Chapter 7. Impact assessment

7.1 Land use and zoning

7.1.1 Proposed water pipeline

Condition 2.2(g)(i) requires consideration of ownership, land use and zoning provisions for land along the proposed water pipeline route. In addition, the suitability of the proposed route is to be considered, specifically with respect to potential land use conflicts with existing and future land users.

Ownership

The DN600 Hobas Rising Main is located on Council-owned land immediately to the west of the Delta site, and runs along the boundary between the two sites.

The preferred option is for the connection to the Rising Main to occur at the location shown in Figure 4.3, with the proposed water pipeline to be located within the Delta site.

Land use

The adjacent Council-owned land is reserve and bushland surrounding the Bamarang reservoir. The Delta site is currently vacant.

Zoning

The DN600 Hobas Rising Main is located on land zoned 7(c) Environment Protection "C" (Water Catchment Areas) under the Shoalhaven Local Environmental Plan (LEP) 1985. In the 7(c) zone, utility installations require development consent. The proposed water supply pipeline is consistent with the definition of a utility installation and is therefore permissible with consent.

The Delta site is zoned 1(d) Rural "D" under the Shoalhaven LEP. In the 1(d) zone, a water pipeline is not listed as a prohibited use, or a use not requiring development consent. As a result, it is permissible with consent.

Clause 5 of the Shoalhaven LEP adopts selected model provisions from the *Environmental Planning and Assessment Model Provisions 1980,* including Clause 35 (except for clause 35(c)):

> *"35 Savings*
>
> *Nothing in the local environmental plan shall be construed as restricting or prohibiting or enabling the consent authority to restrict or prohibit:*
>
> *(a) the carrying out of development of any description specified in Schedule 1,*
>
> *(b) the use of existing buildings of the Crown by the Crown."*

Schedule 1, paragraph 2 states (in part):

> *"The carrying out by persons carrying on public utility undertakings, being water, sewerage, drainage, electricity or gas undertakings, of any of the following development, being development required for the purpose of their undertakings, that is to say:*
>
> *(a) development of any description at or below the surface of the ground …"*

As the proposed water pipeline falls within the definition of 'public utility undertakings' listed in Schedule 1, clause 35 overrides the need for development consent for this infrastructure. Notwithstanding this, in accordance with the requirements of Part 3A of the EP&A Act, approval is required from the Minister for Planning for the proposal as a whole.

Suitability of the proposed route

The preferred water pipeline route is located within the Delta site, and is therefore considered to be suitable.

The preferred water pipeline route is located within the required asset protection zone (APZ) for bushfire purposes, where partial clearing is required. The exact route of the proposed water pipeline will take into account significant vegetation which is to be retained after clearing for the APZ. Therefore the preferred route for the proposed water pipeline is not expected to have any additional impacts on flora and fauna and their habitat.

In addition, the Indigenous heritage assessment undertaken as part of the 2006 environmental assessment did not find any Aboriginal sites or potential archaeological deposits on the Delta site. The nearest Aboriginal sites that were identified during the field survey are located over 3km from the proposed water pipeline. As such, the proposed pipeline is not likely to have any impact on Aboriginal heritage.

As such, the proposed water pipeline route is considered to be suitable and unlikely to have any additional adverse environmental impacts.

7.2 Ecology

7.2.1 Revised facility layout

Vegetation clearance

As outlined in Section 5.7, the revised layout of the stage two facility as a result of the air cooled condenser has increased the amount of vegetation to be cleared.

As described in Section 8.3 and Appendix E of the 2006 environmental assessment, stage two (wet cooled base load facility) would require 6 hectares of total clearing, and 4.7 hectares of partial clearing for hazard reduction in the bushfire asset protection zone. The new layout of stage two (dry cooled combined cycle facility) would require approximately 6.5 hectares of total clearing, and 3.9 hectares of partial clearing for hazard reduction in the bushfire asset protection zone.

As such, while the amount of total clearing has increased by 0.5 hectares, the amount of partial clearing required has decreased by 0.8 hectares.

None of the vegetation to be cleared is considered to be a part of an endangered ecological community.

The majority of the clearing for the APZs would be in the form of partial clearing to ensure a discontinuous canopy and reduce fuel loads to acceptable levels and therefore would not result in clearance of all vegetation in these areas. The removal of vegetated areas would decrease the amount of potential fauna habitat present within the site.

A number of mitigation and management measures were proposed in the 2006 environmental assessment to prevent direct and indirect impacts of the proposal on flora and fauna and their habitat within the study area and locality. These would be implemented for stage two, as follows:

» Fencing of proposed development areas to ensure construction works do not breach the boundaries or enter the adjacent vegetation and surrounding areas;

» Installation of sediment detention basins, or similar, prior to construction to prevent untreated runoff and sediment entering drainage lines and creeks within the study area;

» Implementation of 'best practice' stormwater treatment measures to maximise:

  – Onsite pollutant retention and removal; and

  – Infiltration and sub-surface discharge of stormwater (NPWS 1998);

» Placement of stockpiles away from vegetated areas;

» Piling of soil that may contain seed of exotic species away from adjacent vegetation or drainage lines where they could be spread during rainfall events;

» Maintenance of a vegetated buffer between any development and the adjacent reserve;

» Appropriate fire management measures and asset protection zones to be implemented in accordance with the provisions outlined in the bushfire assessment (Section 7.4) to prevent fires spreading from the site to adjacent areas; and

» Allowance for regeneration to maximum acceptable height along drainage lines supporting potential habitat for Nowra Heath-myrtle.

In addition, consistent with the requirements of the project approval for stage one, Delta will provide a compensatory habitat package in accordance with DECC requirements, for the total area of vegetation removed by stages one and two. Delta commits to continuing discussions with DECC on this issue.

Hollow-bearing trees

The revised layout has reduced the number of hollow-bearing trees that would be removed as a result of the proposal from 15 to 12, as shown in Figure 7.1.

Importantly, the revised layout allows the retention of tree no. 128, which supports a large hollow in the trunk of approximately 50 cm diameter. There is a scarcity of trees with hollows in the trunk and of this size, and the retention of this tree will ensure that potential habitat for a variety of hollow-dependent species would remain at the site.

Figure 7.1 Stage two impact on hollow-bearing trees

Mitigation and management measures relating to hollow-bearing trees were proposed in the 2006 environmental assessment. These would be implemented for stage two, as follows:

» Retention of mature, hollow-bearing trees within the study area (where possible); and

» Where avoidance of hollow-bearing trees is not possible, hollow-bearing branches and trunks would be carefully removed and checked by an ecologist for any fauna and then placed within the adjacent woodland to provide habitat for other fauna species.

7.2.2 Proposed water pipeline

The preferred route for the water pipeline is proposed to be constructed within the Delta site.

The preferred water pipeline route is located within the required asset protection zone (APZ) for bushfire purposes, where partial clearing is required. The exact route of the proposed water pipeline will take into account significant vegetation which is to be retained after clearing for the APZ.

Therefore the proposed water pipeline is not expected to have any additional impacts on flora and fauna and their habitat.

7.3 Indigenous heritage

7.3.1 Revised facility layout

Indigenous heritage impacts associated with the proposed gas facility were assessed in the 2006 environmental assessment (Section 9.6 and Appendix J) and the submissions report.

The 2006 Indigenous heritage assessment did not find any Aboriginal sites or potential archaeological deposits on the site of the proposed gas power facility. As such, the increased footprint of the facility as a result of the now proposed air cooled condenser is not expected to impact on any Aboriginal sites. As such, it is considered that there are no Aboriginal heritage constraints to the modified proposal.

7.3.2 Proposed water pipeline

The preferred route for the water pipeline is proposed to be constructed within the Delta site.

The 2006 Indigenous heritage assessment did not find any Aboriginal sites or potential archaeological deposits on the site of the proposed gas power facility. As such, the proposed water pipeline is not expected to impact on any Aboriginal sites. As such, it is considered that there are no Aboriginal heritage constraints to the proposed water pipeline.

7.4 Bushfire

A bushfire risk assessment for the proposed gas power facility was undertaken for the 2006 environmental assessment (Section 8.4 and Appendix F).

Following consultation with the Rural Fire Service, this assessment recommended asset protection zones (APZ) of 40m from the edge of the power facility structure, and 20m from the edge of the cooling tower and any other structures on the site.

The proposed air cooled condenser is similar in nature to the previously proposed cooling tower and other ancillary structures, in that it does not use gas or generate electricity. As such, the 20m APZ applies to the air cooled condenser.

The APZs have been applied to the modified facility layout, as shown in Figure 7.2.

It is considered that the implementation of proposed bushfire asset protection zones, together with other site management practices proposed, would adequately protect the proposed facility from risk associated with bushfire hazards.

7.5 Air quality and plume rise

As required by condition 2.2(e) of the concept approval for the Bamarang Gas Turbine Facility, this section provides an updated Air Quality Impact Assessment for stage two.

In order to assess the change to the use of dry cooling processes in stage two, an updated air quality impact assessment has been undertaken by Heggies Pty Ltd. This section provides a summary of the findings of the updated assessment. The full report is contained in Appendix C.

7.5.1 Air quality

Methodology

The air quality impact assessment has been conducted in accordance with the publication *Approved Methods and Guidance for Modelling and Assessment of Air Pollutants in New South Wales* (DECC, 2005).

