

do not consider that there are any pertinent riparian issues requiring consideration as the site lacks any substantive watercourses.

Potential Environmental Impacts

SLR have identified the potential environmental impacts as being the removal of approximately 8.9 ha of open forest and heathland vegetation. However, it is considered by SLR that the majority of this is in a disturbed condition, and is largely offset by the conservation of high quality vegetation in an Environmental Conservation zone, and the implementation of a Vegetation Management and Habitat Restoration Plan. Consequently, general environmental impacts are not expected to constrain development.

Potential Impacts on Threatened Species

Having regard to the potential impact on threatened species, SLR have advised that those species requiring consideration include the Nowra Heath-myrtle flora species and several threatened fauna species being the Square-tailed kite, Gang-Gang Cockatoo, Glossy Black Cockatoo, Powerful Owl, Yellow-bellied Glider, Grey-headed Flying Fox, East-coast Free-tail bat and Common Bent-wing Bat. There are no endangered ecological communities identified at the subject site.

Having regard to the Nowra Heath-myrtle, SLR have advised that the proposal will result in the removal of approximately 0.29 ha of land in the northern part of the site where there is a dense stand of this species, along with a number of individual in less dense shrubby woodland and open forest along the eastern side of the development footprint. As a result of the assessment of SLR, the project has been modified in the northern portion of the site, thus enabling the retention of the vast majority of the large stand of Nowra Heath-myrtle. SLR have also noted that this area is either upslope or across slope from the proposed subdivision which will therefore not impact on stormwater run-off. SLR also advises that the impacts are offset by the following measures:-

- *the retention of the majority of the population and most of the suitable habitat for the species within the Conservation Area on the subject land;*
- *the proposal to implement a dedicated Vegetation Management Plan within the Conservation Area, designed specifically inter alia to protect and enhance populations of the Nowra Heath-myrtle; and*
- *a commitment within the Statement of Commitments (SoC) to monitor the population of the Nowra Heath-myrtle within the Conservation Area, and to provide data and information to Council and/or the OEH until the Conservation is dedicated to Council or the OEH for biodiversity conservation purposes.*

With respect to the threatened fauna species, SLR have identified the following impacts:

- the site contains a small hollow bearing tree and sap feed trees which are utilised by the Yellow-bellied Glider and these are located within the development footprint. However, SLR also indicate that these resources are abundant within that area which is to be conserved, and also in adjoining lands;
- the open forest and woodland vegetation to be removed represents only a minute portion of that present in the locality and which is to be retained for biodiversity conservation purposes;
- any loss of hollow-bearing trees utilised by microchiropteran bats as roost sites, and foraging open forest or woodland habitat will represent only a minor reduction in the extent of available resources in the locality;
- a Hollow-bearing Tree Protocol is to be implemented as part of the project to enable the salvage, re-use and/or replacement of tree-hollows;
- substantial resources of Allocasuariana species are available in the locality for the Glossy-Black Cockatoo. Further, only one or two potential nest trees for the Glossy Black Cockatoo will be removed, whilst there is no evidence of any breeding by Glossy Black Cockatoos on the site;
- the proposal will remove a small area of habitat that the Powerful Owl may potentially forage within however, there are no hollow trees suitable for this species; and
- the highly mobile and wide-ranging Greyheaded Flying Fox and Square-tailed Kite will not be significantly impacted by the removal of woodland vegetation as there are no specific resources of value for these species on the site.

Impact Analysis

SLR considers that the proposal will result in the following impacts on threatened fauna and their habitats:

- removal of 30 - 40 hollow bearing trees;
- removal of some Yellow-bellied Glider feed trees in the eastern portion of the proposed development;
- removal of some Glossy Black Cockatoo feed trees;
- having regard to the Nowra Heath-myrtle, the loss of a small proportion of this species.

Assessment of impacts and mitigation and amelioration measures are discussed below.

Impact on Stormwater Management Regime

The assessment of SLR has referenced the Water Cycle Management Report prepared by Storm Consulting which has incorporated a specific Hydrogeological Assessment prepared by Martens Consulting Engineers (as Annexure F to that report).

