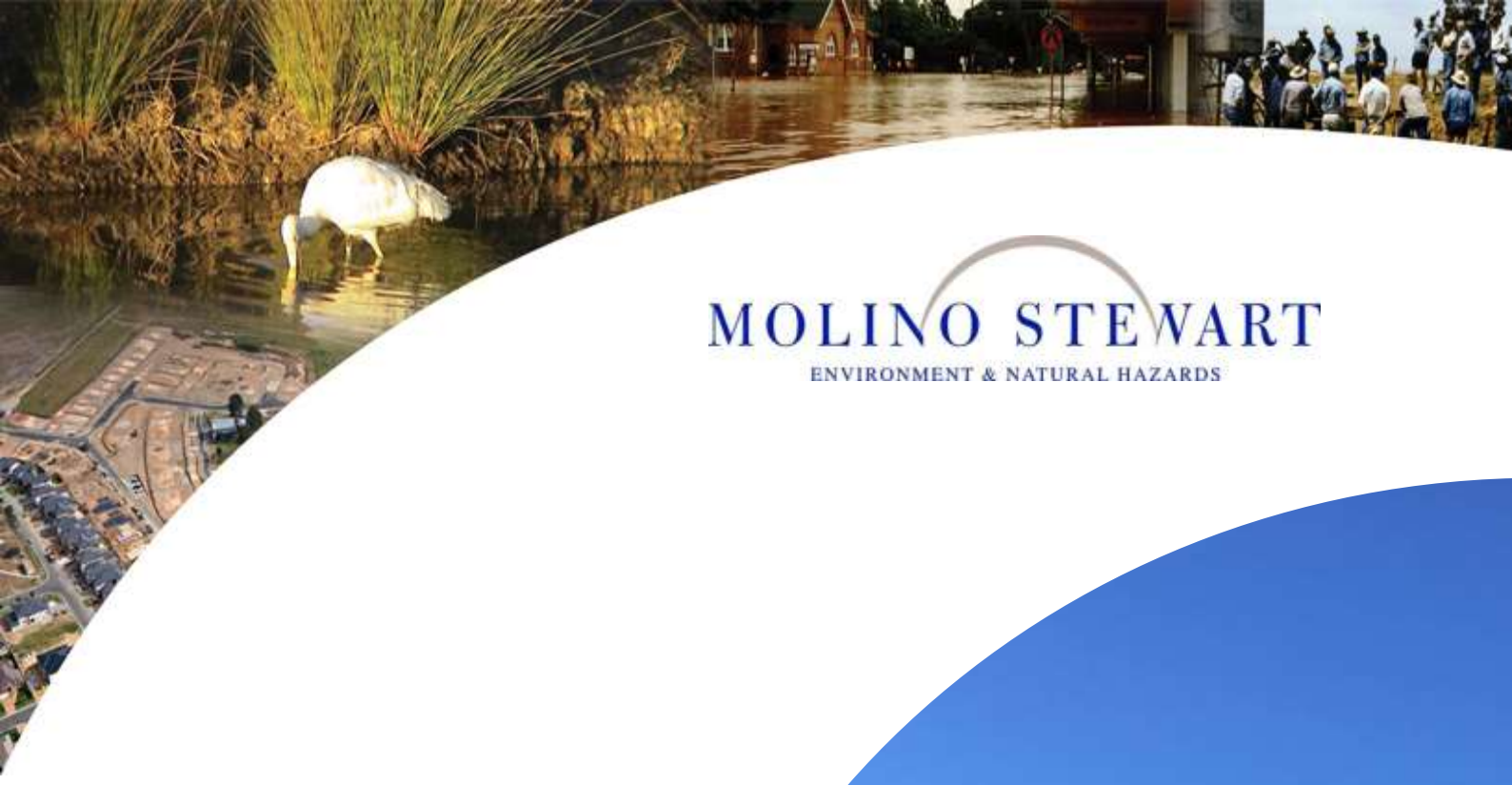

MOLINO STEWART

ENVIRONMENT & NATURAL HAZARDS

Hazim Al-Said

17 Dido Street, Kiama Planning Proposal

Flora and Flora Assessment Report

17 Dido Street, Kiama Planning Proposal

FLORA AND FLORA ASSESSMENT REPORT

for

Hazim Al-Said

by

Molino Stewart Pty Ltd
ACN 067 774 332

SEPTEMBER 2019

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DOCUMENT APPROVAL

For Molino Stewart	
Name	Shireen Baguley
Position	Principal
For Hazim Al-Said	
Name	Hazim Al-Said
Position	Property owner

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1 INTRODUCTION

Molino Stewart has been engaged by Zane Al-Said to prepare a Flora and Fauna Assessment for 17 Dido Street Kiama to accompany a planning proposal to amend the Kiama Local Environment Plan (LEP) (2011) in order to rezone the subject site from RU1 Primary Production to R2 Low Density Residential.

The planning proposal was submitted to Kiama Municipal Council (hereafter referred to as Council) and the Department of Planning and Environment (DPE) and included a Flora and Fauna Constraints Assessment prepared by Biosis 2017. The DPE has advised that progression of the proposal was conditional on the preparation of a Flora and Fauna Assessment to address concerns regarding the removal of an endangered ecological community (EEC) identified by Biosis as being present onsite.

1.1 LOCATION

The subject site is located at 17 Dido Street, Kiama (Lot 3 DP 1018217) within the Kiama Local Government Area (LGA) south of Sydney (Figure 1).

1.2 PROPOSED WORKS

The objective of the planning proposal is to amend the Kiama LEP (2011) to allow rezoning from RU1 Primary Production to R2 Low Density Residential in accordance with the Kiama Urban Strategy (KUS) to permit subdivision and low density residential development of this land (SET Consultants 2017). The KUS was adopted by Council on 20 September 2011 and is Kiama's overarching strategy to meeting housing targets identified in the then Illawarra Regional Strategy (IRS) (SET Consultants 2017). The lot yield recommended for the site under the KUS is 11-12, however topographic and bushfire constraints have lowered this to 10 lots (Appendix B).

