastern Gas Pipeline. The Moomba-Sydney Pipeline supplies the Sydney distribution network with gas from Moomba in South Australia and also from the Victorian wholesale gas market, which is receipted via the NSW Interconnect Pipeline. The Eastern Gas Pipeline transports gas from Longford in Victoria to the Sydney distribution network and other gas distribution networks including Canberra and Wollongong.

As the existing gas supply contracts come to an end natural gas from Moomba is increasingly being committed and shipped to liquefied natural gas (LNG) facilities in Gladstone, Queensland, due to high export gas prices. Gas supply from the Victorian wholesale gas market along the Moomba-Sydney Pipeline is subject to internal security of supply considerations and cannot be relied upon to meet the future gas demand within the Sydney distribution network. The ability to maintain and increase gas supply to the Sydney distribution network from Moomba-Sydney Pipeline is therefore constrained.

Longford has additional gas supply capacity which can supply the Sydney distribution network via the Eastern Gas Pipeline. The most practicable option for meeting existing and future gas demand within the Sydney distribution network is from the Eastern Gas Pipeline.

Jemena owns operates the Eastern Gas Pipeline and associated facilities. Jemena intends to increase the ability of the existing pipeline to deliver gas to the Sydney distribution network.

Gas delivery from the Eastern Gas Pipeline is currently constrained the Horsley Park Meter Station. The facility connects the Eastern Gas Pipeline to the Sydney distribution network. The Horsley Park Meter Station is currently operating at contractual capacity, meaning that Jemena cannot commit to additional gas supply through this facility. Gas deliverability needs to be increased to allow current and future gas demand within the Sydney distribution network to be supplied by the Eastern Gas Pipeline.

Options considered

The additional gas deliverability could be increased by:

- Option 1: Rely on the additional gas requirements to be delivered by the Moomba-Sydney Pipeline (effectively the 'Do Nothing' option)
- Option 2: Construct new pipeline sections that run parallel to and are connected to the existing Eastern Gas Pipeline (referred to a 'looping') to increase the capacity of the existing pipeline
- Option 3: Install additional compressor stations on the Eastern Gas Pipeline to deliver more gas through the pipeline
- Option 4: Upgrade existing facilities on the Eastern Gas Pipeline to increase Jemena's ability to deliver more gas into Sydney distribution network, or
- Option 5: Connect the Eastern Gas Pipeline to other pipelines connected to the Sydney distribution network that have additional capacity and divert gas from the Eastern Gas Pipeline into those pipelines.

Options 1, 2 and 3 do not meet the objective of the proposal and have been discounted.

Option 5 meets the objective of the proposal and is considered the most ideal solution as it would build supply redundancy into gas delivery from the Eastern Gas Pipeline. There are, however, risks associated with the approval pathway and timing for Option 5 which may mean that it cannot be implemented within suitable a time frame.

Option 4 would meet the objective of the proposal and is not subject to the same approval and timing risks as Option 5. Option 4 has therefore been adopted as the preferred option.

Statutory and planning framework

The Eastern Gas Pipeline and the Horsley Park Meter Station are subject to Pipeline Licence No. 26 under the NSW *Pipelines Act 1967*. As the proposal would occur within the existing licence area for the Eastern Gas Pipeline and the existing facility is described in the pipeline licence, a pipeline licence variation is not required.

In accordance with *State Environmental Planning Policy (State and Regional Development) 2011* the proposal is considered State Significant Infrastructure and requires approval from the Minister for Planning under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act). It is noted that prior to the introduction of this policy the proposal would not have required any approval under the EP&A Act.

No other statutory approvals are required for the proposal.

Community and stakeholder consultation

Jemena has consulted with the NSW Department of Trade and Investment, which administers the *NSW Pipelines Act 1967*, regarding the proposal. The Department has confirmed that a pipeline licence variation it is not required for the proposed upgrade work and that no alternative approval pathways are available. Jemena will keep the Department of Trade and Investment informed throughout the approval process.

Jemena has written to Fairfield City Council regarding the proposal. Jemena has also written to the State and Federal members of parliament for the electorates in which the proposal would occur. Invitations for individual briefings regarding the proposal have been made. No return correspondence has been received.

Jemena has written to the local residents in the vicinity of the existing facility to advise them of the proposal and the intention to lodge an application for approval for the proposed upgrade. None of the residents have contacted Jemena to discuss the proposal further.

Environmental impacts

No significant environmental impacts would occur as a result of the proposal.

A Biodiversity Impact Assessment has been carried out for the proposal. The vegetation present within the facility consists of exotic pasture grasses and planted native trees. No features of high biodiversity conservation significance would be affected by the proposal.

Only minor earthworks and changes to the existing surface topography would occur as a result of the proposal. There is no evidence to suggest that soils present are contaminated. The proposal would not result in any significant soil and water impacts or adverse changes to site hydrology and flooding.

A Due Diligence Archaeological Assessment has been carried out for the proposal in accordance with relevant guidelines. The assessment was carried out by a suitably qualified archaeologist with the involvement of a representative from the relevant Local Aboriginal Land Council. No features of aboriginal archaeological or cultural heritage significance were identified that would be impacted by the proposal. The assessment concluded that due to level of past ground disturbance associated with agricultural activities and the construction of the existing facility that the likelihood of encountering any intact features of archaeological significance is minimal. There is little risk that any features of aboriginal archaeological or cultural heritage significance would be affected as result of the proposal.

The existing facility combusts natural gas for heating purposes. The proposed upgrade includes the installation of additional heating apparatus which would also combust natural gas. As the potential for natural gas combustion would double as a result of the proposal, potential greenhouse gas (GHG) emissions from the existing facility are also anticipated to double. GHG emissions from the combustion of coal are around 70% higher than those generated by the combustion of natural gas.

The majority of natural gas supplied by the distribution network is combusted for heating purposes. If the ability to deliver natural gas into the Sydney distribution network is not increased, the energy shortfall may lead to increased use of electricity from coal combustion with associated GHG emission increases. In this regard the proposal would provide a benefit in terms of overall GHG emissions.

Gaseous emissions from the existing facility other than carbon dioxide include carbon monoxide (CO) and oxides of nitrogen (NO_x). The potential emissions of CO and NO_x are anticipated to double as a result of the proposal. The potential emissions from the facility may be similar to a two kilometre section of the Westlink M7 motorway to the west. Contributions to regional air quality due to the upgraded facility would be minor compared to overall transport related emissions. The potential emissions from the facility would disperse into the atmosphere. Given that the closest residences are 300 metres or more from the facility, the risk of local increases in the concentration CO and NO_x is low. No significant impacts to local or regional air quality would result from the proposal.

The existing facility generates noise but is generally inaudible at the nearest noise sensitive receivers. The proposed upgrade includes the installation of additional noise generating apparatus. The nearest residences to the existing facility are around 300 metres to the south and south-east. A conservative quantitative assessment of operational and construction noise associated with the upgrade indicates that any potential noise increases would not adversely affect the residents in the vicinity of the existing facility. No significant noise impacts would occur as a result of the proposal.

No vibration impacts are anticipated as a result of the proposal.

Construction of the proposal would result in increased light and heavy vehicle movements along Chandos Road. The increased vehicle movements due to construction of the proposal of the proposal would not significantly increase congestion or travel times for other road users or result in any property access restrictions for residents along Chandos Road. Operation of the upgraded facility would not increase existing site access requirements significantly. No significant traffic and access impacts would occur as a result of the proposal.

No features of European heritage conservation significance have been identified in the vicinity of the proposal. Due to level of past ground disturbance associated with agricultural activities and the construction of the existing facility that the likelihood of encountering any intact features of European heritage significance is minimal. There is little risk that any impacts to features of European heritage significance would occur as a result of the proposal.

The location of the proposal is semi-rural in character but also features utility infrastructure and industrial operations. The proposal includes the installation of additional gas infrastructure within an existing gas facility. There is another gas facility located immediately south of the location of the proposal. The existing facility is around 300 metres the closest residence. The existing facility is obscured either wholly or partially from most of the residences in the vicinity due to other buildings, agricultural structures, screening and other vegetation and topography. The proposal would not alter the landscape character of the location or result in any significant visual impacts.

The proposal would not directly or indirectly affect any properties or commercial activities in the

vicinity of the existing facility and would not result in adverse socio-economic impacts. Natural gas as energy source is an important economic commodity. As outlined in this document the supply of natural gas to the Sydney distribution network is currently constrained. If the ability to deliver natural gas into the network is not increased the development and operation of gas dependent industries may be constrained with the potential for adverse socio-economic impacts to the wider community. The proposal would result in socio-economic benefits.

Operation of the upgrade facility would result in increased waste generation. Certain maintenance activities generate potentially contaminated wastes in the form of the used dry gas filter cartridges and materials contaminated by light hydrocarbons. These wastes are typically collected in 205 litre HAZMAT drums and taken away by suitably licensed waste contractors for disposal at suitably licensed waste facilities. Maintenance activities that generate these wastes would increase as a result of the proposal and waste stream could potentially double. The maintenance activities that generate these types wastes occur infrequently, however, and only small amounts of potentially contaminated waste are generated. The amount of wastes that would be generated by the upgraded facility would not be significant.

The main resources that would be used during construction of the proposal include steel, concrete, masonry products (bricks) and quarry products. The quantities required to construct the proposal would not result in resource availability issues and impacts.

Justification and conclusion

The proposed upgrade of the Horsley Park Meter Station would meet the objective of the proposal by increasing the deliverability of natural gas into the Sydney distribution network from the Eastern Gas Pipeline by 120 terajoules per day to address developing gas supply constraints.

The assessment of potential impacts associated with the proposal indicates that no significant environmental and amenity impacts would occur. Any adverse environmental and amenity impacts associated with the proposal would be more than adequately outweighed by the socio-economic benefits provided by increasing gas supply potential into the Sydney distribution network. On this basis the overall impact of the proposal would be beneficial in terms of state and regional environmental and economic planning objectives and the proposal is justified.

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1 Introduction

1.1 Proposal identification

SGSP (Australia) Assets Pty Ltd and its group of subsidiary companies (Jemena) propose to upgrade an existing natural gas facility at Horsley Park, New South Wales (the Horsley Park Meter Station). The proposal involves the construction and installation flow conveyance and control apparatus, associated connecting pipework and masonry enclosures within the boundaries of the existing facility. The purpose of the proposal is to increase natural gas deliverability from the Eastern Gas Pipeline into the Sydney natural gas distribution by 120 terajoules per day by winter 2016 to meet the increasing demand for natural gas and address potential supply constraints. The proposal is referred to as the Horsley Park Meter Station Upgrade.

1.2 Purpose of this report

A review of relevant legislation, regulations and policies indicates that the proposal is State Significant Infrastructure. This Preliminary Environmental Impact Assessment (PEIA) has been prepared by EnviroPlan Pty Ltd on behalf of Jemena to support an application for approval of the proposal under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act). The purpose of this PEIA is to provide relevant details about the proposal and to document the likely impacts of the proposal on the environment to allow the NSW Department of Planning and Infrastructure (DP&I) to process the application and issue the Director-General's Environmental Assessment Requirements.

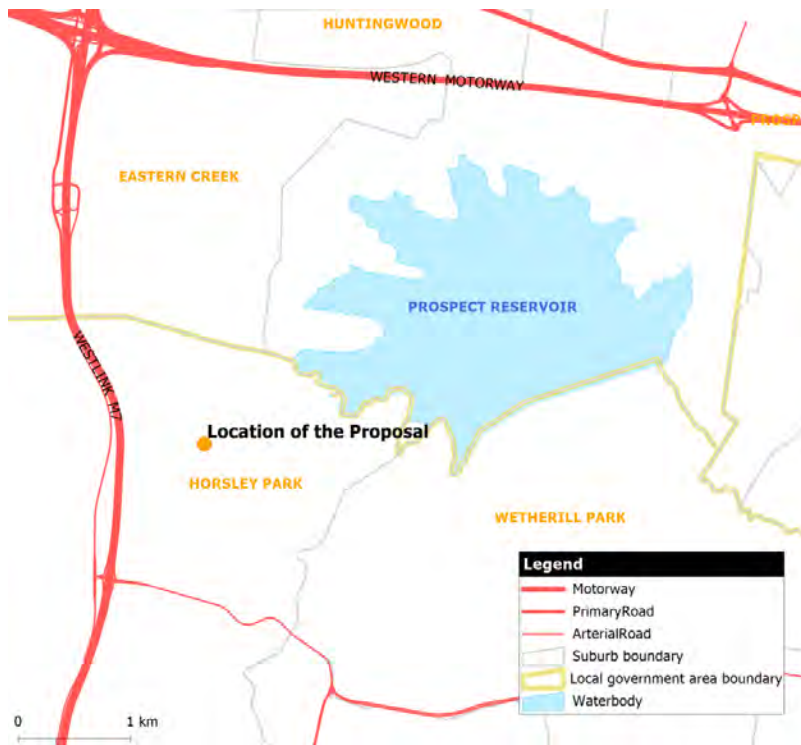
1.3 Location of the Proposal

The Horsley Park Meter Station is located at 194-202 Chandos Road, Horsley Park. The project location is within the Fairfield local government area. The location of the proposal is shown in Figure 1-1.

The facility is located on Lot 3 in Deposited Plan 1002746 as shown in Figure 1-2. All works associated with the proposal would occur within the boundaries of this property.

1.4 Land tenure

The certificate of title for Lot 3 in Deposited Plan 1002746 indicates that the lot is owned by Duke Eastern Gas Pipeline Pty Limited and DEI Eastern Gas Pipeline Pty Limited as joint tenants. A review of the Australian Business Number (ABN) histories of each entity indicates that these entities have been renamed Jemena Eastern Gas Pipeline (2) Pty Ltd and Jemena Eastern Gas Pipeline (1) Pty Ltd respectively. These two entities are the pipeline licensees of the Eastern Gas Pipeline and are wholly owned subsidiaries of SGSP (Australia) Assets Pty Ltd.



Data: Land and Property Information

Figure 1-1 The location of the proposal



Data: Land and Property Information. Imagery: Jemena

Figure 1-2 Location of property: Lot 3 in Deposited Plan 1002746

1.5 Background

The Eastern Gas Pipeline was constructed in 1999/2000 and extends approximately 797 kilometres from Longford in Victoria to Sydney as shown in Figure 1-3. The pipeline currently has a capacity of around 290 terajoules per day. The Eastern Gas Pipeline is subject to Pipeline Licence No. 26 under the NSW *Pipelines Act 1967*. The licensees for the Eastern Gas Pipeline are Eastern Gas Pipeline (1) Pty Ltd and Eastern Gas Pipeline (2) Pty Ltd, both subsidiaries of Jemena.



Figure 1-3 The Eastern Gas Pipeline

The Eastern Gas Pipeline is one of the major gas feeds into the Sydney distribution network. The other main feed into the network is the Central Trunk (Pipeline Licences No. 1 and No. 3) which is owned by Jemena Gas Network (NSW) Limited. The Central Trunk is fed by the Moomba-Sydney Pipeline (Pipeline Licence No. 16) which is owned and operated by the APA Group. Together these pipelines provide for almost all of the gas demand within Sydney distribution network.

The Horsley Park Meter Station reduces and regulates the pressure of gas from the Eastern Gas Pipeline and delivers that gas into the Central Trunk and another pipeline referred to as the Smithfield Lateral. The Central Trunk feeds the Sydney distribution network. The Smithfield Lateral

is an extension of the Eastern Gas Pipeline and supplies high pressure gas to a large volume industrial gas user in the Smithfield area. The pipelines connected by the Horsley Park Meter Station are shown in Figure 1-4.

The existing facility is currently at contractual capacity, meaning that it has the capacity to meet the full requirements of all existing gas supply contracts. Jemena cannot, however, commit to providing additional gas supply through the facility to meet any increased demand within the Sydney distribution network.



Data: Land and Property Information, Jemena. Imagery: Jemena

Figure 1-4 Pipelines connected by the Horsley Park Meter Station

1.6 The existing facility

The Horsley Park Meter Station includes:

- A bulk liquid separator
- Two dry gas filters
- Three water bath heaters which heat the gas up prior to pressure reduction
- Gas metering equipment to measure the amount of gas being delivered to the Central Trunk
- Gas regulators to reduce the pressure of gas from the Eastern Gas Pipeline to the required pressures for the Central Trunk and the Smithfield Lateral
- Associated connecting pipework
- Pipeline internal inspection tool receiving (Easter Gas Pipeline) and launching (Smithfield Lateral) apparatus
- Pipeline venting apparatus

- A number of site buildings, and
- Perimeter fencing.

A schematic showing the main apparatus of the Horsley Park Meter Station is provided in Figure 1-5. Photos of the main gas flow conveyance and control apparatus are provided in Plate 1-1, Plate 1-2, Plate 1-3, Plate 1-4 and Plate 1-5.

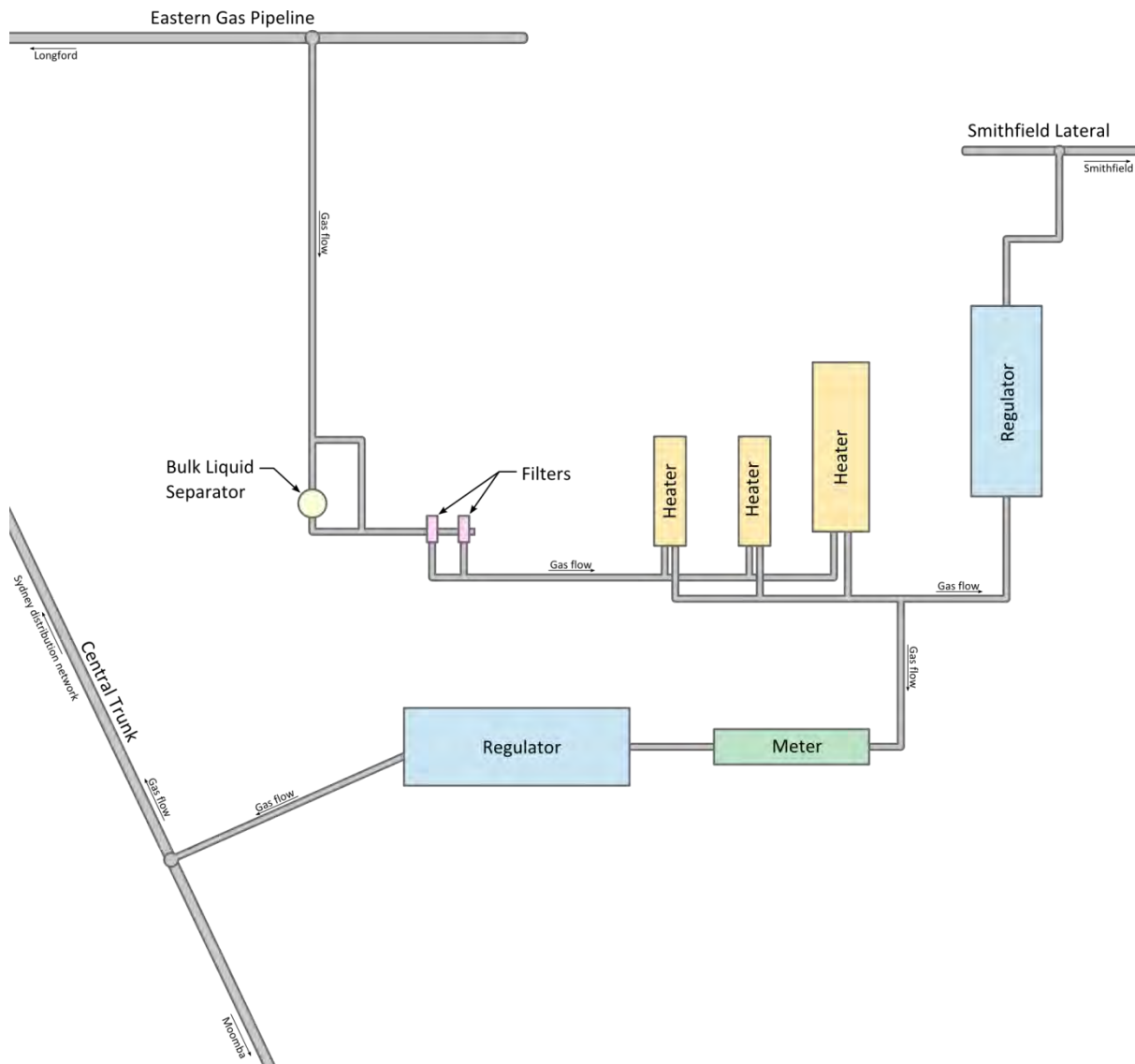


Figure 1-5 Schematic of the Horsley Park Meter Station



Plate 1-1 **Metering equipment (foreground) and regulator for gas delivery to the Central Trunk (inside masonry enclosure)**



Plate 1-2 **Regulator gas for delivery to the Smithfield Lateral (inside masonry enclosure)**



Plate 1-3 **Dry gas filters and associated pipework**



Plate 1-4 **Water bath heaters (three) and associated pipework**



Plate 1-5 **Bulk liquid separator and associated pipework**

1.7 The Proponent

The proponent for the proposal is SGSP (Australia) Assets Pty Ltd and its group of subsidiary companies (Jemena). Jemena, its subsidiaries and associated sub-contractors would carry out the proposal on behalf the pipeline licensees.

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2 Need and options considered

2.1 Strategic need for the proposal

Around 95% of the gas supplied to Sydney distribution network comes from either the Moomba-Sydney Pipeline or the Eastern Gas Pipeline. The Moomba-Sydney Pipeline transports gas from Moomba in South Australia and also from the Victorian wholesale gas market, which is via the NSW Interconnect Pipeline. The Eastern Gas Pipeline transports gas from Longford in Victoria to the Sydney distribution network and other gas distribution networks including Canberra and Wollongong. The remainder of gas demand in the Sydney distribution network is supplied from small coal seam gas reserves in south western Sydney. A schematic of the pipelines and gas markets relevant to gas supply in the Sydney distribution network is provided as Figure 2-1.



Figure 2-1 Gas pipelines and markets relevant to gas supply in the Sydney distribution network

Future gas supply availability options for the Sydney distribution network are currently limited. Gas supply capacity at Moomba is almost completely utilised. As existing contracts for gas supplied from Moomba come to an end gas is increasingly being committed and shipped to the new liquefied natural gas (LNG) facilities in Gladstone, Queensland, to make the most of the export gas prices, which are significantly higher than domestic wholesale gas prices. The ability to maintain and increase gas supply to the Sydney distribution network from Moomba is therefore constrained.

The Victorian wholesale gas market is regulated by the independent Australian Energy Market Operator (AEMO). Gas can be supplied to the Sydney distribution network from the Victorian wholesale gas market along the Moomba-Sydney Pipeline via the NSW Interconnect Pipeline. The export of gas from the Victorian wholesale gas market to other markets is, however, governed by the gas demand within that network and is at the discretion of the AEMO. When demand within the Victorian wholesale market is at or near its peak, AEMO will prioritise security of supply within that market over exports of gas for the Sydney distribution network. The ability to maintain and increase existing gas supplies for the Sydney distribution network from this market is therefore also constrained.

No such market constraints affect the supply of gas from Longford into the Sydney distribution network along the Eastern Gas Pipeline. Longford has additional gas supply capacity which can supply the Sydney distribution network. Unless gas reserves within NSW are developed and utilised, meeting the current and future gas supply requirements of the Sydney distribution network from the Eastern Gas Pipeline is the most practicable option.

The ability to increase gas supply to the Sydney distribution network from the Eastern Gas Pipeline is currently constrained by the existing physical capacity of the pipeline and associated facilities. In particular, the Horsley Park Meter Station, which connects the Eastern Gas Pipeline into the Sydney distribution network, is at its maximum contractual capacity. This means that it only has the physical capacity to deliver the full requirements of all existing gas supply contracts at peak demand. Jemena cannot commit to providing sustained additional gas delivery through the facility without jeopardising the ability of existing gas customers to draw their full contractual amounts of natural gas from the network.

Some analysis indicates that gas supply to the Sydney distribution network could fall significantly below gas demand as early as 2016 if nothing is done (Simshauser and Nelson, 2014). Jemena intends to address this concern by increasing the ability of the Eastern Gas Pipeline to supply gas to the Sydney distribution network. Addressing the delivery restrictions imposed by the existing Horsley Park Meter Station is necessary to achieve this outcome.

2.2 Proposal objective

The objective of the proposal is to address the current requirement to increase gas deliverability into the Sydney distribution network and to do so in a timely manner that minimises the potential for environmental impact and community disruption.

2.3 Alternatives and options considered

The additional gas deliverability could be increased by:

- Option 1: Rely on the additional gas required to be delivered by the Moomba-Sydney Pipeline (effectively the 'Do Nothing' option)
- Option 2: Construct new pipeline sections that run parallel to and are connected to the existing Eastern Gas Pipeline (referred to as 'looping') to increase the throughput capacity
- Option 3: Install additional compressor stations on the Eastern Gas Pipeline to deliver more gas through the pipeline
- Option 4: Upgrade existing facilities on the Eastern Gas Pipeline to increase Jemena's ability to deliver more gas into Sydney distribution network, or
- Option 5: Connect the Eastern Gas Pipeline to other pipelines that connect to the Sydney distribution network that have additional capacity and diverting gas from the Eastern Gas Pipeline into those pipelines.

The options are evaluated below.

Option 1 – Do nothing

Under this option the Eastern Gas Pipeline would not be altered and the Moomba-Sydney Pipeline would deliver additional gas required. As outlined above, the ability to maintain and increase gas supply to the Sydney distribution network from Moomba and the Victorian wholesale gas market along the Moomba-Sydney Pipeline is limited.

This option would not, therefore, meet the objective of the proposal in the short or long term.

