Appendix B Environmental Risk Analysis

Horsley Park Meter Station Upgrade Project

Environmental Risk Analysis

Prepared for:

Jemena

Review History

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1 Introduction

Jemena proposes to upgrade an existing natural gas facility located in Horsley Park, New South Wales (NSW). The proposal involves the installation of additional natural gas flow conveyance, control and metering apparatus within the boundaries of the existing facility. The proposal is referred to as the Horsley Park Meter Station Upgrade Project. The purpose of the proposal is to increase the deliverability of natural gas from the Eastern Gas Pipeline into the Sydney natural gas distribution network.

The proposal meets the definition of State Significant Infrastructure and requires approval form the NSW Minister for Planning and Environment under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979*. The Secretary of the NSW Department of Planning and Environmental (DPE) has issued the environmental assessment requirements (the SEARs) for the proposal. The SEARs require the Environmental Impact Statement to include an environmental risk analysis. An environmental risk assessment of the proposed Horsley Park Meter Station Upgrade Project has been completed and is set out in this document.

2 Scope

The SEARs for the proposal contain the following requirement:

> *Notwithstanding the above key assessment requirements, the EIS must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this additional key environmental impact must be included in the EIS.*

The risk assessment outlined in this document covers the activities associated with the construction and operation of the Horsley Park Meter Station Upgrade Project. This document identifies and assesses the potential risks to features of environmental and heritage conservation significance that may be encountered as a result of the proposal. The assessment of potential environmental impacts outlined in Preliminary Environmental Impact Assessment that has been prepared for the proposal have been used as a guide. The risks identified and the appropriate management and mitigation measures identified in this document will be used as the basis for the EIS as per the specific assessment requirement above.

3 Activities

The activities associated with the construction of the Horsley Park Meter Station Upgrade Project would include the following:

- Site establishment

- Earthworks to create a benched surface onto which to install the new gas infrastructure and trenching for the installation of pipework and conduits
- Civil works to create concrete pads for new gas infrastructure
- Mechanical installation of prefabricated gas conveyance and control apparatus and associated connecting pipework, and
- General construction-related activities.

All new gas infrastructure would be installed within the boundaries of the existing natural gas facility.

The facility is not permanently manned and is monitored and operated remotely from a central control centre. The upgraded facility would be monitored and operated in the same manner. The main aspects of facility operation that have the potential to interact with the environment include:

- Emissions due to combustion of natural gas within the gas-fired boiler that would be installed
- Emissions of greenhouse gases (GHG) associated with natural gas combustion (direct) and electricity usage (indirect)
- Noise emissions, and
- Waste generation from during maintenance activities.

4 Risk Analysis

The activities and operational aspects identified in the preceding section have the potential to interact with and impact the environment. An analysis of the potential environmental risks associated with Horsley Park Meter Station Upgrade Project is provided in this section.

The aspects of each activity that have the potential to interact with the environment have been identified. The potential impacts to the environment, features of heritage significance and the community residents associated with each aspects have been identified. Notes are provided for each identified impact to provide some context for the identified risks. For each impact the mitigation measures and controls that would be adopted are outlined. The residual risk is then evaluated by assessing the potential consequence associated with each impact and the likelihood that the consequence will occur with the specified management measures in place (treated risk).

The definitions of the consequence ratings relevant to environmental risk that have been adopted are provided in Table 4-1. The definitions of the likelihood ratings relevant to environmental risks that have been adopted are provided in Table 4-2. The risk matrix that has been used to determine the level of residual risk after controls have been implemented based on the consequence and likelihood ratings is provided in Table 4-3.

The complete risk analysis is provided in Table 4-4. The analysis makes use of the information in the PEIA including the technical assessments prepared for potential biodiversity and Aboriginal heritage impacts. The analysis also makes use of the conclusion of the Air Quality Impact Assessment that has been prepared for the proposal in accordance with the SEARs.

Table 4-1 Consequence ratings and descriptions

Consequence Ratings	Descriptions					
	Business	**Health Safety**	**Environment**	**Heritage**	**Community**	**Regulatory Compliance**
5 Catastrophic	Potential disastrous impact on Jemena or Business Unit strategies or operational activities. Widespread stakeholder concern / interest.	1 or more fatalities or total permanent disabilities (staff or contractors. 1 death of a member of the public. Significant destruction of third-party property.	Habitat loss leading to extinction of threatened species or communities. Removal or death of threatened species likely to lead to species extinction. Extreme (unobtainable) biodiversity offset requirements. Loss of native vegetation communities on a state wide scale. Offsite environmental release with impacts on a regional scale. Complete rectification not possible.	Wilful damage to significant areas (>1 ha) containing large numbers of features of high heritage significance. Impacts without agreement from relevant stakeholders.	Community amenity disruption likely to draw complaint and public concern at state level.	Sustained and widespread outbreak by public or media on a national level. Reputation impacted with majority of key stakeholders. Sustain stakeholder criticism/negativity lasting months.
4 Major	Significant impact Jemena Business Unit strategies for operational activities. Significant stakeholder concern/interest.	Total disability (staff or contractors). Multiple hospitalisations, permanent disability, members of the public with life threatening injuries. Destruction of third-party property.	Habitat loss affecting viability of threatened species, communities and populations on a regional scale. Removal or death of threatened species likely to lead to extinction of local populations. Large specific biodiversity offset requirements that are very difficult to secure. Native vegetation loss significant on a regional scale (> 10 ha). Large off-site environmental release with impacts at a locality scale. Rectification difficult but possible.	Actual impacts to features of high heritage significance. Impacts without agreement from relevant stakeholders.	Community amenity disruption likely to draw complaint and public concern at regional (local government level).	Significant adverse media/public attention on a state level. Reputation impacted with significant number of stakeholders. Significant stakeholder criticism/negativity lasting weeks.