The subject site is mapped as bush fire prone according to Council's Bushfire Prone Land Map. According to Section 117 of the Environmental Planning and Assessment Act (1979) Ministerial Direction 4.4 'Planning for Bushfire Protection' (2009):

A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

a) Provide an Asset Protection Zone (APZ) incorporating at a minimum:

(i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and

(ii) An Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road

The aforementioned specifications and other bushfire constraints are detailed in the Bushfire Risk Assessment prepared by SET Consultants for this proposal (December 2017) and shown in the map in Appendix B. It is likely that to satisfy these requirements, vegetation present on-site will need to be cleared to accommodate development of the Inner Protection Area (IPA) and APZ.

1.3 DEFINITIONS

i) *Survey area:* the survey area is defined as Lot 3 DP 1018217, Dido Street, Kiama, and a portion of the vegetation mapped as E2 Environmental Conservation in Kiama LEP (2011) to the south west.

ii) Site: the subject site is defined as Lot 3 DP 1018217, Dido Street, Kiama (*Figure 1*).

iii) Study area: this area is the wider area and includes both the site and adjacent lots to the west and south east, and a portion of the reserve to the south west. The context of the assessment for the subject site was to consider vegetation quality and value in the surrounds.

Figure 1: Subject site

1.4 LEGISLATIVE CONTEXT

The legislation specifically addressed in this flora and fauna assessment is listed below:

- NSW Environmental Planning and Assessment Act 1979 (EP&A Act)
- NSW Biodiversity Conservation Act 2016 (BC Act).
- Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

1.5 PURPOSE OF THIS ASSESSMENT

The purpose of this report is to provide an assessment of the potential direct and indirect impacts of the proposal on flora and fauna and their habitats, including consideration of threatened species, populations and EECs.