As for the 2006 environmental assessment, a computer based dispersion model, The Air Pollution Model (TAPM), developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), was used to model the potential air quality impacts of the proposal.

Updated air quality monitoring data for 2006 was obtained from Nowra Water Treatment Plant, approximately 1 km to the northwest of the site and the DECC air quality monitoring station at Albion Park South, located approximately 43 km north-east of the site.

TAPM was used to generate a complete 2006 meteorological data set for the project site, incorporating hourly observations recorded at both the onsite weather station and the Nowra RAN Air Station BoM monitoring site.

Relevant characteristics of the proposal

The relevant characteristics of the proposal, as described in Section 8.1.2 of the 2006 environmental assessment, have not altered.

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Figure 7.2 Revised APZs for stage two (dry cooling)

Existing environment

The climate in the region is as reported in Section 8.1.3 of the 2006 environmental assessment. Wind data has been updated. The 2006 prevailing annual wind directions and average wind speeds for monitoring stations at Nowra Water Treatment Plant and Nowra RAN Air station is summarised in Table 7.1.

Table 7.1 Summary of annual wind behaviour near the Bamarang site, 2006

	Nowra Water Treatment Plant	Nowra RAN BoM
Dominant Wind Direction	SW-W	W-WNW and S
Average Wind Speed (m/s)	1.2	3.4
Frequency of Calms (%)	20.7	4.9

Regional topography is unaltered.

The nearest sensitive receptors have been updated, as outlined in Table 7.2.

Table 7.2 Nearest potentially sensitive receptors

Property Name	Description	MGA Dwelling Coordinates	
		East (metres)	North (metres)
'Bundanon'	2.6 kilometres north east of proposed site	271728	6136340
Water Treatment Plant	1.3 kilometres west northwest of proposed site	272637	6135903
Bamarang Bush Cabins	1.2 kilometres north northeast of proposed site	273436	6136080
'Katalives'	1.8 kilometres north of proposed site	274343	6136620
'Mundamia' Properties	2.3 kilometres west northwest of proposed site	275993	6135903
"Lot 7" Gannet Road	1.8 km south west of proposed site	275018	6133615

Background air quality parameters have also been updated on the basis of more recent air quality monitoring data from Nowra Water Treatment Plant and the DECC air quality monitoring station at Albion Park South. The background air quality levels adopted for this assessment are summarised in Table 7.3.

Table 7.3 Background air quality levels adopted for the assessment

Air quality parameter	Averaging period	Assumed background concentration [1]	Monitoring data location
PM_{10}	24-Hour	44.1 µg/m3	Albion Park South
	Annual	17.2 µg/m3	
NO_2	1-Hour	16 ppb (30.1 µg/m3)	Nowra Water Treatment Plant
	Annual	0.8 ppb (1.6 µg/m3)	
SO_2	1-Hour	38 ppb (99.6 µg/m3)	Albion Park South
	24-Hour	9.6 ppb (25.1 µg/m3)	
	Annual	0.8 ppb (2.2 µg/m3)	
Photochemical Oxidants (as O_3)	1-Hour	95.7 ppb (188 µg/m3)	Albion Park South
	Annual	17.3 ppb (33.9 µg/m3)	
CO	1-Hour	2.7 ppm (3.1 mg/m3)	Albion Park South
	8-Hour	1.5 ppm (1.7 mg/m3)	

Note 1 All gravimetric concentrations derived based on 25 ºC and 1 atmosphere pressure.

Impact assessment

Project air quality goals

The air quality goals adopted for the assessment, which conform to current DECC air quality targets and other relevant air quality criteria, have not changed from the 2006 environmental assessment and are summarised in Table 7.4.

Table 7.4 Project air quality goals

Pollutant	Averaging Time	Maximum Concentration		Reference
		Gravimetric	Volumetric	
PM_{10}	24 hours Annual	50 µg/m^3 30 µg/m^3	N/A	DECC NEPM
Nitrogen dioxide (NO_2)	1 hour Annual	246 µg/m^3 62 µg/m^3	120 ppb 30 ppb	DECC
Sulphur Dioxide (SO_2)	10 minutes 1 hour 24 hours Annual	712 µg/m^3 570 µg/m^3 228 µg/m^3 60 µg/m^3	250 ppb 200 ppb 80 ppb 20 ppb	DECC
Photochemical oxidants (as ozone - O_3)	1 hour 4 hours	214 µg/m^3 171 µg/m^3	100 ppb 80 ppb	DECC

Pollutant	Averaging Time	Maximum Concentration		Reference
		Gravimetric	Volumetric	
Carbon Monoxide (CO)	15 minutes 1 hour 8 hours	100 mg/m^3 30 mg/m^3 10 mg/m^3	87 ppm 25 ppm 9 ppm	DECC
Dust Deposition	Annual	4 g/m^2/month [1]	N/A	DECC

Note: 1 Assumes background dust deposition of the order of 2 g/m2/month.

In addition to the ground level concentration criteria above, the proposal must meet the CAPER emission limits for a gas turbine (used in connection with an electricity system with a capacity of 10 megawatts or more) outlined in Table 7.5.

Table 7.5 CAPER pollutant emission limits

Pollutant	Emission limit	Applicable to
NO_2	0.07 g/m^3	Gas Turbines > 10 megawatts using gaseous fuels
Particulate (PM_{10})	0.10 g/m^3	Boilers or incinerators emitting solid particles
Opacity	20% opacity	All fuel burning plant

Emissions from the proposal

The primary source of air emissions from the proposal would be from exhaust stacks on the two gas turbine generators. Emission levels have been estimated from technical design and equipment specification requirements. Equipment specifications are performance based and nominate particular upper limits on concentrations of airborne contaminants, such as unburnt hydrocarbons, NO_x and particulates. The gas turbines selected for this proposal would be of the dry low NOx type, which are now commonly used in the power generation industry.

Atmospheric dispersion modelling was used to assess the impacts of proposed stage two activities on the surrounding environment. Stack emission parameters are dependant upon the ambient temperature during the period of operation.

It is noted that the stage two stack parameters, particularly with regard to stack release area and velocity, have altered since the original air quality impact assessment (Appendix D of the 2006 environmental assessment), as a result of the December 2006 *Options to reduce plume rise impacts* report (GHD, 2006c).

A summary of the revised full-load exit parameters are given in Table 7.6.

Table 7.6 Full load stack exit parameters

Stack parameter	**East and west heat recovery steam generator exhaust stacks**			
Project stage	Stage two			
Description	Exhaust stack servicing the turbines, operating in combined cycle mode. Combustion gases passed through the heat recovery steam generator prior to exhaust			
Location (easting, northing)	273812 6134875		273851 6134869	
Height (metres)	40		40	
Diameter (metres)	6.7		6.7	
Area (m2)	35.3		35.3	
Exit temperature (K)	398		398	
	Ambient temperature			
	273	**288**	**298**	**313**
Exit temperature (K)	398	422	416	406
Flow rate (Nm3/s)	392	372	360	339
Flow rate (Am3/s)	572	575	548	503
Exit velocity (metres/s)	16.0	16.2	15.5	14.2

Considering the information above, to simulate “worst-case” release parameters, stack exit parameters corresponding to an ambient temperature of 273 K (0 °C) have been used in dispersion modelling. The assessment identified that stack emission rates were predicted to be greater at the lower temperature, and as such, stack exit parameters at 0 ^{o}C have been used in the dispersion modelling to provide the most conservative scenario.

The TAPM model was run in chemistry mode to account for the photochemistry that would drive the formation or destruction of oxides of nitrogen.

Plumes trapped in building wakes can either be recirculated in the cavity region immediately downwind of a building or subjected to plume downwash and enhanced horizontal or vertical spreading due to the turbulent zone that exists further downwind. Due to the size and proximity of the air cooled condenser to the exhaust stacks, the above criteria for building wakes effects are met. Consequently, the dimensions of this structure have been inserted within TAPM to allow for potential interaction with predicted dispersion.

Due to the close proximity of the two stacks, located approximately 40 metres apart, the impact of plume merging and subsequent buoyancy enhancement was assessed in the evaluation of plume dispersion. Additionally, the potential plume rise enhancement that the air cooled condenser plumes may provide the exhaust stack plumes was calculated and assessed.

The results of dispersion modelling for the operation of both stages the proposal have been summarised against the project air quality goals in Table 7.7. Full results of modelling for each pollutant and contour diagrams can be found in Appendix C.

Table 7.7 Ground level concentrations of air quality parameters for stage two (dry cooling)

Receptor	PM_{10} (maximum 24-hr average, $\mu g/m^3$)	NO_2 (1-hr average, ppb)	NO_2 (annual average, ppb)	CO (1-hr average, ppm)	CO (8-hr average, ppm)	SO_2 (1-hr average, ppm)	SO_2 (24-hr average, ppm)	SO_2 (annual average, ppm)
Project Air Quality Goal	*50*	*120*	*30*	*25*	*9*	*200*	*80*	*20*
'Bundanon'	44.61	11.26	1.09	2.7	1.5	38.20	9.63	0.85
Water Treatment Plant	44.47	11.53	1.10	2.7	1.5	38.18	9.63	0.85
Bamarang Bush Cabins	44.39	11.28	1.10	2.7	1.5	38.17	9.62	0.85
'Katalives'	44.90	11.75	1.11	2.7	1.5	38.23	9.65	0.85
'Mundamia' Properties	45.02	11.27	1.16	2.7	1.5	38.24	9.66	0.85
"Lot 7" Gannet Road	45.48	14.65	1.18	2.7	1.5	38.72	9.69	0.85

Photochemistry impact

The original air quality impact assessment (Appendix D of the 2006 environmental assessment) addressed the potential photochemical impact of the proposed power facility on the surrounding region. This assessment indicated that emissions from the proposed power facility would not significantly influence the ability of the receiving airshed to generate adverse photochemical reactions.