Consequence Ratings	Descriptions					
	Business	**Health Safety**	**Environment**	**Heritage**	**Community**	**Regulatory Compliance**
3 Severe	Moderate impact on Jemena or Business Unit strategies or operational activities. Moderate stakeholder concern/interest.	Single permanent partial disability (staff or contractors). Medical aid required for members of the public. Some loss of or damage to third-party property.	Habitat loss likely to affect the viability of threatened species, communities and populations on a local scale. Large biodiversity offset requirements. Removal or death of threatened species likely to significantly threaten the viability of local populations. Native vegetation loss significant at locality scale (> 5 ha). Off-site environmental release with local impacts. Involved rectification required.	Actual impacts to features of low heritage significance. Impacts without agreement from relevant stakeholders.	Temporary or ongoing community amenity disruption likely to cause concern and complaint at local (suburb) scale.	Numerous regional complaints. Adverse local media and/or heightened concern. Reputation impacted with some stakeholders. Some stakeholder criticism/negativity lasting a week.
2 Serious	No material impact on Jemena, issues are dealt with internally. Minimal stakeholder concern/interest.	Medical treatment injury or loss injury (staff or contractors). On-site first aid to a number of members of the public, lost time.	Habitat loss for threatened species, communities and populations not likely to affect viability on a local scale. Removal of threatened flora species or death of native fauna with no potential to significantly affect the viability of local populations. Medium biodiversity offset requirements. Native vegetation loss <5 ha. On-site release within the development footprint. Rectification required.	Minor actual or potential impacts to features of heritage significance. Impacts agreed to by relevant stakeholders and as per required permits/approvals.	Temporary or ongoing community amenity disruption likely to draw multiple or repeated complaints.	Limited complaints. Minor, adverse local media attention. Reputation adversely affected with small number of people. Minor stakeholder complaints that can be readily managed. Disciplinary action likely.

Consequence Ratings	Descriptions					
	Business	**Health Safety**	**Environment**	**Heritage**	**Community**	**Regulatory Compliance**
1 Minor	Negligible impact on Jemena, issues are regionally dealt with by operational areas.	Minimal impact on health and safety (staff, contractors, public).	Non-significant habitat loss for threatened species. Minor native vegetation loss <0.5 ha. Minor or temporary disruption of native fauna only. No removal of threatened flora species. No biodiversity offset requirements. No effect or minor on-site effects rectified with negligible residual effect or rectification not required.	No impact to features of heritage significance.	Minor temporary or ongoing community amenity disruption unlikely to draw complaint.	Media annoyance, little or no stakeholder interest. Minor communication with stakeholders only. Disciplinary action may be taken.

Table 4-2 Likelihood ratings and descriptions

Likelihood rating	*Likelihood description*	*Guide*
5 Almost Certain	Event is expected to occur in most circumstances	• Expected to occur once (or more) within one year, or • > than 75% probability of occurrence, or • Has occurred recently and unlikely to occur again.
4 Likely	Event will probably occur in most circumstances	• Will probably occur at sometime within the next two years, or • 51% to 75% probability of occurrence, or • Has a history of occurrence or could be difficult to control due to some external influences.
3 Possible	Event could occur at some time	• Might at sometime within the next five years, or • 26% to 50% probability of occurrence.
2 Unlikely	Event will occur at some time	• Could occur at sometime within the next 10 years, or • 5% to 25% probability of occurrence.
1 Rare	Event may occur only in exceptional circumstances	• Improbable occurrence only in exceptional circumstances (i.e. may occur only occur in more than 10 years), or • < 5% probability of occurrence.

Table 4-3 Qualitative risk analysis matrix

Likelihood	*Consequence*				
	1 Minor	*2 Serious*	*3 Severe*	*4 Major*	*5 Catastrophic*
5 Almost Certain	**Moderate**	**High**	**Extreme**	**Extreme**	**Extreme**
4 Likely	**Moderate**	**Significant**	**High**	**Extreme**	**Extreme**
3 Possible	**Low**	**Moderate**	**Significant**	**High**	**Extreme**
2 Unlikely	**Low**	**Low**	**Moderate**	**Significant**	**High**
1 Rare	**Low**	**Low**	**Moderate**	**Moderate**	**Significant**