Option 2 – Pipeline looping

Pipeline looping has the ability to significantly increase the capacity of an existing pipeline. Pipeline looping projects typically require extensive environmental investigations and lengthy planning and approval processes, which would reduce the ability of the option to meet the more immediate gas supply issues. Also, any additional capacity that a looping project would provide on the Eastern Gas Pipeline would be limited by the current supply restrictions at the Horsley Park Meter Station, which is currently operating at capacity.

As this option would not provide a timely increase in supply capacity and the benefits would be limited by the restrictions at the Horsley Park Meter Station it would not meet the objective of the proposal.

Option 3 – Installing additional compressor stations

Additional compressor stations can be installed to push more gas through the existing pipeline. Compressors are typically connected at the location of existing valves on the pipeline and require specific connections, which are typically installed during construction of the pipeline. Decisions about the location of number of future compressor stations that can be installed on a pipeline are therefore made during the original pipeline planning process.

Additional connection points for compressors were installed on the Eastern Gas Pipeline during construction. Jemena is currently progressing plans to install additional compressor stations at some of these locations. Any additional gas supply capacity that would be provided by the additional compression would, however, be limited by the current delivery restrictions at the Horsley Park Meter Station, as it is currently operating at contractual capacity.

The installation of additional compressors alone would not therefore meet the objective of the proposal.

Option 4 – Upgrade the Horsley Park Meter Station

Under this option the Horsley Park Meter Station would be upgraded to provide the additional gas supply capacity currently required. This could be achieved by the installation of additional pipework and associated gas conveyance and flow control apparatus. This would increase the existing delivery capacity of the facility by 120 terajoules per day, which is a significant increase. This option would allow Jemena to increase gas supply into the Sydney distribution network from the Eastern Gas Pipeline. As the work required to upgrade the facility would occur within the boundaries of the existing facility it could also be implemented relatively quickly with minimal impact to the environment.

This option would therefore meet the proposal objective in the required timeframe.

Option 5 – Provide an alternate connection into the Sydney gas distribution network

Under this option a connection would be made between the Eastern Gas Pipeline and the Moomba-Sydney Pipeline or Central Trunk at a location upstream of the Horsley Park Meter Station. Both of these pipelines and their associated facilities have additional capacity and are located close to the Eastern Gas Pipeline in certain locations. Creating an interconnecting pipeline between either of these two pipelines and the Eastern Gas Pipeline would allow the supply restriction at the Horsley Park Meter Station to be avoided, increasing gas supply into the Sydney distribution network.

Jemena is assessing a proposal to construct an interconnecting pipeline. The proposed pipeline would be constructed as part of the Eastern Gas Pipeline and would require approval from the Minister for Energy under Part 5 of the EP&A Act. If it is determined that the proposal would result in any significant environmental impacts, however, the proposal would need to be assessed as State Significant Infrastructure under Part 5.1 of the EP&A Act. If that occurs it is unlikely that the interconnecting pipeline would be finished in time to meet current and future gas supply requirements.

This option would therefore meet the proposal objective. There are, however, risks associated with implementing this option within suitable time frames.

Analysis of options

Option 1 does not provide adequate security of future gas supply into the Sydney gas distribution and beyond. This option would rely on all future increases in gas to be supplied from either Moomba, the Victorian gas wholesale market or internal reserves within NSW that are yet to be developed. Option 1 has therefore been discounted.

Options 2 and 3 would provide a good solution to the long term requirement to increase gas supply into the Sydney distribution network. Without a corresponding upgrade of the Horsley Park Meter Station or a connection to the Moomba-Sydney Pipeline or the Central Trunk, however, any capacity increases in the Eastern Gas Pipeline provided would be limited. Option 2 and Option 3 alone do not therefore meet the objective of the proposal. It is also noted that the construction of new pipeline sections and the clearing of land on which to construct a compressor stations could result in environmental impacts more significant than the current proposal.

If Option 5 was approved and completed in time it would meet the objective of the proposal. This option would be preferred over the other options as it would add supply redundancy (i.e. two connections into the Sydney distribution network). If it is determined that such a proposal would result in any significant environmental impacts, however, the preferred approval pathway for Option 5 would not be available and the interconnecting pipeline would not be constructed within suitable timeframes. There are therefore timing risks associated with adopting Option 5 as the preferred option.

Option 4 would increase the overall gas supply capacity into the Sydney distribution network significantly and within acceptable timeframes. Also, it would occur entirely within the boundary of an existing facility gas facility, reducing the potential for additional environmental impacts. Option 4 therefore represents lowest risk way to meet the objective of the proposal and has been selected as the preferred option.

2.4 Justification of the proposal

Upgrading the Horsley Park Meter station is justified on the basis that it:

- it is the least complex option
- requires the no land acquisition
- would involve no disturbance to land outside those areas already disturbed as part of construction of the existing pipeline and facility, and
- can be implemented relatively quickly to ensure that future demand can be met in a timely manner.

As the proposal would occur within the boundaries of an existing facility it would also meet the objective of the proposal of minimising the potential for environmental impact and community disruption, which is demonstrated in the following sections.

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3 Description of the proposal

3.1 The proposal

The proposal involves the construction of additional gas flow conveyance, control and metering equipment and associated pipework within the boundaries of the existing Horsley Park Meter Station. To increase the overall capacity of the station a second run of pipework and gas conveyance control apparatus would be installed in parallel with the existing infrastructure within the boundaries of the existing facility.

The proposal includes the following:

- Removal of the existing bulk liquid separator and associated pipework
- Installation of new dry gas filtration equipment
- Installation of new gas heat exchangers
- Installation of hot water heaters (boilers) and a noise attenuating masonry enclosure
- Installation of a new gas metering unit
- Installation of a new gas regulator and a noise attenuating masonry enclosure, and
- Associated above and belowground connecting pipework.

The new section of pipework and apparatus would inject additional gas flows into the outlet of the existing regulator that supplies the Central Trunk and the Sydney distribution network. A schematic of the additional components that would be installed as part of the Horsley Park Meter Station is provided in Figure 3-1. All the new gas conveyance control equipment would be connected into the existing telemetry system and continually monitored at the existing Jemena Control Centre, which is located remotely from the site.

A preliminary design plan for the proposed upgrade is provided as Appendix A. It is noted that the detailed design for the proposal has not yet been finalised. As a result the details of the proposal provided in this document may change. Any such changes, however, would be accommodated entirely within the boundary of the existing facility and would not result in any additional environmental impacts.

The location where the majority of the new apparatus would be installed is shown in Plate 3-1.

3.2 Capital investment value

The capital investment value of the proposal is \$15 million.

3.3 Design

All flow conveyance and control apparatus and associated pipework will be designed and constructed in accordance with the requirements of Australian Standards *AS2885.1 Design and*

construction of Pipelines gas and liquid petroleum and AS4041-2006 Pressure piping.

The masonry structures that would be placed around the new regulator and water heaters would be constructed in accordance with the Building Code of Australia and certified by an appropriate certifying authority.

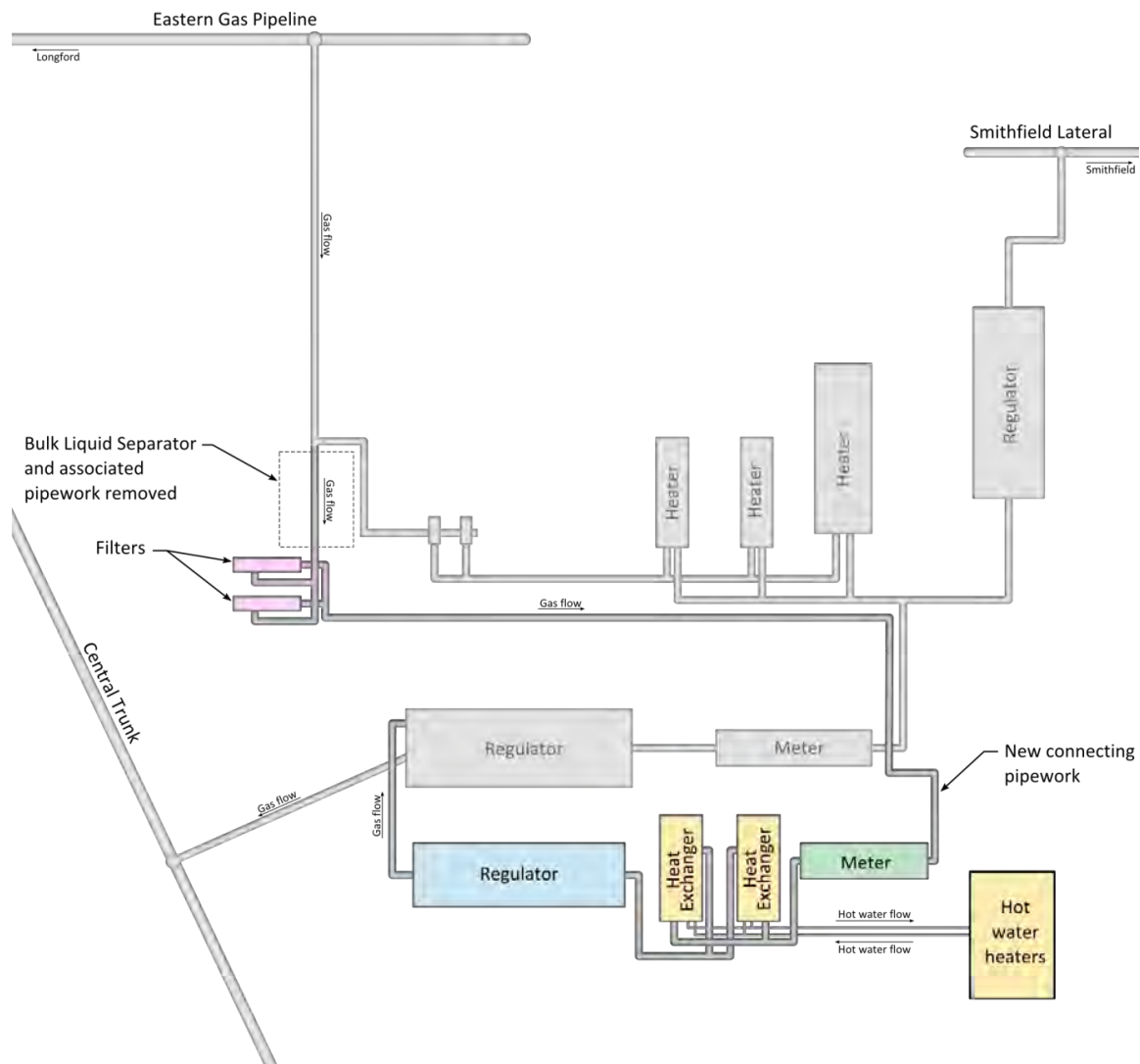


Figure 3-1 Schematic of the additional apparatus and pipework to be installed as part of the proposal



Plate 3-1 The location where most of the new apparatus would be installed

3.4 Construction activities

3.4.1 Work methodology

It is noted that the flow conveyance control equipment would typically be fabricated at an off-site location and brought to site for installation. Certain components of the connecting pipework, such as elbows and flanges, would also be fabricated offsite. Other components would be cut to size on site and installed. The proposal includes the following construction activities:

- Site establishment, including installation of temporary site shelters and amenities for construction personnel, installation of storage containers and areas.
- Site survey and mark out
- Verification of the locations of underground pipework and services
- Bulk excavations to extend the existing level surface of the facility and create the new area onto which to install the new infrastructure
- Minor excavations for concrete pads and plinths and for underground conduits, services and pipework
- Creation of concrete pads for apparatus and plinths for connecting pipework
- Delivery and installation of gas flow conveyance control equipment
- Delivery and installation of connection pipework
- Installation of electrical systems
- Installation of connections to the existing pipework
- Introduction of gas into the new pipework and apparatus, and
- Testing and commissioning.

The regulator, metering unit, heat exchangers and filters would be assembled off site on platforms referred to as skids. This allows the units to be pre-assembled, pre-tested, brought to site and then lifted directly into the appropriate position within the facility for connection. This method

substantially reduces the amount of work required onsite.

3.4.2 Construction hours and duration

Typical construction hours for the proposal will be:

- 6am to 7pm Mondays to Fridays, and
- 7am to 1pm Saturdays

No construction work likely to generate significant noise levels would occur on Sundays and Public holidays and outside standard construction hours. Works associated with the proposal could potentially be carried out outside these standard construction hours where they are unlikely to result in disturbance of any noise sensitive receivers in the vicinity of the work location.

It is anticipated that the proposal would take around six months to construct and commission. The new pipework and apparatus would continue to operate for the life of the Eastern Gas Pipeline.

3.4.3 Plant and equipment

The plant and equipment required to carry out the proposal typically would include:

- Excavators
- Back hoes
- Skid loaders
- Delivery trucks
- Dump trucks
- Mobile cranes (Hiabs, Frannas, slew cranes etc)
- Generators
- Compressors
- Plate compactors
- Concrete trucks
- Concrete pumps
- Welding equipment
- Painting equipment, and
- Hand tools.

Other equipment may also be required.

3.4.4 Earthworks

Earthworks would be carried out to:

- Create a level surface at the same level as that on which the existing facility is located on which to install the new apparatus and pipework
- Create trenches for belowground pipework
- Create trenches for belowground service and telemetry conduits
- Create concrete pad foundation for gas conveyance control equipment, and to

- Create footings and foundations for plinths to support aboveground pipework.

3.4.5 Traffic management and access

The site would be accessed directly from Chandos Road, Horsley Park. The facility is connected to Chandos Road along an asphalt driveway around 220 metres long. Chandos Road would be typically accessed from Wallgrove Road which connects to both Westlink M7 Motorway and the M4 Western Motorway along with a number of other arterial roads.

All parking for construction personnel would be accommodated with existing unused space within Lot 3. No offsite parking would be required as part of the proposal.

3.5 Ancillary facilities

Existing space on the western side within Lot 3 would be used for laydown and storage areas and to locate site sheds, storage containers and site amenities required during construction. No land outside Lot 3 would be required for ancillary facilities.

3.6 Public utility adjustments

The location of services within the site boundary may require relocation as part of the proposal. The proposal would not disrupt gas flow through the existing components of the facility or otherwise affect gas delivery into the Sydney distribution network.

The proposal would also include an upgrade of the electricity supply connection outside the boundaries of the site. This would likely include the installation of standard 3 phase 400V industrial connection equipment on an existing power pole on Chandos Road and an upgrade of the electrical lines between the new equipment and the facility. The application for the proposed connection upgrade would be lodged with Endeavour Energy. It is unlikely that electricity supply in the vicinity would be disrupted during the installation and connection process.

No other public utility adjustments are anticipated due to the proposal.

3.7 Property acquisition

The proposal does not include any property acquisition or adjustments, changes to the existing pipeline easements or the licence areas for the existing pipelines.

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4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 53 of the Infrastructure SEPP permits development for the purpose of a pipeline without consent on any land if the pipeline is subject to a licence under the NSW *Pipelines Act 1967*. The Horsley Park Meter Station is part of the Eastern Gas Pipeline which is subject to Pipeline Licence No. 26 under the *Pipelines Act 1967*. The proposal would occur on land wholly within the lands included in the existing pipeline licence area. Based on this policy alone the proposal would not require any consent.

4.2 State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (the State and Regional Development SEPP) aims to identify types of development of State regional and environmental significance that should be assessed and approved by Minister for Planning and to confer planning assessment and approval functions on the Planning Assessment Commission.

Under clause 14 in the State and Regional Development SEPP development that does not require consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act) and is of a type specified in Schedule 3 to the policy is classified State Significant Infrastructure. Clause 5 in Schedule 3 includes development for the purpose of a pipeline licensed under the NSW *Pipelines Act 1967*. This essentially means that any development associated with a licensed pipeline, even minor alterations within the existing licence area, is considered State Significant Infrastructure that requires approval from the Minister for Planning.

As the facility is subject to Pipeline Licence No. 26 granted under the *Pipelines Act 1967* and the proposal does not require approval under Part 4 of the EP&A Act (due to the Infrastructure SEPP) the proposal therefore meets the definition of State Significant Infrastructure and requires approval under Part 5.1 of the EP&A Act. It is noted, however, that prior to the introduction of this policy no consent under the EP&A Act would have been required for the proposal.

4.3 State Environmental Planning Policy (Western Sydney Parklands) 2009

The aim of *State Environmental Planning Policy (Western Sydney Parklands) 2009* (the Western Parklands SEPP) is to put in place planning controls that will enable the Western Parklands to be developed into a multi-use urban parkland for the region of western Sydney.

A review of maps referenced in the Western Parklands SEPP indicates that the location of the proposal falls within the area covered the Western Parklands. Under Clause 9 of *State Environmental Planning Policy (Western Sydney Parklands) 2009* this land is considered to be unzoned.

Part 2 of the Western Parklands SEPP describes land uses and provisions applying to development within the Western Parklands. The proposal is not of a type included within the description of activities that may be carried out without consent in the Western Parklands. Schedule 2 to the policy lists describes development that is exempt from the need to obtain development consent. The proposal is not of a type described in Schedule 2.

Clauses 12 and 17 set out matters that must be considered by the consent authority for development in the Western Parklands. As the proposal would occur within an existing gas facility and would not require the disturbance and use of any additional land outside the property boundary, the proposal is consistent with the aims of the Western Parklands SEPP.

Clause 17A of the Western Parklands SEPP provides that consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available:

- The supply of water
- The supply of electricity
- The disposal and management of sewage
- Stormwater drainage or on-site conservation, and
- Suitable road access.

The proposal location is already serviced by the essential services required to operate the existing gas facility. It is noted that a minor upgrade of electrical infrastructure along Chandos Road is proposed to augment electrical supply into the facility (refer to Section 3.6).

4.4 Local Environmental Plans

4.4.1 Fairfield Local Environmental Plan 2013

The proposal is within the Fairfield local government area. A review of zoning maps for Fairfield local government area indicates that the location of the proposal is within an area covered by the Western Parklands SEPP. Accordingly, the land is not zoned. In accordance with clause 6 of the Western Sydney Parklands SEPP the *Fairfield Local Environmental Plan 2013* does not apply to the location of the proposal.

4.5 State legislation

4.5.1 The Pipelines Act 1967

The *Pipelines Act 1967* regulates the construction, operation and maintenance of high pressure

natural gas transmission pipelines in NSW. Under section 11 a person must not construct or a pipeline unless in pursuance of the licence granted under the *Pipelines Act 1967*. The Eastern Gas Pipeline subject to Pipeline Licence No. 26 granted under the *Pipelines Act 1967*. As the pipeline licence already includes the Horsley Park Meter Station and no additional land is required for the proposal, no amendment to the licence is required for the proposal.

The savings and transitional provisions in clause 6 of Schedule 1 to the Act provide that where a pipeline was subject to a permit issued under the pre-2006 version of the Act and the proposed alterations are entirely within the lands subject to the permit, alterations can be assessed under Part 5 of the EP&A Act and approved by the Minister for Energy, rather than as State Significant Infrastructure. While the Eastern Gas Pipeline was subject to such a permit, the permit did not cover the section for the pipeline from Wilton to Sydney, including the Horsley Park Meter Station. Approval for the proposal under Part 5 of the EP&A Act is therefore not available for this facility. This position has been confirmed through correspondence with the NSW Department of Trade and Investment. This proposal must therefore be assessed as State Significant Infrastructure.

4.5.2 Environmental Planning and Assessment Act 1979

The proposal is classified as State Significant Infrastructure and requires approval under Part 5.1 of the EP&A Act (the EP&A Act). Under section 115W of the EP&A Act the Minister for Planning is the consent authority for State Significant Infrastructure.

As noted in section 115ZG of the EP&A Act, the following approvals are not required for State Significant Infrastructure projects:

- Concurrence under Part 3 of the *Coastal Protection Act 1979*
- Permits under section 201, 205 or 219 of the *Fisheries Management Act 1994*
- Approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*
- Aboriginal heritage impact permits under section 90 of the *National Parks and Wildlife Act 1974*
- An authorisation referred to in section 12 of the *Native Vegetation Act 2003* to clear native vegetation or State protected land,
- Bush fire safety authorities under section 100B of the *Rural Fires Act 1997*, and
- Water use approvals under section 89, water management work approvals under section 90 and activity approvals (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

Based on the assessment outlined in this document the risk that any of these approvals would be required if the proposal was not State Significant Infrastructure is extremely low.

4.6 Commonwealth legislation

4.6.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) regulates actions that the potential to significantly impact on matters of national environmental significance or the

environment of Commonwealth land. Any actions that have the potential to result in such impacts must be referred to the Commonwealth Department of the Environment.

No matters of national environmental significance have been identified that would potentially be impacted by the proposal. Accordingly, it is unlikely that the proposal would need to be referred to the Commonwealth Department of the Environment.

4.7 Summary of consents required

As outlined above the only statutory consent required for the proposal is approval from the Minister for Planning under Part 5.1 of the NSW EPA Act.

5 Stakeholder and community consultation

5.1 Consultation strategy

Due to the minor nature of the work included in the proposal and the fact that they would occur within the confines of an existing gas facility boundary, the low population and residence density in the vicinity of the proposal it is considered unlikely that a significant and widespread consultation program would be required.

Jemena has consulted with the NSW Department of Trade and Investment regarding the proposal, potential approval pathways and potential licensing requirements under the *NSW Pipelines Act 1967*. Jemena will continue to consult with the Department throughout the assessment and approvals process.

Formal letters regarding the proposal have been sent to the following project stakeholders:

- Potentially affected residents in the vicinity of the proposal location
- Fairfield City Council, and
- State and Federal members of parliament for the electorates in which the proposal would occur.

A Community and Stakeholder Engagement Plan would be developed prior to the commencement of construction in accordance with relevant project approval conditions and implemented during the proposed works.

5.2 Aboriginal community involvement

Due to the disturbed nature of the lands that would be affected by the proposal it is considered unlikely that any intact features of Aboriginal archaeological or cultural heritage significance would be present that could be impacted by the proposal. Jemena has carried out a Due Diligence Archaeological Assessment of the proposal in accordance with *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (NSW Department of the Environment, Climate Change and Water, 2010). The assessment included a site survey with a representative of the Deerubbin Local Aboriginal Land Council (LALC) present.

As no features of Aboriginal archaeological or cultural heritage significance were identified on site no further investigations were recommended. This approach was confirmed by the LALC. No further identification and consultation with Aboriginal stakeholders is proposed.

5.3 Government agency and stakeholder involvement

Consultation with other relevant government agencies will be carried out as directed by or at the discretion of the Department of Planning and Infrastructure.

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6 Environmental assessment

6.1 Biodiversity

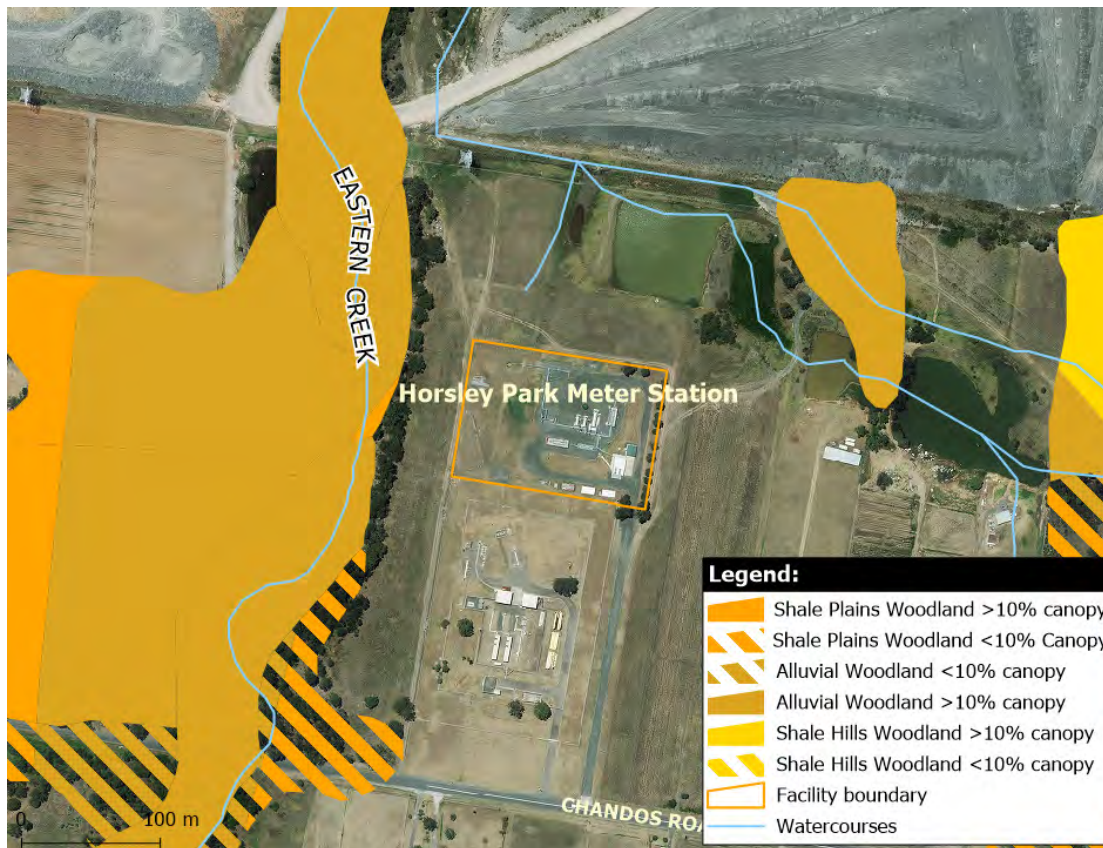
6.1.1 Existing environment

A Biodiversity Impact Assessment of the site has been carried out by Biosis Pty Ltd and is included as Appendix B. A summary of the outcomes of the assessment is provided below.