This flora and fauna assessment investigates the native flora and fauna present on the site in accordance with the NSW OEH guidelines and Kiama LEP.

This report also addresses the legislative requirements to assess the impacts of the proposed development on threatened species, populations or communities listed under the BC Act and the EPBC Act

2 METHODOLOGY

The ecological assessment was conducted in accordance with the following legislation:

- Part 4 of the NSW Environmental Planning & Assessment Act 1979 (EP&A Act);
- NSW Biodiversity Conservation Act 2016 (BC Act)
- Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities Draft (DEC, 2004).
- Threatened species assessment guidelines: The assessment of significance (DECC, 2007).
- OEH Fact Sheets and advice associated with the Biodiversity Conservation Act.

The Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (DEC, 2004) facilitate informed decision making at the local scale for individual development activities with particular regard to: preliminary flora and fauna determination; and assessment of significance. The Guidelines to this assessment were applied with the following objectives:

- Determining the threatened flora species recorded from the locality;
- Assessing the vascular flora species capable of being identified, searching for threatened flora species and the description of vegetation associations on site;
- Determining the threatened fauna species occurring in the locality;
- Searching for threatened fauna species; and,
- Assessing the habitat value of the site for threatened fauna species.

2.1 PERSONNEL

The survey and assessment was conducted by the following personnel in accordance with the Office of Environment and Heritage (OEH) Scientific Licence and Department of Primary Industries (DPI) Animal Research Authority.

2.1.1 Rebecca O'Rourke

Rebecca undertook desktop research, site survey and report preparation.

a) Qualifications:

Bachelor of Science Honours Degree in Science (University of Sydney)

b) Licences / Approvals:

- Scientific Licence Number SL100527 (issued under s132c, NPW Act, 1974)
- ITAR Animal Ethics Certification

c) Experience:

Rebecca has undertaken numerous ecological assessments within the Sydney region and has worked with the Australian Wildlife Conservancy in regional Western Australia where she became proficient in fauna survey and handling. She has a working knowledge of Sydney Basin flora and fauna, and has experience undertaking flora and fauna surveys and preparing threatened species assessments for developments.

2.1.2 Vince Bonanno

Vince undertook desktop research, site survey and report preparation.

a) Qualifications:

Bachelor of Science (Environmental Biology) (University of Technology Sydney)

b) Licences / Approvals:

Scientific Licence Number SL100527 (issued under s132c, NPW Act, 1974)

c) Experience:

Vince is an experienced Environmental Scientist and Spatial Analyst who has provided support in ecological field surveys, report preparation and GIS analysis.

2.2 BACKGROUND RESEARCH AND DESKTOP SEARCHES

In completing this assessment, the following background searches and desktop searches were undertaken:

- Review of Illawarra Subtropical Rainforest in the Sydney Basin Bioregion Mapping (OEH 2016);
- Search of the NSW Bionet Wildlife Atlas (OEH 2019) was used to identify any threatened species and populations listed under the BC Act that have been previously detected within the defined locality for the project area: being within an approximate 10km radius of the subject site;
- Search of records of species listed under the schedules of the EPBC Act was obtained from the protected matters search tool using a 10km search area;
- Search for the subject property on the OEH NSW Biodiversity Values Map; and
- Use ESpade soil mapping to determine soil landscapes mapped at the site.

Results of these desktop searches are detailed in the relevant sub-sections of Section 3.

2.3 DESKTOP ASSESSMENT OF THREATENED SPECIEIS HABITAT

Based on the results of the background research and desktop searches, an analysis of the potential for the site to provide habitat for locally recorded threatened species, populations and communities was undertaken. The tables in Appendix C shows the likelihood of occurrence of each species or community based on known habitat requirements. This table was used to determine the need to undertake targeted searches for specific species during field survey. After the field survey was undertaken, the likelihood of occurrence table was updated to include the survey results.