Table 4-4 Environmental risk assessment

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
Construction							
Site establishment	Increased vehicle movements along Chandos Road associated with equipment deliveries	Increased congestion and travel times	The project would generate increased light and heavy vehicle movements along Chandos Road. During site establishment large items of construction plant would be transported to site along Chandos Road. Chandos Road is, however, used extensively as a back way between Wallgrove Road and Wetherill Park to the east. The limited numbers of additional vehicle movements due to the project would be unlikely to increase congestion to a level necessary to significantly affect travel times.	• Limit vehicle movements to and from site as much as practicable.	1 Rare	1 Minor	Low
	Heavy vehicles (equipment deliveries) turning into site from Chandos Road	Increased traffic hazards	Light and heavy vehicles slowing to turn into the existing facility/project location could increase the risk of collision with other vehicles on Chandos Road. This risk would be greater during the morning and afternoon peaks when existing traffic levels along Chandos Road are elevated.	• Develop and implement a Traffic Control Plan in accordance with relevant road safety standards that addresses project-related vehicle movements along Chandos road and site entry/egress. • Limit heavy vehicle movements to and from site during morning an evening peak periods wherever practicable.	2 Unlikely	3 Severe	Moderate
	Emissions from project-related vehicle movements	Reduction in local air quality due to increased vehicle emissions	The vehicle movements associated with the project would increase exhaust emissions. Due to the existing traffic levels along Chandos Road and the proximity of the project location to the Westlink M7 Motorway, increased exhaust emissions from project-related vehicles would have a negligible impact on local air quality and would also be temporary in nature.	• Limit vehicle movements to and from site as much as practicable. • Ensure that construction vehicles and plant are adequately maintained to reduce potential emissions.	2 Unlikely	1 Minor	Low
	Greenhouse Gas (GHG) emissions from construction plant and equipment	Increased contribution to anthropogenic GHG emissions and climate change	Vehicle movements associated with site establishment would increase GHG emissions. The increase would, however, be minor in nature compared to existing traffic-related GHG emissions in the local area and Sydney metropolitan region. The increased GHG emissions would also be temporary in nature.	• Limit vehicle movements to and from site as much as practicable.	2 Unlikely	1 Minor	Low
	Noise from project-related vehicle movements	Loss of amenity for local residents due to increased road noise	The increase vehicle movements along Chandos Road associated with site establishment would have the potential to increase road noise. As the potential increases in overall traffic levels due to construction of the proposal would be minor only, it is unlikely that increased noise levels would be significant enough to be noticeable by residents in the vicinity. Any increases in road noise levels would be temporary in nature.	• Limit vehicle movements to and from site as much as practicable • Include the need to minimise compression braking by heavy vehicles in the Project Induction. • Limit project vehicle movements to: – Monday to Friday 7am to 6pm, and – Saturday 8am to 1pm. unless required by RMS or Police for safety reasons or in emergency situations.	2 Unlikely	1 Minor	Low
	Trimming of trees at entrance to facility to facilitate the delivery of large items of equipment	Loss of visual amenity	Only minor trimming would be required of up to three (3) trees adjacent to the existing gate of the facility. Due to the large distances between the nearest visual receivers and the trees the risk of ant noticeable visual changes is minimal.	• Remove only what is necessary to provide the clearance required to enable site access for large deliveries. • Favour trimming rather than tree complete removal where practicable.	2 Unlikely	1 Minor	Low
		Loss of foraging habitat for fauna species	Only minor trimming would be required of up to three (3) trees adjacent to the existing gate of the facility. The trees present are not part of any intact bushland area and ecological community and are unlikely to provide anything other than marginal foraging habitat. Trimming the trees would not result in any significant impacts to foraging habitat.	• Remove only what is necessary to provide the clearance required to enable site access for large deliveries. • Favour trimming rather than tree complete removal where practicable.	2 Unlikely	1 Minor	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
Bulk earthworks	Disturbance of the ground surface	Increased potential for erosion and sedimentation/degradation of aquatic ecosystems in Eastern Creek	Eastern Creek (upper reaches) is located around 70 metres to the west of the existing facility boundary and around 130 metres to the west of the proposed work location. Erosion from site could travel overland and into Eastern Creek during significant precipitation, which could result is sedimentation, water quality reduction and a degradation of any aquatic habitat present. It is noted that Eastern Creek at this location is semi-ephemeral, affected by urban and agricultural run-off and does not support high quality aquatic ecosystems.	• 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. • Inspect and maintain installed soil and erosion controls regularly including prior to forecasted inclement weather and after storms.	2 Unlikely	1 Minor	Low
		Loss of topsoil	The disturbance created by vegetation clearing across the site will result in a loss of ground stability, at least in the short-term, which may result in a loss of topsoil during rainfall. The loss of topsoil may reduce the effectiveness of natural regeneration and revegetation efforts. It is noted, however, that the areas surrounding the additional gas apparatus would be hardstand surfaces free from vegetation for fire safety reason. The topsoil will be completely removed from these areas. The topsoil from these areas will be available for rehabilitation of adjacent areas. The topsoil in the areas outside the construction footprint will remain unaffected by construction of the facility.	• The area of disturbance associated with the proposal would be limited to the greatest extent practicable to minimise the potential for erosion and loss of topsoil from site. • Topsoil would be removed from areas to be excavated and stockpiled separately to subsoil and protected from erosion. • Topsoil would be replaced over disturbed surfaces after backfilling during site restoration to assist with revegetation. • Soil and erosion controls would be installed during site restoration to protect topsoil until a stable soil profile has been re-established.	2 Unlikely	1 Minor	Low
		Weed growth	Ground disturbance creates an opportunity for weeds to germinate, either from existing seed banks in the soil within the facility on from weed material introduced on excavation equipment.	• Contractually require that all construction plant and equipment is received on-site fee from build-ups of soil and organic matter to prevent introduction of weed material. • Inspect all construction plant and equipment for soil and vegetative matter prior to entry to site. Send any equipment that fails the inspection away for cleaning at a suitable location and re-inspect prior to site entry. • Carry out weed monitoring and management during construction and throughout the post-construction period, which would be documented in the Construction EMP and/or a subsidiary document.	2 Unlikely	1 Minor	Low
	Altered surface levels and hydrology	Increased runoff due to increased impervious surfaces which could lead to increased erosion and sedimentation impact in in Eastern Creek.	The proposal would alter surface gradients, increase impervious areas and runoff potential. The grass cover within and outside the facility would be sufficient to reduce runoff velocities and erosion potential. Increased sedimentation in Eastern Creek during operation of the proposal is unlikely.	Restore disturbed surfaces (non-hardstand areas) at the completion of construction to reinstate continuous grass cover and a stable ground surface.	2 Unlikely	1 Minor	Low