As the original pollutant emission rates are not expected to change for revised operations, combined with the low level of predicted pollutant concentration change, it can be assumed that the resultant air quality impact from revised stage two operations will not differ significantly from that predicted in the original assessment. Consequently, it can be assumed that the potential photochemistry impact of the proposed gas power facility's revised operating conditions would not differ significantly from the original findings.

Therefore, it is not anticipated that the revised stack parameters will adversely alter the conclusions of the original assessment with regards to regional photochemical impacts from the proposed power facility.

Start-up and shut-down emissions

No change to start-up and shut-down emissions has been predicted.

Stack concentration limits

Predicted stack concentrations for the modified dry cooling option satisfy the CAPER emission-based limits.

Potential construction impacts

No change to potential air quality impacts during construction is predicted.

Mitigation measures

As the modified dry cooling proposal is predicted to comply with all relevant air quality goals, no additional mitigation measures are recommended.

7.5.2 Plume rise

The plume rise assessment undertaken by Heggies (refer to Appendix C) has been conducted for stage two operations, to account for the plume rise from both turbine exhaust stacks and the now proposed air cooled condenser.

While there are no pollutant emissions to air associated with the air cooled condenser, there is still the potential for the released air to provide enhancement to the release plume of the turbine stacks. Plume enhancement can result in a longer plume life, which can alter local pollution dispersion and vertical plume growth. Consequently, this study has incorporated atmospheric pollution dispersion modelling and vertical plume rise assessment of stage two operations, accounting for the influence of the air cooled condenser.

The proposed gas power facility is located within the Conical Surface OCS for NAS Nowra. Through correspondence with the Department of Defence it is understood that the exhaust plume velocity from the power station should not exceed 4.3 m/s at the height of or above the

Conical Surface OCS. The height of the Conical Surface OCS above the Bamarang gas turbine facility stacks has been determined at 167 m AHD. Topographical data for the site indicates that the Bamarang site lies at an elevation of approximately 107 m AHD. Accordingly, the OCS used for this assessment is 60 m AGL directly above the stacks.

Methodology

In accordance with CASA requirements, The Air Pollution Model (TAPM) was used in plume rise mode to analyse plume behaviour from the stacks for meteorological conditions predicted for the site over a modelling period of 5 years (2002-2006).

The plume rise from a single stack from each source type was modelled, and an hourly-varying plume rise enhancement factor was applied to the vertical velocity inputs to conservatively account for the impact of enhanced buoyancy as a result of plume merging.

Impact assessment

Results of the plume rise assessment for stage two, as contained in Appendix C, indicate that the probability of an exceedance of the critical vertical velocity (4.3 m/s) is considerably less than predicted exceedances for stage one and decreases significantly with altitude. Approximately 98% and 99.7% of all predicted exceedances of the critical vertical velocity occur beneath 100 m AGL, (60 m above stack height) for the exhaust stacks and air cooled condenser respectively.

The maximum height at which the average vertical plume velocity is predicted to exceed the critical vertical velocity is 289 m and 156 m AGL for the exhaust stacks and air cooled condenser respectively. The frequency with which this was predicted to occur was less than 0.05% for both sources.

Conservative modelling accounting for the enhancement of the exhaust stacks plume rise by the ACC system was conducted and compared with the modelling of the two source types in isolation. Following comparison between the modelling approaches, the interaction between the ACC system and the exhaust stacks is unlikely to significantly increase plume rise.

7.6 Noise

As required by condition 2.2(f) of the concept approval for the Bamarang Gas Turbine Facility, this section provides an updated Noise Assessment for stage two.

As part of the Environmental Assessment for the Concept Approval, a Noise Impact Assessment was undertaken by GHD Pty Ltd. This initial assessment included consideration of the noise impacts generated from the use of wet cooling processes in stage two. It was concluded that if all equipment are attenuated to a minimum sound power level of 91 dB(A), then the project specific noise goals could be met.

In order to assess the change to the use of dry cooling processes in stage two, an updated noise impact assessment has been undertaken by Heggies Pty Ltd. This section provides a summary of the findings of the updated Noise Impact Assessment. The full report is contained in Appendix D.

7.6.1 Operational noise criteria

As part of the previous noise impact assessment undertaken by GHD, an ambient noise study was conducted to determine design criteria in accordance with the Department of Environment and Climate Change's Industrial Noise Policy (INP).

Given the power station may operate 24 hours per day it was determined that the more stringent night-time criteria apply:

» L_{Aeq} of 35 dBA for all the receivers.

This noise criterion was also used in the updated noise assessment.

7.6.2 Operational noise modelling

Acoustic modelling for the operation of the proposed gas turbine facility was undertaken using SoundPLAN noise prediction software, using the CONCAWE industrial noise algorithm. To ensure a comparison could be drawn with the initial GHD modelling of the noise emission level from plant items and operations was undertaken using the same equipment, configuration and scenarios. Stage one and stage two of the project were modelled for the same meteorological conditions of the GHD report, being neutral, a temperature inversion with 2 m/s south-easterly wind, and a temperature inversion with 2 m/s north-westerly wind.

The same receivers were also used in the Heggies noise model as in the original assessment as follows:

» Lot 22 Yalwal Road approximately 750 m north of the site. A mud brick business is located at this location, and as advised in the 2006 environmental assessment there is an on-site caravan and development application with council for a permanent residence.

» 213 Gannet Road approximately 1.65 km south-east of the site. This location is representative of the nearest of a number of semi rural residences south-east of the site.

» 190 Bamarang Road approximately 1.4 km north west of the site. This location is representative of the nearest rural residences north-west of the site.

Heggies' acoustic model is confirmed to be acceptable to predict the noise levels from the proposed gas power facility; and, correlates well with the initial acoustic model used by GHD, with the result differences being in accordance with the respective model accuracies (tolerances).

The SoundPLAN noise model discussed above was then modified to include the proposed dry cooling system using an air cooled condenser.

7.6.3 Impact assessment

Noise levels have been predicted for the air cooled option and are presented in Table 7.8 below.

With reference to Table 7.8 the meteorological conditions corresponding to the three scenarios are:

» Scenario 1 – neutral
(Temperature = 20 ^{0}C, Relative Humidity = 70%, Wind = 0m/s, stability class D)

» Scenario 2 – temperature inversion and south-easterly wind (Temperature = 20 ^{0}C, Relative Humidity = 70%, Wind = 2m/s, stability class F)

» Scenario 3 – temperature inversion and north-westerly wind (Temperature = 20 ^{0}C, Relative Humidity = 70%, Wind = 2m/s, stability class F)

Table 7.8 Predicted noise levels (dry cooling), no mitigation

Receivers	Noise Goals (dBA)	Predicted noise levels in dBA		
		Scenario 1	Scenario 2	Scenario 3
Lot 22	35	50	52	50
213 Gannet Road	35	38	37	42
190 Bamarang Road	35	38	42	37

Analysis of the predicted noise levels at the nominated receiver locations (without mitigation) is summarised in the following points:

» At the distant receivers of 190 Bamarang Road (to the north) and 213 Gannet Road (to the southeast), which are representative of the residential receivers in these areas, the design criterion is exceeded by 3 dBA under neutral conditions and by up to 7 dBA for meteorologically enhanced conditions; and

» At the single isolated receiver Lot 22 (mud brick business to the north), the design criterion is exceeded by 15 dBA to 17 dBA.

7.6.4 Noise mitigation options

Concept noise mitigation that will result in compliance of the design criterion has been considered. Two options for mitigation were addressed: the first to achieve a nominal reduction of 7 dBA in order to comply at the more distant residences; and the second to achieve a nominal 17 dBA reduction in order to comply at the single nearby residence.

It should be noted that the moderate and major attenuation measures discussed below and associated predicted noise levels are indicative only and a detailed assessment is required during the detailed design phase of the project.

To address the significant exceedances of the design criterion at Lot 22 (mud brick business), consideration could be given to either negotiating an agreement with the owner or acquiring the property in order to minimise the degree of mitigation required.

7.6.5 Moderate mitigation

Under meteorologically enhanced conditions, significant contributions to the received noise levels are produced at the distant receivers by the by the stack exits, followed by the 36 Hudson fans and transition ductwork, boiler section and pumps.

Adequate reduction in noise levels at the more distant receivers could be achieved by including the following attenuation measures:

» Stack exit attenuators;

» Use of low noise fans and/or fan attenuators;

» Installation of an acoustical shroud over all, or portions of, the transition ducts, boiler section and pumps; and

» Provision of noise barriers as an alternative, or in combination with, the above, where feasible.

Noise levels have been predicted with the moderate mitigation implemented and these are presented in Table 7.9.