SLR considers that there are two vegetation types that are partly dependent on groundwater drainage and discharges being the Swamp Paperbark Community in and around a shallow drainage line, to the north-east, and small moss gardens in the eastern portion of the site. SLR note that these vegetation types are not restricted to the subject site, whilst they do not have any special conservation significance. In addition, SLR considers that these vegetation types are not dependent solely on groundwater, rather rainfall is also an essential requirement for both populations.

Having regard to the vegetation type Nowra Heath-myrtle, SLR notes that whilst this vegetation type is often associated with moist areas, there are many examples on the subject lands where it occupies dry locations. Furthermore, SLR note that the vast majority of this vegetation type are located outside of the hydraulic catchment of the project, and therefore will not be impacted.

SLR have assessed the stormwater management measures proposed by Storm Consulting and consider that although there may be some impact as a result of changes to the discharges of stormwater, the proposal implements appropriate measures such that no significant impact on any native biota is anticipated. These measures include ensuring low points continue to receive stormwater discharge and drainage is directed via bio-filtration systems.

The Hydrogeological Assessment undertaken by Martens Consulting Engineers has assessed Hydrogeological characteristics, examine potential impacts associated with the proposed subdivision and identify mitigation measures on the sites groundwater system. The emphasis of the assessment is the Spring Tiny Greenhood Orchid and Nowra Heath Myrtle which are identified threatened species. The Nowra Heath Myrtle has been found on the site, and whilst the Spring Tiny Greenhood Orchid has not been identified on the site, the property does contain potential habitat Kunzea Shrubland/Heathland community where this species has been known to occur.

The assessment undertaken by Martens has advised that urban development has the potential to affect groundwater through reduction in groundwater recharge due to increases in impervious areas, and a reduction in site vegetation. As a consequence of the potential impacts, Martens Consulting Engineers recommends a mitigation strategy

that mimics the existing stormwater characteristics by enabling the supplementary recharge of the drainage system at regular intervals. The Supplementary Recharge System recommended by Martens Consulting Engineers consists of road side swales, bio-retention swales, bio-retention basins and rain gardens. The Hydrogeological Assessment prepared by Martens Consulting Engineers concludes that the implementation of the recommended protection and mitigation measures will ensure neutral impacts result. As a consequence, the proposal will not have any adverse impacts on the groundwater requirements of the Nowra Heath-myrtle, or the potential habitat of the Spring Tiny Greenhood Orchid.

Impact of Bushfire Projection Measures

The subject site is identified as being bushfire prone by mapping prepared by Shoalhaven Council and endorsed by the NSW Rural Fire Service. As a result, development will require implementation of Asset Protection Zones in order to mitigate the bushfire threat. The provision of the relevant APZ will require:

- thinning of dense shrub and reduction in leaf litter;
- some removal of trees to ensure a discontinuous tree canopy prevails;
- ongoing maintenance of the required fuel levels.

SLR consider that impacts will not be unreasonable as compliance with the Vegetation Management Plan accompanying their assessment will ensure that suitable measures are taken, including:

- preservation of hollow bearing trees and Yellow-bellied Glider trees;
- preservation of Nowra Heath-myrtle; and
- on-going monitoring to refine the management regime.

SLR note that having regard to the Nowra Heath-myrtle, management of the APZ is likely to be beneficial as this species has responded well in the past to intermittent slashing.

Cumulative Impacts

The DGRs have required consideration be given to cumulative impacts of projects on threatened floral and fauna. SLR have considered that the proposal will not result in unreasonable cumulative impacts as:-

- the development is restricted to that area identified for future growth by the NBSP,

- the assessment undertaken by SLR has guided the project and resulted in a reduced development footprint in order to preserve the Nowra Heath-myrtle;
- stormwater management will maintain water quality and soil moisture requirements;
- enables the implementation of APZ requirements in a sustainable manner;
- provides for the conservation of relevant lands in a conservation area to preserve these areas in perpetuity.