2.4 PREVIOUS STUDIES

A Flora and Fauna Constraints Assessment was prepared by Biosis in 2017 for the planning proposal. The Flora and Fauna Constraints Assessment documented the database and literature review, field investigation and threatened species assessment undertaken as part of this assessment. The key findings were:

- A 0.013ha area of Illawarra Subtropical Rainforest Endangered Ecological Community (EEC) is present in the SW corner of the site;
- No threatened fauna were recorded within the study area during site investigations;
- No hollow-bearing trees were recorded within the site;
- The vegetation is dominated by Broad Leaf Privet;
- No likelihood of occurrence table was included with the assessment but the report assessed a medium or high likelihood of occurrence for a number of species, mainly bats and owls;
- All other threatened fauna, excluding those mentioned below are considered to have a low likelihood to occur; and
- Priority Weeds are present.

2.5 FIELD SURVEY

The survey effort was undertaken on 30 July 2019 and consisted of a targeted daytime flora and fauna survey and an evening spotlighting survey.

2.5.1 Weather Conditions

The weather was cool (maximum 15^{o}C) and dry during the survey period. There was 0.4mm of rainfall recorded earlier in the day (Bureau of Meteorology 2019).

2.5.2 Habitat Assessment

The habitat assessment focussed on recording the following features. Particular attention was

paid to searching for scats, tracks or other signs of fauna activity.

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places;
- Areas of dense vegetation;
- The presence of hollow logs/debris and areas of dense leaf litter;
- The presence of fruiting flora species;
- The presence of blossoming flora species, particularly winter-flowering species;
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation;
- The presence of caves and man-made structures that may be suitable for bat roost sites; and
- The presence of bulky nests which may belong to raptors

2.5.3 Flora Survey

The flora survey was undertaken over a half day period. The survey consisted of a walk over of the entire site to record flora species. Additionally, particular attention was paid to ground-truthing the vegetation within the area where an EEC had been previously identified and by Biosis. The boundaries of this area of vegetation were mapped.

2.5.4 Fauna Survey

The fauna survey was for four hours. This consisted of:

- Daytime observations from 1:00pm to 4:00pm
- Evening bird survey and spotlighting for one hour from 6pm by two observers

2.5.5 Limitations of Field Survey

The flora survey was completed on a single day in July 2019. A longer survey period or surveys over a greater number of seasons would likely detect more species. This survey period in winter may limit detection for species that may grow or flower during other seasons. A limitation of this survey is a lack of assessment of non-vascular plants and non-flowering species of *Cyperaceae, Poaceae* and *Orchidaceae*. This survey has conducted an appraisal of the vascular flora species evident above ground.

The fauna survey was conducted on a single day in July 2019. This is a period when some fauna such as microbats are less active and less likely to be detected. Repeat surveys over a range of seasons would be likely to detect more species. As many faunal species are cryptic and/or nocturnal and/or wide-ranging and mobile, they are unlikely to be detected even during seasonal surveys. The fauna assessment accordingly includes an assessment of the potential of the subject site as habitat for various fauna species. With the exception of species definitely recorded on the site, there is no certainty as to the presence or absence of the species discussed.

No invertebrate surveys were undertaken.

It was not deemed necessary to undertake further ecological survey given the small scale of the proposed work area, the lack of hollow bearing trees and the highly modified nature of the property and surrounding areas.

3 EXISTING ENVIRONMENT

3.1 LANDSCAPE CONTEXT

The site is generally sloped and is quite steep in some places. A shared access road traverses across the site east from Dido Street, to the western boundary. Spring Creek runs to the south of the site and flows onto Bombo beach approximately 1km east of the site.

3.2 LAND USE

3.2.1 Previous Use

It is probable the site was previously used as agriculture land as inferred by the presence of a dry rock wall constructed adjacent to the southern boundary (Figure 3). This is consistent with the current land zoning RU1 Primary Production permits extensive agriculture without consent (Kiama LEP 2011). Available historical aerial images from 1964-1993, show that the site had been extensively cleared with only a small patch of vegetation remaining in the south west corner (Appendix A).