Table 7.9 Predicted noise levels (dry cooling), moderate mitigation

Receivers	Noise Goals (dBA)	Predicted noise levels in dBA		
		Scenario 1	Scenario 2	Scenario 3
Lot 22	35	44	46	42
213 Gannet Road	35	32	29	35
190 Bamarang Road	35	30	32	26

With moderate mitigation measures, Table 7.9 indicates compliance with the design goal at both 213 Gannett Road and 190 Bamarang Road, and a 11 dBA exceedance at Lot 22.

7.6.6 Major mitigation

Under meteorologically enhanced conditions at the receiver Lot 22 significant contributions to the received noise levels are produced by virtually all modelled sources, except the CT inlet and Comp Ventilation. In particular, the stack exits, followed by the 36 Hudson fans, transition ductwork and pump noise sources individually exceed the design criterion.

Adequate reduction in noise levels at Lot 22 could be achieved by including the following attenuation measures:

» Installation of stack exit high performance attenuators;

» Use of low noise fans and fan attenuators;

» Installation of an acoustical shroud over all or portions of the transition ducts;

» Attenuation to the Boiler Section using increased mass, lagging or enclosures;

» Attenuation to the Combustion Turbine Generator, typically including:

  – Air inlet silencing;

  – Upgrades of exhaust silencing;

  – Acoustic insulation on the outside of the air inlet;

– Upgrades of the standard CGT acoustic enclosure;

» Low Noise GSUT or enclosure;

» Enclosures to major pumps; and

» Provision of noise barriers as an alternative, or in combination with, the above where feasible.

Noise levels have been predicted with the moderate mitigation implemented and these are presented in Table 7.10.

Table 7.10 Predicted noise levels (dry cooling), major mitigation

Receivers	Noise Goals (dBA)	Predicted noise levels in dBA		
		Scenario 1	Scenario 2	Scenario 3
Lot 22	35	33	36	32
213 Gannet Road	35	20	19	25
190 Bamarang Road	35	18	23	18

With major mitigation measures Table 6 indicates a minor 1 dBA exceedance of the design goal at Lot 22, which in consideration of the modelling tolerances is considered acceptable for assessment based on preliminary design information.

7.7 Visual impact

A visual assessment of the proposal was undertaken as part of the Environmental Assessment for the Concept Approval for the Bamarang Gas Turbine Facility. This earlier assessment considered the visual impacts of the main features of the proposal.

As described earlier in Section 6, the change to the use of air-cooling processes requires the construction of an air cooled condenser. The air cooled condenser has a height of approximately 31.1m, which is less than the height of the approved exhaust stacks. However, it would be one of the largest structures in the plant, and requires a large footprint to complement its height, and is therefore a large, bulky structure.

This section provides a visual assessment of the air cooled condenser in the context of the conclusions of the earlier visual assessment for the proposal.

7.7.1 Existing landscape

As noted in the 2006 environmental assessment, heavily wooded bushland areas, which include land contained within Crown land and reserves, dominate the landscape of the majority of the study area. The site is located at an elevation of approximately 107 metres AHD. The landform undulates gently to the south and east, with a steeper fall towards Shoalhaven River towards the north and northwest. Other landscape features include:

- Steep hill slope running behind (to the south of) Bamarang Road;
- Floodplain adjoining Shoalhaven River;
- Pulpit Hill to the northwest; and
- Nowra Hill (and lookout) approximately 6 kilometres to the southeast.

The development pattern in the broader area consists of:

- Scattered rural dwellings interspersed in the bushland;
- Rural and rural residential development approximately 2 kilometres to the east of the site in the vicinity of Cabbage Tree Lane;
- Roads and a number of transmission corridors;
- Public utilities and associated infrastructure including:
  - Radio transmission mast approximately 1 kilometre to the northeast;
  - Waste disposal facility located approximately 3.5 kilometres to northeast;
  - Water treatment plant approximately 1 kilometre to the northwest;
  - Transmission corridors, including the corridor through Bamarang Nature Reserve (which includes a water pipeline and 33 kilovolts electricity transmission line) to the north, the 132 line to the east, and the Eastern Gas Pipeline; and
  - Bamarang Reservoir approximately 500 metres to the west.
- Shoalhaven campus of Wollongong University located approximately 4.5 kilometres to the northeast;
- Urban areas of West Nowra approximately 7 kilometres to the east; and
- HMAS Albatross approximately 4.5 kilometres to the south.

7.7.2 Visual impact of the air cooled condenser

Partial views of the air cooled condenser will potentially be visible from the site entrance off Yalwal Road and as part of the entire site as viewed from longer distances including the Nowra Hill lookout and the Cabbage Tree lane area. The air cooled condenser will be no higher than the other infrastructure proposed for the site, being approximately 31m high. The consistency of heights will assist in ensuring the air cooled condenser is viewed as an integrated component of the development.

The air cooled condenser does however encompass a larger footprint of the site than the previously assessed wet cooling tower. This will result in more building bulk visible at the site and will potentially impact the views from the site entrance off Yalwal Road. Vehicles travelling along Yalwal Road will have partial views of the air cooled condenser (see Figure 7.3).

As shown in the simulated views in Figure 7.4 and Figure 7.5, the potential views of the development from both the Nowra Hill lookout and the Cabbage Tree Lane area are not considered to have a significant impact due to the long distances from the site. Although the amount of infrastructure visible at these distances has increased compared to the wet cooled option, it is considered that the air cooled condenser will not be viewed as a distinguishable or stand out component and therefore not create significant additional visual impact.