		Increased flood levels in adjacent areas if Eastern Creek Flood	The location of the facility is at the top of the catchment for Eastern Creek, limiting the potential for significant floods level likely to affect the facility. The facility is on raised ground adjacent to Eastern Creek. The main additional components to be installed as part of the proposal would also be on raised ground above the floodplain. The proposal would be unlikely to significant affect floodplain storage and flood levels/hazard.	• Limit works and surface level alterations to raised ground within the facility.	1 Rare	2 Serious	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
	Hydrocarbon leaks from excavation equipment, hydrocarbons spills during refuelling and spills/leakage due to inappropriate fuel and chemical storage and handling	Soil contamination	Localised soil contamination could occur due to leakage of hydraulic fluids, lubricants fuel from poorly maintained excavation plant.	• Ensure that construction plant and equipment is adequately maintained. • Inspection construction plant and equipment regularly for leaks. Carry out maintenance to address any leak issues identified. • 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. • Use appropriate task-specific equipment and drip trays during any onsite refuelling to minimise the potential for spillage and potential spill volumes. • Avoid hand refuelling of construction plant and equipment. • Spills kits will be located on site near chemical storage areas and immediately on hand during plant and equipment refuelling. • Clean up any spills immediately, isolate and contain any potential contaminated material and dispose of at an appropriately licensed waste facility.	3 Possible	2 Serious	**Moderate**
		Contamination of surface water runoff from site leading to water quality impacts and the degradation of aquatic ecosystems in Eastern Creek.	Surface water runoff from site could become contaminated by any contaminated soils present. During significant rainfall events, surface water runoff from site could enter Eastern Creek. Eastern Creek adjacent to the project location is semi-ephemeral in nature. The water present is affected by urban and agricultural runoff from adjacent areas. As a result it does not support high quality aquatic ecosystem. The potential for significant water quality impacts due to hydrocarbon contaminated runoff from the project areas is therefore low.	• Ensure that construction plant and equipment is adequately maintained. • Inspection construction plant and equipment regularly for leaks. Carry out maintenance to address any leak issues identified. • 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. • Use appropriate task-specific equipment and drip trays during any onsite refuelling to minimise the potential for spillage and potential spill volumes • Avoid hand refuelling of construction plant and equipment. • Spills kits will be located on site near chemical storage areas and immediately on hand during plant and equipment refuelling. • Clean up any spills immediately, isolate and contain any potential contaminated material and dispose of at an appropriately licensed waste facility.	2 Unlikely	2 Serious	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
	Loss of existing groundcover (grassed areas)	Increased potential for erosion and sedimentation/degradation of aquatic ecosystems in Eastern Creek	Erosion from site could travel overland and into Eastern Creek during significant precipitation, which could result in sedimentation, water quality reduction and a degradation of any aquatic habitat present. It is noted that Eastern Creek at this location is semi-ephemeral, affected by urban and agricultural run-off and does not support high quality aquatic ecosystems. As the site would be revegetated at the completion of construction the potential impact would be temporary.	• The area of disturbance associated with the proposal would be limited to the greatest extent practicable to minimise the potential for erosion and loss of topsoil from site. • Topsoil would be removed from areas to be excavated and stockpiled separately to subsoil and protected from erosion. • Topsoil would be replaced over disturbed surfaces after backfilling during site restoration to assist with revegetation. • Soil and erosion controls would be installed during site restoration to protect topsoil until a stable soil profile has been re-established.	2 Unlikely	1 Minor	Low
		Weed growth	Removal on existing ground cover creates an opportunity for weeds to germinate, either from existing seed banks in the soil within the facility on from weed material introduced on excavation equipment.	• Contractually require that all construction plant and equipment is received on-site fee from build-ups of soil and organic matter to prevent introduction of weed material. • Inspect all construction plant and equipment for soil and vegetative matter prior to entry to site. Send any equipment that fails the inspection away for cleaning at a suitable location and re-inspect prior to site entry. • Carry out weed monitoring and management during construction and throughout the post-construction period.	2 Unlikely	1 Minor	Low
	Increased vehicle movements within the site	Soil compaction, decreased rainfall infiltration, increased run-off volumes and velocities and increased potential for scour, erosion and sedimentation in Eastern Creek.	Soil compaction and associated runoff increases would increase the risk sedimentation and water quality impacts in Eastern Creek during significant rainfall events. Given the small area of potential disturbance and the presence of heavily grassed surfaces between the proposed work locations and Eastern Creek it is unlikely that significant amounts of sediment would reach the watercourse.	• Limit vehicle movements within site to defined working areas and access ways. • Ensure that working areas and access ways are covered in the ESCP for the site. • Inspect and maintain installed soil and erosion controls regularly including prior to forecasted inclement weather and after storms. • Ensure that area that have been compacted by vehicle and construction plant movements are ripped during site restoration activities to increase rainfall infiltration.	2 Unlikely	1 Minor	Low
		Dust generation and deposition in adjacent areas and potential sedimentation in Eastern Creek	Soil will be exposed as part of the bulk earthworks. Vehicle movements over these surfaces will generate dust emissions. As the nearest sensitive receivers are some distance away from the site amenity impacts are unlikely. Dust deposition outside the project area may be transported during rain. Given the small area of potential disturbance and the presence of heavily grassed surfaces between the proposed work locations and Eastern Creek it is unlikely that significant amounts of sediment would reach the watercourse.	• Limit vehicle movements within site to defined working areas and access ways. • Stabilise exposed soil as soon as practicable following disturbance. • Apply dust suppression (such as using water carts) as required to minimise dust emissions.	2 Unlikely	1 Minor	Low
	Increased vehicle movements along Chandos Road due to the removal of excess spoil	Increased traffic hazards on Chandos Road due to turning vehicles.	Chandos Road can be busy, particularly during morning and afternoon peak periods. There is good visibility of the facility/project entrance on approach each direction along Chandos Road. Limited soil removal will be required and associated vehicle movements will be infrequent.	• Develop and implement a Traffic Control Plan in accordance with relevant road safety standards that addresses project-related vehicle movements along Chandos road and site entry/egress. • Limit heavy vehicle movements to and from site associated with spoil removal during morning an evening peak periods wherever practicable.	2 Unlikely	3 Severe	Moderate