Impact Amelioration and Management

SLR have considered the ecological impacts of the project on threatened flora and fauna species and notes the following amelioration measures:

- *the design and the subsequent management of stormwater control features, both during construction activities and following completion and occupation of the land, to limit the potential discharge of contaminants and to maintain existing hydrologic regimes within the Conservation Area. These features will be constructed and managed according to current 'best practice' principles, and as outlined in the Water Cycle Management Report of Storm Consulting (2012);*
- *the implementation of 'Water Sensitive Urban Design' principles, including the capture and re-use of stormwater runoff, the treatment of water to be discharged from the development, and the avoidance of the use of potable water for other purposes; and*
- *detailed design of the peripheral bioretention swale and detention basin system to maintain.*

Environmental Management Measures

SLR recommends a range of measures to ameliorate impact in addition to the retention of the more significant vegetation resources in the conservation area. These additional measures are as follows:

- *the use of sediment fences and other appropriate control measures during construction activities to manage and/or avoid erosion and sediment discharge or the discharge of other contaminants;*
- *the ongoing management of stormwater discharge volumes and water quality from the development area, both during construction activities and following completion and occupation of the site, according to current 'best practice' principles and as outlined in the Water Cycle Management Report of Storm Consulting (2012);*
- *the ongoing management of the peripheral bioretention swale system to maintain water quality, soil moisture and groundwater regimes, and to provide supplementary habitat for native biota;*

- *the ongoing management of the APZs to ensure that habitat and resources for, and individuals of, threatened species are protected;*
- *the implementation of a management regime during the construction process to ensure that no wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint and are appropriately managed;*
- *management of the Asset Protection Zones (APZs), where required, around the development to retain specimens of and habitat or resources for the relevant threatened biota, including inter alia:*
 - *the preferential and selective retention of hollow-bearing trees;*
 - *the preferential and selective retention of identified Yellow-bellied Glider and Glossy Black Cockatoo feed trees;*
 - *the slashing of shrub layer and understorey vegetation at selected locations to promote the Nowra Heath-myrtle;*
- *the implementation of a Vegetation Management Plan (VMP) for the E2 – Environmental Conservation Zone to ensure the long-term viability of flora and fauna populations which utilise the land, particularly the Glossy Black Cockatoo, Yellow-bellied Glider and Nowra Heath-myrtle.*
- *the collection of native vegetation removed from development areas and its re-use within the Conservation Area for bushland rehabilitation and/or landscaping purposes and/or the provision of that material to Council for bushland management and rehabilitation purposes;*
- *the destruction or appropriate removal of weeds from the development footprint and from the Conservation Area; and*
- *the implementation of a Hollow-bearing Tree Protocol, involving:*
 - *the segmental ‘dismantling’ by professional tree experts of hollow-bearing trees in order to salvage tree-hollows, wherever possible;*
 - *the placement of salvaged tree-hollows on existing large trees or dedicated poles in the Conservation Area;*
 - *alternatively, the placement of salvaged tree-hollows on the ground as hollow log habitat, where placement in existing trees is not practical; and*
 - *the use of artificial nest boxes to replace tree-hollows which cannot be salvaged and to supplement that resource on the site.*

In addition, the report of SLR has provided a VMP for implementation and this includes requirements relating to:

- general protection measures;

- management recommendations for vegetation within the conservation area and asset protection zone areas;
- stormwater management;
- maintenance; and
- a monitoring program.

5.6.6 Conclusions

SLR have conducted an ecological assessment in accordance with the requirements of the *Draft Guidelines for Assessment of Impacts on Threatened Species Under Part 3A (2005)*. The assessment by SLR has addressed all matters outlined in the DGR's having regard to ecological matters.

The assessment has concluded that the proposal results in the retention of high quality habitat in the conservation area which will largely ameliorate ecological impacts associated with the proposal.

The assessment by SLR builds upon that already undertaken by various ecologists on behalf of SCC in the identification of developable areas under the NBSP. This process has enabled the characterisation of the high value habitat (which is proposed to be conserved as part of the proposal and future zoning) as well as land having low ecological value, primarily being that land affected by past rural land uses and site disturbances. It is primarily this disturbed and cleared area which is to be developed by the Major Project application. Based on the assessment undertaken by SLR, it is considered that the proposal will not adversely impact on threatened species or their habitats, whilst broader ecological objectives are attained through the habitat and vegetation retained in the conservation area as part of the project.