3.2.2 Current Use

There are no dwellings currently onsite, however several residential properties exist on the east side of Dido Street as well as one residential property on the south east boundary, one large dwelling to the north, and one to the north west. Since 2011 aerial photos show that the site is more densely covered, with what was found to be mostly dense exotic regrowth (Figure 2). A Strahler Class 4 tributary of Spring Creek is located approximately 100 metres, downslope to the south of the study area. The tributary flows north east into Spring Creek lagoon approximately 250 metres to the east of the study area (Figure 2). To the north of this is a large area of vegetation zoned E2 Environmental Conservation associated with the natural drainage line. The area (3.2 hectares is) classified as RFp111: Subtropical Dry Rainforest (SCIVI. VIS_ID 2230 OEH 2016). This classification is related to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC. The riparian area to the south of Spring Creek is mostly cleared. The riparian area associated with Spring Creek is mapped on the Biodiversity values map (NSW DPIE), however this does not extend to the subject site or the portion of vegetation zoned E2 (Appendix D). The riparian vegetation was in better condition to the north of the creek with some native riparian species present; however there was still a high level of weed invasion.

3.3 SOILS

According to geology mapping for the Wollongong area, the site is located near a transition in subsurface geology. The north-west of the site is mapped as underlain by Blowhole Latite (Pbh) of the Gerringong Volcanics (Shoalhaven Group), which is comprised of Latite. The rest of the site is mapped as underlain by Kiama Tuff of the Gerringong Volcanics (Shoalhaven Group), which is comprised of trachytic tuff with pebbly bands (e-Spade 2019).

3.4 NSW BIODIVERSITY VALUES MAP

The riparian vegetation along Spring Creek to the south of the site is included on the NSW Biodiversity Values Map (Appendix D). The subject site.is not mapped on the NSW Biodiversity Values Map.

3.5 FLORA

3.5.1 Flora Survey Results

A full list of flora species recorded on site is included at Table 1 in Appendix E. The site is mostly exotic weed regrowth or cleared pasture land. The Flora and Fauna Constraints Report prepared by Biosis (2017) identified a small patch of vegetation to the southeast as Subtropical Dry Rainforest (SCIVI. VIS_ID

2230 OEH 2016) which is a classification related to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC (OEH 2011). During the current survey period, the identified area of EEC was ground-truthed. The patch of vegetation was found to be in a consistent location and condition as presented in the Biosis report (2017). The boundary of the vegetation was recorded and presented in Figure 4.

No threatened flora species were detected on site during survey.

3.5.2 Vegetation Communities

a) Mapped vegetation communities

The vegetation communities present on the property or surrounding land are described with reference to the Southeast NSW Native Vegetation Classification and Mapping (SCIVI. VIS_ID 2230 OEH 2016) and Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (Tozer et al 2010).

The site is mapped as cleared according to southeast NSW Native Vegetation Classification and Mapping (SCIVI. VIS_ID 2230 OEH 2016).

To the southeast of the site there is a large patch (3.2 hectares) of vegetation zoned as E2 in Kiama LEP (2011) and mapped as RFp111: Subtropical Dry Rainforest (SCIVI. VIS_ID 2230 OEH 2016). This classification is related to the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC (OEH 2011) (Figure 4).

b) Vegetation communities present onsite

This assessment found that the vegetation on the site was comprised of three communities: closed exotic shrub land and grassland, managed residential gardens, and a small isolated patch of native vegetation which has been classified as Illawarra Subtropical Rainforest EEC. These communities are discussed in greater detail in the following sections. These findings were generally consistent with the findings of the Biosis assessment (2017) (see map in Appendix F).

c) Closed Exotic Shrub land

Much of the site was dominated by exotic trees and shrubs with the dominant species being Broad-leaved privet (*Ligustrum lucidum*) (Figure 5) and African olive (*Olea europaea ssp africana*). Additionally, there were several native species that are prominent including Sweet pittosporum (*Pittosporum undulatum*), Silky oak (*Grevillea robusta*), and Illawarra flame tree (*Brachychiton acerifolius*). The understory was weedy and included Lantana (*Lantana camara*) (Figure 6) and Fireweed (*Senecio madagascariensis*) which are both weeds of national significance (DPI NSW WeedWise).