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
		Increased congestion and travel times on Chandos Road	Limited soil removal will be required and associated vehicle movements will be infrequent. It is highly unlikely that vehicle movements associated with soil removal will result in increased congestion on Chandos Road and increased travel times.	None	1 Rare	1 Minor	Low
		Increased noise from project-related traffic affecting the amenity of local residents	Limited soil removal will be required and associated vehicle movements will be infrequent. It is highly unlikely that vehicle movements associated with soil removal would result in any significant increase in road noise levels experienced by local residents. Any increase will be temporary in nature and limited to the construction period.	• Include the need to minimise compression braking by heavy vehicles in the Project Induction.	2 Unlikely	1 Minor	Low
	Increased noise from construction plant	Loss of amenity of adjacent residents	Due to the distances between the nearest residences and the proposed work location it is unlikely that residents would experience construction noise levels above relevant construction noise management levels. Noise from construction may, however, be perceptible to the residents. Any increases in noise levels during construction would be temporary and short lived in nature.	• Notify resident of the commencements of construction. • Notify residents prior to any activities likely to generate high-impact noise. • Limit construction activities likely to generate noise level above noise management levels to: – Monday to Friday 7am to 6pm, and – Saturday 8am to 1pm.	2 Unlikely	1 Minor	Low
	Increased emissions from construction plant	Reduction in local air quality	Construction plant and equipment will generate gaseous emission in the form of NO_X, CO, particulates and VOCs. The amount of construction plant required to carry out the proposal will be small. The local area is already subject to considerable vehicle emissions associated with the existing traffic along Chandos Road and the Westlink M7 Motorway to the west. Exhaust emissions construction plant and equipment would be relatively small compared to existing vehicle emissions in the local area, would be unlikely to a significantly affect local air quality and would be temporary in nature.	• Limit the amount of construction plant and equipment on site. • Switch construction plant and equipment of when not in use. • Ensure that construction vehicles and plant are adequately maintained to reduce potential emissions.	2 Unlikely	1 Minor	Low
	Greenhouse Gas (GHG) emissions from construction plant and equipment	Increased contribution to anthropogenic GHG emissions and climate change	The amount of construction plant required to carry out the proposal will be small. GHG emissions from construction plant and equipment associated with the proposal would be relatively small and would not significantly increase GHG levels.	• Limit the amount of construction plant and equipment on site. • Switch construction plant and equipment of when not in use.	2 Unlikely	1 Minor	Low
	Waste generation (excess spoil)	Loss of capacity in existing waste facilities	Limited excess spoil would be generated during construction. The volume of excess spoil generated would be unlikely to results in a significant decrease in waste facility capacity in the area. Potential reuse options would be identified and assessed for the spoil (subject to waste classification).	• Test soil removed to determine if it can be used for fill onsite. • Classify spoil in accordance with the NSW Waste Classification Guidelines to determine potential reuse options.	2 Unlikely	1 Minor	Low
	Disturbance of previously unknown features of heritage significance	Loss of heritage values	Due to the past level of soil disturbance within the project area it is unlikely that intact items of high heritage conservation significance (Aboriginal or European) would be present. The potential for heritage impacts is very low.	• Limit area of disturbance. • Stop work at the location if any items are uncovered that may be of heritage conservation significance. • Investigate any items uncovered with assistance from specialists and government agencies as required. • Proceed with works only in accordance with any required approval and agreed management protocols.	2 Unlikely	2 Serious	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
	Open trenches	Injury or death or death of fauna trapped in trenches during backfilling if egress from trenches is not possible	Trenches will need required for underground pipework and conduits. Fauna may enter into and become trapped within these trenches.	• Create trenches with sloped ends to allow fauna egress. • Check trenches and excavations for prior fauna to backfilling. • If fauna is present engage a suitable qualified fauna handling specialist to remove trapped fauna.	2 Unlikely	2 Serious	Low
	Discharge/disposal of water collected in trenches	Changes in water quality in Eastern Creek	Water that collects in open trenches/excavations would feature high sediment loads and could also be contaminated with hydrocarbon (from spills/equipment leakage etc). Discharge of trench water to pervious surfaces within the project area, through appropriate filtration devices and in a manner that does not result in scour and erosion is appropriate if there is no evidence that the water is contaminated with anything other than sediment.	• Inspect water collected in trenches/excavations prior to removal. • If visual or olfactory evidence is present of contamination ensure that water is collected and taken for disposal as liquid waste at a suitably licensed waste facility. • If there is no evidence of contamination ensure that water is discharge through appropriate filtration devices to remove sediment.	2 Unlikely	1 Minor	Low
Civil works	Hydrological changes due to site surface modifications (benching) and concrete pad/equipment enclosure creation	Reduced infiltration/increased run-off leading to increased erosion and sedimentation in Eastern Creek	The installation of concrete pads reduces infiltration of rainfall and can result in increased run-off from the development site. Only small areas of concrete pads would be constructed as part of the development. The risk of changes in overall hydrology of the site and location due to changes in water infiltration due to concrete pad installation is very low.	• Ensure appropriate site restoration to re-establish continuous ground cover to reduce velocity of and filter site runoff. Rehabilitation requirements will be documented in a Construction EMP. • Monitor the site during the post-construction period for erosion and correct any issues identified.	2 Unlikely	1 Minor	Low