The Horsley Park Meter Station occupies a rectangular site roughly 140 metres by 100 metres. The site is mostly covered with exotic pasture grasses and areas of gravel hardstand. There are a number of native trees (*Eucalyptus spp.* and *Corymbia spp.*) either side of the facility access gate at the south eastern corner of the site and along the inside of the fence along the eastern site boundary. The species are representative of the trees commonly found on the Cumberland Plain.

Due to the apparent ages of the trees, the fact that they are planted in a straight line and the fact that there are no other trees outside the fence line in close proximity to the facility the assessment concluded that trees were mostly likely planted as landscaping during construction of the facility in 1999/2000 and are considered to be part of an ecological community referred to as Planted Eucalyptus Over Exotic. The trees may, however, provide some foraging and temporary roosting habitat for highly mobile native fauna species.

The native vegetation in the vicinity of the existing facility is mapped as ecological communities considered part of either *River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*, an endangered ecological community (EEC) under NSW *Threatened Species Conservation Act 1995* (TSC Act) or *Cumberland Plain Woodland in the Sydney Basin Bioregion* which is critically endangered ecological community (CEEC) under the TSC Act and Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The closest mapped native vegetation is around 40 metres to the west of the fence of the existing facility as shown in Figure 6-1.



Data: NSW Office of Environment and Heritage. Imagery: Jemena Limited

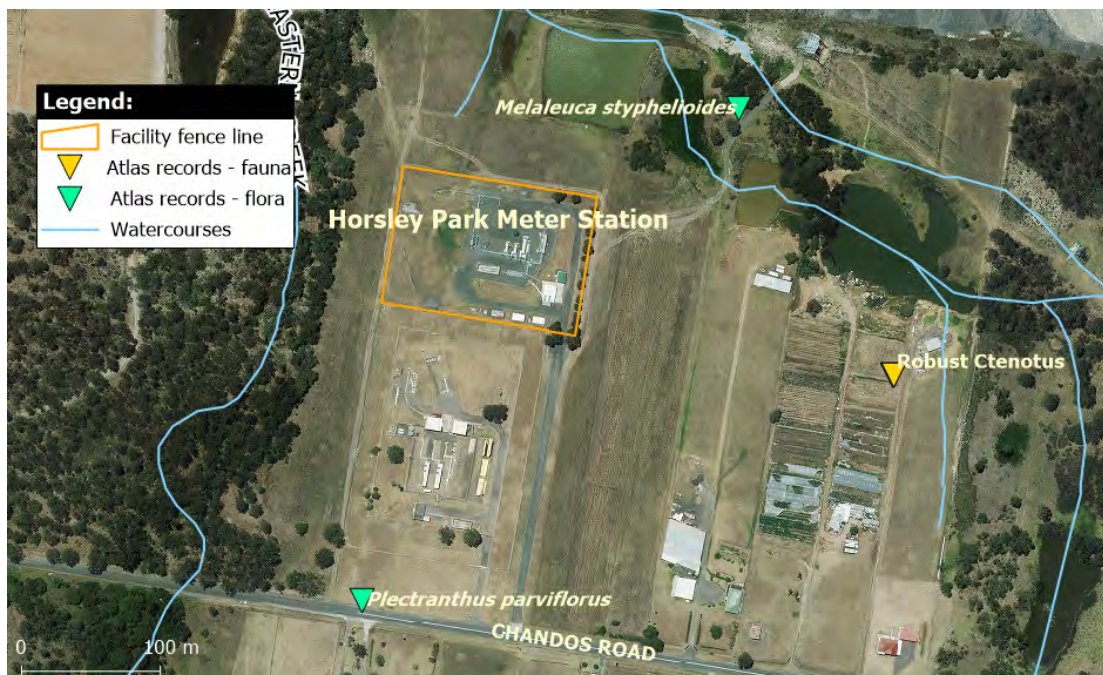
Figure 6-1 Mapped ecological communities in the vicinity of the location of the proposal

Various publicly available databases containing ecological information were searched during the preparation of the Biodiversity Impact Assessment. All threatened biota protected under relevant State and Federal legislation within 5 km of the location of the proposal were identified. The NSW Wildlife Atlas was searched in the vicinity of the location of the proposal. The search identified observations of a number of threatened flora and faunas, the closest of which is around 125 metres northeast of the facility fence, as shown in Figure 6-2.

Site observations indicate that stormwater runoff from the facility flows north along a grassed drainage line and ponds in a depression formed to the west of an existing farm dam. The depression was likely formed as part of significant earthworks and surface alterations that occurred as part of the quarrying and tile manufacturing operation that occur to the north of the facility. During times of significant rainfall the pond would overtop and flow westwards along a depression on the electricity transmission easement and overland into Eastern Creek. Eastern Creek is generally ephemeral at this location and would only contain water during periods of significant rainfall or ponded in depressions.

The water quality in the pond and Eastern Creek is affected by urban and agricultural runoff. To the north of the site Eastern Creek passes between significantly disturbed areas associated with two large quarrying and associated with brick and tile manufacturing activities. The pond, swampy areas and Eastern Creek in the vicinity of the location of the proposal do not represent high quality or important habitat for aquatic or amphibian species.

The Biodiversity Impact Assessment did not identify any threatened species or important potential habitat for threatened species within the site boundary.



Data: Office of Environment and Heritage and Land and Property Information. Imagery: Jacobs Pty Ltd

Figure 6-2 NSW Wildlife Atlas records in the vicinity of the location of the proposal

6.1.2 Potential impacts

Construction activities associated with the proposal would occur entirely within the boundaries of the existing facility. The native vegetation mapped as EEC and CEEC near the facility and the locations where threatened flora and fauna have previously been observed in the vicinity of the facility would not be affected by the proposal either directly or indirectly.

Some pruning of the planted native trees around the access gate for the facility may be required in order to facilitate access for deliveries of large items of gas conveyance apparatus that would be installed as part of the proposal. It is unlikely that the native trees planted along inside of the eastern fence line would be affected by the proposal.

No listed threatened flora species were identified within the areas that would be directly affected by the proposal. No threatened fauna species or important habitat for threatened fauna species were identified within areas that would be affected by the proposal. The planted native trees present may provide some temporary foraging and roosting habitat for native fauna species, including threatened species. The Biodiversity Impact Assessment concluded that all threatened biota noted within the locality were deemed to have a low likelihood of occurrence or were not likely to be directly impacted by the proposed works.

The proposal may result in stormwater runoff with elevated sediment or hydrocarbons levels leaving the site and entering the pond in the depression to the north. An assessment of potential soil and water quality impacts associated with the proposal is provided in Section 6.2. Due to the poor

quality of the water within the pond and the low habitat potential that it provides any run off from site would not result in any significant impact to aquatic ecosystems.

No significant impacts on features of biodiversity conservation significance are anticipated as a result of the proposal.

6.1.3 Mitigation and management measures

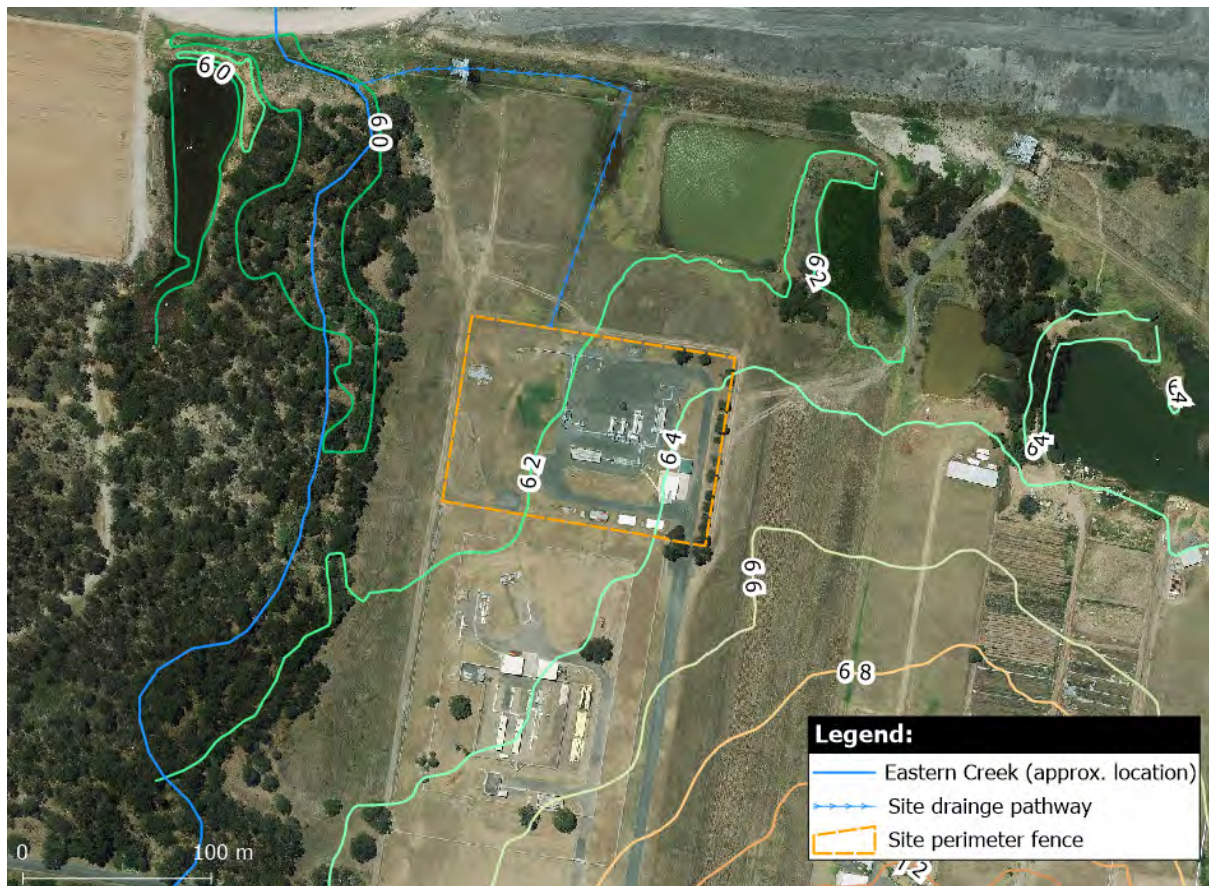
The following mitigation and management measures would be implemented during the proposal to avoid and manage potential biodiversity impacts:

- Limit all works and access to within the existing fenced site perimeter and access driveway
- Review the trees in the vicinity of the site entrance from the perspective of clearance for deliveries of large plant and equipment. If potential clearance issues are identified, favour selective pruning of lower limbs rather than complete removal
- Any tree limb pruning would be carried out by a suitably qualified and experience arborist
- Limit surface disturbance to reduce erosion and potential sedimentation impacts in aquatic ecosystems down gradient from the work location
- Install appropriate sediment filtration devices inside the lowest point of the facility fence line to intercept runoff from site and filter out sediment as outlined in Section 6.2, and
- Implement fuel and chemical storage and use mitigation and management measures outlined in Section 6.2 to reduce the risk of impact to aquatic ecosystems down gradient from the proposed work location.

6.2 Soil and water, hydrology and flooding

6.2.1 Existing environment

The topography of the location in which the proposal would occur is gently undulating. The land on which the existing facility is located generally declines to the northwest. The average slope across the site is around three to four percent. The surface of the facility features local variations due to excavations that have occurred to create a level bench on which the existing facility is constructed. The general topography of the location of the proposal is shown in Figure 6-3.



Data: Land and Property Information (LPI). Imagery: Jacobs Pty Ltd

Figure 6-3 Site topography

The proposal is located within the upper catchment of Eastern Creek. The catchment has been subjected to significant disturbance associated with past vegetation clearing and agricultural practices. Numerous agricultural dams have been constructed along the drainage lines in the vicinity of the site.

Observations from site indicate that the site drains to a low point on the northern side of the facility, as shown in Figure 6-3. From this location runoff from site flows along a small grassed drainage line northwards to a small depression near the electricity transmission easement. The landforms in this location have been significantly altered from the original contours, likely through past agricultural practices, construction of the electricity transmission lines and the establishment of the quarry and tile manufacturing activities that occur to the north. Water ponds in the depression, which connects to a swampy area orientated east to west under the electricity transmission lines. The swampy area drains overland to the west and into Eastern Creek when water levels are sufficiently high.

The ground surfaces both inside and outside the existing facility upslope and downslope from the proposed work location feature continuous and dense grass cover. The site driveway, internal access road and the hardstand area around the existing pipework and apparatus feature are constructed from blue metal rock.

As the facility is on raised ground relative to Eastern Creek and located near the top of the catchment, it is unlikely that it would be subject to significant flood levels affecting the whole site

and inundating the pipework and equipment. Site observations and communications with Jemena operational personnel indicate that the lower (western) portion of the site (below the level of the bench) is subject to inundation during significant rainfall events. To the northwest of the site Eastern Creek passes through a culvert under an access road associated with the quarry and tile manufacturing facility to the north of the proposal location. The culvert and access road would act as a flow restriction during times of significant water flow along the creek. The inundation of the lower portion of the existing facility would likely be a result of ponding above the flow restriction created by the road and culvert. As the floodwaters pond rather than flow the site would not be exposed to significant flow velocities.

Jemena is unaware of any soil contamination within the site. Prior to the construction of the existing facility anecdotal evidence suggests that the property was used as a market garden. Jemena has no records from the construction of the Eastern Gas Pipeline at this location or the facility to suggest that contaminated soil was encountered or that any residual soil contamination persists. A search of the NSW EPA contaminated land record has been carried out. No records were identified in Horsley Park. There is no evidence to suggest that the soils present within the existing facility are contaminated.

6.2.2 Potential impacts

The proposal would involve disturbance of the ground surface. The existing pipework and associated apparatus has been constructed on a level bench, which would be expanded to accommodate the new pipework and apparatus proposed as part of the upgrade. This would require excavation of the raised ground to the south of the existing retaining wall. A depth of around 0.5 metres of soil would be removed creating an extent area of exposed soil roughly 750 square metres in area. Movements of vehicles and plant on unsealed surfaces within the site during construction may lead to further ground disturbance. Erosion from disturbed surfaces on site during periods of rainfall may lead to sedimentation in aquatic ecosystems down gradient from the work location.

The local catchment above the proposed work location is limited, the surface gradient is not steep and there is good grass cover above the proposed work location. It is therefore unlikely that the site would be subject to significant overland stormwater flow volumes and velocities, which would reduce the potential for scour and erosion on site during the works. Sediment controls installed along the inside of the existing northern site perimeter fencing would prevent sediment transport off site. Also, the ground surface down gradient from the facility features dense and continuous ground cover that would intercept runoff from site, reduce flow velocities and limit sediment transport northwards down gradient.

All runoff from site would enter the ponded depression and swampy area to the north of the site which is subject to poor water quality and offers little habitat potential for aquatic or amphibian species. Eastern Creek, into which the location drains, is generally ephemeral in the vicinity of the facility and heavily affected by agricultural and urban runoff. As such, the potential for sedimentation and water quality impacts in aquatic ecosystems down gradient from the proposed work location due to construction of the proposal is very limited.

All surfaces disturbed as part of construction would be stabilised and reinstated, either with grass or hardstand, at the completion of site activities to create a stable ground surface. There is minimal risk that any potential erosion issues would persist on site once stable ground surfaces had been re-established.

The position of the proposed work location on elevated ground relative to Eastern Creek and near the top of the catchment lowers the risk that the area in which the new pipework and apparatus would be installed would flood.

The proposal would involve some alteration of the ground surface including excavation and removal of soil to a depth of around 0.5 metres over an area of roughly 750 square metres to extend the existing bench and create a level area on which the new pipework and apparatus would be constructed. The changes to the existing surface level would be minor in the context of the wider catchment and would be unlikely to result in any significant change to the hydrology of the wider catchment. In the unlikely event that the site does flood, the excavations would increase floodplain storage capacity slightly and would not therefore result in any increases in flood levels or adverse impacts to flood behaviour in the vicinity of the facility.

The risk of encountering contaminated soils during construction is very low.

Maintenance of the proposed flow conveyance and control apparatus, particularly the dry gas filters, can require the removal of light hydrocarbons liquids from within apparatus housings. Plant and equipment required to carry out maintenance works can require refuelling on site. These activities increase the risk of spills on site and potential contamination of the soil and other surface materials. These activities occur very infrequently and the risk of large spills is low. The potential for significant and widespread soil contamination due to the operation of the proposal is therefore very low.

The proposal would not result in any significant impacts associated with soil, water, hydrology and flooding.

6.2.3 Mitigation and management measures

The following mitigation and management measures would be implemented to address potential soil and water impacts:

- The area of disturbance associated with the proposal would be limited to the greatest extent practicable to minimise the potential for erosion from site
- An Erosion and Sediment Control Plan (ESCP) would be prepared for the proposal in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004)(the 'Blue Book'). The ESCP would include as a minimum filtration devices installed immediately inside the fence at the low point on the northern perimeter of the facility
- All site stormwater control features would be identified prior to construction and appropriate controls and protection measures developed, documented in the ESCP and implemented during all works
- Onsite stockpiling of excavated material would be minimised
- All stockpiles of loose and erodible materials would be provided with suitable controls, for

example sediment fencing or filter socks, to prevent erosion

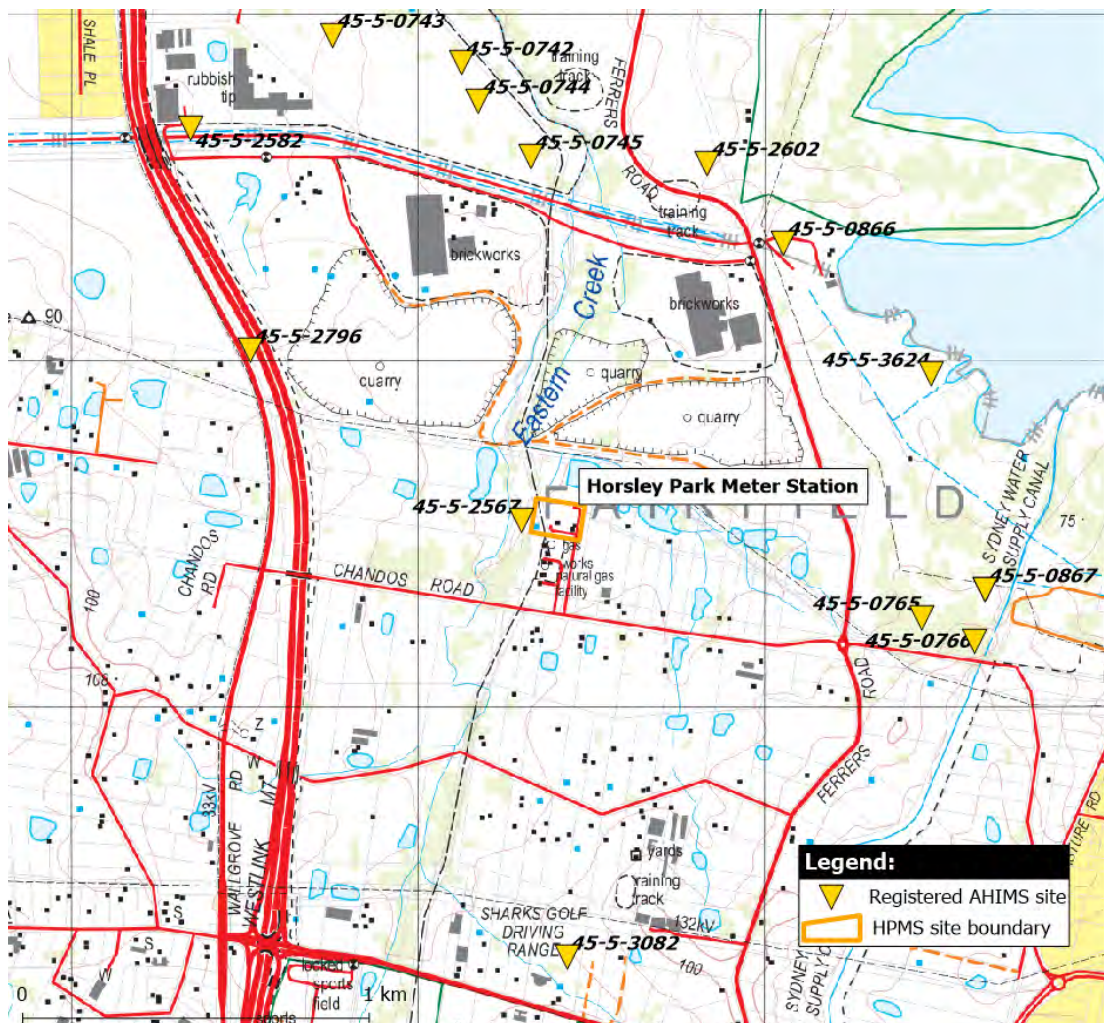
- Store and handle any hydrocarbons and other chemicals required to carry out the proposal in accordance with the relevant Safety Data Sheet (SDS) and product label to reduce the potential for spillage and potential spill volumes
- Refuel construction plant and equipment offsite at a suitable location wherever practicable to avoid the potential for soil contamination in work location and associated contamination of runoff water from site
- Use appropriate task-specific equipment during any onsite refuelling to minimise the potential for spillage and potential spill volumes, and
- Clean up any spills immediately, isolate and contain any potential contaminated material and dispose of at an appropriately licensed waste facility
- If any visual or olfactory evidence of potentially contaminated soils or other materials is uncovered all excavation work at that location would cease until the nature and extent of any potential issues were quantified and appropriate management and mitigations measures developed and implemented to protect the environmental and personnel health safety in accordance with relevant legislation and guidelines
- All surfaces disturbed as part of the proposal would be rehabilitated at the completion of construction to reinstate ground surface stability and reduce the potential for ongoing erosion from site, and
- The effectiveness of site restoration and rehabilitation activities would be monitored during routine facility visits by operational personnel. Corrective actions would be carried out as required to address any ground instability and erosion issues as required.

6.3 Aboriginal heritage

6.3.1 Existing environment

A Due Diligence Archaeological Assessment was carried out for the proposal by Biosis Pty Ltd in accordance with the requirements of *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010). The assessment is provided as Appendix C to this document and summarised below. The assessment was carried out with involvement from the Deerubbin Local Aboriginal Land Council (LALC).

A search of the Aboriginal Heritage Information Management System (AHIMS) register was carried out for the project location. The search identified six (6) previously recorded aboriginal archaeological sites within the vicinity of the project area. Details of these are provided in Table 1 and the site locations are shown in Figure 6-4. The sites registered in the search area are mostly artefacts scatters.



Map Source: Land and Property Information. Aboriginal data source: NSW Office of Environment and Heritage

Figure 6-4 Registered Aboriginal sites in the vicinity of the location of the proposal

Site 45-5-2561 is an artefact scatter that is located around 20 to 30 metres to the west of the western boundary of the facility. The site was recorded in 1999 during the surveys carried out as part of the original impact assessment of the Eastern Gas Pipeline, of which the member of the Deerubbin LALC that attended the recent site survey was a participant. The site comprised of silica artefacts (one flake and one core) located on a vehicle track in a heavily disturbed market garden area. It was determined at the time that the presence of other intact subsurface archaeological matter would be unlikely due to the high level of ground disturbance. It is noted on the site card that a 'Consent to Destroy' with salvage was applied for under section 87 the NSW *National Parks and Wildlife Act 1974* and the location was disturbed during original construction of the Eastern Gas Pipeline. The site is, however, currently still recorded as 'valid' (intact) on the AHIMS register.

The next closest registered aboriginal sites are located around one kilometre from the facility and are not considered further in this assessment.

The field inspection of the proposal location was carried out with the presence of a member of the Deerubbin LALC. Ground surface visibility was generally very low due to dense grass cover and the

presence of paved surfaces, buildings and meter station infrastructure. The ground exposures that are evident around the bases of trees and along fences lines were inspected. No aboriginal objects were located within the existing facility and areas that would be disturbed as part of the proposal.

It was noted that the entire area has been highly disturbed through the installation of the gas meter station and associated infrastructure. It is evident that extensive excavation and earth movement has taken place across the whole site to create a level berm on which to construct the existing gas infrastructure.

6.3.2 Potential impacts

No aboriginal artefacts or areas of cultural potential were identified areas that would be affected by the proposal. Although the project area is located in an area of generally high potential for aboriginal sites, the high levels of previous ground disturbance mean that there is a low potential for other intact archaeological material to be present in the locations that would be disturbed as part of the proposal. It is therefore considered unlikely that the proposal would have any impact on features of aboriginal archaeological or cultural heritage significance.

A draft of the Due Diligence Archaeological Assessment was provided to the Deerubbin LALC for review and comment. The Deerubbin LALC confirmed the conclusions of the assessment.

6.3.3 Mitigation and management measures

The mitigation and management measures that would be implemented in the event that previously unidentified features of Aboriginal archaeological or cultural heritage significance are uncovered (unexpected finds) during the proposal include:

- All work in the vicinity of the unexpected find would cease
- The NSW Department of Planning, NSW Office of Environment and Heritage and the Deerubbin LALC would be contacted and advised of the unexpected find
- No works would recommence at that location until such time as the Department of Planning has determined the nature and significance of any finds and determined an approach for further work, in consultation with other agencies and Aboriginal stakeholders as required, and
- If the unexpected find involves skeletal remains the NSW Police would be contacted and advised immediately. No works would recommence that could further impact the remains unless approved and directed by the NSW Police.

6.4 Greenhouse gases and climate change

6.4.1 Types of greenhouse gas emissions

Greenhouse gas emissions (GHG) can be categorised into three main types:

- Scope 1: Direct emissions associated with the carrying out of an activity or the operation of a facility

- Scope 2: Indirect emissions created as a result of the generation of electricity used during the carrying out of an activity or the operation of a facility, and
- Scope 3: Indirect emissions generated in the wider economy as a consequence of the carrying out of an activity or the operation of a facility.