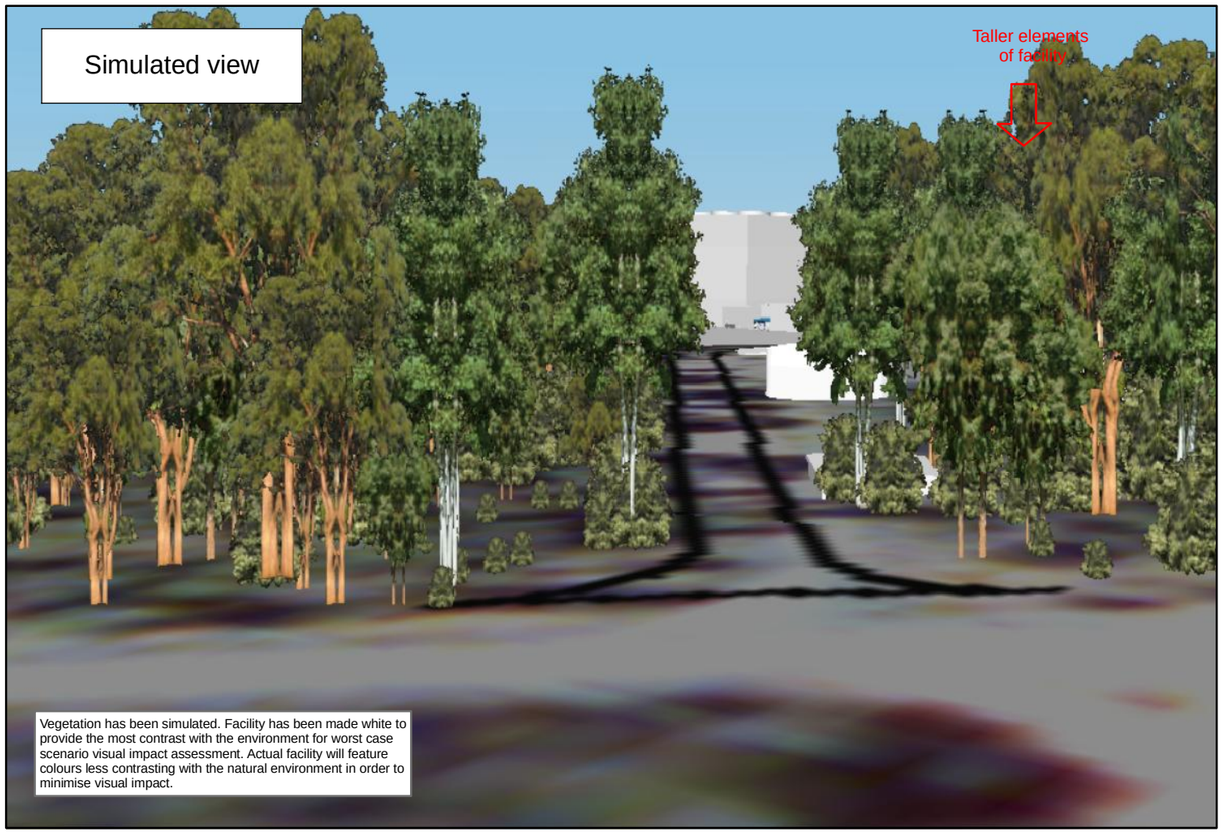

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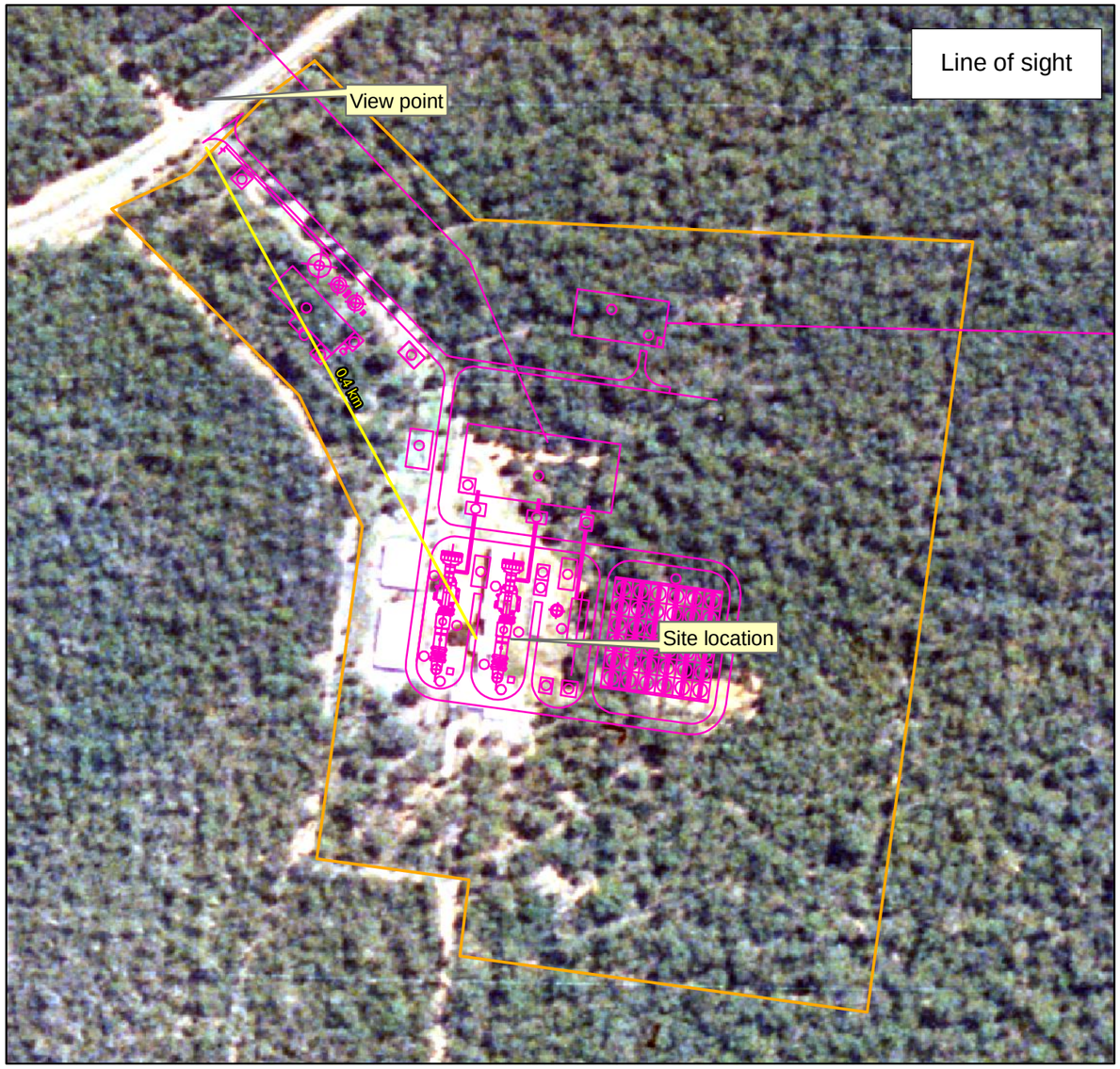
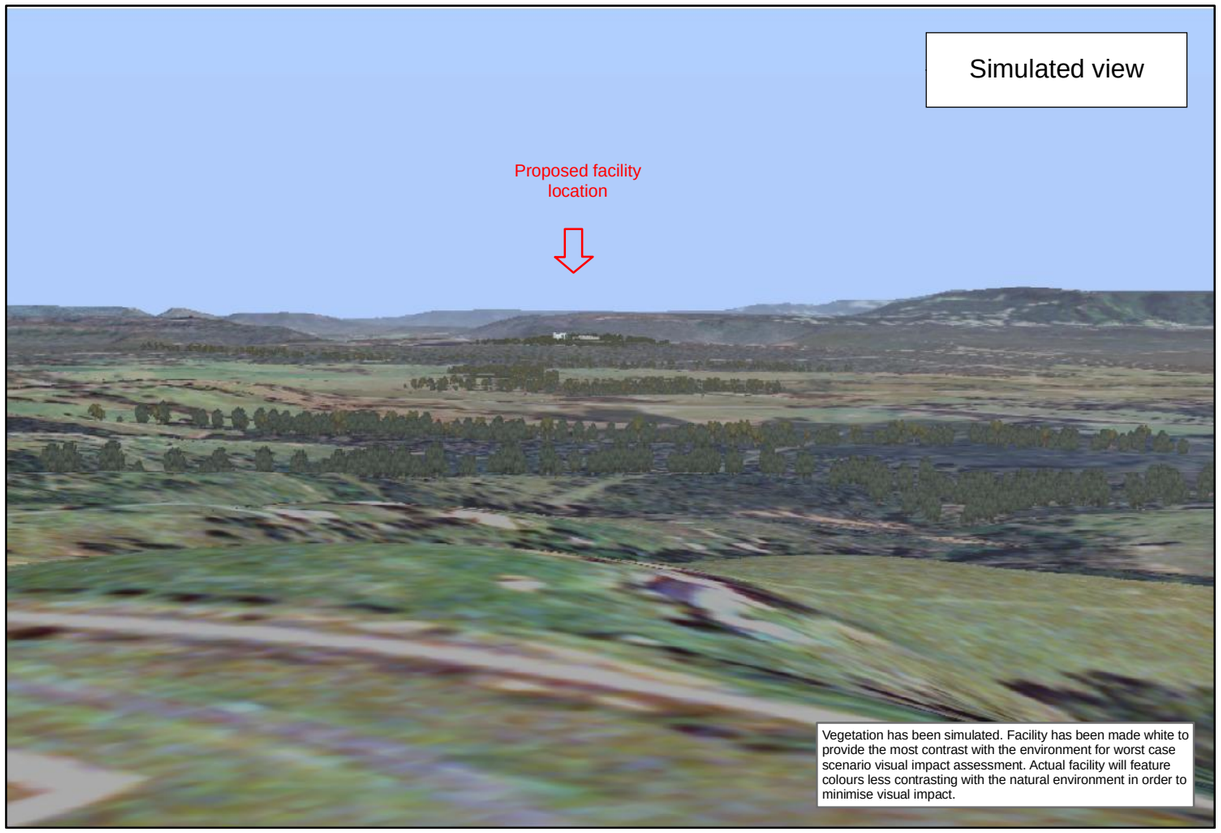
Figure 7.3: Simulated view of development
Yalwal Road