	Wash out of concrete agitators, delivery chutes, pumps and piping	Changes in water quality in Eastern Creek down gradient from the development site due to concrete wash water	Concrete and the water used to clean concrete delivery equipment can alter the pH and chemical characteristics of run-off that comes into contact with the wastes. Run-off water contaminated in this matter can result in changes within aquatic ecosystems down gradient from the development footprint. Due to the distance of any areas perennial water bodies to the development footprint, however, the risk of significant changes in aquatic chemistry due to waste concrete within the development footprint is very low.	• Establish a lined concrete slurry and wash water pit within the site prior to any concrete deliveries. • Ensure that all excess concrete and concrete wash water is discharged into the concrete slurry pit. • Remove concrete lined slurry pit and all contents at the completion of construction and divert to appropriate recycling of waste disposal facilities.	2 Unlikely	1 Minor	Low
	Increased vehicle movements within the existing facility	Reduced infiltration/increases run-off leading to increased erosion and sedimentation in Eastern Creek	Ground compaction reduces infiltration of rainfall and can result in increased run-off from the development site. Only small areas of the site would be compacted by vehicle movements. The risk of significant changes in run-off volumes and sedimentation impacts in Eastern Creek due to ground compaction within the development site is low.	• Limit vehicle movements within site to defined working areas and access ways. • Ensure that working areas and access ways are covered in the ESCP for the site. • Inspect and maintain installed soil and erosion controls regularly including prior to forecasted inclement weather and after storms. • Ensure that area that have been compacted by vehicle and construction plant movements are ripped during site restoration activities to increase rainfall infiltration.	2 Unlikely	1 Minor	Low
	Resource use (concrete and steel reinforcement)	Reduction in availability of resources for other uses	The amount of steel and concrete required for the project would not result in restriction in resource availability for other uses.	• Limit material quantities required for construction in the design phase. • Use recycled products where practicable and where they meet the required design specifications.	2 Unlikely	1 Minor	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
Fuel and chemical storage	Leakage from storage containers and spills due to improper handling	Soil contamination and contamination of surface water runoff from site potentially leading to water quality impacts in Eastern Creek	Limited amounts of chemical would be required to carry out the project. Refuelling would be form dedicated refuelling equipment to reduce the risk of spills. The risk of leaks and spills of volumes significant enough to result in contaminated runoff is low.	• 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. • Ensure that all chemicals are handled and used in accordance with the SDS and product label. • Use appropriate task-specific equipment and drip trays during any onsite refuelling to minimise the potential for spillage and potential spill volumes. • Avoid hand refuelling of construction plant and equipment. • Spills kits will be located on site near chemical storage areas and immediately on hand during plant and equipment refuelling. • Clean up any spills immediately, isolate and contain any potential contaminated material and dispose of at an appropriately licensed waste facility.	2 Unlikely	1 Minor	Low
Mechanical installation	Heavy vehicles (mobile cranes and equipment deliveries) turning into site from Chandos Road	Increased traffic hazards	Light and heavy vehicles slowing to turn into the existing facility/project location increased the risk of collision with other vehicles on Chandos Road. This risk would be greater during the morning and afternoon peaks when existing traffic levels along Chandos Road are elevated.	• Develop and implement a Traffic Control Plan in accordance with relevant road safety standards that addresses project-related vehicle movements along Chandos road and site entry/egress. • Limit heavy vehicle movements to and from site during morning an evening peak periods wherever practicable.	2 Unlikely	3 Severe	Moderate
General construction activities	Increased waste generation	Loss of capacity in existing waste facilities	Construction is not likely to generate significant waste volumes. Waste generated during construction is unlikely to affect local waste facility capacity significantly.	• Review waste likely streams and investigate suitable reuse and recycling options. • Minimise waste generation at all times during construction and operation.	2 Unlikely	1 Minor	Low
	Increased noise from construction plant	Loss of amenity of adjacent residents	Due to the distances between the nearest residences and the proposed work location it is unlikely that residents would experience construction noise levels above relevant construction noise management levels. Noise from construction may, however, be perceptible to the residents. Any increases in noise levels during construction would be temporary and short lived in nature.	• Minimise the amount of construction plant operating simultaneously on site. • Notify resident prior to the commencement of any construction activities likely to generate high impact noise. • Limit construction activities likely to generate noise level above noise management levels to: – Monday to Friday 7am to 6pm, and – Saturday 8am to 1pm.	2 Unlikely	1 Minor	Low
	Increased emissions from construction plant	Reduction in local air quality	The numbers of construction plant and equipment required to construct the project are limited. The potential for increases in emission from construction plant of a level likely to significantly alter local air quality is very low.	• Limit the amount of construction plant and equipment onsite. • Switch construction plant and equipment off when not in use.	2 Unlikely	1 Minor	Low