In the case of the proposal, Scope 1 GHG emissions are those generated during the combustion of fuels by the construction plant and equipment that would be used to carry out the proposal and the combustion of natural gas for heating purposes during the operation of the facility.

Scope 2 GHG emissions are those associated with the generation of any electricity used either during the construction or operation of the proposal.

All other GHG emissions are defined as Scope 3. In the case of the proposal these emissions would include the embodied energy of the materials and resources used to carry out the facility upgrade and the combustion of fuels associated with transportation of plant, equipment, materials and personnel to and from the location of the proposal.

6.4.2 Existing environment

The operation of the existing Horsley Park Meter Station results in GHG emissions directly through the combustion of natural gas in the water bath heaters and also indirectly through the electricity used by the facility and the transportation movements associated with facility operation and maintenance.

During operation of the existing facility the main Scope 1 GHG emissions are generated by the combustion of natural gas in three water bath heaters. The temperature of the gas decreases significantly during pressure reduction, which can lead to the steel of the pipework and apparatus becoming brittle which in turn affects the strength characteristics of the metal. To address this potential issue the temperature of the gas is increased by passing the pipework through water bath heaters prior to pressure reduction. The heaters combust natural gas to heat the water that the pipework passes through. This increases the temperature of the natural gas and reduces the potential for embrittlement.

Around 120,000 gigajoules of natural gas is combusted each year within the three water bath heaters on site. The emissions from natural gas combustion mostly consist of carbon dioxide. Small amounts of unburnt methane and nitrous oxide (N₂O), which are also GHG, are also present.

Natural gas is vented from certain components of the facility during maintenance activities. While difficult to quantify, the emissions occur infrequently and only small volumes of gas are released. It is anticipated that the volume of natural gas released during venting would be very minor compared to the overall GHG emissions from the water bath heaters.

The existing facility uses very little electricity compared to the volume of natural gas combusted. Scope 2 GHG emissions due to facility operation are therefore relatively low. Only limited transportation of equipment, plant, materials, and personnel to and from the facility is required during facility operation and maintenance. Scope 3 GHG emissions are therefore relatively low also. Scope 2 and Scope 3 emissions during normal operation of the facility are negligible compared to

Scope 1 emissions and are not considered further.

Scope 1 GHG emissions from the facility are estimated and reported by Jemena in accordance with requirements of the *National Greenhouse and Energy Reporting Act 2007*. The GHG emissions from the existing facility, as estimated for the 2012/2103 financial year using the methods and emissions factors documented in *National Greenhouse Accounts Factors* (Department of the Environment, 2013), are outlined in Table 6-1. To put these estimated emissions into context, the total estimated GHG emissions for Australia in the year 2012 as reported in the National Greenhouse Gas Inventory are 407,572,202 tonnes (as CO₂-e). The GHG emissions from the facility would represent around 0.000015% of total Australian GHG emissions. In this context the carbon dioxide emissions from the facility are small in terms of overall GHG emissions.

Estimates indicate that around 15% of total GHG emissions are generated by the transport sector. Given the location of the proposal within the wider Sydney metropolitan area and the proximity of the proposal to the Westlink M7 Motorway, the existing emissions from the facility would be unlikely to result in any significant contribution to local or regional GHG emissions.

Table 6-1 Estimated annual Scope 1 greenhouse gas emissions from the Horsley Park Meter Station

Unit	Maximum heating capacity (MW)	Energy Consumed (GJ)	Total GHG emissions (t CO ₂ -e)			Total GHG (t CO ₂ -e)
			CO ₂	CH ₄	N ₂ O	
Heater 1	0.4	15,160	788	1.5	0.5	790
Heater 2	0.4	16,614	864	1.7	0.5	866
Heater 3	1.2	87,803	4,565	8.9	2.7	4,577
Total						6,233

Source: Jemena

6.4.3 Potential Impacts

Construction

Construction of the proposal would result in GHG emissions. An assessment of potential GHG due to construction of the proposal has been carried out in accordance with the guidance and emission factors contained in *National Greenhouse Accounts Factors* (Department of the Environment, 2014) and *Greenhouse Gas Assessment Workbook for Road Projects* (Transport Authorities Greenhouse Group, 2013). The assessment considered the fuel that would be used by construction plant and equipment, the embodied energy of the main construction materials that would be used and GHG emissions associated with transport of materials, plant, equipment and personnel to from site over the duration of construction.

The majority of electricity required during construction of the proposal would be provided by on site generators negligible Scope 2 GHG emissions are anticipated. No scope 3 emissions have been considered in the assessment of GHG emissions due to construction.

A summary of the results of the assessment is provided in Table 6-2. Around three quarters of the

estimated GHG emissions due to construction are Scope 3 emissions associated with the embodied energy in the construction materials. The rest of the estimated GHG emissions are direct and indirect emissions from fuel combustion associated with construction plant and equipment and transportation. Potential GHG emissions due to construction of the proposal are significantly lower than the GHG emissions due to the operation of the existing facility.

Table 6-2 Estimated GHG emissions due to construction of the proposal

Source of GHG emissions	Annual GHG emissions (t CO ₂ -e)
Scope 1	
Estimated fuel combustion from construction plant and equipment	98
Scope 2	
Electricity consumed	0
Scope 3	
Embodied energy of main construction materials:	
• Concrete	203
• Steel Structural	378
• Hardstand materials	2
• Bricks	39
Fuel combustion associated with transportation:	
• Heavy vehicles	22
• Light vehicles	88
Total:	830

Operation

An assessment of potential increases in GHG emission due to the operation of the proposal has been carried out in accordance with the guidance and emission factors contained in *National Greenhouse Accounts Factors* (Department of the Environment, 2014). The results of the assessment are outlined in Table 6-3.

Additional water heating apparatus would be installed as part of the proposal. Two heat exchangers would be installed to heat the gas within the new pipework prior to pressure reduction. The heat exchangers would use hot water provided by new boilers that would combust natural gas to generate heat. The emissions from the boilers would increase Scope 1 GHG emissions from the facility.

Table 6-3 Estimated annual increases in GHG emissions due to the operation of the proposal

Source of GHG emissions	Annual GHG emissions (t CO ₂ -e)
Scope 1 emissions	
Additional natural gas combusted by proposed heating apparatus	6,233
Scope 2 emissions	
Additional electricity consumed	241
Scope 3 emissions	
Embodied energy of main construction materials	0
Fuel combustion associated with transportation	0
Total:	6,471

Heating requirements and associated natural gas combustion increase with increasing gas flow through the facility. The boilers that would be installed as part of the proposal would have a maximum heating capacity of 1.4 megawatts which is similar to the heating output currently provided by the existing water bath heaters. The proposed and existing heating apparatus would therefore combust similar quantities of natural gas and result in similar GHG emissions in terms of composition and quantity.

At full gas throughput the potential Scope 1 GHG emissions from the facility would therefore double under the current proposal. Actual Scope 1 GHG emissions from the upgraded facility would, however, increase steadily over time as gas flow through the facility increases in response to increased gas demand within the distribution network.

The proposal would also result in a substantial increase in electricity demand by the facility, which would result in increased Scope 2 GHG emissions. It is anticipated that the additional electricity demand from the upgraded facility would be around 32 kilowatts per hour. The potential increase in Scope 2 GHG emissions due to the proposal is outlined below in Table 6-3.

As the proposal would not substantially alter the movement of plant, equipment, materials and personnel to from the facility, no increases in Scope 3 GHG emissions are anticipated.

Almost all of the additional GHG emissions due the operation of the proposal would result from the additional combustion of natural gas associated with the new heating apparatus. The potential increase in Scope 1 GHG emissions due the proposal is significant relative to existing emissions from the facility. As the combustion of natural gas is an essential part of the gas conveyance process this potential impact is unavoidable.

Based on emission factors provided in *National Greenhouse Accounts Factors* (Department of the Environment, 2014) GHG emissions from the combustion of coal are around 70% higher than those generated by the combustion of natural gas. The majority of natural gas supplied by the distribution network is combusted for heating purposes. If the additional natural gas delivery is not increased, the shortfall may lead to increased use of electricity from coal combustion, with associated GHG

emission increases. In this regard, the proposal may actually provide a benefit in terms of overall GHG emissions.

So while the potential increases in GHG that would result from the proposal are significant relative to existing GHG emissions from the facility, the increases are considered justified based on the potential benefits provided by proposed upgrade.

6.4.4 Mitigation and management measures

The following mitigation and management measures would be implemented during the proposal to avoid and manage potential GHG emissions:

- Switch plant and equipment off when not in use
- Ensure that all construction plant and equipment is adequately serviced and maintained
- Investigate options for and use materials with a high recycled content (for example quarry products for hard stands and concrete) wherever practicable
- Reduce facility blow downs during maintenance to the greatest extent practicable
- Flare rather than vent natural gas during facility maintenance activities when safe, reasonable and feasible to do so
- Car pool or arrange a shuttle bus service from appropriate public transport facilities wherever reasonable and feasible to reduce vehicle trips

6.5 Air quality

6.5.1 Existing environment

The location of the proposal is semi-rural area located within a regional urban environment and the background air quality reflects this. Regional air quality is subject to factors such as seasonal variations, wind and temperature effects, varying potential pollutant sources such as vehicular emissions and industry and event type pollutant loads such as bushfires. As such, regional air quality can be highly variable in nature. The Westlink M7 Motorway and M4 Western Motorway, which are in the vicinity of the proposal, and the associated vehicle emissions are significant contributors to local air quality.

As described in the preceding section, the existing facility combusts natural gas. The combustion of natural gas results in the emission of carbon dioxide, carbon monoxide and oxides of nitrogen (NO_x). The emissions of carbon dioxide from the facility are assessed in Section 6.4 and are not considered further in this section. As natural gas does not contain any long chain hydrocarbons, no particulates or harmful products of incomplete combustion are generated.

The emission of carbon monoxide (CO) and oxides of nitrogen (NO_x) from the existing facility is estimated and reported by Jemena as part of the National Pollution Inventory. Estimates for the existing facility for the 2012/2013 financial year calculated based on an annual natural gas usage of 2,321 tonnes per year are outlined in Table 6-4.

Table 6-4 Estimated annual emissions from the Horsley Park Meter Station

Substance	Estimated annual emissions (kg)
Carbon monoxide (CO)	4,220
Oxides of nitrogen (NO _x)	5,010

Source: Jemena

6.5.2 Potential impacts

Construction

Fuel combustion associated with the plant and equipment required to construct the proposal would generate emissions. The movements associated with the delivery of plant, equipment and materials and the movements of the construction workforce would also result in emissions. The emissions would consist of carbon dioxide, CO, NO_x, particulates and volatile organic compounds. As the location of the proposal is in the vicinity of two motorways that would be major contributors to local air quality and the trips made associated with the proposal would be insignificant compared to the total vehicle movements along those motorways, any contribution to local and regional air quality due to the construction of the proposal would be negligible.

Construction of the proposal would require some minor excavations. Disturbance of the ground surface and exposure of soils may lead to dust generation during construction. Due to the distance of any sensitive receivers from the location proposal, it is considered unlikely that dust from construction would reach or otherwise affect the amenity of any residents in the vicinity.

All vehicular movements outside the boundaries of the existing facility would occur on sealed or gravelled roads. The potential for increase dust generation to vehicular movements during construction of the proposal is therefore limited.

The construction of the proposal is therefore considered unlikely to result in any significant air quality impacts.

6.5.3 Operation

The installation of additional heating apparatus as part of the proposal would increase the operational emissions from the facility. The emissions would consist mainly of carbon dioxide, CO and NO_x. The potential increase in carbon dioxide emissions during operation of the proposal is assessed in Section 6.4 and is not considered further in this section.

The maximum heating capacity of the new heating equipment proposed would be similar to the current heating levels of the existing facility. It is anticipated that maximum natural gas combustion by the upgrade facility would double. Emissions from the new boilers proposed as part of the proposal would be similar in composition to the emissions from the existing heating apparatus. Potential emissions of CO and NO_x are therefore likely to double as a result of the proposal.

CO and NO_x are typical constituents of vehicle emissions. Potential emission of CO and NO_x from the

upgraded facility can be put into context by considering the potential emissions from vehicles on the Westlink M7 motorway around one kilometre to the west. Around 150,000 vehicles use the Westlink M7 every day.

An estimation CO and NO_x emissions from a two kilometre long section of the Westlink M7 motorway in the vicinity of the proposal is provided in Table 6-5. The calculations assume that around one third of vehicles that use the Westlink M7 everyday use a section of the motorway in the vicinity of the location of the proposal. Potential emissions have been estimated using emissions factors for light petrol passenger vehicles contained in *Emissions Estimation Technique Manual for Aggregated Emissions from Motor Vehicles* (Environment Australia, 2011).

Table 6-5 Indicative estimated annual emissions from a 2km section of the Westlink M7 motorway

Substance	Estimated annual emissions (kg)
Carbon monoxide (CO)	16,900
Oxides of nitrogen (NO _x)	9,782

CO and NO_x emissions from vehicles are dependent on engine size, age and condition, fuel type, traffic conditions and driving behaviour and are therefore difficult to estimate accurately. The estimated pollutant loads determined using this method can, however, give an indication of the relative scale of emissions compared to the Horsley Park Meter Station. Based on the calculations, the potential emissions from the upgraded Horsley Park Meter Station might be similar to the emissions from a two kilometre long section of the Westlink M7. In the context of overall emissions from the Westlink M7 and other motorways in the Sydney region, potential contributions to regional air quality due to increased emissions from the upgraded Horsley Park Meter Station would be minor.

The temperature of the exhaust gases from the facility would be significantly greater than ambient temperatures. Emissions from the facility would rise and disperse into the atmosphere. Given that the closest residences are around 300 metres or more from the facility, the risk of any measurable increases in the concentrations of CO and NO_x at any residences in the vicinity of the facility due to the proposal would be low.

The risk that the proposal would result in adverse impacts to local and regional air quality would be low.

6.6 Noise and vibration

6.6.1 Existing environment

While the location of the proposal is in a regional urban environment, the areas immediate adjacent to the facility are semi-rural area in nature, with characteristic low background noise levels. The existing facility generates noise due to the gas flow through above ground pipes and fittings and the operation of other apparatus, such as the water bath heaters. The apparatus present with the

greatest potential for noise generation, the regulators and the metering equipment, is housed in open-roofed masonry enclosures to attenuate the noise generated. Other sources of noise in the vicinity include the other gas facility to the south of the Horsley Park Meter Station which is associated with the Central Trunk, the quarrying and tile manufacturing activities carried out to the north of the location and traffic noise associated with the Westlink M7 Motorway to the west.

Noise monitoring was carried out by Forster OHS in 2009 to determine noise exposure levels within the Horsley Park Meter Station in accordance with the requirements of *AS 1269-1998: Occupational Noise Management*. The study measured the noise levels produced by the noise emitting apparatus on site. A summary of the average noise levels and noise level ranges for each item is provided in Table 6-6. From the data a cumulative average noise level of 91 dBA and a cumulative maximum noise level 96 dBA from the existing facility can be assumed.

Table 6-6 Noise levels for existing apparatus at the Horsley Park Meter Station

Item	Average noise level (dBA)	Noise level range (dBA)
Central Trunk Meter Skid	69	67-71
Central Trunk Regulation Skid	85	79-89
Water Bath Heater 1 (small)	79	77-83
Water Bath Heater 2 (small)	79	76-82
Water Bath Heater 2 (large)	88	78-94
Central Trunk Launcher Trap	76	75-77
Smithfield Lateral Regulation Skid	84	75-88

Source: Noise Survey Metering Station – Horsley Park & Smithfield (Forster OHS, 2009)

From time to time natural gas has to be released from sections of the existing facility, typically when replacement of certain components is required. Referred to as 'blow down', the natural gas releases generate noise levels between 130-140 dBA. These events typically occur for several minutes only and may occur on average once or twice a year. It is not practicable to attenuate the noise from blow downs.

The closest sensitive receivers to the location of the proposal are residences located along either side of Chandos Road, as shown in Figure 6-5. The closest residences to the location of the proposal, Residences 1, 6 and 7, are located around 300 metres to southeast. Background noise levels are very low in the vicinity of the proposal are very low. With the exception of occasional blow downs, the existing facility is not audible at the closest residences.

The existing facility does not contain any equipment or apparatus or processes that generate significant vibration levels.



Cadastral data: Land and Property Information. Imagery: Jemena Limited

Figure 6-5 Noise sensitive receivers in the vicinity of the location of the proposal

6.6.2 Criteria

Construction

Noise goals (limits) for construction, referred to as noise management levels (NMLs), are defined in the *Interim Construction Noise Guideline* (DECCW, 2009) (ICNG). NMLs are related to the rating background levels (RBLs) for a particular location, determined in accordance with the *NSW Industrial Noise Policy* (NSW EPA, 1999) (the INP). Specific NMLs are defined for the day time (7am to 6pm), evening (6pm to 10pm) and night-time (10pm to 7am) periods. The INP states that where background noise levels are found to be less than 30 dBA, then a RBL of 30 dBA is adopted. For the purpose of this initial construction noise assessment a RBL of 30 dBA been adopted. The NMLs adopted for the purpose of this assessment are outlined in Table 6-7.

The ICNG outlines that persons undertaking work should aim to keep LAeq(15 minute) noise levels within the relevant NMLs. It is recognised, however, that due to the nature of construction works this may not always be possible.

Table 6-7 Noise management levels for the proposal

Descriptor	Period		
	Day 07:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 07:00
Noise management level definition	RBL + 10	RBL + 5	RBL + 5
Noise management level	40	35	35

Operations

The INP sets noise goals for operational noise from fixed facilities. The INP considers both intrusive (short-term) noise impacts and noise amenity. As with the INCG, the noise goals developed in accordance with the INP and related to the RBLs for the location. The intrusive noise criterion is defined as relevant RBL plus five dBA. The acceptable noise level criteria for amenity are defined for different noise receivers in various contexts in Table 2.1 of the INP.

The INP states that where background noise levels are found to be less than 30 dBA, then a RBL of 30 dBA is adopted. Operational noise criteria for the proposal are outlined in Table 6-8 below.

Due to the conservative assumption regarding the RBL the intrusive criteria becomes the limiting criterion for operational noise.

Table 6-8 Construction and operational noise criteria for the proposal

Criteria		Period		
		Day 07:00 – 18:00	Evening 18:00 – 22:00	Night 22:00 – 07:00
Intrusive criteria	Definition	RBL + 5	RBL + 5	RBL + 5
	Criteria	35	35	35
Amenity criteria	Definition	From Table 2.1 in the INP	From Table 2.1 in the INP	From Table 2.1 in the INP
	Criteria	50	45	35

6.6.3 Potential impacts

Construction

Typical construction scenarios were identified for the proposal as shown in Table 6-9. The scenarios assume all items of plant are operating concurrently at peak sound power levels and are considered to be highly conservative. Based on Table 6-9 a maximum worst case cumulative sound power level of 109 dBA has been adopted for the assessment of potential construction noise impacts.

Table 6-9 Typical construction scenarios and cumulative sound power levels

Scenario	Equipment	Max LAeq sound power levels SWL (LAeq (15minute)) (dBA)	No .of items	Cumulative Sound Power Level, SWL (dBA)
Site excavation	Excavators (20t)	104	2	109
	Tipper truck	97	2	
	Backhoe (7.5t)	104	1	
Concrete pours	Concrete truck	106	1	109

Scenario	Equipment	Max LAeq sound power levels SWL (LAeq (15minute)) (dBA)	No .of items	Cumulative Sound Power Level, SWL (dBA)
	Concrete pump	106	1	
Site deliveries	Semi-trailer	106	1	108
	Flatbed truck	100	1	
	Franna	99	1	
	Telehandler	92	1	
Mechanical installation	Mobile Crane (100t)	101	1	109
	Telehandler	92	1	
	Semitrailer	106	1	
	Excavator (20t)	104	1	
	Compressor (250 cfm)	92	1	

Worst case potential construction noise impacts for the residences in the vicinity for each indicative work scenario are outlined in Table 6-10. It is noted that all construction activities would be scheduled within standard day time construction hours. The predicted construction noise levels at each residence in the vicinity of the location of the proposal are therefore compared to the day time NML. The day time NML is only predicted to be exceeded at two residences in the vicinity of the location of the proposed work and only by 1 dBA. Due to the conservative nature of this assessment it is anticipated that such exceedances would be very short-lived in nature, if they occur at all.

There will be no significant construction noise impacts generated by the proposal.

Table 6-10 Predicted construction noise levels

Residence	Distance from site (m)	Sound pressure level at receiver, SPL (dBA)	Noise Management Level (dBA)	Predicted exceedance of NML (dBA)
1	318	40	40	-
2	362	39	40	-
3	375	38	40	-
4	492	35	40	-
5	391	38	40	-
6	298	41	40	1
7	300	41	40	1
8	614	32	40	-

Residence	Distance from site (m)	Sound pressure level at receiver, SPL (dBA)	Noise Management Level (dBA)	Predicted exceedance of NML (dBA)
9	558	33	40	-
10	631	32	40	-
11	625	32	40	-
12	577	32	40	-

Various activities would be carried out during construction of the proposal that generate vibration. These activities would typically be associated with compaction of the earth to provide stable foundations for the new apparatus and pipework that would be installed as part of the upgrade. Vibrations typically diminish rapidly with increasing distance from source. Any vibrations generated during construction would therefore be unlikely to affect the structural integrity of the buildings or infrastructure within the existing facility.

The closest vibration sensitive receivers in the vicinity of the location of the proposal are the residences located along Chandos Road. Due to the large distances between the nearest residences and the facility it is unlikely any vibrations generated during construction would be perceptible at these locations. Construction of the proposal would not result in any significant vibration impacts.

Operation

The following noise sources would be added to the existing facility as part of the proposal:

- a regulator, and
- boilers.

Masonry walls would be constructed around each of these features to reduce noise propagation. While these would be roofless structures, the masonry walls would significantly reduce the lateral propagation of operational noise. It is noted that heat exchangers are proposed as part of the proposal rather than water bath heaters as the exchangers generate significantly lower noise emissions. As any noise generated by the heat exchangers would be significantly lower than the noise levels from the other apparatus and would not likely contribute to overall operational noise levels from the upgraded facility they have not been considered further in this assessment.

For the purposes of an initial assessment of potential operational noise impacts associated with the proposal the noise value of the maximum measured range for the existing regulator and metering skid have been assumed for the new regulator and metering skid. There is no boiler room in the existing facility. The maximum measured noise value for the larger water bath heater present on site has been conservatively assumed for the proposed for boiler room. It is noted that the water bath heater does not feature any noise attenuating walls or devices. These assumed noise levels have been combined with the measured noise levels referred to in Table 6-6 into a conservative estimate of the cumulative maximum operational noise from the upgraded facility of 99 dBA.

An assessment of the potential operational noise impacts of the upgraded facility on the noise sensitive receivers in the vicinity is provided in Table 6-11. Based on this conservative assessment it is considered highly unlikely that the normal operation of the upgraded facility proposal would result in exceedances of either the intrusive or amenity criteria for operational noise. The proposal would not therefore result in any significant additional impacts associated with continuous operational noise from upgraded facility.

Table 6-11 Predicted operational noise levels from the upgraded Horsley Park Meter Station

Residence	Distance from site	Sound pressure level at receiver, SPL (dBA)	Intrusive Criteria (dBA)	Exceedance (dBA)	Minimum Amenity Criteria (night-time period)	Exceedance (dBA)
1	318	27	35	-	40	-
2	362	25	35	-	40	-
3	375	27	35	-	40	-
4	492	24	35	-	40	-
5	391	27	35	-	40	-
6	298	30	35	-	40	-
7	300	30	35	-	40	-
8	614	22	35	-	40	-
9	558	23	35	-	40	-
10	631	21	35	-	40	-
11	625	21	35	-	40	-
12	577	22	35	-	40	-

Blow down of the new apparatus and pipework that would be installed as part of the proposal would be required from time to time and would add to the frequency of existing blow downs carried out for the facility. While operational noise levels from the facility are measured as averages over 15 minute periods (LAeq(15 minute)) and the blow down events are typically completed within one to two minutes, it is still anticipated that the blow down events would exceed the operational noise criteria at the residences in the vicinity due to the magnitude of the noise levels generated. The proposal would therefore result in an increase of events that exceed the relevant operational noise criteria at sensitive noise receivers in the vicinity. It is not practicable to significantly reduce the noise levels associated with blow down events.

It is noted that blow downs are manually instigated activities that occur during maintenance work within standard day time construction hours. Noise from blow downs that occur within the existing facility would already be considered part of the existing acoustic environment by noise receivers in the vicinity of the facility. As the proposal would only result in small number of additional blow down instances per year (if at all) and would not introduce a completely new type of noise event to the local area, the potential operational noise impacts associated with an increased number of blow

downs due to the proposal are not considered significant.

No new equipment or apparatus with the potential to generate significant vibration levels would be installed as part of the proposal. No vibration impacts are therefore anticipated due to the operation of the proposal

6.6.4 Mitigation and management measures

The mitigation and management measures that would be implemented for the proposal to minimise potential noise impacts are outlined below:

- Construction activities would be limited to between 7am and 6pm Monday to Friday and 8am to 1pm on Saturdays. No activities likely to generate noise would be carried out on Sundays or Public Holidays or outside standard construction hours
- Machinery would be switched off when not in use wherever practicable
- The potentially affected residents would be notified prior to commencement of construction. The contact details of an appropriate site person would be provided for community queries and complaints
- Any complaints received from the community regarding noise impacts would be entered into Jemena's Incident Management System, investigated and addressed promptly
- Compression breaking would be banned in the vicinity of the facility for all heavy vehicle associated with the proposal. The need to avoid compression breaking would be included in a Project Induction that would be delivered to all personnel (including drivers) prior to their involvement in the proposal, and
- A qualitative assessment of potential operational noise levels due to the upgraded facility would be carried out by a specialist noise or acoustic consultant in accordance with the requirements of NSW *Industrial Noise Policy* (NSW EPA, 1999) to confirm the findings of the preliminary assessment of operational noise described in this document. If the assessment indicates operational noise levels would not comply with the relevant noise goals from policy, the consultant would specify additional controls required to ensure compliance with relevant operational noise criteria.