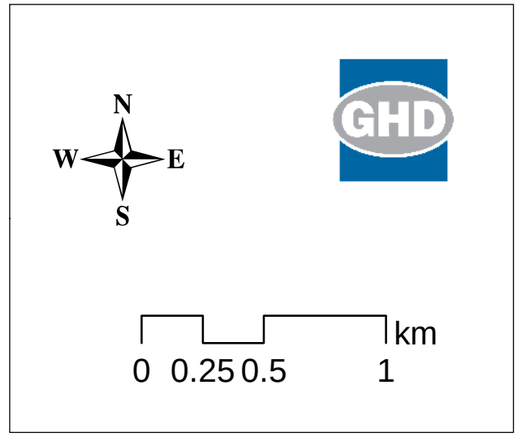


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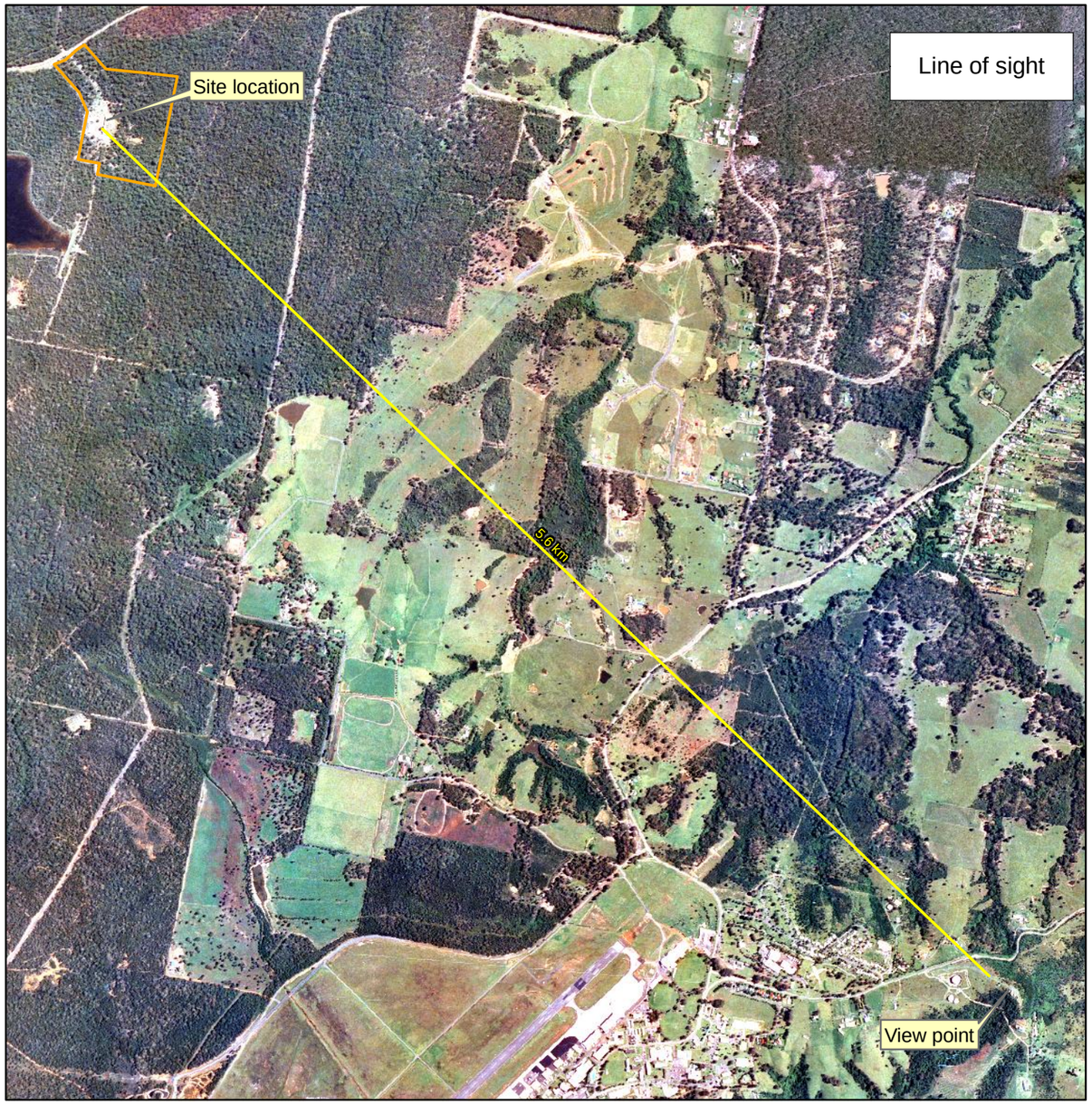
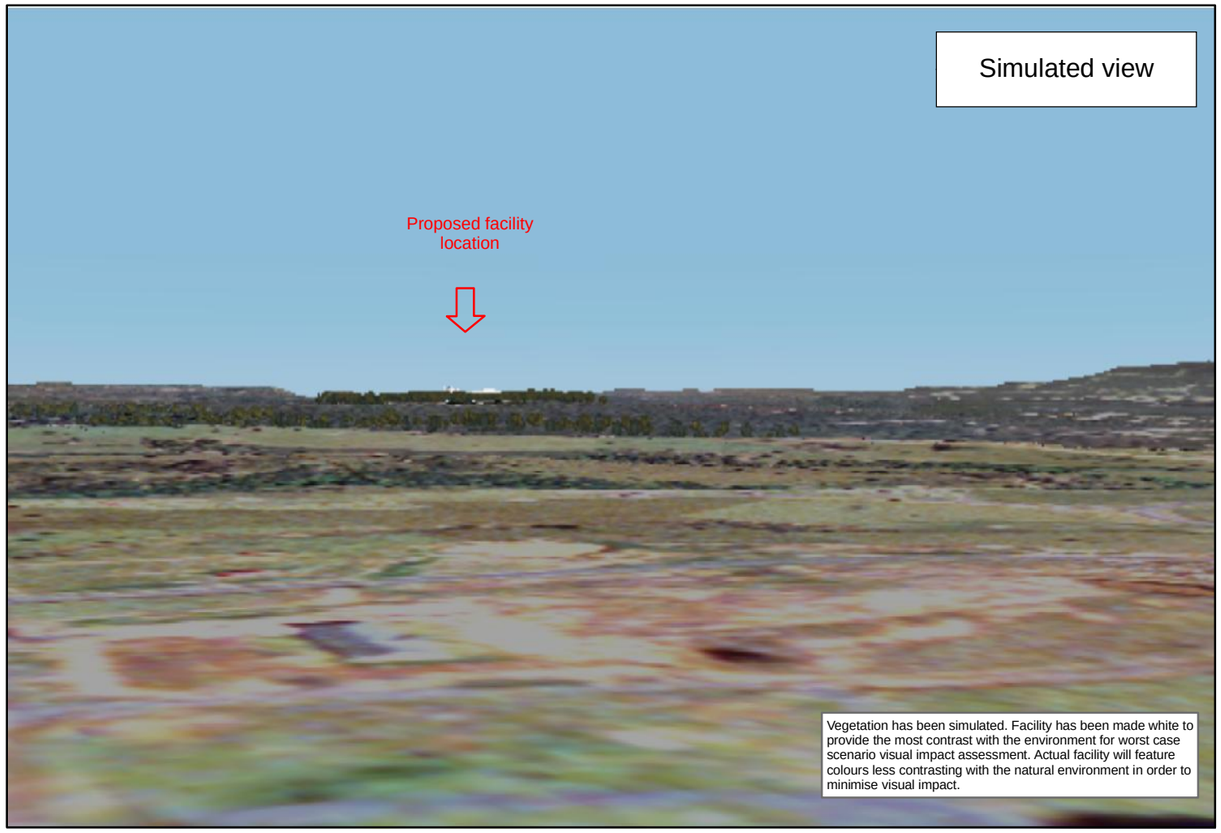
Figure 7.4: Simulated view of development
Nowra Hill Lookout





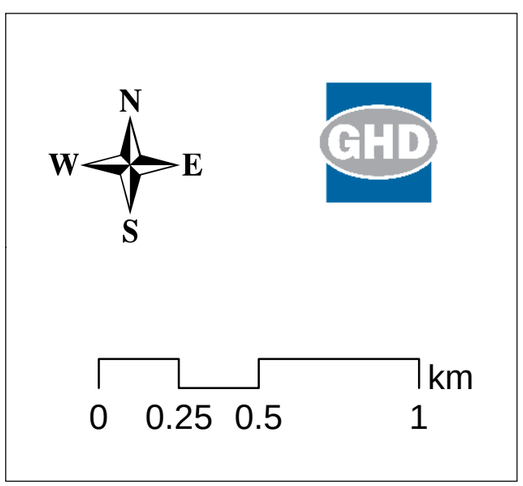


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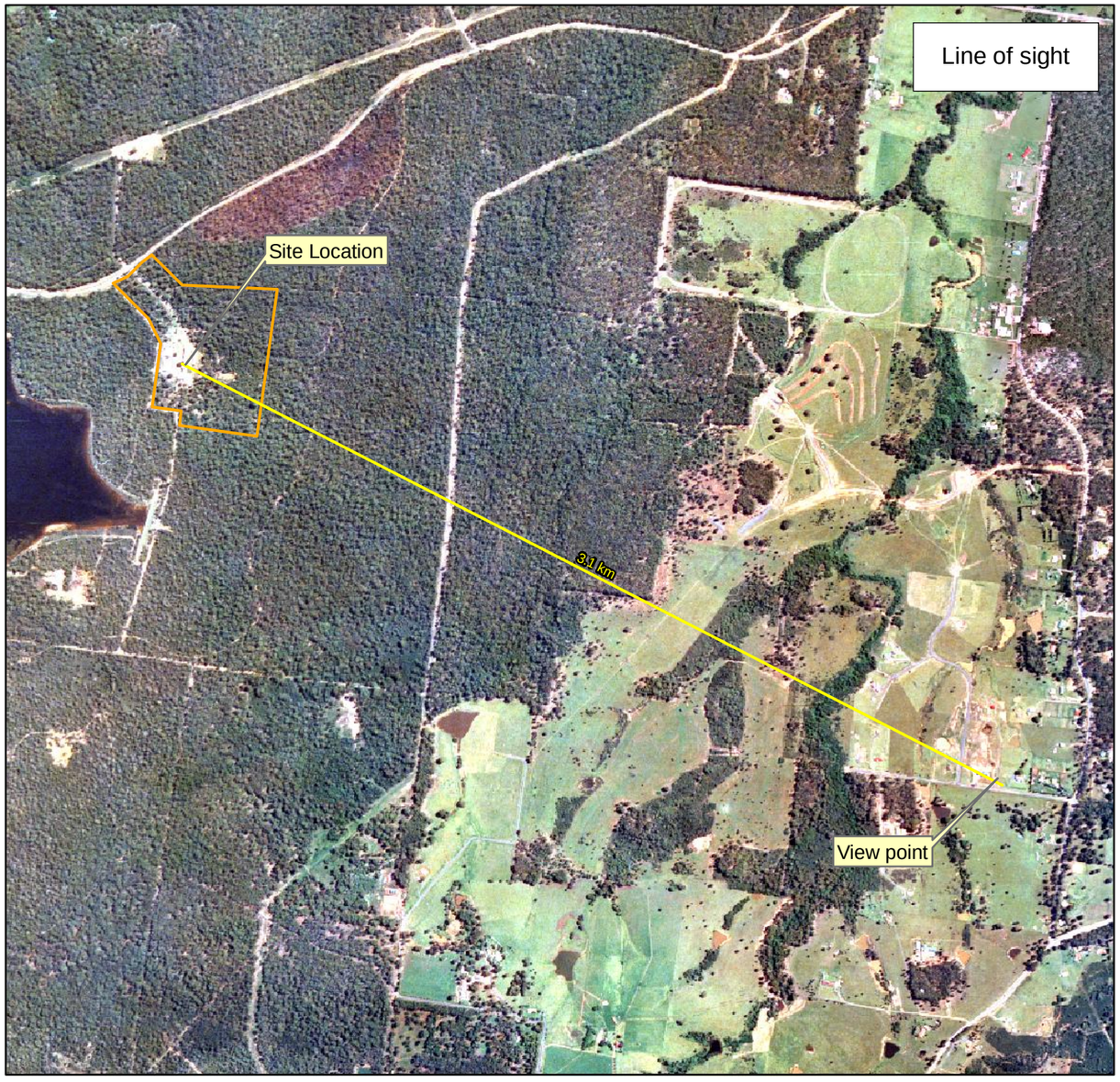
Figure 7.5: Simulated view of development
Cabbage Tree Lane area



As noted in the 2006 environmental assessment, the majority of the proposal would be surrounded by heavily wooded areas, which significantly reduces its overall visibility. This will include a reduction of the visibility of the air cooled condenser and is considered to reduce the impact of an increase in building bulk.