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
Operation							
Facility operation	Generation of hazardous waste	Soil and water contamination (if hazardous waste is not managed appropriately	Maintenance of the facility components generates waste materials that are contaminated with light hydrocarbons (cleaning rags, filter cartridges etc) and "dust" from within the pipeline. Maintenance that generates this type of waste is not carried out frequently. Materials are routinely paced in HAZMAT bins which are taken for disposal at EPA Licensed waste facilities. The potential for spillage and subsequent soil and water contamination from this maintenance is low.	• Ensure that suitable number of HAZMAT drums are available during any maintained likely to generate hazardous. • Ensure that all potential hazardous wastes are placed directly into HAZMAT drums as they are generated. • Ensure that filled HAZMAT drum are closed immediately and stored in an appropriate location/manner prior to removal from site for disposal at a suitably licensed waste facility.	2 Unlikely	2 Serious	Low
		Loss of capacity of waste facility able to accept hazardous wastes in the area.	The volumes of hazardous waste generated are not large and they are generate only infrequently during certain maintenance activities.	• Ensure scheduled service intervals are selected to minimise hazardous waste generation.	2 Unlikely	1 Minor	Low
	Increased noise level due to facility operations	Loss of amenity for residents in the vicinity of the facility	The facility has been designed to use low noise technology (boiler/heat exchanger package as opposed to water bath heaters). Due to the distance of the nearest noise sensitive receivers (residents) from the facility noticeable increases in noise due to operation of the upgrade facility would be unlikely and compliant with relevant noise goals form the *NSW Industrial Noise Policy*.	• Monitor noise emission post-construction during high load operating conditions to ensure that actual noise level are within relevant noise criteria at the most affected residence. • Investigate and implement additional noise mitigation measures if nonoperational noise levels are non-compliant.	2 Unlikely	1 Minor	Low
	Increased emissions for due to facility operation (combustion of natural gas)	Loss of air quality in the local area	The upgraded facility would include a gas-fired boiler which would increase air emissions from the facility. The main air pollutants generated would be carbon monoxide (CO) and oxides of nitrogen (NO_X). The air quality assessment indicates that the concentration of the key air pollutants likely to be generated by the upgraded facility would be unlikely to exceed relevant air quality criteria.	• Monitor emissions post-construction during high load operating conditions to ensure that the inputs used in the air quality modelling are appropriate and the model results are representative actual operating condition and complaint with relevant criteria. • Investigate and implement option to reduce emissions if operational air quality monitoring results levels indicate non-compliance with air quality criteria.	2 Unlikely	1 Minor	Low
	Increased GHG emissions due to facility operation (combustion of natural gas)	Increased levels of GHG in the atmosphere contributing to global warming	The combustion of natural gas within the gas-fired boiler would generate carbon dioxide. GHG emissions from the facility would increase. The combustion of natural gas produce significantly less GHG emission per unit of energy than coal. It is noted that increasing the supply of natural gas into the Sydney distribution network would decrease reliance on electricity from coal-fired power station as an energy source, lowering potential GHG emissions overall. Natural gas is also vented from the facility from time to time to take components out of service and carry out maintenance.	• Reduce facility blow downs (venting) during maintenance to the greatest extent practicable.	5 Almost Certain	1 Minor	Moderate
	Increased electricity usage due to facility operation	Increased indirect GHG emissions due to electricity generating	The facility would use electricity to drive the induction fans in the boiler/heat exchanger package. It is noted, however, that the boiler/heat exchanger package has been adopted as opposed to a traditional water bath heater due to lower noise emissions.	None	5 Almost Certain	1 Minor	Moderate
	Increased vehicle movements associated with facility operation and maintenance	Congestion and increased traffic hazards on Chandos Road	The facility would be unmanned during normal operation. Scheduled maintenance activities would generate additional vehicle movements along Chandos Road. The numbers of additional vehicle movements would be small compared to existing traffic levels. Such maintenance activities occur infrequently.	None	2 Unlikely	3 Severe	Moderate