As no vibration the impacts are anticipated due to proposal, no mitigation and management measures are proposed for vibration.

6.7 Traffic and access

6.7.1 Existing environment

The Horsley Park Meter Station is located on Chandos Road, which is a local road through a semi-rural area of Western Sydney. Chandos Road does, however, provide an east to west link between Wallgrove Road and Wetherill Park and site observations indicates that it is subject to reasonable traffic volumes during morning and afternoon peak times consisting of both light and heavy vehicle movements. At other times, Chandos Road is subject to low traffic volumes.

Chandos Road intersects with Wallgrove Road around one kilometre to the west of the Horsley Park

Meter Station. Wallgrove Road is an important arterial road and is subject to high a volume of light and heavy vehicle movements. Wallgrove Road also connects to the Westlink M7 Motorway the M4 Western Motorway which are heavily trafficked by both light vehicles and heavy vehicles and provide fast and efficient road-based access to the wider Sydney region and beyond.

Under normal operating conditions the existing facility is unmanned and requires only infrequent vehicular access. Increased site access would be required during facility maintenance activities. Vehicular movements during these activities may include light vehicles trips associated with personnel movement and also heavy vehicles trips associated with site deliveries. Such activities occur infrequently. Due to low traffic volumes on Chandos Road, the limited numbers of vehicles that would access the site during maintenance activities and the temporary nature of the work, facility operation and maintenance would be unlikely to result in congestion, increased travel times or restrictions in property access along any roads in the vicinity of the facility.

6.7.2 Potential impacts

The majority of site access would occur directly along Chandos Road from Wallgrove Road. The proposed upgrade would result in increased light and heavy vehicle movements along these roads. The increased vehicle movements would be generated by deliveries of new pipework and apparatus, construction equipment and materials, the removal of waste materials, excess construction materials and equipment at the completion of construction and the movements of the construction and commissioning workforce.

It is anticipated that the proposal would generate around 200 additional heavy vehicle movements to and from the site in total. These additional vehicle movements would occur over the six month construction and commissioning period. The proposal would also likely generate up to 40 additional light vehicle movements to and from the site each day. Due to the low existing traffic volumes along Chandos Road is it unlikely that the increase in light and heavy vehicle movements associated with the proposal would result in increased congestion, reductions in travel times or property access restriction for any other vehicles using the road. The additional vehicle movements that would be generated during construction of the proposal would be unlikely to result in any significant impacts on Wallgrove Road or in the wider road network.

Any increases in vehicle movements associated with the proposal would be limited to the construction and commissioning period. Once the upgrade works are complete it is anticipated traffic volumes and conditions along Chandos Road and the wider road network would return to existing conditions.

The proposal is not anticipated to result in any significant temporary or long term traffic or property access related impacts.

6.7.3 Mitigation and management measures

The following mitigation and management measures would be implemented during the proposal to manage and avoid potential traffic and access impacts:

- A Traffic Control Plan (TCP) would be developed for the proposal in accordance with the

relevant Australian Standards. The TCP would specify controls, such as signage and reduced vehicle speeds, that would be implemented along Chandos Road in the vicinity of the facility during the construction of the proposal

- A reduced speed limit would be adopted along Chandos Road for all heavy vehicles associated with the proposal
- Details of the TCP and safety awareness training would be included in the Project Induction delivered to all personnel associated with the proposal prior to involvement, and
- All parking and associated with the proposal would occur within that Jemena owned land. No parking would occur along Chandos Road associated with the proposal.

6.8 European heritage

6.8.1 Existing environment

Searches for heritage items within or in the vicinity of the location of the proposal were carried within the following documents and using the following registers, datasets and search tools:

- *Horsley Park Local Environmental Plan 2013*
- *State Environmental Planning Policy (Western Sydney Parklands) 2009*
- The NSW Heritage Register
- The NSW Heritage Inventory
- The EPBC Protected Matters Search Tool, and
- The Register of the National Estate.

Listed features of European heritage conservation significance in the vicinity of the location of the proposal are provided in Table 6-12.

There are no known features of European heritage conservation significance within the site boundary of the Horsley Park Meter Station. The soils within the existing facility have been subject to significant levels of disturbance due to past agricultural practices (market gardens) and during construction of the Eastern Gas Pipeline and the facility itself.

Table 6-12 Listed features of European heritage significance near the proposal

Name	Location	Source of listing	Distance from proposal (m)
Prospect Reservoir and surrounding land	Horsley Park, Prospect and Wetherill Park	State Heritage Register Register of the National Estate	800
Spotted Gum forest	Corner of Chandos Road and Ferrers Road, Horsley Park	State Environmental Planning Policy (Western Sydney Parklands) 2009	800

6.8.2 Potential impacts

The listed features of European heritage conservation significance in the vicinity of the location of the proposal would not be directly or indirectly affected by the proposal. Due to the significant soil disturbance that has occurred due to past agricultural and construction activities it is considered highly unlikely that any intact subsurface relics would be present in the locations that would be disturbed as part of the proposal.

The proposal would not have any impact of features of European heritage conservation significance.

6.8.3 Mitigation and management measures

The following mitigation and management measures would be implemented in the event that previously unknown items of features of European heritage conservation significance are uncovered during the proposal:

- All work in the vicinity of the unexpected find would cease
- The NSW Department of Planning would be contacted and advised of the unexpected find, and
- No works would recommence at that location until such time as the Department of Planning has determined the nature and significance of any finds and determined an approach for further work, in consultation with other agencies and parties as required.

6.9 Visual impact

6.9.1 Existing environment

The location of the proposal is semi-rural in nature and contains visual elements typical of agricultural areas including pastured areas, agricultural dams, market gardens, sheds, greenhouses, residences and areas of native vegetation. The area does, however, features dominant visual elements that are not consistent with the semi-rural character of the local area. These visual elements include the two natural gas facilities, the electricity transmission infrastructure running east-west to the north of the site and a very large stockpile of overburden material around 30 to 40 metres in height to the north associated with the quarrying and tile manufacturing activities that occur at that location. The facility is shown in Plate 6-1.

The closest residences to the location of the proposal are around 300 metres to the south and south-east on Chandos Road (refer to Figure 6-5). The facility is partially or completely obscured from many of the closest residences by the other gas facility to the south, other residences, agricultural buildings and structures, topography, native vegetation and vegetation planted along the inside of the perimeter fence on the eastern side of the existing facility. A view of the location of the location of the proposal from Chandos Road is provided in Plate 6-2.



Plate 6-1 Photo of the facility



Plate 6-2 View of the facility from Chandos Road showing the facility associated with the Central Trunk on the left

6.9.2 Potential Impacts

Due to the distance of the residential receivers to the existing facility and the lack of other viewpoints from publicly accessible places, it is unlikely that proposed additions to the Horsley Park Meter Station would be noticeable.

As the proposal would involve upgrading an existing gas facility and there is another gas facility to the south, the additional apparatus and pipework that would be installed is considered to be in

context with the existing visual and landscape character of the area.

The proposal would not have any significant impact on landscape character or the visual amenity of the resident with line of sight to the facility.

6.9.3 Mitigation and management measures

The following mitigation and management measures would be implemented during the proposal to limit impacts the landscape character and visual amenity:

- General site cleanliness and condition would be monitored on a daily basis during the work and appropriate actions taken as required to address any issues identified, and
- The existing vegetation along the inside of the eastern perimeter fencing site would be protected during the works to maintain visual screening for the facility.

6.10 Socio-economic impacts

6.10.1 Existing environment

The gas that flows through the Horsley Park Meter Station is supplied to large numbers of small residential customers and also large scale industrial and commercial customers. Natural gas is a key commodity and the availability of natural gas as an energy source is a requirement and constraint for many forms of industry. The industries that use natural gas contribute to the economy and provide benefits to the wider community. Natural gas is also an economic energy source for heating for many residential customers. The availability of natural gas can therefore have a significant impact on the socio-economic wellbeing of the state.

The existing pipelines and distribution networks in Eastern Australia and issues associated with current and future gas supply into the Sydney distribution network are described in Section 2.1. All gas within the Sydney distribution network and beyond passes through the gas facilities in Horsley Park. Without the proposed upgrade to Horsley Park Meter Station there is therefore a very real possibility that future gas supplies into the Sydney distribution network would be restricted.

6.10.2 Potential Impacts

The proposal involves additions to an existing gas facility and does not require the expansion of land required for that facility. It is unlikely that the proposal would affect the any commercial activities, for example agriculture, that occur in the vicinity of the facility in any way. The proposal would not adversely affect the socio-economic status of the local area and region in general.

If the proposed alterations to the Horsley Park Meter Station do not occur, future natural gas supply gas into Sydney distribution network will be constrained further. This will result in restriction of gas supplies for existing customers and would also limit the potential for existing industrial and commercial customers to expand existing operations or for new natural gas dependent industries to develop. This may lead to adverse economic and social impacts. Gas restrictions and shortages may result in loss of amenity for residential gas customers and may result in increased adverse economic

and associated social impacts.

The proposal would therefore result in positive socio-economic impacts. Not proceeding with the proposal could result in significant adverse socio-economic impacts if an alternative solution to increasing gas supply into the Sydney distribution network is not implemented.

6.10.3 Mitigation and management measures

As no adverse socio-economic impacts are anticipated as a result of total, no mitigation and management measures are proposed.

6.11 Waste and resources

6.11.1 Existing environment

The existing Horsley Park Meter Station does not generate significant amounts of waste. The various existing waste streams are described below.

The existing facility includes a bulk liquid separator that was installed as part of original construction. Natural gas contains small amounts of liquid hydrocarbons which must be removed. Bulk liquid separators perform that function. Existing facilities upstream of the Horsley Park Meter Station also have similar equipment. As a result there are negligible amounts of liquid hydrocarbons present in the gas by the time it reaches the Horsley Park Meter Station. The quantities of liquid hydrocarbons are so insignificant that the separator would be removed as part of the proposal.

The existing facility includes gas filters to remove any solid debris that may be present within the gas. The debris, referred to as pipeline dust, is mostly iron oxides and particles from exposed metal surfaces within the pipeline at pipe joint locations. The filters consist of banks of plastic and fabric filter cartridges.

Under normal operating conditions the filter cartridges that have been filled are removed and replaced annually. The removed cartridges are placed into 205 litre capacity HAZMAT drums. Typically only one drum is filled when the cartridges are replaced. Once the used filter cartridges are removed the internal services of the filter housing are cleaned using the rags, degreasers and water before the new filter cartridges are installed. The oily rags, dirty water and any other potentially contaminated materials are also placed into the HAZMAT drum. The HAZMAT drums are removed from site by a suitably licensed waste contractor for disposal at a suitably licensed waste facility.

Once every 5 to 10 years an internal gauge is sent through the pipeline in the gas stream to clean internal surface and detect any integrity issues. As the gauge comes into contact with the internal surfaces of the pipeline it generates larger than usual amounts of pipeline dust that ends up in the filters. During such operations more filter cartridges need to be replaced and three to four HAZMAT drums might be filled. Increased levels of pipeline dust are also present for three to four months following the completion of internal inspections. The filters are inspected two to three times during this period and cartridges are replaced as required. Usually one HAZMAT bin is filled during each inspection.

From time to time maintenance is required on various parts of the other gas conveyance and flow control apparatus present on site. This may require the removal and replacement various components including seals, lubricants, gauges and measurement devices. Maintenance occurs very infrequently and does not generate significant volumes of waste. The majority of waste generated from maintenance classified as general solid waste and disposed of accordingly. Any potentially contaminated wastes are placed in HAZMAT drums and removed from site by a suitably licensed waste contractor for disposal at a suitably licensed waste facility. The volume of wastes generated during maintenance is typically very small.

The existing facility has small office which is used occasionally by Jemena operational personnel. The wastes produced from the facility are typical office wastes and include wastepaper, toner cartridges and general rubbish. Only small volumes are generated. This waste is collected regularly by a licensed waste contractor and disposed of at a suitably licensed waste facility.

The main resource used by the facility during normal operation is the natural gas combusted within the water bath heaters. The amount of natural gas used by the existing water bath heaters represents around 0.1% of the total capacity of the Eastern Gas Pipeline. This use of natural gas for this purpose facilitates the availability of this resource to the wider community.

As the facility predominantly uses gas as its energy source it uses very little electricity.

6.11.2 Potential impacts

The majority of waste generation due to the proposal occur during the construction phase. An area of approximately 750 metres would need to be excavated to extend the existing level surface on which the existing infrastructure is located to create an area on which to install the new apparatus and associated pipework. It is anticipated that around 320 m³ of soil would need to be excavated. The excavated material would be classified in accordance with the NSW *Waste Classification Guidelines Part 1: Classifying Waste* (DECCW, 2008) and disposed of at a suitably licensed waste facility or diverted for reuse if appropriate.

The other wastes generated during construction would include materials such as wooden pallets, empty containers, plastic and other wrapping and packaging materials, pipe offcuts and general refuse. Waste materials with recycling potential would be stored separately and diverted to appropriate waste recycling facilities. Other waste materials would typically be placed in skip bins and removed from site by a suitably licensed waste contractor for disposal at an appropriately licensed waste facility. It is not anticipated that significant volumes of general construction waste would be generated by construction.

Any soils that become contaminated by spills of hydrocarbons and other liquids or any other potentially contaminated materials would be collected and placed in HAZMAT bins, which would then be removed from site by a suitably licensed waste contractor for disposal at a suitably licensed waste facility. Significant volumes of fuels, lubricants and other hydrocarbons would not be stored on site. It is considered unlikely that significant volumes (in excess of one cubic metre) of contaminated soils or other potentially contaminated materials would be generated by the proposal.

During operation of the proposal the wastes generated by the new flow conveyance control

apparatus would be similar to those already generated by the facility. As two additional filters would be installed as part of the proposal the potential waste stream associated with the filter replacement would double. As filter replacement occurs only infrequently, however, and significant volumes of waste are not generated by this activity this increase is not considered significant.

The existing office facilities would not be subject to additional use once the upgrade works are complete. It is unlikely that the wastes generated by the use of the office facilities would change as a result of the proposal.

The main resources that would be used to construct the proposal would include the steel associated with the new flow conveyance and control apparatus and associated pipework, quarry products to create new hardstand surfaces, concrete to create stable footings for the new apparatus and plinths for the connecting pipework, polymer and resin coatings for new pipework and apparatus and bricks to construct the new masonry noise attenuating structures. The volumes of these additional resources required to construct the proposal are not considered to be significant in terms of overall supply and would not limit resource availability for other purposes.

During the operational phase of the proposal the additional heating apparatus that would be installed would have the potential to consume an additional 120,000 gigajoules of natural gas year. To put this into context this represents less than 0.3% of the total additional throughput that would be provided by the upgrade. The total potential gas usage by the upgraded facility would represent about 0.16% of the total upgrade capacity of the Eastern Gas Pipeline. The additional gas that would be used by the upgraded facility is considered insignificant in terms of additional resource use. The additional resource use is considered justified due to the benefits the proposal would provide to the Sydney distribution network in terms of increased supply capacity and natural gas availability.

It is therefore considered unlikely that the proposal would result in any significant adverse impacts associated with increased waste generation and resource availability. The proposal would provide an important beneficial impact by maintaining the existing and the increasing the future supply potential of natural gas, an important energy resource, into the Sydney distribution network.

6.11.3 Mitigation and management measures

The following mitigation and management measures would be implemented during the proposal to minimise potential impacts associated with waste generation and resource use:

- The volumes of wastes generated by the proposal would be minimised to the greatest extent practicable
- The use of recycled and reclaimed material would be investigated and such materials would be sourced for use where appropriate
- Potential recycling and reuse options would be considered for all waste streams likely to be generated by the proposal
- Where potential reuse and recycling options are identified, suitable receptacles would be provided for all waste streams that could be diverted for recycling and reuse
- All wastes generated by the proposal would be classified in accordance with the NSW *Waste Classification Guidelines Part 1: Classifying Waste* (DECCW, 2008) and disposed of at a suitably licensed waste facility, and

- HAZMAT bins would be provided on site for any potentially contaminated wastes that might be generated by the proposal.

Once construction of the proposal is complete, waste from the upgraded facility would be managed in accordance with existing facility waste management practices.

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7 Environmental management

A Construction Environmental Management Plan (CEMP) would be prepared for the proposal prior to commencement of construction. The CEMP would be prepared in accordance with *Guideline for the Preparation of Environmental Management Plans* (DIPNR, 2004) and would reference relevant procedures and systems from Jemena's corporate Health, Safety and Environmental Management System, which is aligned with ISO14001, guidelines, legislation and project approval conditions. The CEMP would be implemented and compliance with the plan monitored during construction.

The Eastern Gas Pipeline and the Horsley Park Meter Station are currently operated and maintained in accordance with existing environmental, safety and operational management plans. These plans would be updated to include the new components that would be installed as part of the proposal.

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8 Conclusion

An analysis of the current gas supply situation on the eastern seaboard of Australia indicates that the future gas supply into the Sydney distribution network is constrained and that gas supply could fall significantly below gas demand as early as 2016 if nothing is done. As the Eastern Gas Pipeline is not subject to same constraints at other potential gas sources for Sydney, it is a practicable way of maintaining existing gas supplies within an increasing the potential futures gas supplies to the Sydney distribution network. The existing Horsley Park Meter Station, however, is currently operating at contractual capacity and is constraining natural gas supply from the Eastern Gas Pipeline.

The primary objective of the proposal is to increase deliverability of natural gas into the Sydney distribution network from the Horsley Park Meter Station Upgrade. The proposal would increase the ability the Eastern Gas Pipeline by 120 terajoules per day, which is a significant increase.

The assessment of potential impacts associated with the proposal indicates that no significant environmental and amenity impacts would occur. Any adverse environmental and amenity impacts associated with the proposal would be more than adequately outweighed by the socio-economic benefits associated with increasing potential gas supply into the Sydney distribution network. On this basis, the overall impact of the proposal would be beneficial in terms of state and regional environmental and economic planning objectives.

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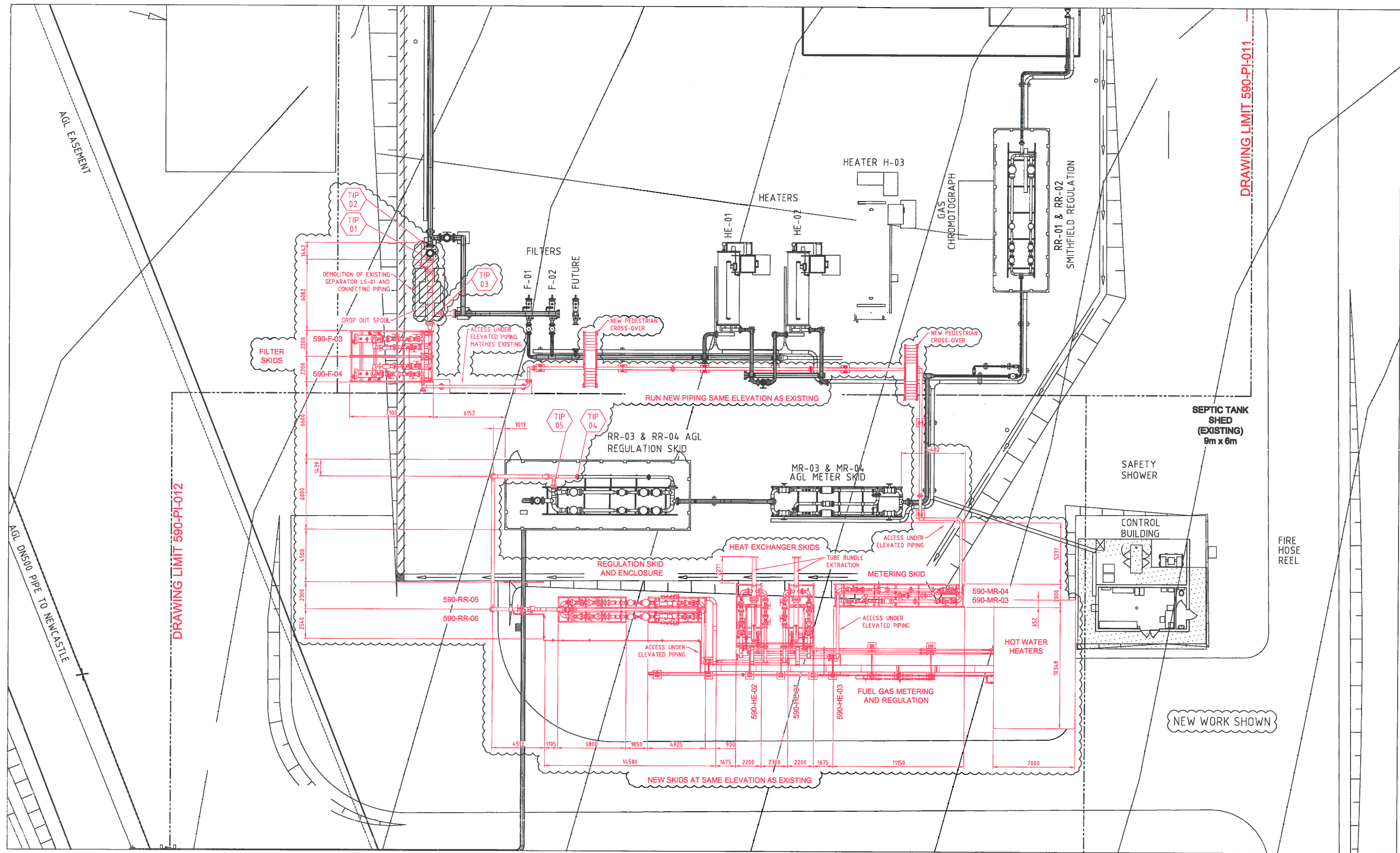
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Appendix A Design Plan



ASSET MANAGER		ASSET OWNER		COPYRIGHT.		CONSULTANT		HORSLEY PARK METER STATION	
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DRAWING No.		REFERENCE DRAWINGS		C 09.07.14 ISSUED FOR PHASE 1 DESIGN		NB JS KS		JEMENA GAS NETWORK UPGRADE OPTION 2	
1		2		B 30.06.14 ISSUED FOR HAZOP		NB WW KS		DRAWN N BAILEY	
3		4		A 24.06.14 ISSUED FOR DESIGN REVIEW		NB		SCALE 1:150	
5		6		DATE		DRAWN		SUPERSEDES	
7		8		DESCRIPTION		CHECKED		DRAWING NUMBER	
9		10		11		APPROVED		590-DW-PI-049	
12		13		14		15		REV	

Appendix B Biodiversity Impact Assessment

21 August 2014

John Fisher
Principal Consultant
EnviroPlan Pty Ltd
john.fisher@enviroplan.com.au

Dear John,

Re: Biodiversity Impact Assessment for Horsley Park Meter Station upgrade
Our Ref: Job# 18687

Jemena Limited (Jemena) proposes to upgrade to the existing natural gas facility at Horsley Park, New South Wales (the Horsley Park Meter Station). Biosis Pty Ltd was engaged by Jemena via EnviroPlan Pty Ltd to undertake a biodiversity impact assessment for the proposed upgrade works. This letter documents the findings and recommendations with regard to ecological values found within the Horsley Park Meter Station (study area).

A field investigation was undertaken on 5 August 2014 by Jane Murray, Principal Ecologist (Botanist) of Biosis and guided by John Fisher of EnviroPlan Pty Ltd. This assessment has been written by Amy Nelson and reviewed by Jane Murray (Biosis Pty Ltd).

Study Area Context and Proposed Impacts

Horsley Park is located approximately 16 kilometres (km) west of the Sydney Central Business District in the Fairfield Local Government Area (LGA). The Horsley Park Meter Station is located at 194-202 Chandos Road, Horsley Park, on Lot 3 DP 1002746 (Appendix 1, Figure 1). The study area is defined as the area to be directly and indirectly impacted by the proposed works. The study area is located within a semi-rural area surrounded by paddocks, patches of vegetation, exotic grasses and roads. Immediately to the north and adjacent to the study area features two dams (Appendix 2) both of which feature fringing vegetation. To the west lies Eastern Creek which flows parallel to the M7 Motorway and is lined with forest and woodland vegetation. Prospect Reservoir is also located a little over one kilometre to the east (Appendix 2, Figure 1).

The Horsley Park Meter Station was constructed in 2000. The existing facility requires an upgrade which includes increasing the capacity of the facility through the installation of a new gas regulator, metering equipment, gas heating and filter equipment, and associated pipework. The study area falls under the State Environmental Planning Policy (Western Sydney Parklands) 2009. The State Environmental Planning Policy (State and Regional Development) 2011 is applicable and the proposed works will be assessed as State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This letter report will form part of the supporting documentation for a Preliminary Environmental Impact Assessment as part of the approvals process.

Specifically, the proposal would include the following:

- Removal of the existing oil separator and associated pipework.

- Installation of two new gas filters.
- Installation of new gas heat exchangers.
- Installation of hot water heaters and associated building.
- Installation of a new gas metering unit.
- Installation of a new gas regulator and noise attenuating enclosure.
- Associated above and belowground connecting pipework.