Figure 3: Dry rock wall

Figure 2: Exotic regrowth (left)

Figure 4: Vegetation mapping

Figure 5: Broad-leaved privet *(Ligustrum lucidum)*

d) Closed Exotic Grassland

The north west and lower south of the site had large open pasture areas dominated by an exotic grass species. There were some exotic ground cover species such as Cape Ivy (*Delairea odorata*), Lantana, and natives such as bracken fern (*Pteridium esculentum*).

Figure 6: Lantana and exotic grasses

e) Managed Residential Gardens

The property on the eastern boundary has a garden with a mixed of planted natives and exotics including Swiss Cheese plant (*Monstera deliciosa*), Illawarra flame tree (Figure 7), and Australian tree fern (*Cyathea cooperi).* There is some encroachment of these species into the subject site.

Figure 7: Illawarra flame tree in residential garden

3.5.3 Threatened Flora Species, Populations and Endangered Ecological Communities

a) Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC

The NSW BC Act listed Illawarra Subtropical Rainforest in the Sydney Basin Bioregion EEC (OEH 2011) is present onsite existing as a small isolated patch (130 m^2) in the south western corner of the subject site. The patch was not in optimum health as the understorey is highly weed infested. The topographic position of the site is consistent with the Scientific Committee Determination, and six of a total 29 characteristic species including: Whalebone Tree (*Streblus brunonianus*), Illawarra Flame Tree, and Orange Thorn (*Pittosporum multiflorum*) were present (OEH 2011). There were few juvenile characteristic

species present. The vegetation patch would be regrowth, being located in an area that was subject to clearing historically, with all vegetation from this area removed (refer historical aerials from the 1960s onwards Appendix A).

Overall the vegetation in this patch was of poor quality and assessed as being low condition. It is isolated by a barrier of numerous African olive and broad-leaved privet trees of which saplings had infiltrated the understory in many places.

b) Threatened flora species

Seven (7) NSW listed threatened flora species have been previously recorded within 10km of the site. An analysis of the potential for the site to provide habitat for these threatened species and populations is shown in Appendix C.

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3.6 TERRESTRIAL FAUNA

3.6.1 Terrestrial Fauna Habitats

There is native and exotic vegetation on the site that provides a range of food resources and habitats for fauna. The thick weed growth in the understory was observed to provide sheltering habitat for small birds. Trees provide roosting and perching habitat, although no hollow bearing trees are present. There is some leaf litter that provides on ground habitats. Multiple rabbit burrows were observed throughout the site.

3.6.2 Fauna Survey Results

A full list of fauna species recorded on site is included in Table 2 in Appendix E.

During the diurnal survey several rabbits (*Oryctolagus cuniculus*) were sighted as well as one magpie (*Cracticus tibicen*)

Three species were detected during spotlighting including a Fox (*Vulpes vulpes*), an Owl (species unknown), and rabbits.

4 IMPACT ASSESSMENT

4.1 DIRECT IMPACTS

The direct impacts of the proposed re-zoning are anticipated to be minor as much of the site is cleared or is highly disturbed. However, a small area of isolated low condition EEC persists in the south west of the site. It is likely that to maintain an IPA for bushfire protection purposes it is likely that this area will need to partially or completely cleared as shown in Appendix B.

The following aspects have the potential to directly adversely affect the local biodiversity, as part of the development proposal:

- Loss of vegetation and associated habitat;
- Disruption to connectivity; and
- Injury and mortality to wildlife.

4.1.1 Loss of vegetation / habitat

The proposed rezoning will likely involve the removal of some native and exotic vegetation to accommodate an IPA and APZ as the subject site is bushfire prone.