A revised assessment of the potential visual issues associated with the proposed facility, including the air cooled condenser is contained in **Error! Not a valid bookmark self-reference.**.

Table 7.11 Potential visual issues

	Number of viewers	Comment
Yalwal Road	Moderate	Filtered views of the proposal would be possible from the road for passing traffic. This will include partial views of the air cooled condenser. Some clearing of vegetation would be needed for the proposal (particularly the asset protection zones) and the transmission corridor. However, sufficient vegetation would remain to provide a degree of screening from the road.
Bundanon	Low	Across the Shoalhaven River from Bundanon, the landform rises steeply to approximately 100 metres and then flattens to a plateau. The site is set back approximately 1 kilometre from the edge of the plateau. As a result, the proposal (including the air cooled condenser) is not expected to be visible from Bundanon. The heavily forested landscape in the area would further screen the proposal from view.
Bamarang Road residents	Low	The main views for houses along Bamarang Road are to the north, towards Shoalhaven River. The steep slope located to the south of the road limits the opportunity for views towards the site.
Rural residential development in the vicinity of Cabbage Tree Lane.	Low-moderate	The potential for views of the proposal would be limited by the distance from the site (approximately 2 kilometres) and the significant screening that would be provided by surrounding bushland. Limited background views of the top section of the stack and air cooled condenser may be possible, however the potential for visual impacts are considered to be low as a result of the distance from the site.

	Number of viewers	Comment
Nowra Hill	Low	The potential for views of the proposal would be limited by the distance from the site (approximately 6 kilometres) and the significant screening that would be provided by surrounding bushland. The top section of the stack and air cooled condenser may just be visible from the look out, however the potential for visual impacts are considered to be low as a result of the distance from the site.

7.8 Greenhouse gas assessment

A greenhouse gas assessment was undertaken as part of the 2006 environmental assessment (Section 8.2 and Appendix D of the 2006 environmental assessment).

As part of the updated air quality impact assessment undertaken by Heggies for the revised dry cooling option for stage two (as contained in Appendix D of this environmental assessment), the greenhouse gas impacts of the dry cooling option were confirmed.

This assessment shows that the greenhouse gas impacts of the proposed gas power facility are unchanged from that assessed in the 2006 environmental assessment, as shown in Table 7.12.

Table 7.12 Predicted emissions of greenhouse gases natural gas-fired turbine engines (dry cooling)

Compound	CO_2	NO_2	CH_4	Total emissions
Predicted emissions (tonnes/year)	1,240,800	2.4	192	1,240,994.4
CO2-equivalent (tonnes/year)	1,240,800	744	4,032	1,245,576
% of CO2 emissions of Australian electricity generation, 1990	0.96%	0.00058%	0.00313%	0.97%
% of CO2 emissions of Australian electricity generation, 2002	0.68%	0.00041%	0.00222%	0.68%

7.8.1 Greenhouse gas abatement strategies

As the second largest electricity generator in Australia, Delta recognises its responsibility to continue to meet increasing energy demands, the need to deliver this energy in the most sustainable form practicable, and to meet the increasing concerns of the global community regarding global warming.

Delta currently manages greenhouse gas abatement at a whole-of-organisational level, through participation in the Australian Government's Greenhouse Challenge (Plus) Program and the Generator Efficiency Standards Program. These programs are established by the AGO, Commonwealth Department of Environment and Heritage. The AGO provides a range of programs and initiatives designed to assist Australian business and industry to meet Australia's Kyoto target.

The approach to greenhouse gas abatement adopted by Delta includes:

» Minimising impacts of existing coal-fired plants;

» Investigating transitional, combined technologies; and

» Developing new renewable energy technologies for the future.

While natural gas is a non-renewable fuel source, the proposal provides increased energy efficiency over traditional coal fired power stations.

Through its commitment to the Generator Efficiency Standards and the Greenhouse Challenge Program, Delta has implemented a range of greenhouse gas emissions abatement measures including:

» Technology upgrades and replacement for older stations;

» Installation of control systems;

» Introducing co-firing of renewable fuels (biomass) as a fuel feed at coal fire power stations; and

» Installation of a number of mini-hydro power stations and sugar mill cogeneration projects to increase the production of electricity from renewable sources.

In the 2002/2003 period, Delta achieved abatement of 304,000 tonnes of CO_2 equivalent from projects implemented under the Generator Efficiency Standards and Greenhouse Challenge programs. Development of co-generation plants with sugar mills in NSW are expected to achieve some 400,000 tonnes of greenhouse gas abatement each year.

Implementation of the proposed gas power facility will follow the introduction of the new National Greenhouse and Energy Reporting Act of 2007. This Act introduces a mandatory single national framework for reporting and disseminating information on greenhouse gas emissions. The Act will underpin the introduction of a national emission trading scheme which Delta Electricity will participate in. The completion of the mandatory reporting and participation in the future Emissions Trading Scheme will incorporate Delta Electricity's current activities described above and include this project.

Chapter 8. Statement of commitments

As required by condition 2.2(a) of the concept approval for the Bamarang Gas Turbine Facility, this section provides Delta's project specific commitments for environmental mitigation, management and monitoring.

The commitments listed in this section are consistent with the statement of commitments prepared for the gas turbine facility. The commitments from the submissions report (2006) have been updated to reflect only those commitments relevant to stage two.

The commitments that are not relevant to this stage of the project or have been superseded have been deleted. The remaining commitments have been retained or amended. New commitments developed as an outcome of this environmental assessment have been added. These changes have been noted in the consistency column of Appendix E.

Issue	Commitment	Timing
Overall commitments		
Obligation to minimise harm to the environment	Delta confirms its commitment to ensuring that all practicable measures are implemented to prevent or minimise any impacts to the environment that may arise form the construction, commissioning and operation and where relevant, the decommissioning of the proposal.	-
Staging of development	Delta confirms its intention to construct the proposal either in two separate stages, or concurrently. Should staged construction occur, prior to the construction of stage two of the proposal, Delta would submit to the Director-General: » A demonstration that, based on extrapolation of relevant monitoring data established during the operation of stage one of the proposal, that the progression to stage two would not cause any air quality impacts above those predicted; and » An updated construction environmental management plan to reflect the inclusion of stage two works. Should staged construction occur, construction of stage two would not proceed until Delta has received written approval of the above documents and addressed any further requirements that may form part of the approval. Should concurrent construction occur, prior to construction commencing, Delta would submit to the Director-General a construction environmental management plan to reflect the concurrent construction of both stage one (as approved on 27 February 2007) and stage two works.	-
Restriction to fuel consumption	Delta would only operate the proposal on natural gas for routine firing in the power station turbines. Delta would not use liquid fuels to fire the proposal without written the approval of the Director-General.	-

Issue	Commitment	Timing
Mitigation measures		
Air quality	*Operating conditions* Natural gas is the only fuel to be used for firing the power station turbines. All activities at the premises would be undertaken in a manner that does not cause or permit the emission of offensive odour beyond the boundary of the premises. All plant and equipment installed at the premises or used in conjunction with the construction or operation of the facility activity would be maintained in a proper and efficient condition and would be operated in a proper and efficient manner.	Operation
	Discharge limits The project air quality goals specified by the project approval for stage two are achieved. The proposal would be designed and operated to ensure that the concentration of each pollutant listed in Table 7.4 of this environmental assessment (GHD, March 2008) would not be exceeded for each discharge point.	Design, operation
	Dust emissions All activities undertaken would be carried out in a manner that minimises the generation of dust, or emission of dust from the site, including wind-blown and traffic-generated dust. Measures proposed to minimise dust would be specified in the construction and operation environmental management plans.	Construction, operation
Greenhouse	*Delta's greenhouse commitments* Delta would continue to meet its commitments under the Commonwealth Government's Generator Efficiency Standards and Greenhouse Challenge (Plus) Program. Under these agreements, Delta is committed to achieving greenhouse gas emissions abatement through diversification of its generation portfolio, reflecting community and government expectations of a sustainable future for electricity generation. Delta's approach to greenhouse gas abatement includes: » Minimising impacts of existing coal-fired plants » Investigating transitional, combined technologies » Developing new renewable energy technologies for the future	Construction, operation
Flora and fauna	*Physical works to prevent off-site impacts* Fencing of proposed development areas to ensure construction works do not breach the boundaries or enter the adjacent vegetation and National Parks and Reserves. Sediment and erosion control measures to be implemented. Placement of stockpiles away from vegetated areas. Piling of soil that may contain seed of exotic species away from adjacent vegetation or drainage lines where they could be spread during rainfall events. Maintenance of a vegetated buffer between any development and the adjacent reserve.	Construction
	Protection measures Retention of mature, hollow bearing trees within the study area (where possible).	Pre-construction