Disturbances to the ground surface would be undertaken in order to:

- Create trenches for belowground pipework.
- Create trenches for belowground service and telemetry conduits.
- Create concrete pad foundation for gas conveyance control equipment.
- Create footings and foundations for plinths to support aboveground pipework.

Typical plant and equipment required to carry out the proposal includes, but is not limited to, excavators, back hoes, skid loaders, delivery trucks, dump trucks, mobile cranes, concrete trucks and concrete pumps.

Background research

Prior to completing the field investigation, documentation provided by EnviroPlan as well as other key information was reviewed, including:

- Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife for *Threatened Species Conservation Act 1995* (TSC Act) listed threatened biota.
- Department of Environment (DoE) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool.
- NSW Department of Primary Industries (DPI) Threatened and protected species - records viewer for species listed under the *Fisheries Management Act 1994* (FM Act).
- NSW Department of Primary Industries (DPI) *Noxious Weeds Act, 1993* (NW Act) listed weeds for the Fairfield LGA.
- OEH VIS Mapping through the Six Viewer portal.

Field Investigation

Jane Murray of the Biosis Sydney office visited the study area (Appendix 1, Figure 1) at Horsley Park on 5 August 2014 to determine whether there is any TSC Act and/or EPBC Act listed ecological constraints likely to be impacted by the proposed works. The study area was traversed on foot and the flora and fauna composition and condition was noted and threatened biota habitat searched for.

Findings

The study area was found to be in fairly poor condition ecologically, with a high prevalence of exotic grasses and weeds in the immediate vicinity (Appendix 1, Figure 2; Appendix 2, Plate 1). The exotic grasses and weeds community comprised such exotics as; Cape Weed *Arctotheca calendula*, Kikuyu *Pennisetum clandestinum* and

Large Plantain *Plantago major*. The exotic grasses and weeds community was found to provide foraging material for birds such as; Red-browed Finches *Neochmia temporalis* and Welcome Swallow *Hirundo neoxena* (Appendix 3, Table 2).

The second vegetation community present on site is Planted Eucalypts Over Exotic (Appendix 1, Figure 2, Plate 2). Due to the age of the trees present it is likely that this vegetation was planted in 2000 when the Meter Station was constructed. The main canopy species observed in this community included a row of; Spotted Gum *Corymbia maculata*, Narrow-leaved Ironbark *Eucalyptus crebra*, Grey Box *Eucalyptus moluccana*, Grey Ironbark *Eucalyptus paniculata* and Forest Red Gum *Eucalyptus tereticornis* (Appendix 2: Table 1). The mid-storey contained a few native species; White Sally *Acacia floribunda* and Prickly-leaved Tea Tree *Melaleuca styphelioides* (Appendix 3, Table 1). The understorey contained a few native grasses such as Common Couch *Cynodon dactylon* and Windmill Grass *Microlaena stipoides* but had largely been colonised by exotic grasses, forbs and herbs such as Kikuyu Grass *Pennisetum clandestinum*, Dandelion *Taraxacum officinale* and Capeweed *Arctotheca calendula* (Appendix 3, Table 1). None of the observed exotic species have been declared as noxious weeds within the Fairfield LGA (NSW DPI, 2014). This community provides foraging resources for avifauna such as Lorikeets *Trichoglossus haematodus* and Gallah's *Eolophus roseicapillus*.

Prior to the site inspection, Biosis confirmed that the vegetation communities surrounding Eastern Creek and Prospect reservoir have previously been mapped as either *River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* (Endangered Ecological Community, TSC Act) or *Cumberland Plain Woodland in the Sydney Basin Bioregion* (Critically Endangered Ecological Community under the TSC Act and EPBC Act)(Cumberland V2 2008 VIS map 3785). As the works will be confined to the immediate vicinity of the Horsley Park Meter Station these communities will not be directly or indirectly impacted by the proposed works.

The field investigation indicated that the site drains, via a vegetated trench, northward to a pond in a depression just to the west of one of the dams. Based on preliminary observations it would be likely that the water quality in the pond is influenced by a range of surrounding land use patterns and was considered to be of relatively poor quality, given a high abundance of weeds surrounding the pond, and little habitat for aquatic and amphibious species.

During the desktop and field based survey, all threatened biota protected under the TSC Act, FM Act and/or EPBC Act (excluding migratory species) that have a likelihood of occurring within 5 kilometres were assessed as to their likely presence within or usage of (foraging or dwelling) the study area (Appendix 4). However it should be noted that of these threatened biota, all were deemed to have a low likelihood of occurrence, or were not likely to be directly impacted upon by the proposed works.

Concluding Advice and Recommendations

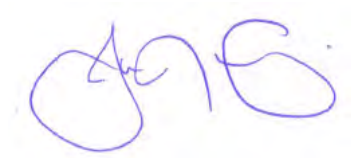
Given that no threatened biota, nor suitable habitat for such have not been found within the immediate vicinity of the study area the main focus of the associated works would be to limit the impacts of the work to within the perimeter of the existing facility. Therefore the following recommendations have been made with regard to the proposed upgrade:

- Erosion and sediment controls to be implemented around the works area and any associated stockpiles so to avoid run off and associated stormwater related impacts on surrounding lands, including the pond to the north of the study area and Eastern Creek to the west.
- Ensure machinery is free of weed material before entering and exiting the study area for the proposed works.

- Ensure appropriate procedural of physical controls are implemented to limit potential impacts to the planted native trees and shrubs within the existing facility.

Please contact me on 0421 013 061 if you would like to discuss further.

Yours sincerely

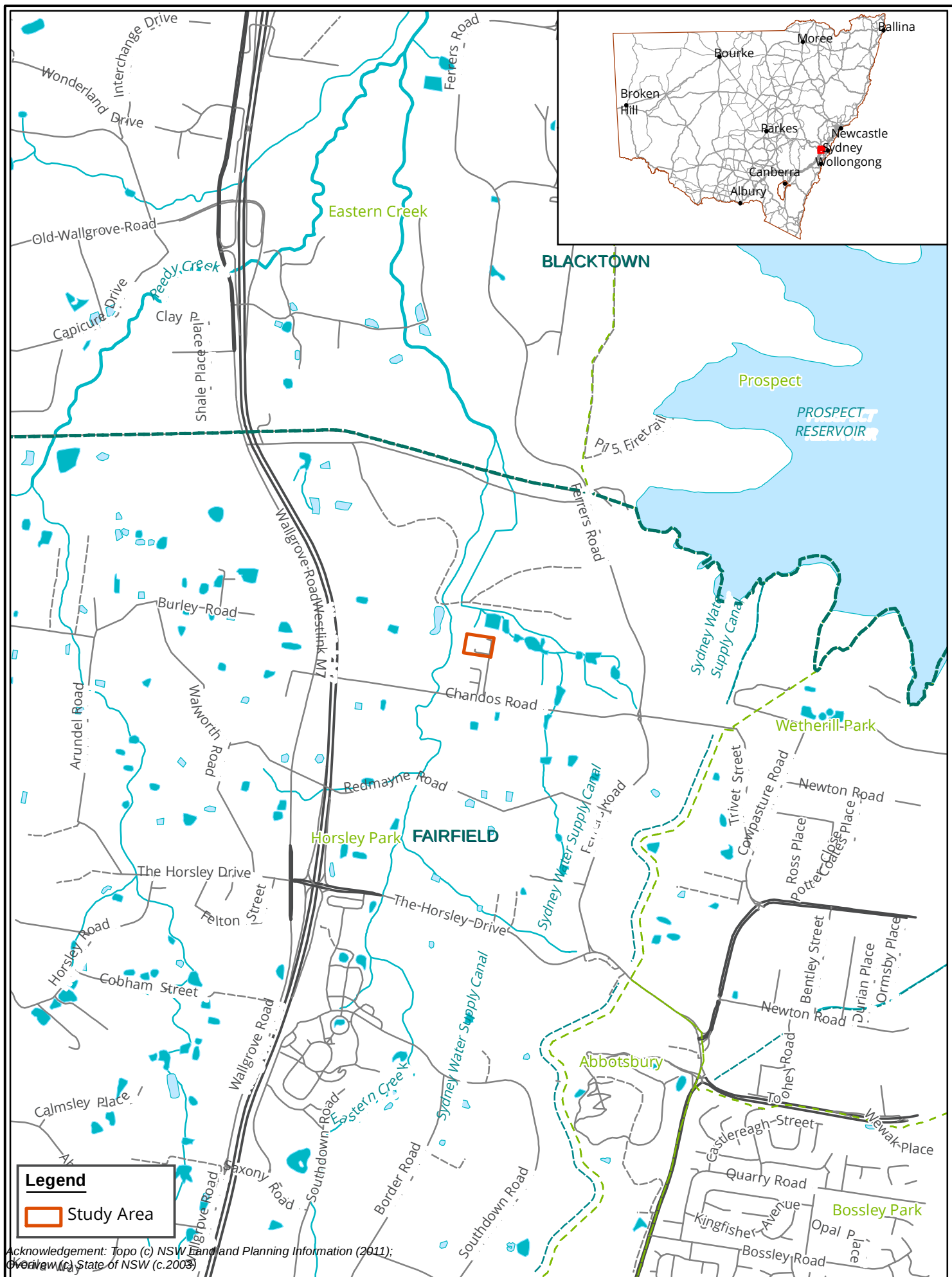


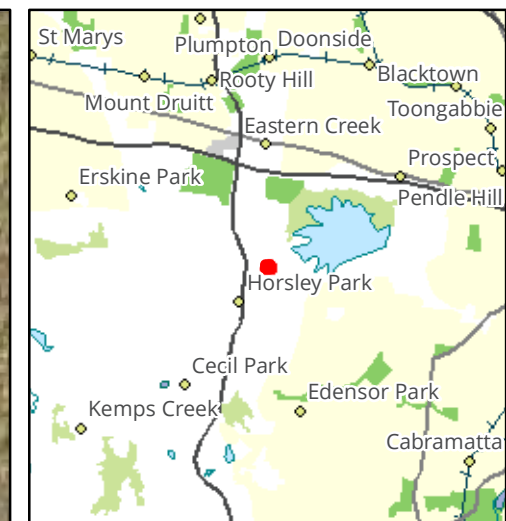
Jane Murray
Principal Ecologist

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Appendix 1: Figures





Legend

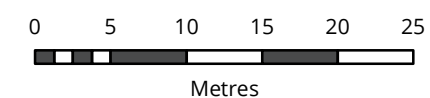
Study area

Vegetation communities

Exotic grasses and weeds

Planted Eucalyptus over exotic

Figure 2: Vegetation

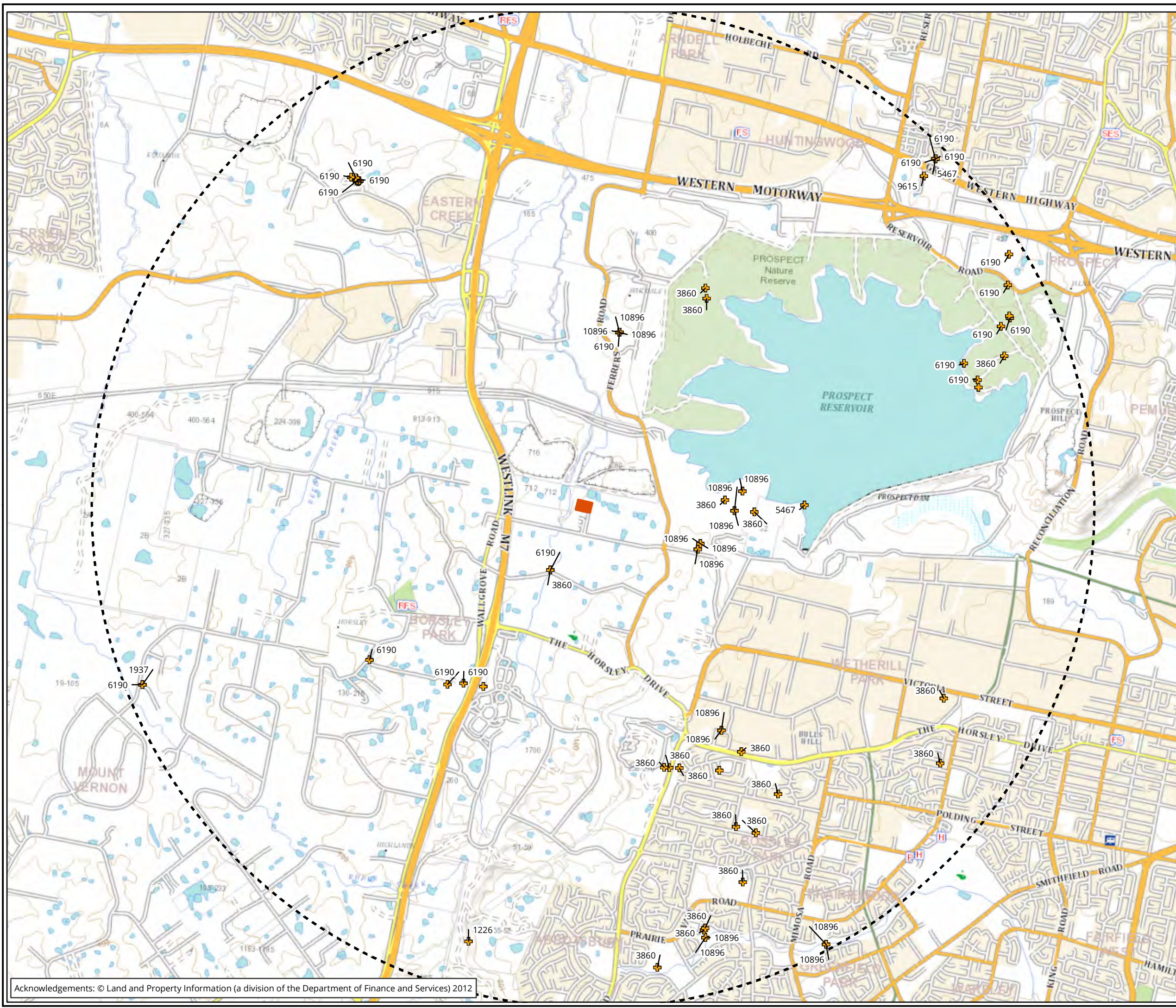


Scale: 1:500 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Ballarat, Brisbane, Canberra, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 18687
Date: 13 August 2014
Checked by: JMM, Drawn by: JMS, Last edited by: jshepherd
Location: P:\18600s\18687\Mapping\18687_F2_Vegetation



Legend

Study Area

Search area

Threatened flora

- 10896; *Marsdenia viridiflora* subsp. *viridiflora*
- 1226; *Cynanchum elegans*
- 1937; *Wahlenbergia multicaulis*
- 3860; *Acacia pubescens*
- 5467; *Persoonia nutans*
- 6190; *Pimelea spicata*
- 9615; *Pterostylis saxicola*

Figure 3: Threatened Flora within 5km of the study area

0 350 700 1,050 1,400 1,750

Metres

Scale: 1:35,000 @ A3

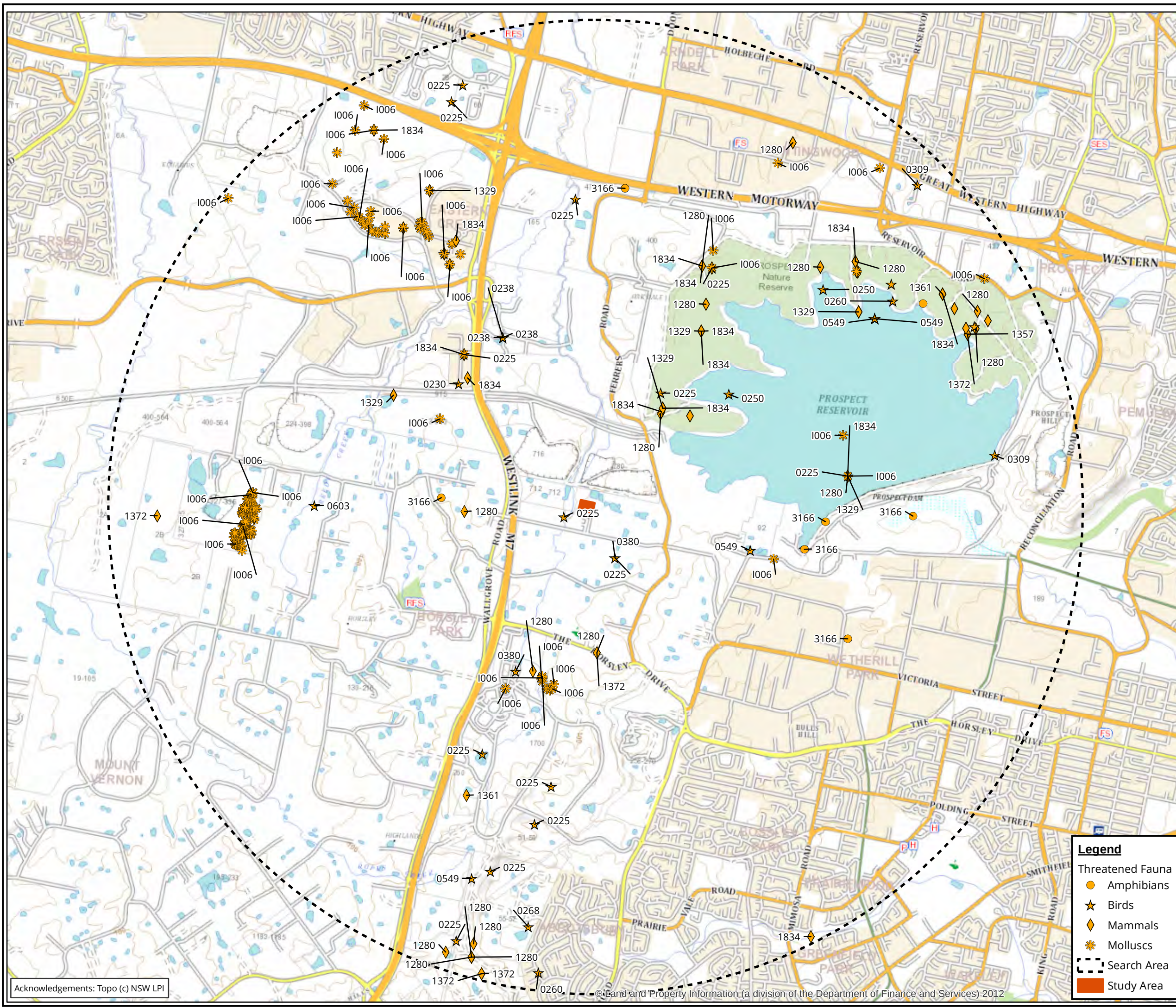
Coordinate System: GDA 1994 MGA Zone 55

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Matter: 18687
Date: 13 August 2014
Checked by: JKH, Drawn by: JMS, Last edited by: jshepherd
Location: P:\18600s\18687\Mapping\18687_F3_ThrFlora



- Species list
- Amphibians
- 3166 - Green and Golden Bell Frog
- Birds
- 0225 - Little Eagle
0230 - Square-tailed Kite
0238 - Black Falcon
0250 - Masked Owl
0260 - Little Lorikeet
0268 - Gang-gang Cockatoo
0309 - Swift Parrot
0380 - Scarlet Robin
0549 - Varied Sittella
0603 - Regent Honeyeater
- Mammals
- 1280 - Grey-headed Flying-fox
1329 - Eastern Freetail-bat
1357 - Southern Myotis
1361 - Greater Broad-nosed Bat
1372 - Eastern False Pipistrelle
1834 - Eastern Bentwing-bat
- Molluscs
- I006 - Cumberland Plain Land Snail

Figure 4: Threatened Fauna within 5km of the Study Area

0 360 720 1,080 1,440 1,800

Metres

Scale: 1:36,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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Matter: 15743
Date: 13 August 2014
Checked by: SMV, Last edited by: jshepherd
Location: P:18600s18687\Mapping\18687_F4_ThrFauna

Acknowledgements: Topo (c) NSW LPI

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Appendix 2: Plates



Plate 1: Exotic Grasses and Weeds



Plate 2: Planted Eucalypts



Plate 3: Nearby Dam to the North

Appendix 3: Flora and fauna recorded within the study area

Table 1: Flora species recorded by Biosis, 05.08.2014

Status	Family	Scientific Name	Common Name
	Native species		
	Fabaceae (Mimosoideae)	<i>Acacia floribunda</i>	White Sally
	Geraniaceae	<i>Pelargonium australe</i>	Native Storksbill
	Myrtaceae	<i>Corymbia maculata</i>	Spotted Gum
	Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
	Myrtaceae	<i>Eucalyptus moluccana</i>	Grey Box
	Myrtaceae	<i>Eucalyptus paniculata</i>	Grey Ironbark
	Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Red Gum
	Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush
	Myrtaceae	<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree
	Poaceae	<i>Chloris truncata</i>	Windmill Grass
	Poaceae	<i>Cynodon dactylon</i>	Common Couch
	Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass
	Poaceae	<i>Microlaena stipoides</i>	Weeping Grass
	Introduced species		
	Asteraceae	<i>Arctotheca calendula</i>	Capeweed
	Asteraceae	<i>Soliva sessilis</i>	Bindi
	Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle
	Asteraceae	<i>Taraxacum officinale</i>	Dandelion
	Fabaceae (Faboideae)	<i>Trifolium repens</i>	White Clover
	Fabaceae (Faboideae)	<i>Trifolium sp</i>	Berseem Clover
	Malvaceae	<i>Malva spp.</i>	Mallow
	Myrsinaceae	<i>Anagallis arvensis</i>	Scarlet Pimpernel
	Plantaginaceae	<i>Plantago major</i>	Large Plantain
	Poaceae	<i>Pennisetum clandestinum</i>	Kikuyu Grass
	Polygonaceae	<i>Acetosella vulgaris</i>	Sheep Sorrel

Table 2: Fauna species recorded by Biosis, 05.08.2014

Scientific Name	Common Name	Observation Type
<i>Anthochaera chrysoptera</i>	Little Wattlebird	O
<i>Egretta novaehollandiae</i>	White-faced Heron	O
	Lorikeet	
<i>Eolophus roseicapillus</i>	Galah	O
<i>Eopsaltria australis</i>	Eastern Yellow Robin	O
<i>Grallina cyanoleuca</i>	Magpie-lark	O
<i>Hirundo neoxena</i>	Welcome Swallow	O
<i>Malurus cyaneus</i>	Superb Fairy-wren	O
<i>Manorina melanocephala</i>	Noisy Miner	O
<i>Neochmia temporalis</i>	Red-browed Finch	O
<i>Rhipidura leucophrys</i>	Willie Wagtail	O

Appendix 4: Likelihood of Occurrence - Threatened Biota

Table 3: Threatened fauna likelihood of occurrence

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
Birds							
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E1	#	Low	No foraging material or habitat present within study area.	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including <i>Typha spp.</i> and <i>Eleocharis spp.</i> . Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo		V, E2	2007	Low	No foraging material or habitat present within study area.	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.
<i>Daphoenositta chrysoptera</i>	Varied Sittella		V	2011	Low	No suitable habitat present within study	The Varied Sittella is a sedentary species which inhabits a wide variety of dry eucalypt forests and woodlands,

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
						area.	usually with either shrubby understorey or grassy ground cover or both, in all climatic zones of Australia. Usually inhabit areas with rough-barked trees, such as stringybarks or ironbarks, but also in mallee and acacia woodlands, paperbarks or mature Eucalypts. The Varied Sittella feeds on arthropods gleaned from bark, small branches and twigs. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	EN	E1	#	Low	No suitable habitat present within study area.	Found in coastal woodlands, dense scrub and heathlands, particularly where it borders taller woodlands.
<i>Falco subniger</i>	Black Falcon		V	2003	Low	No suitable habitat present within study area.	Mainly occur in woodlands and open country where can hunt. Often associated with swamps, rivers and wetlands. Nest in tall trees along watercourses.
<i>Glossopsitta pusilla</i>	Little Lorikeet		V	2007	Low	No suitable habitat present within study area.	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range in NSW, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Mostly occur in dry, open eucalypt forests and woodlands. They feed primarily on nectar and pollen in the tree canopy. Nest hollows are located at heights of between 2 m and 15 m, mostly in living, smooth-barked eucalypts. Most breeding records come from the western slopes.
<i>Hieraaetus morphnoides</i>	Little Eagle		V	2012	Low	No suitable habitat present within study	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
						area.	species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.
<i>Lathamus discolor</i>	Swift Parrot	EN	E1	2004/#	Low	No suitable habitat, some foraging material present, however not to be impacted within study area.	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> . Commonly used lerp infested trees include Grey Box <i>E. microcarpa</i> , Grey Box <i>E. moluccana</i> and Blackbutt <i>E. pilularis</i> . This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
<i>Lophoictinia isura</i>	Square-tailed Kite		V	2008	Low	No suitable habitat present within study area.	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by <i>Eucalyptus longifolia</i> , <i>Corymbia maculata</i> , <i>E. elata</i> , or <i>E. smithii</i> . Individuals appear to occupy large hunting ranges of more than 100 km ² . They require large living trees for breeding, particularly near water with surrounding woodland /forest close by for foraging habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
<i>Petroica boodang</i>	Scarlet Robin		V	2004	Low	No suitable habitat present within study area.	During the breeding season the Scarlet Robin is found in eucalypt forests and temperate woodlands, often on ridges and slopes. During autumn and winter it moves to more open and cleared areas. It has dispersive or locally migratory seasonal movements. The Scarlet Robin forages amongst logs and woody debris for insects which make up the majority of its diet. The nest is an open cup of plant fibres and cobwebs, sited in the fork of a tree (often a dead branch in a live tree, or in a dead tree or shrub) which is usually more than 2 m above the ground. It is conspicuous in open and suburban habitats.
<i>Tyto novaehollandiae</i>	Masked Owl		V	2011	Low	No suitable habitat present within study area.	The Masked Owl may be found across a diverse range of wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting. It has mostly been recorded in open forests and woodlands adjacent to cleared lands. They nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometimes dead. The nest hollows are usually located within dense forests or woodlands. Masked Owls prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet. It has a large home range of between 500 to 1000 ha.
Mammals							
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	VU	V	#	Low	No suitable habitat present within study area.	Occurs from the Queensland border to Ulladulla, with largest numbers from the sandstone escarpment country in the Sydney Basin and Hunter Valley. Primarily found in