Activity	Aspect	Impact	Notes	Controls	Likelihood	Consequence	Residual Risk
	Altered visual appearance of the facility due to the additional gas infrastructure installed within.	Loss of visual amenity for local residents	The new gas infrastructure would be installed within the existing facility which is surrounded by a high palisade fence. Due to the large distances between the nearest residences and the facility and the presence of structures and vegetation which screen or partially screen view angles, the visual amenity of adjacent residents is unlikely to be significantly affected due to the proposed upgrade.	None	1 Rare	1 Minor	Low

5 Discussion and Conclusion

Construction of the proposal would have the greatest number of activities that have the potential to interact with the environment. During construction the only environmental risks identified with a residual risk above 'Low' relate to potential traffic hazards associated with project vehicles entering and leaving the facility site. Mitigation measures are proposed to reduce the likelihood of traffic accidents at this location. As behaviour of drivers using Chandos Road is outside of the proponent's control, accidents may still happen. The risk level cannot be reduced from 'Moderate' as the potential consequence of such incidents is still 'Severe' as per Table 4-1.

The location of the proposed work within an existing gas facility and does not feature any sensitive environmental or heritage features. The proposed work location is not in close proximity to sensitive environmental features and residents. The overall environmental risk associated with construction is low if the outlined environmental controls are implemented.

During operation the only environmental risks that are assessed with a residual risk above 'Low' are:

- direct GHG emissions due to the combustion of natural gas within the gas-fired boiler
- the indirect GHG emissions associated with the electricity use by fans associated with the gas-fired boiler, and
- the risk of traffic accidents due to vehicles turning into the driveway of the facility.

GHG emissions during operation of the facility are unavoidable. The pressure reduction process within the proposed gas infrastructure results in dramatic temperature loss. If not corrected the low temperatures can cause metal pipework and components to become brittle which in turn affects the ongoing safe operation of the facility. Natural gas is combusted to provide the energy to heat the gas prior to pressure reduction to avoid this issue. The only way to do this other than combustion of natural gas would be by combusting another fossil fuel or using electricity. Both options would generate GHG. The environmental risk is rated is 'Moderate' because while the overall contribution to atmospheric GHG levels might be low, the GHG emissions will almost certainly happen.

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 shortfall in natural gas supply may lead to increased use of electricity generated by 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.

The additional components to be installed within the facility would increase electricity consumption, with associated indirect GHG emissions. The electricity would be used to drive fans within the gas-fired boiler/heat exchanger package. Choosing alternative methods to heat the gas (such as using water bath heaters similar to those already in operation within the facility) would decrease electricity usage. The gas-fired boiler/heat exchanger option, however, has been selected because it is significantly quieter than alternatives. The solution is therefore justified on the basis of minimise overall impacts to the environment, including the adjacent residents. While the overall consequence of increase indirect GHG emissions due to increased electricity usage is relatively minor in terms of

potential contributions to atmospheric GHG levels, the environmental risk level is rated as 'Moderate' as it will almost certainly happen.

The risk of traffic hazards on Chandos Road are discussed above in reference to the construction phase. As operation of the upgraded facility will not significantly affect overall traffic levels and maintenance is only required very infrequently, the level risk will remain similar to the exiting situation.

The potential environmental risks associated with the proposed Horsley Park Meter Station Upgrade Project have been identified based on the activities that will be carried out on site. The potential risks have been analysed and appropriate controls outlined to reduce the risks as much as reasonably practicable. It is considered that all environmental risks associated with the proposal can be adequately managed and the overall level of environmental risk associated with the proposal is low.