Issue	Commitment	Timing
	Offsets Delta commits to continuing discussions with DECC on habitat offsets. Consistent with the requirements of the project approval for stage one, Delta will provide a compensatory habitat package in accordance with DECC requirements, for the total area of vegetation removed by stages one and two.	Design
Bushfire hazard	*Fire management measures* Asset protection zones to be implemented in accordance with the provisions outlined in Section 7.4 of this environmental assessment (GHD, March 2008).	Construction, operation
	Building standards Level 2 (AS 3959 – 1999) Construction Standards to apply where relevant. Combustible materials likely to be impacted by radiant heat would not used in the construction of the gas fired power facility.	Design
	Operation environmental management plan The operation environmental management plan would include fire prevention measures to be implemented during construction, including but not limited to: » Work involving risk of ignition would not be carried out during periods of total fire ban; » Fire suppression equipment would be available on site; » Appropriate storage and maintenance of fuels and other flammable materials. » Evacuation procedures would also be detailed for any persons located at the gas fired power facility during a bushfire; and » The local Rural Fire Service control centre would be notified of the dates of construction, dates during which 'hot works' are to be conducted would be highlighted.	Operation
Water	*Water quality* All activities at the premises must be undertaken in a manner that does not cause or permit water pollution as defined in the *Protection of the Environment Operations Act 1997*.	Design, construction, operation
	Recycling The recycling of stormwater during operation (for ancillary use), as described in the 2006 environmental assessment, is maximised through: » Provision of stormwater retention strategies and infiltration; » Rainwater harvesting; and » Management and monitoring of onsite water related activities and infrastructure.	Operation
Noise and vibration	*Noise emission limits* The project noise criteria specified in Table 9.2 and 9.3 of the 2006 environmental assessment are achieved. The proposal would be designed, constructed and operated to ensure that noise criteria are not exceeded. The contractor responsible for the design and management of the facility would be required to meet noise criteria.	Design, construction, operation
	Construction time restrictions » Monday to Friday – 7am - 6pm; » Saturday – 7am to 1pm if inaudible at a residential premises; otherwise 8am to 1pm; and » No work on Sundays or Public Holidays.	Construction

Issue	Commitment	Timing
	Noise attenuation on machinery All practical measures would be used to silence construction equipment, particularly in instances where extended hours of operation are required.	Construction
	Noise management strategy to be prepared » A noise management strategy would be prepared as part of the construction environmental management plan, detailing the methodology proposed by the construction contractor and the relative phasing of different construction activities in different areas. This would also outline a program of operational noise monitoring. » To achieve the construction noise criteria at the closest residence (Location 1) the overall sound power level from construction as a guide should not exceed approximately 112 dB(A).	Construction
Soils, contamination	*Removal of wastes* All dumped and buried wastes are removed from the site, either prior to, or as part of the development process.	Construction
	Evidence of oily or putrescible wastes If evidence of putrescible or oily / liquid wastes are noted during removal, then these materials would be sampled and analysed, to permit classification for off-site treatment and disposal, in accordance with the Environmental Guideline Assessment, Classification and Management of Liquid and Non-Liquid Wastes (NSW EPA, May 1999).	Construction
Soils	*Prepare a management plan* A construction phase soil and water management plan would be prepared as part of the construction environmental management plan, detailing control mechanisms to be implemented during the construction phase.	Construction
	Ensure appropriate environmental controls During the construction phase (including site construction, plus pipeline / transmission line installation), soil and groundwater would be protected from contamination via the installation of appropriate bunds, drainage networks and (if required) lined detention basins.	Construction
	Contingency planning A contingency plan would be developed, documenting procedures to be adopted in the event that potentially contaminated soils or uncontrolled fill is encountered during excavation works.	Pre-Construction
Hazards and risk	*Design features* The following design features would be implemented: » Undertaking a detailed HAZOP during design and incorporate recommended measures; » Installation of a fire protection system in accordance with the requirements of the Building Code of Australia; » Compliance with dangerous goods storage and transport codes, regular inspections and maintenance of critical components; » Bunding of chemical storage tanks; and Standard operating procedures for activities, which could have the potential to cause hazards or risks.	Design

Issue	Commitment	Timing
	Undertake risk and hazard assessments Prepare (if concurrent construction) or update from stage one (if staged construction) and implement the following as part of the operation environmental management plan: » Construction safety study; » Fire safety study; » HAZOP; » Emergency plan; » Safety management system; and » Hazard auditing.	Design, operation
	Management procedures to be implemented Management procedures would be implemented incorporating practices to prevent risk scenarios occurring: » Minimising build-up of combustible materials on-site; and » Installing bollards/protective barriers around gas metering station.	Design, construction, operation
	Emergency management procedures to be developed Emergency management procedures would be developed (if concurrent construction) or updated from stage one (if staged construction) for response to fire and explosion that may be initiated from either on-site or off-site sources.	Construction
Visual amenity and landscape	*Retain vegetation* Retention of existing vegetation outside the areas required to be cleared (for fire protection, facility footprint).	Design/ Construction
	Maintain existing understorey Maintaining the existing understorey beneath the transmission line where possible.	Design/ Construction
	Additional tree planting Additional tree planting at the site entrance.	Operation
	Appropriate building materials Appropriate choice of building materials and treatments, including: » Minimal use of reflective elements, and use of textual cladding where practicable. » Use of darker green/brown colour tones on the buildings and plant to minimise the potential for contrast with surrounding bushland. » Use of a lighter green colour on the upper portion of built elements (including stacks) to minimise the potential for contrast with the sky and treetops.	Design
	Navigation lighting The need for obstruction warning lighting at the top of the proposed stacks would be determined during the detailed design phase in consultation with the Civil Aviation Safety Authority and the Department of Defence.	

Issue	Commitment	Timing
Traffic	*Recommended management measures* » Temporary reduction to the signposted speed limit on Yalwal Road. » Installation and operation of traffic control devices provided in AS 1742.3-1996 Traffic Control Devices for Works on Roads. » Additional advanced warning signage on both approaches to the bridge on Yalwal Road to the east of the site. » Limit heavy vehicle movement during peak commuter periods and encourage movement during the off peak period. » Adequate area and management controls would be introduced at the site entry to safely control the movement of vehicle into and from the site, including excavation materials need to be covered before trucks leaving the site. » Loading, unloading and manoeuvring of vehicles would always occur on-site and must be in accordance to AS2890.1 and AS2890.2. » All construction worker parking spaces would be provided off road/ on-site during the entire construction period.	Construction
Environmental management and monitoring		
Environmental representative	If staged construction, prior to the commencement of construction of stage two, Delta would appoint a qualified and experienced environmental management representative on a full-time basis during the construction, commissioning and operation of the development. If concurrent construction, a single Environmental Management Representative would be appointed for construction of both stages one and two.	
Construction environmental management plan	If staged construction, a construction environmental management plan would be prepared prior to the commencement of stage two and implemented. If concurrent construction, a single construction environmental management plan would be prepared and implemented. The construction environmental management plan would outline environmental management practices and procedures to be followed during site preparation, construction and commissioning of the gas turbine facility as a whole.	
Operation environmental management plan	Delta would update its existing Environmental Management System to incorporate the operation of the proposal. A dedicated operation environmental management plan would be developed for the operation of the gas turbine facility as a whole. The management plan would incorporate monitoring measures in accordance with the conditions of approval for the project	
Auditing	Twelve months after the commencement of operation of stage two of the project, Delta would commission and independent, suitably qualified person or team to prepare, to the satisfaction of the Director-General, the following: » Hazard audit report; and » Environmental audit report.	

Chapter 9. Conclusion

This environmental assessment has considered the potential impacts of the proposed development of stage two of the gas power facility on Yalwal Road, Bamarang near Nowra in the local government area of Shoalhaven. The environmental assessment has been prepared by GHD on behalf of Delta Electricity to assist the Minister for Planning in assessing the proposal.

The environmental assessment has been prepared in accordance with the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* and the requirements of condition 2.2 of the concept approval for the gas power facility project, to seek project approval for the construction and operation of stage two, so that the facility can operate as a base load power station. The operation of the facility as a base load power station is consistent with the findings of the Owen Inquiry into Electricity Supply in NSW.

The environmental assessment provides an assessment of the potential environmental impacts of stage two of the proposal, considering both the potential positive and negative impacts of the proposal, and recommending management and mitigation measures to protect the environment where required. It demonstrates that the project is consistent with the requirements of the concept approval and generally consistent with the scope and intent of the concept outlined in the Major Project Application, environmental assessment of the concept plan, and the submissions report.

Following investigation of water supply options for water cooling of the facility, as required by the conditions of the concept approval, Delta has decided to implement dry cooling of the facility as it requires significantly less water than wet cooling. This has resulted in a modification of the layout of the proposed facility.

This environmental assessment has examined a number of key issues surrounding the modified proposal, and has found that the impacts of the modified proposal are generally consistent with the impacts identified in the original environmental assessment for concept approval. Any adverse impacts would be mitigated through implementation of the Statement of Commitments.

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