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between three and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spotted-tailed Quoll	EN	V	2004	Low	No suitable habitat present within study area.	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha, while males have larger home ranges of between 2000 and 5000 ha. Breeding occurs from May to August.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle		V	2005	Low	No suitable habitat present within study area.	Distribution extending east of the Great Dividing Range throughout the coastal regions of NSW, from the Queensland border to the Victorian border. Prefers wet high-altitude sclerophyll and coastal mallee habitat, preferring wet forests with a dense understorey but being

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							found in open forests at lower altitudes. Apparently hibernates in winter. Roosts in tree hollows and sometimes in buildings in colonies of between 3 and 80 individuals. Often change roosts every night. Forages for beetles, bugs and moths below or near the canopy in forests with an open structure, or along trails. Has a large foraging range, up to 136 ha. Records show movements of up to 12 km between roosting and foraging sites.
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat		V	2013	Low	No suitable habitat present within study area.	Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat		V	2011	Low	No suitable habitat present within study area.	Distribution extends east of the Great Dividing Range from southern Queensland to south of Sydney. Most records are from dry eucalypt forests and woodland. Individuals tend to forage in natural and artificial openings in forests, although it has also been caught foraging low over a rocky river within rainforest and wet sclerophyll forest habitats. The species generally roosts in hollow spouts of large mature eucalypts (including paddock trees), although individuals have been recorded roosting

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							in the roof of a hut, in wall cavities, and under metal caps of telegraph poles. Foraging generally occurs within a few kilometres of roosting sites.
<i>Myotis macropus</i>	Southern Myotis		V	2013	Low	No suitable habitat present within study area.	Scattered, mainly coastal distribution extending to South Australia along the Murray River. Roosts in caves, mines or tunnels, under bridges, in buildings, tree hollows, and even in dense foliage. Colonies occur close to water bodies, ranging from rainforest streams to large lakes and reservoirs. They catch aquatic insects and small fish with their large hind claws, and also catch flying insects.
<i>Phascolarctos cinereus</i>	Koala	VU	V	#	Low	No suitable habitat present within study area.	Pittwater LGA and Hawks nest: In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include <i>Eucalyptus robusta</i> , <i>E. tereticornis</i> , <i>E. punctata</i> , <i>E. haemostoma</i> and <i>E. signata</i> . They are solitary with varying home ranges. In high quality habitat home ranges may be 1-2 ha and overlap, while in semi-arid country they are usually discrete and around 100 ha.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	VU		#	Low	No suitable habitat present within study area.	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44 ha to 1.4

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi, and is therefore likely to play an important role in seed dispersal and fungal spore dispersal. It is likely that the species spends considerable time foraging above-ground for food, predisposing it to predation by native predators and introduced species. Breeding typically occurs between August and January, but can extend into autumn.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	V	2011/#	Low	No suitable habitat present within study area.	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies (camps), commonly in dense riparian vegetation. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat		V	2013	Low	No suitable habitat present within study area.	Occurs along the Great Dividing Range, generally at 500 m but up to 1200 m, and in coastal areas. Occurs in woodland and rainforest, but prefers open habitats or natural or human-made openings in wetter forests. Often hunts along creeks or river corridors. Flies slowly and directly at a height of 30 m or so to catch beetles and other large, flying insects. Also known to eat other bats and spiders. Roosts in hollow tree trunks and branches.
Reptiles							

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	VU	E1	#	Low	No suitable habitat present within study area.	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.
Amphibians							
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	VU	V	#	Low	No suitable habitat present within study area.	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250m from breeding sites.
<i>Litoria aurea</i>	Green and Golden Bell Frog	VU	E1	1969/#	Low	No suitable habitat present within study area, potential dispersal habitat to the north and west of the site.	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks , although the species has also been

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land. Breeding usually occurs in summer. Tadpoles, which take approximately 10-12 weeks to develop, feed on algae and other vegetative matter. Adults eat insects as well as other frogs, including juveniles of their own species.
<i>Litoria raniformis</i>	Southern Bell Frog	VU	E1	#	Low	No suitable habitat present within study area.	In NSW the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral swamps or billabongs with an abundance of bulrushes and other emergent vegetation along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.
Fish							
<i>Macquaria australasica</i>	Macquarie perch	EN		#	Low	No suitable habitat present within study area.	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries
<i>Prototroctes</i>	Australian	VU		#	Low	No suitable habitat	The Australian Grayling occurs in streams and rivers on

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
<i>maraena</i>	Grayling					present within study area.	the eastern and southern flanks of the Great Dividing Range from Sydney southwards to the Otway Ranges in Victoria, and Tasmania. Australian grayling do not occur in the inland Murray–Darling Basin system. Grayling is a diadromous species; migrating between freshwater streams and the ocean. This species has been found in clear, gravel-bottomed streams with alternating pools and riffles, and granite outcrops, and also in muddy-bottomed, heavily silted habitats.
Invertebrates							
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail		E1	2013	Low	No suitable habitat present within study area.	Most likely restricted to Cumberland Plain, Castlereagh Woodlands and boundaries between River-flat Forest and Cumberland Plain Woodland. It is normally found beneath logs, debris and amongst accumulated leaf and bark particularly at the base of trees. May also use soil cracks for refuge.

Table 4: Threatened flora likelihood of occurrence

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
<i>Acacia pubescens</i>	Downy Wattle	VU	V	2013/#	Low	A range of records nearby, however no species present or suitable habitat within study area.	<i>Acacia pubescens</i> is found in Sydney Metropolitan, and Hawkesbury/Nepean Catchment Management Region, with concentrated populations around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. The species occurs in open woodland and forest, in a variety of plant communities, including Cooks River/ Castlereagh Ironbark Forest, Shale/ Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October. The pods mature in October to December.
<i>Allocasuarina glareicola</i>		EN	E1	#	Low	Associated vegetation community not present within study area.	Found in the Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Regions. Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Also found in Dry Sclerophyll forest/Woodland. Associated species include <i>Eucalyptus parramattensis</i>, <i>Eucalyptus fibrosa</i>, <i>Angophora bakeri</i>, <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i>. Common associated understorey species include <i>Melaleuca nodosa</i>, <i>Hakea dactyloides</i>, <i>Hakea sericea</i>, <i>Dillwynia tenuifolia</i>, <i>Micromyrtus minutiflora</i>, <i>Acacia</i>

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							<i>elongata</i> , <i>Acacia brownei</i> , <i>Themeda australis</i> and <i>Xanthorrhoea minor</i> .
<i>Cynanchum elegans</i>	White-flowered Wax Plant	EN	E1	1993/#	Low	One record to the south of the site approximately 4 kilometers away, associated vegetation community not present.	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. Catchment Management Regions include Hawkesbury/Nepean, Hunter/Central Rivers, Northern Rivers, Southern Rivers and Sydney Metropolitan. <i>Cynanchum elegans</i> usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; <i>Leptospermum laevigatum</i> , <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> ; <i>Eucalyptus tereticornis</i> open forest and woodland; <i>Eucalyptus maculata</i> open forest and woodland; and <i>Melaleuca armillaris</i> scrub to open scrub. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific.
<i>Genoplesium baueri</i>	Bauer's Midge Orchid		V	#	Low	Associated vegetation community not present within study area.	This terrestrial orchid species grows in open sclerophyll forest or moss gardens on sandstone. Typically the habitat is a drier heathy forest. The species has been recorded from locations between Nowra and Pit
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Square Raspwort	VU	V	#	Low	Associated vegetation community and moisture not present within study area.	Square Raspwort is known from a few scattered locations in south-eastern NSW including the Nepean River (near Sydney), Lake Illawarra, the Wallaga Lake - Tilba area and the Geehi Valley in Kosciuszko National Park. There are isolated records from northern NSW (Mt Kaputar National

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							Park and Tuggolo State Forest). It also occurs in Victoria. Square Raspwort occurs in damp places near watercourses. It regenerates only from seed. The species appears to be favoured by soil disturbance.
<i>Marsdenia viridiflora subsp. viridiflora</i>	Native Pear		E2	2007	Low	Associated vegetation community not present within study area and not recorded on site.	This species has a wide distribution in subcoastal and southern Queensland but has been recorded rarely in NSW and from a disjunct occurrence near Sydney where it occurs as very scattered plants in areas of remnant vegetation. Grows in woodland and scrub and is typically found in Sydney Turpentine Ironbark Forest. Grows in vine thickets and open shale woodland. Recent records are from Prospect, Bankstown, Smithfield, Cabramatta Creek and St Marys. Previously known north from Razorback Range.
<i>Persoonia nutans</i>	Nodding Geebung	EN	E1	1802/#	Low	Associated vegetation community not present within study area, not recorded on site.	Occurs in Hawkesbury/Nepean and Sydney Metropolitan Catchment. Restricted to the Cumberland Plain between Richmond in the north and Macquarie Fields in the south. Core distribution occurs within the Penrith LGA, and to a lesser extent, Hawkesbury LGA. Small populations also occur in the Liverpool, Campbelltown, Bankstown and Blacktown LGAs. Confined to aeolian and alluvial sediments and occurs in a range of sclerophyll forest and woodland vegetation communities with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland. <i>P. nutans</i> also occurs on Shale/Gravel Transition Forest and Cooks River Castlereagh Ironbark Forest. In Castlereagh Scribbly Gum Woodlands it is found in open woodland with dominant

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							overstorey species being <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> . The Agnes Banks Woodlands have a similar array of tree species, with the addition of <i>Banksia serrata</i> and <i>Banksia aemula</i> . <i>Persoonia nutans</i> is found on the Agnes Banks and Berkshire Park soil landscapes. Drainage appears to influence the distribution of <i>P. nutans</i> as the species is more common on the deeper sands at Agnes Banks. At other locations on the Cumberland Plain it occurs on low rises as opposed to swales or other low lying areas.
<i>Pimelea curviflora</i> var. <i>curviflora</i>		VU	V	#	Low	Associated vegetation community not present within study area and not recorded on site.	Occurring in Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Areas. Confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. Occurs on lateritic soils and shale-sandstone transition soils on ridge tops in woodland. Associated with Dry Sclerophyll forests and Coastal valley grassy woodlands. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Flowers October to May.
<i>Pimelea spicata</i>	Spiked Rice-flower	EN	E1	2013/#	Low	Associated vegetation community not present within study area and not recorded on site.	Once widespread on the Cumberland Plain, <i>Pimelea spicata</i> occurs in two disjunct areas, the Cumberland Plain and the Illawarra. Catchment areas are Hawkesbury/Nepean, Southern Rivers, and Sydney Metropolitan Catchment.

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							In western Sydney, <i>P. spicata</i> occurs on an undulating topography of substrates derived from Wianamatta Shale in areas supporting, or that previously supported, the Cumberland Plain Woodland Vegetation Community. Associated species include: <i>Eucalyptus moluccana</i>, <i>E. tereticornis</i>, <i>E. crebra</i>, <i>Bursaria spinosa</i>, and <i>Themeda australis</i>. <i>Pimelea spicata</i> flowers sporadically throughout the year, with flowering likely to depend upon climatic conditions, particularly rainfall. Flowering times recorded for <i>P. spicata</i> vary. Rye (1990) noted flowering period as May - January; Benson and McDougall (2001) noted peak flowering period as March/ April.
<i>Pomaderris brunnea</i>	Brown Pomaderris	VU	V	#	Low	Associated vegetation community not present within study area and not recorded on site.	<i>Pomaderris brunnea</i> is found in a very limited area around the Nepean and Hawkesbury Rivers, including the Bargo area. Occurs in the Central West, Hawkesbury/Nepean, Hunter/Central Rivers Catchments. Occurs on clay & alluvial soils. In the Hawkesbury/Nepean region, the species is known to be associated with Dry sclerophyll forests (Cumberland, Upper Riverina, Sydney Coastal, Sydney Hinterland, Sydney Sand Flats), Coastal Floodplain Wetlands and Coastal Valley Grassy Woodlands. Flowers appear in September and October.
<i>Pterostylis gibbosa</i>	Illawarra Greenhood	EN	E1	#	Low	Associated vegetation community not present within study area and not recorded on site.	Known from a small number of populations in the Hunter region, the Illawarra region and the Shoalhaven region. It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland,

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by <i>Eucalyptus tereticornis</i>, <i>E. longifolia</i> and <i>Melaleuca decora</i>. Near Nowra, the species grows in an open forest of <i>Corymbia maculata</i>, <i>E.tereticornis</i> and <i>E. paniculata</i>. In the Hunter region, the species grows in open woodland dominated by <i>E. crebra</i>, Forest Red Gum and <i>Callitris endlicherii</i>. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	EN	E1	1804/#	Low	Associated vegetation community not present within study area and not recorded on site.	Restricted to western Sydney between Freemans Reach in the north and Picton in the south (Hawkesbury/Nepean and Sydney Metropolitan Catchment). Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where <i>Pterostylis saxicola</i> occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
							recorded for this species, however flowering occurs from October to December and may vary due to climatic conditions. The above ground parts of the plant wither and die following seed dispersal and the plant persists as a tuberoid until the next year.
<i>Pultenaea parviflora</i>		VU	E1	#	Low	Associated vegetation community not present within study area and not recorded on site.	<i>Pultenaea parviflora</i> is endemic to the Cumberland Plain, with a core distribution from Windsor to Penrith and east to Dean Park. Outlier populations are recorded from Kemps Creek and Wilberforce. <i>P. parviflora</i> may be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays and in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. Often found in association with other threatened species such as <i>Dillwynia tenuifolia</i> , <i>Dodonaea falcata</i> , <i>Grevillea juniperina</i> , <i>Micromyrtus minutiflora</i> , <i>Persoonia nutans</i> and <i>Styphelia laeta</i> . Flowering may occur between August and November depending on environmental conditions.
<i>Streblus pendulinus</i>	Whalebone Tree	EN		#	Low	Associated vegetation community not present within study area and not recorded on site.	The species is found in warmer rainforests, chiefly along watercourses. The altitudinal range is from near sea level to 800 m above sea level. The species grows in well developed rainforest, gallery forest and drier, more seasonal rainforest).
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell		E2	1998	Low	Associated vegetation community not present within study area and	Grows in forest, woodland and grassland, chiefly in coastal and tablelands districts south from Sydney and the Blue Mountains, west along the Murray River to Mathoura. This

Scientific name	Common name	EPBC Act	TSC Act	Most recent record	Likelihood of occurrence	Rationale for likelihood	Habitat description
						not recorded on site.	listing covers 13 known sites, two of which are in northern Sydney on the Hawkesbury soil landscape with the remainder in inner-western Sydney on the Villawood soil landscape (Rookwood, Chullora, Bass Hill, Bankstown, Georges Hall, Campsie, South Granville and Greenacre). Found in damp, disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. In Hornsby LGA it occurs in or adjacent to sandstone gully forest. In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest.

Appendix C Due Diligence Archaeological Assessment

20 August 2014

John Fisher
Principal Consultant
EnviroPlan Pty Ltd
john.fisher@enviroplan.com.au

Dear John

Re: Due Diligence Advice for Aboriginal archaeological heritage for the Horsley Park Meter Station upgrade – FINAL

Our Ref: Matter # 18669

Jemena Limited (Jemena) proposes to upgrade to the existing natural gas facility at Horsley Park, New South Wales (the Horsley Park Meter Station). This letter documents Aboriginal heritage due diligence advice for the proposed works. It has been prepared under the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010) and fulfils Jemena's due diligence obligations under this code. This assessment has been written by Samantha Gibbins and reviewed by Lyn O'Brien (Biosis Pty Ltd).

Project Area

The Horsley Park Meter Station is located at 194-202 Chandos Road, Horsley Park, on Lot 3 DP 1002746 (Figure 1). The Project Area encompasses the boundaries of the existing Horsley Park Meter Station, as shown in Figure 2, and is located within the Fairfield Local Government Area (LGA). The Project Area falls under the State Environmental Planning Policy (Western Sydney Parklands) 2009.

Project Background and Proposed Impacts

The Horsley Park Meter Station was constructed in 2000. Required upgrades include increasing the capacity of the facility through the installation of a new gas regulator, metering equipment, gas heating and filter equipment, and associated pipework. The State Environmental Planning Policy (State and Regional Development) 2011 is applicable and the proposed works will be assessed as State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This letter report will form part of the supporting documentation for a Preliminary Environmental Impact Assessment as part of the approvals process.

Specifically, the proposal would include the following:

- Removal of the existing oil separator and associated pipework;
- Installation of two new gas filters;
- Installation of new gas heat exchangers;
- Installation of hot water heaters and associated building;

Biosis Pty Ltd
Sydney Resource Group

Unit 14, 17-27 Power Avenue
Alexandria NSW 2015

Phone: 02 9690 2777
Fax: 02 9690 2577

ACN 006 175 097
ABN 65 006 175 097

Email: sydney@biosis.com.au

biosis.com.au

- Installation of a new gas metering unit;
- Installation of a new gas regulator and noise attenuating enclosure; and
- Associated above and belowground connecting pipework.

Disturbances to the ground surface would be undertaken in order to:

- Create trenches for belowground pipework;
- Create trenches for belowground service and telemetry conduits;
- Create concrete pad foundation for gas conveyance control equipment; and
- Create footings and foundations for plinths to support aboveground pipework.

Typical plant and equipment required to carry out the proposal includes, but is not limited to, excavators, back hoes, skid loaders, delivery trucks, dump trucks, mobile cranes, concrete trucks and concrete pumps.

Project Objectives

The following is the summary of the major objectives of the due diligence investigation:

- Identify Aboriginal objects and Places known to exist within the Project Area through a search of the Aboriginal Heritage Information Management System (AHIMS) register, maintained by the Office of Environment and Heritage (OEH);
- Consult with the Deerubbin Local Aboriginal Land Council (LALC);
- Undertake a field inspection to relocate any previously recorded sites and to assess previous disturbance and the potential for Aboriginal heritage to be present;
- Record and assess sites identified during the field inspection in compliance with the guidelines issued by the OEH;
- Identify potential impacts to all identified Aboriginal sites and Places based on potential ground disturbance from the works; and
- Make recommendations to minimise or mitigate potential impacts to cultural heritage values within the Project area.

Legislation

The investigation has been carried out under the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010). The code sets out steps which individuals and organisations need to take to determine if:

- Aboriginal objects are, or are likely to be present in the area; and
- The proposed activity will harm Aboriginal objects.

If it is determined through the due diligence assessment that Aboriginal objects are present, or are likely to be present, and the proposed activity will harm Aboriginal objects, the code specifies that:

- Further investigation and consultation under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010) is required; and

- An Aboriginal Heritage Impact Permit (AHIP) application is also required if Aboriginal objects or Places are present and will be harmed.

Investigation Methodology & Results

Community Consultation

Consultation with the Aboriginal community is not a formal requirement of the Due Diligence process, however it is recognised in NSW that Aboriginal people are the primary determinants of the significance of their cultural heritage. A landscape may hold intangible values that can be assessed only by the Aboriginal community.

The Project Area falls within the boundaries of the Deerubbin LALC. Steve Randall, Site Officer at Deerubbin LALC, attended the field inspection on 4 August 2014. The draft report was sent to Deerubbin LALC for comment on 19 August 2014. Deerubbin LALC advised Biosis that they have no objections to the proposed upgrade of the Horsley Park Meter Station on the grounds of Aboriginal cultural heritage (a copy of their report is attached at Appendix 2). A copy of this final report will be provided to Deerubbin LALC for their records.

AHIMS Search

The OEH maintains a database of Aboriginal sites within NSW under Part 6 of the NSW *National Parks and Wildlife Act 1974*. Aboriginal objects and places in NSW are legally required to be registered on the AHIMS register.

A search of the OEH AHIMS register was conducted on 1 August 2014 (Client Service ID 143393). The search identified six previously recorded Aboriginal archaeological sites within the vicinity of the Project Area. Details of these sites are provided in Table 1 and their locations are shown in Figure 2 (site 45-5-2567) and Figure 3. These figures contain sensitive cultural information and should not be made public.

Table 1: AHIMS sites present within the vicinity of the Project Area.

AHIMS Site No.	Site Name	Site Features
45-5-2567	DLC1	Artefact (Open Camp Site)
45-5-0866	TPP 1; Prospect Reservoir	Artefact (Open Camp Site)
45-5-0745	WDD 6	Artefact (Open Camp Site)
45-5-2796	WSO-IF-2	Artefact (Isolated Find)
45-5-3082	Horsley Dr PAD	Potential Archaeological Deposit (PAD)
45-5-3624	EC132KV4	Artefact (Open Camp Site)

The predominant site types registered in the search area are Artefact scatters (n=5). One instance of PAD has also been recorded. No previously recorded sites are located within the Project Area.

Site 45-5-2567 is an artefact scatter that is located 20-30 metres to the west of the western boundary of the Project Area (Figure 2). The site was recorded in 1999 during a survey of the proposed Eastern Gas Pipeline Route. As recorded on the site card, the site comprised two silcrete artefacts (one flake and one core) located on a vehicle track in a heavily disturbed market garden area. It was determined to be unlikely that other archaeological material was present due to the high level of disturbance. It is noted on the site card that Consent to Destroy with salvage was applied for; however, the site is currently recorded on the AHIMS

register with a status of 'valid'. A copy of site card 45-5-2567 is attached to this report. This site card contains sensitive cultural information and should not be made public.

No other previously recorded sites are located within the immediate vicinity of the Project Area. The next nearest site (45-5-3624) is an artefact scatter that is located approximately 900 metres to the east of the Project Area.

Field Inspection

An inspection of the Project Area was undertaken on 4 August 2014, attended by Samantha Gibbins (Biosis) and Steve Randall (Deerubbin LALC). John Fisher (EnviroPlan) also attended the field inspection and provided information about the proposed works.

The objectives of the field inspection were to:

- Assess the previous disturbance to the Project Area;
- Assess the potential of the Project Area to possess intact Aboriginal heritage; and
- Locate any Aboriginal objects or Places present within the Project Area.

Results of the site survey

Survey Coverage and Visibility

The accessible sections of the Project Area were surveyed. Ground surface visibility was generally very low due to dense grass cover and the presence of paved surfaces, buildings and meter station infrastructure (Plate 1 and Plate 2). Odd exposures were evident around the bases of trees and along fencelines, and these were all inspected.



Plate 1: Dense grass cover through the Project Area, restricting ground surface visibility. View to west.



Plate 2: Paved surfaces, buildings and infrastructure within the Project Area. View to SW.

Landform

The Project Area is located on a very gently undulating creek flat, approximately 70 metres to the east of Eastern Creek. The land slopes very gently downwards from south to north, and also westwards towards the creek.

Sites Located

No Aboriginal objects were located within the Project Area.

Disturbance

The entire Project Area has been highly disturbed through the installation of the existing gas meter station and associated infrastructure, including buildings; paved roads and surfaces; fences; and underground pipelines and cables (Plate 3 and Plate 4). It is evident that extensive excavation and earth movement has taken place across the whole area, with the main facility located on a levelled artificial terrace (Plate 5 and Plate 6). The original vegetation has been completely cleared from within the Project Area.



Plate 3: Buildings and paved roads within the Project Area. View to south.



Plate 4: Underground cables and pipelines within the Project Area. View to west.



Plate 5: Previous excavation and earth movement within the Project Area (south-west corner). View to NW.



Plate 6: Main facility within the Project Area located on a levelled artificial terrace. View to SE.

Archaeological Potential

The proposed works are located in an area of generally high potential for Aboriginal sites, less than 100 metres from Eastern Creek. A previously recorded Aboriginal site (45-5-2567) is located 20-30 metres to the west of the western boundary of the Project Area. However, at the time of recording it was determined to be unlikely that other archaeological material was present due to the high level of disturbance. No Aboriginal objects were detected during the current field inspection. The current Project Area has been subject to high levels of ground surface disturbance through the installation of the existing gas meter

station and associated infrastructure. There is a correspondingly low potential for intact Aboriginal archaeology to be present within the Project Area.

Impact Assessment

- The proposed works will involve disturbances to the ground surface in order to create trenches for belowground pipework; create trenches for belowground service and telemetry conduits; create concrete pad foundations for gas conveyance control equipment; and create footings and foundations for plinths to support aboveground pipework.
- No known Aboriginal objects or Places will be impacted by the proposed works.
- The Project Area has been subject to high levels of disturbance through previous activity (see above discussion on disturbances).