5.7 NOISE IMPACT

5.7.1 Introduction

The DG's EARs issued for the EA require the consideration of potential noise impacts, on the proposed development in particular from road traffic, aircraft noise, and noise generated by the development of the proposed Bamarang Power Station.

It is considered that these are the most likely to impact on the amenity of residents proposed in this subdivision as other surrounding land uses are restricted to rural and rural residential activities which are unlikely to result in noise impacts.

The location of the site is subject of negligible through traffic and as such noise impacts should be restricted to that generated by the development itself.

Figure 16 is an aerial photo which shows the siting of the subject property in relation to HMAS Albatross and the proposed Bamarang Power Station.

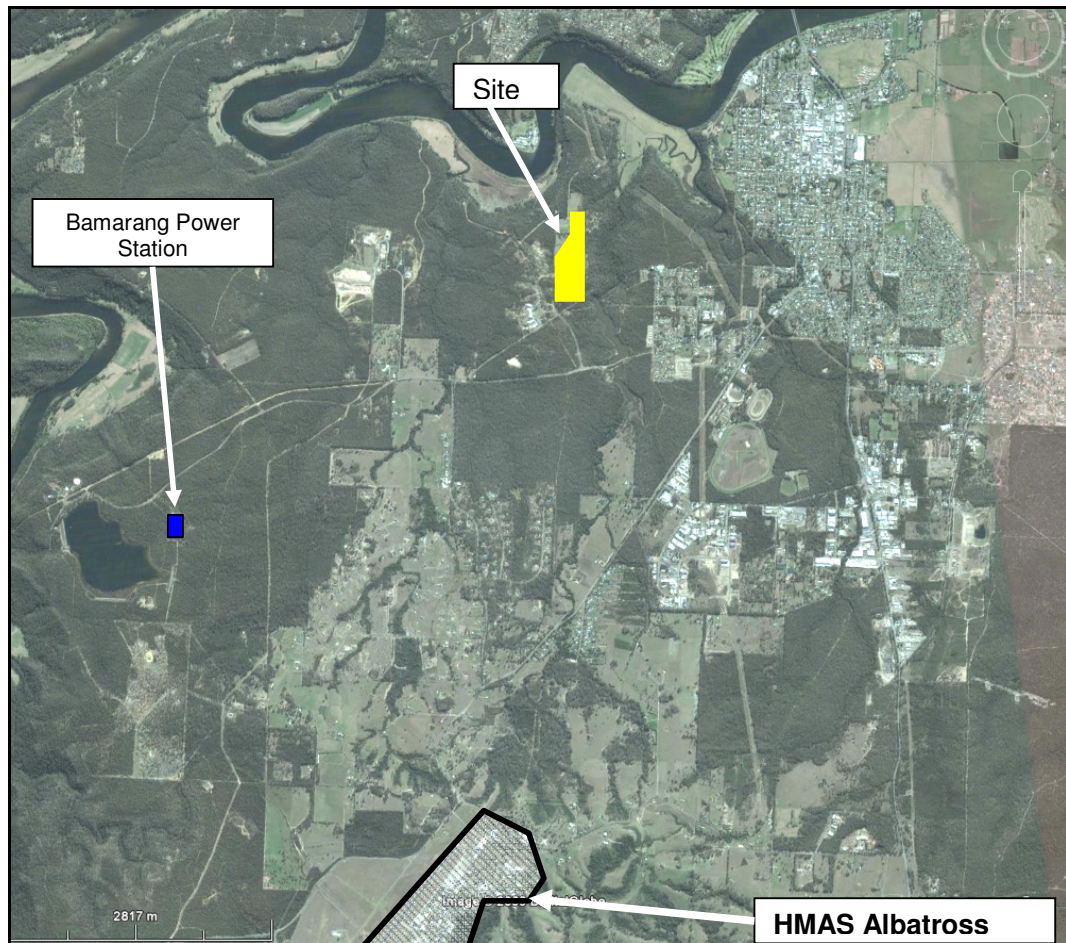


Figure 16: Aerial Photo of Locality.