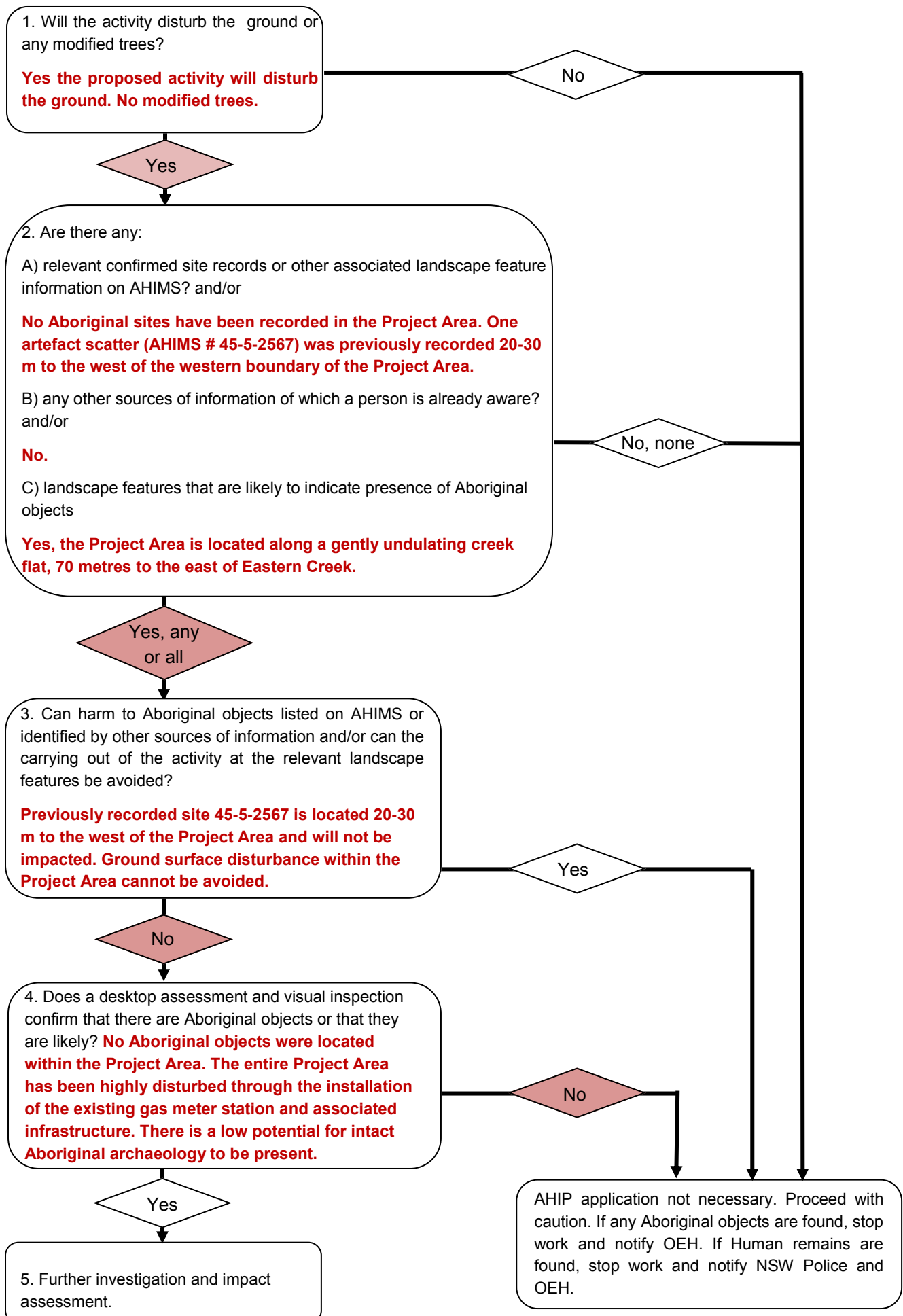
The Code provides a flowchart composed of six questions to identify the presence of, and potential harm to Aboriginal objects within the Project Area. These questions were applied to the investigation methodology (Chart 1).

Discussion

Although the Project Area is located in an area of generally high potential for Aboriginal sites, the high levels of previous ground surface disturbance mean that there is a low potential for intact Aboriginal archaeology to be present within the Project Area. No Aboriginal objects or areas of archaeological potential were identified within the Project Area.

Work can proceed with caution, with the understanding that all Aboriginal objects and Places are protected under the NSW *National Parks and Wildlife Act 1974*, even if in a disturbed or partially damaged state. If any Aboriginal objects are uncovered during any project activity, work must stop immediately and reference should be made to the recommendations listed below.

Chart 1: Due Diligence Process



Recommendations

Based on this investigation, it is recommended that:

Recommendation 1: Proposal to proceed without further archaeological input

The work described in this report can proceed without further assessment or approval from the NSW *National Parks and Wildlife Act 1974* as no Aboriginal objects or Places have been identified as occurring within the Project Area and the potential of locating them during the proposed works is assessed as low. This recommendation is conditional upon recommendations 2, 3, and 4.

Recommendation 2: Discovery of unanticipated Aboriginal cultural material

All Aboriginal Places and objects are protected under the NSW *National Parks and Wildlife Act 1974*. This protection extends to Aboriginal objects and Places that have not been identified but might be unearthed during construction. The following contingency plan describes the actions that must be taken in instances where Aboriginal cultural material is encountered. Any such discovery at the activity area must follow these steps:

1. **Discovery:** Should unanticipated Aboriginal cultural material be identified during any works, works must cease in the vicinity of the find.
2. **Notification:** OEH must be notified of the find.
3. **Management:** In consultation with OEH, Deerubbin LALC and a qualified archaeologist, a management strategy should be developed to manage the identified Aboriginal cultural material. This may include the requirement to apply for an Aboriginal Heritage Impact Permit.
4. **Recording:** The find will be recorded in accordance with the requirements of the NSW *National Parks and Wildlife Act 1974* and OEH guidelines.

Recommendation 3: Discovery of Unanticipated Human Remains

The following contingency plan describes the actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the activity area must follow these steps:

1. **Discovery:** If suspected human remains are discovered all activity in the vicinity of the human remains must stop to ensure minimal damage is caused to the remains. The remains must be left in place and protected from harm or damage.
2. **Notification:** Once suspected human skeletal remains have been found, the Coroners Office and the NSW Police must be notified immediately. Following this, the find must be reported to OEH and it is recommended that it is also reported to Deerubbin LALC.
3. **Management:** If the human remains are of Aboriginal ancestral origin an appropriate management strategy will be developed in consultation with Aboriginal Stakeholders and OEH.
4. **Recording:** The find will be recorded in accordance with the requirements of the NSW *National Parks and Wildlife Act 1974* and OEH guidelines.

Recommendation 4: Report to Deerubbin Local Aboriginal Land Council

A copy of this final report should be distributed to Deerubbin LALC for their records.

Please contact me on (02) 9101 8707 if you require further information.

Yours sincerely,

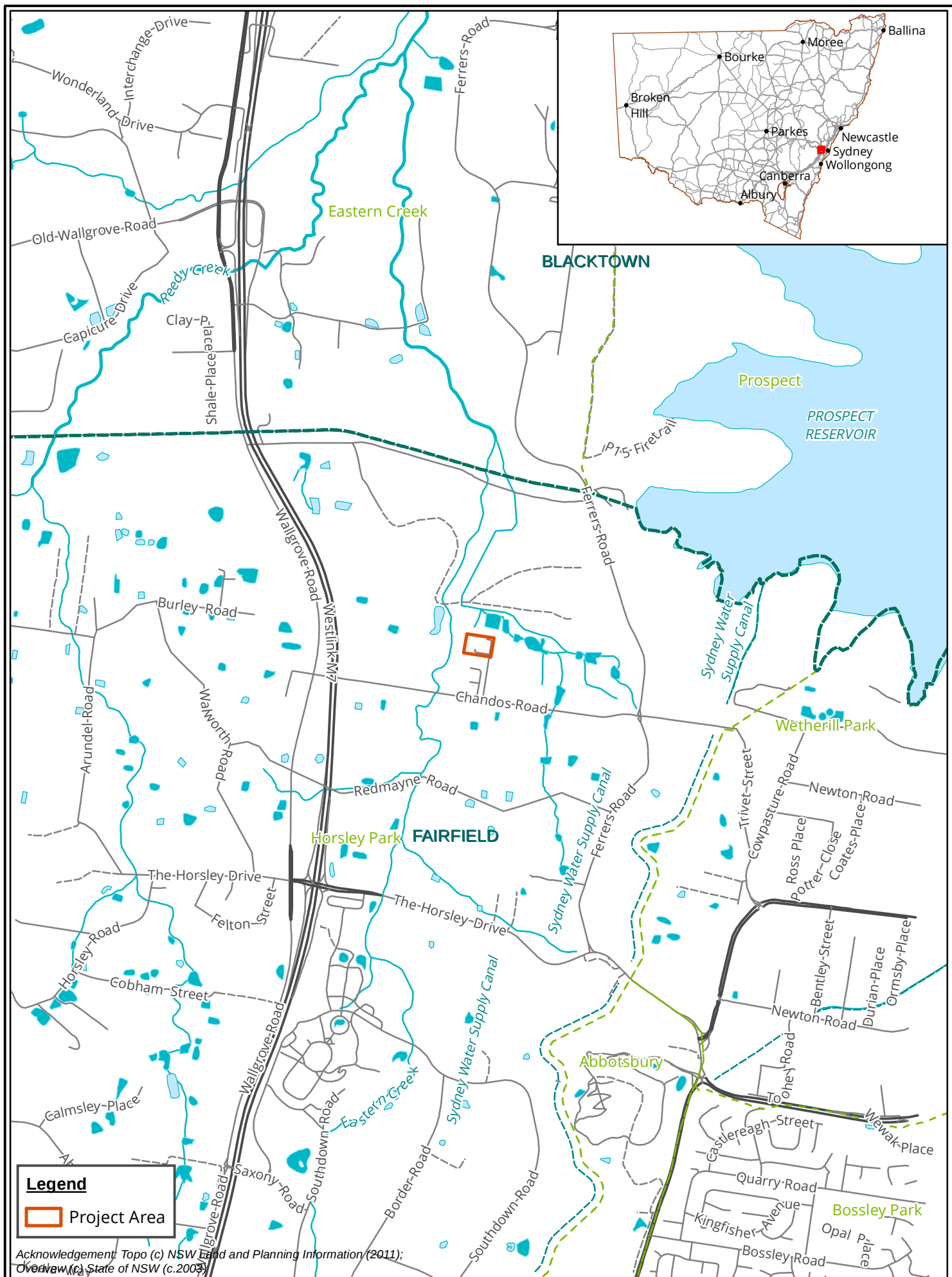


Samantha Gibbins

Consultant Archaeologist

Appendices

Appendix 1: Figures

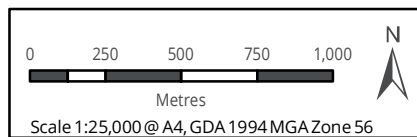


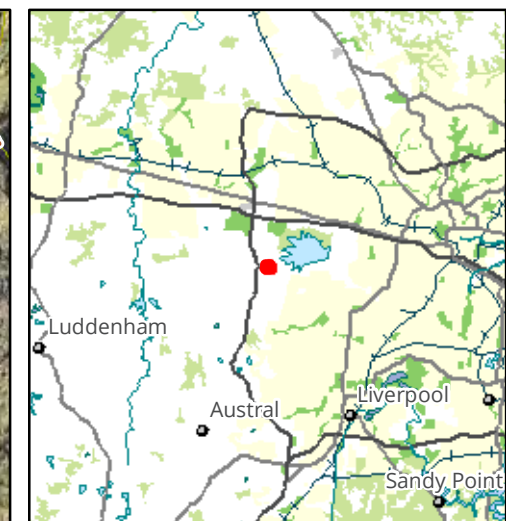
Acknowledgement: Topo (c) NSW Land and Planning Information (2011);
Overview (c) State of NSW (c.2003)



Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 18669
Date: 12 August 2014,
Checked by: SJG, Drawn by: JMS, Last edited by: jshepherd
Location: P:\18600s\18669\Mapping\

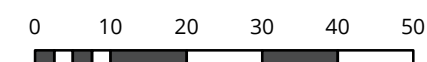




Legend

- Project Area
- AHIMS sites

Figure 2: Project Area Detail

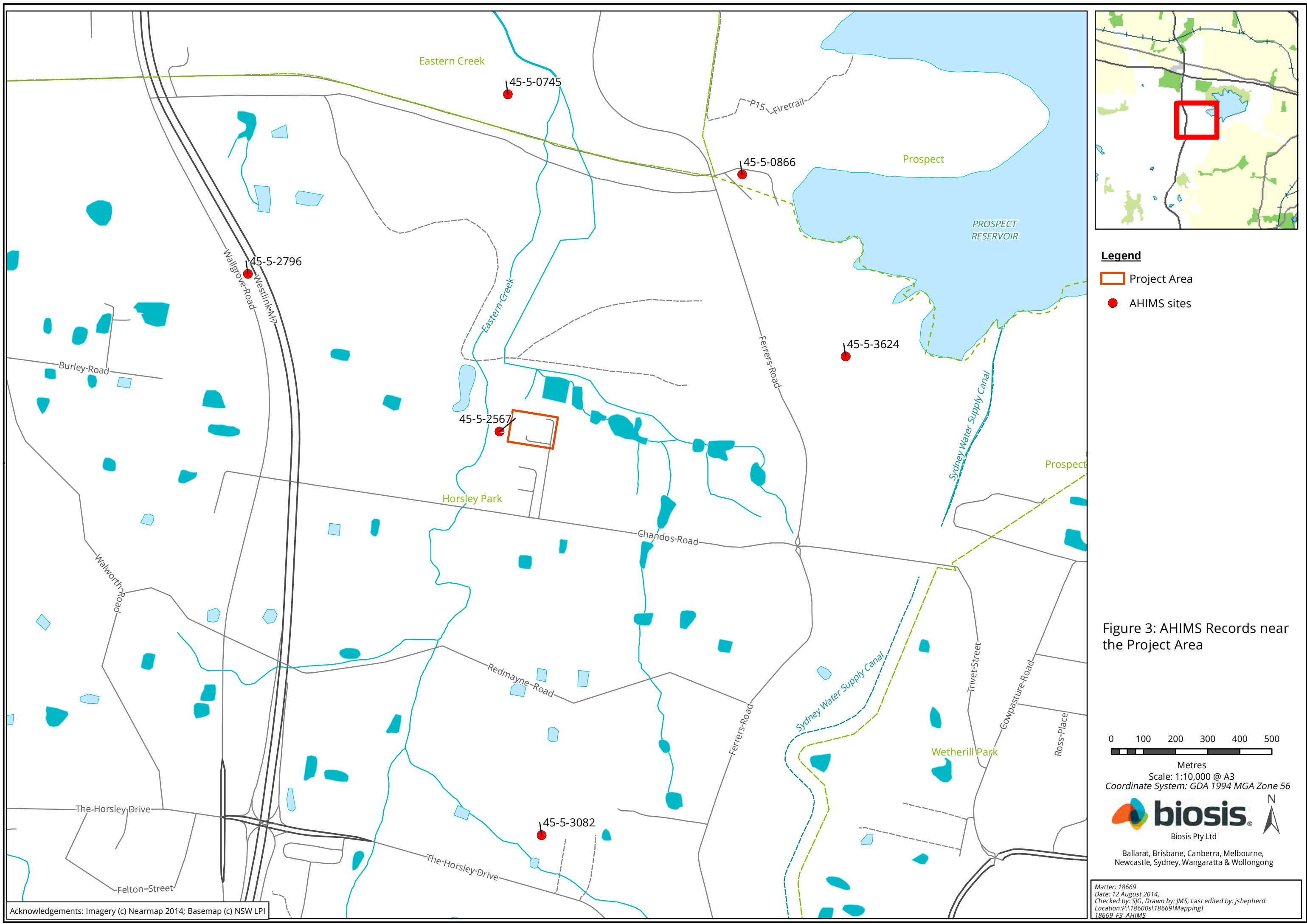


Metres
Scale: 1:1,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

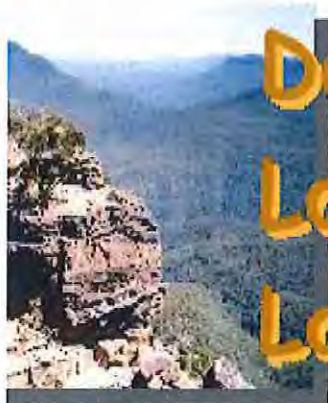


Ballarat, Brisbane, Canberra, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 18669
Date: 12 August 2014
Checked by: SJG, Drawn by: JMS, Last edited by: jshepherd
Location: P:\18600s\18669\Mapping\18669_F2_ProjectArea



Appendix 2: Aboriginal Consultation Documentation



Deerubbin Local Aboriginal Land Council

Level 1, Suite3
291-295 High Street
PENRITH NSW 2750

PO Box 40
Penrith BC
NSW 2751 AUSTRALIA

ABN: 41 303 129 586
T: (02) 4724 5600
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EnviroPlan Pty Ltd

Our Ref: 2463

C/- Biosis Pty Ltd

Your Ref: Matter # 18669

Unit 14, 17-27 Power Avenue

ALEXANDRIA NSW 2015

19 August 2014

PROTECTION OF ABORIGINAL CULTURAL HERITAGE

Horsley Park Meter Station Upgrade

194-202 Chandos Road, Horsley Park

Attention: Samantha Gibbins,

A representative of Deerubbin Local Aboriginal Land Council inspected the proposed upgrade of Gas Meter Station, Horsley Park on 4 August 2014. An Aboriginal cultural heritage assessment was undertaken to evaluate the likely impact the proposed development has on the cultural heritage of the land.

The station had been inspected in 1999 it has no intact soils then and no Aboriginal cultural material (in the form of stone artefacts, for example) were found during the inspection.

Deerubbin Local Aboriginal Land Council therefore has no objections to the proposed upgrade of the Horsley Park Meter Station on the grounds of Aboriginal cultural heritage.

Yours Faithfully,


(Steven Randall

Aboriginal Cultural Heritage Officer)

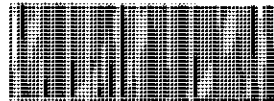
C.c. Miranda Morton – Office of Environment & Heritage

Appendix 3: Site Card 45-5-2567



National Parks and Wildlife Service

Box 1967, Hurstville NSW 2220. Tel: (02) 585 6444
Standard Site Recording Form Revised 5/88



45-5-2567

1:250,000 map sheet:

Sydney

NPWS Code

14.5

AMG Grid reference

250K
302190 mE
25K

250K
6254340 mN
25K

Full reference - please include leading digits

Scale of map used for grid reference

[x] 25K, 50K

[] 100K

[] 250K

Please use largest scale available

SPS

(preferred)

1:25K, 50K, 100K map name:

Prospect

HEAD OFFICE USE ONLY:

NPWS Site no:

455-2567

Site types:

Accessioned by:

Date:

Data entered by:

Date:

Owner/Manager:

Department of Urban

Address:

Affairs and Planning

PO Box 404

Barramatta 2150

Site name: DLC1

Locality/property name:

Prospect Reserve

NPWS District:

South Maitland

Region:

Central

Reason for investigation

Survey of proposed Eastern Gas Pipeline Route: Wilber to Hoxley Park section.

Portion no:

Lot 6, DP 408890

Parish:

Photos taken?

Yes

How many attached?

How to get to the site (refer to permanent features. give best approach to site eg. from above, below, along cliff.
(Draw diagram on separate sheet.)

Access to the site is via Charles Road, off Wilber Rd. Site is located on northern side of Charles Road, 800m to east of Wilber Rd junction. Site is located 60m north of road.

Other sites in locality?

Yes

Site Types include:

Artificial scatters, scattered trees, rockshelters with art + deposit.

Are sites in NPWS Register?

Yes

Have artefacts been removed from site?

No

When?

By whom?

Deposited where?

Is site important to local Aborigines?

Description

Local

Aboriginal Land Council

Give contact(s) name(s) + address(es)

Site Officer

Luke Hickey

PO Box 1184,

Mt Outhill Village

NSW

2770

Contacted for this recording?

Yes

Site officer conducted field inspection during

(Attach additional information separately) If not, why not?

which site was recorded.

Verbal/written reference sources (including full title of accompanying report)

Report for the section of study to be produced by AASC (Australia Archaeological Survey Consultants) based on summary of results provided by Nelson. Report on previous work on this section of the route - AASC 1998.

NPWS Report Catalogue #

Checklist:

surface visibility,
damage/disturbance/
threat to site

Condition of site:

Two artefacts located in heavily disturbed market garden area. Found adjacent to existing Agl isolation fence + in middle of vehicle track.

Recommendations for management & protection (attach separate sheet if necessary)

Recommended that site (2 artefacts) be salvaged. They were identified in middle of access to Hoxley Park proposed gas meter station. Unlikely that other material remains due to disturbance -

Site recorded by:

Annie Nicholson

Date: 8/10/99

Cassett to Daphney
with salvage
applied for.

Address/institution:

PO Box 1773, Port Linton 5606 SA

SITE POSITION & ENVIRONMENT

OFFICE USE ONLY: NPWS site no:

1. Land form a. beach/hill slope/ridge top, etc:

b. site aspect:

c. slope:

d. mark on diagram provided or on your own sketch the position of the site:

e. Describe briefly:

on flats south of
Prospect Reservoir, 80m from
creeklane on track in
market garden area.

f. Local rock type: shale

g. Land use/effect: market garden

2. Distance from drinking water:

80m

Source:

creek

3. Resource Zone associated with site (estuarine, riverine, forest etc):

estuarine

4. Vegetation:

wooded

5. Edible plants noted:

6. Faunal resources (include shellfish):

7. Other exploitable resources (river pebbles, ochre, etc):

Site type:

Artefact
scatter

DESCRIPTION OF SITE & CONTENTS.

Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.

Red siltstone unmodified Plate 14x18x4mm
Red siltstone core 14x20x18mm

CHECKLIST TO HELP:

length, width, depth,
height of site, shelter,
deposit, structure,
element eg. tree scar,
grooves in rock.

DEPOSIT: colour,
texture, estimated
depth, stratigraphy,
contents-shell, bone,
stone, charcoal, density
& distribution of these,
stone types, artefact
types.

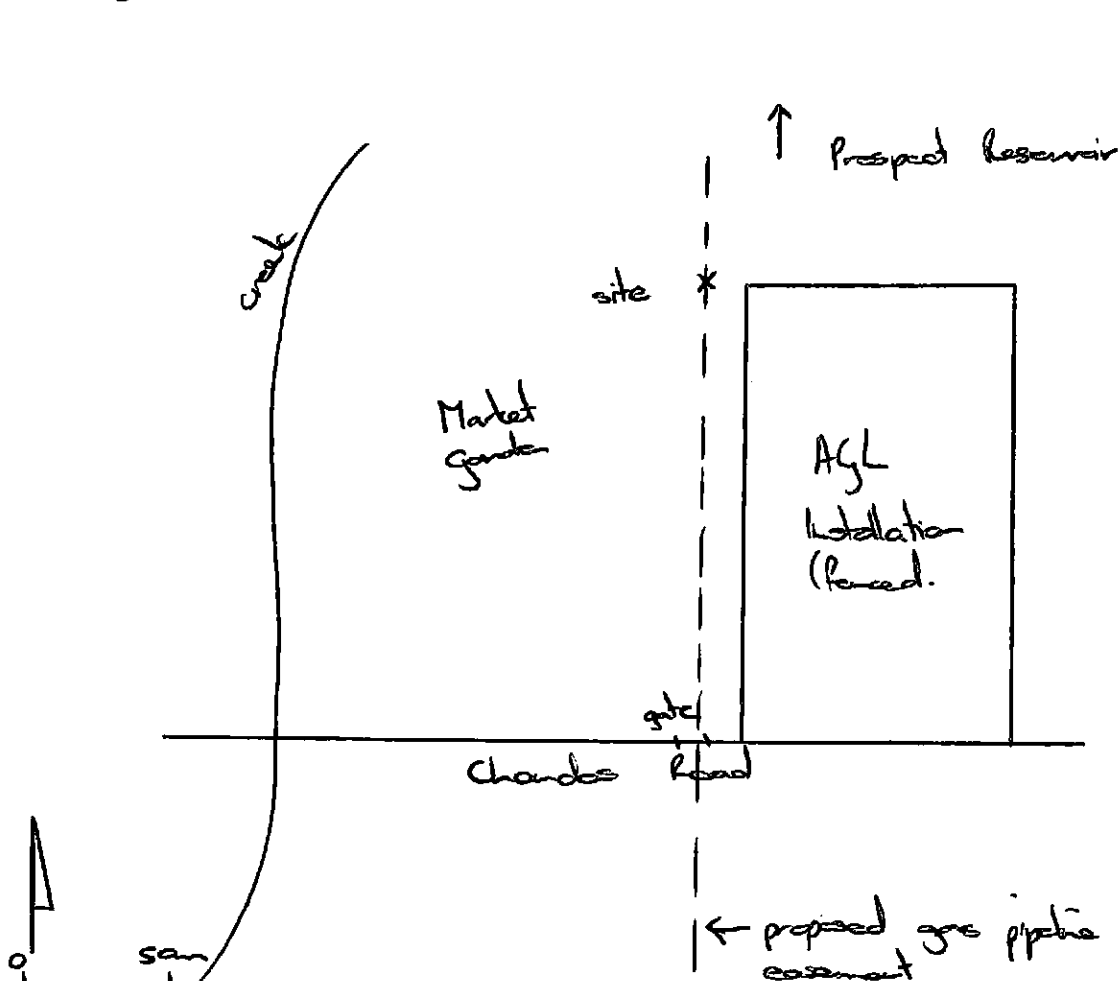
ART: area of surface
decorated, motifs,
colours, wet, dry
pigment, technique of
engraving, no. of
figures, sizes,
patination.

BURIALS: number &
condition of bone,
position, age, sex,
associated artefacts.

TREES: number, alive,
dead, likely age, scar
shape, position, size,
patterns, axe marks,
regrowth.

QUARRIES: rock type,
debris, recognisable
artefacts, percentage
quarried.

OTHER SITES EG.
structures (fish traps,
stone arrangements,
bora rings, msa msa),
mythological sites, rock
holes, engraved groove
channels, contact sites
(missions massacres
cemeteries) as
appropriate



Attach sketches etc. eg. plan & section of shelter, show relation between site contents, indicate north, show scale.

Attach annotated photos (stereo where useful) showing scale, particularly for art sites.