5.7.2 Road Noise

As outlined above, the site is subject to minimal through traffic generation and traffic noise will primarily emanate only from that traffic generated by the development itself, which is not a large volume. Section 4.3 of the Roads and Traffic Authority's *Guide to Traffic Generating Developments* deals with impact on amenity from vehicles and road noise, often referred to as the environmental capacity. The RTA *Guide to Traffic Generating Developments* at Table 4.6 indicates that an environmental goal of 200 trips per hour, up to a maximum of 300 trips per hour, is considered reasonable for Local

Streets, whilst, the range of 300 to 500 trips is considered reasonable for Collector Streets.

The Transport Report prepared by CBHK (Section 5.3), prepared to assess the traffic implications of the proposal outlines that the proposed development is likely to generate a maximum of 330 trips per hour in the peak hour.

The proposed subdivision pattern is very permeable with a collector road proposed through the centre of the release area. The permeable layout will ensure that traffic flows are not concentrated on any one local street but are distributed evenly throughout the subdivision. Consequently, for local streets, traffic is expected to be within the environmental goals established by the RTA.

The proposed collector road is projected to carry a maximum of 330 trips in the peak hour, according to CBHK, which is at the lower end of the range of the environmental capacity of a collector road as identified by the RTA Guidelines.

Based on the above, it is considered that road noise should be acceptable for residents of the proposed subdivision and within guidelines established by the RTA.

5.7.3 Aircraft Noise

HMAS Albatross is sited near Nowra Hill to the south west of the Nowra Township. Infrastructure at HMAS Albatross includes two runways, one orientated generally north-south, the other generally east-west and ancillary support facilities including maintenance buildings, aircraft control tower and administrative offices. HMAS Albatross is the largest operational Naval establishment and the Navy's only Air Station, and its primary task is to support the four Naval Air Squadrons, which provide air support to the Navy fleet. At present, HMAS Albatross is the base for the 723 Squadron which flies AS350 Squirrel helicopters; 816 Squadron which uses the S-70B Seahawk helicopters; and 817 Squadron which utilizes the SK50 Westland Sea King helicopters.

In addition, HMAS Albatross is the site of the Fleet Air Arm Museum (previously known as, and now incorporating, Australia's Museum of Flight). Aircraft movements associated with the museum are very limited due to the static nature of displays, however there are occasional Air Show days, usually on an annual basis.

The airfield is also used for occasional private aircraft movements.

The City of Shoalhaven is not subject to any other significant aircraft movements, apart from occasional small aircraft and more regular coastal patrols.

It is reasonable to restrict the consideration of aircraft noise to that generated from HMAS Albatross.

Immediately surrounding HMAS Albatross are rural and rural-residential land uses. SCC has adopted Development Control Plan No. 69, the aims and objectives of which are to:

- *to ensure that RANAS Nowra's strategic national and local importance is not compromised by inappropriate residential development;*
- *to alert owners or prospective owners wishing to live in the vicinity of RANAS Nowra that they should consider that noise from aircraft movements using RANAS Nowra now or in the future may be found by them to be a problem;*
- *to control the establishment or growth of residential areas in the vicinity of RANAS Nowra by taking into account present or future noise levels from aircraft movements;*
- *to minimise land use conflict and the impact of aircraft noise on residential areas in the vicinity of RANAS Nowra;*
- *to ensure that in the consideration of applications for new dwellings, where permissible in the LEP, that design and siting criteria are appropriately addressed; and*
- *that owners, inquirers or applicants for residential development or associated building works are advised and urged to consider insulation against aircraft noise.*

A map outlining the area to which DCP No. 69 applies is shown as **Figure 17**.

The area which is affected by the provisions of DCP No. 69 is generally sited around HMAS Albatross, and is 2 km from the subject site at the closest point.

The provisions of DCP No. 69 serve to advise developers and property owners that are potentially affected by aircraft noise that consideration be given to implementing noise attenuation in the design and construction of any future dwellings in order to achieve compliance with Australian Standard 2021. In this instance, as the property is well clear of this area (by 2 km), no special requirements apply.