The aerial imagery from the 1960s shows that the site was previously cleared, inclusive of the area where the EEC patch is located. The native vegetation present onsite would be regrowth (Appendix A).

The removal of native vegetation from the proposal site would likely include the poor quality patch of EEC in the south west, which sits within the area affected by the bushfire constraints (Appendix B). The EEC is in poor condition and contains only a small number of the characteristic species outlined in the determination (OEH 2011). Furthermore, the area is isolated and infiltrated by dense exotic species such as African olive and Broad-leaved privet.

The rest of the vegetation on the subject site will likely be subject to some clearing as part of development. This majority of rest of the site is dominated by exotic species or is cleared. There are scattered native species present. No threatened flora species were found across the rest of the site. This may reduce dense understory areas that may be used by small birds and mammals, however with careful management, replacement native alternatives could be reinstated thus improving the native biodiversity of the site overall.

There are no hollow bearing trees or large logs that would require removal. The lack of hollow bearing trees is probably owing to the young age of the trees present, being regrowth following extensive clearing which is present in the historical aerials from the 1960s onwards (Appendix A).

4.1.2 Connectivity

The proposed re-zoning will not impact significantly on the existing connectivity with areas of native vegetation. The patch of EEC in the south west of the site does not form part of a continuous corridor or amalgamation of good quality and quantity native vegetation. Site inspection found that the patch was isolated and weed and exotic species were encircling and infiltrating the area. Furthermore, it is unlikely that this patch is part of remnant vegetation as evidenced through aerial imagery and thus is more likely to be more recent regrowth (Appendix A). Therefore, the impacts on the connectivity of native vegetation on-site and within the broader area are likely to be minimal.

The area would benefit from a well-managed bushcare program, using indigenous, locally-abundant species in landscape plantings. This would not only improve the native vegetation connectivity, but also add considerable ecological and aesthetic values to the surrounding environment of the development.

4.1.3 Injury and mortality to wildlife

Given the vast stands of mature lantana and associated exotic vegetation, which has been on the site, undisturbed for a long period, it is likely that the site will be home to many fauna, particularly reptiles, birds and small mammals.

This fauna could be adversely impacted by the proposed development's construction activities, unless it is protected and allowed to re-locate to nearby, suitable habitat.

Prior to the commencement of any vegetation clearing, the areas should be assessed for potential fauna. As part of this pre-clearance assessment, a protocol should be established for the capture and relocation of any fauna to avoid harm or injury to wildlife.

This protocol should be developed in consultation with an experienced fauna spotter and/or ecologist and may also involve obtaining input from wildlife service organisations.

4.2 INDIRECT IMPACTS

4.2.1 Weed Spread

The site is heavily weed infested. The re-zoning represents an opportunity to reduce weed cover, however disturbance to soils, weed removal and movement of equipment has the potential to increase weed spread through the area and cause a subsequent flush of weed growth within the disturbed soils.

As detailed in Section 5, this potential for weed spread during clearing would need to be controlled by careful disposal of weeds and their propagules and implementation of wash down procedures for vehicles and equipment. Weed infested soils should not be reused on site, but instead disposed to landfill. Post construction, a weed control and revegetation program will be implemented to prevent weed proliferation.

4.2.2 Pathogens

The movement of machinery and personnel can facilitate the spread of fungal pathogens such as Myrtle rust (*Austropuccinia psidii*) which is known to infect Myrtaceae species (NSW Department of Primary Industries, 2019). Construction work on the site has potential to introduce plant and animal pathogens if contaminated machinery was used on site. To control this, hygiene control measures would be implemented during construction for vehicles and equipment.

4.2.3 Fragmentation of Habitats

The subject site has a history of clearing with aerial imagery dating from the 1960s showing almost the entire site cleared. The majority of the vegetation currently present is a combination of exotic grass and shrub regrowth (Appendix A). It is unlikely that the proposed re-zoning will impact established habitat corridors in the area as the identified EEC onsite is not remnant and is enclosed by weeds forming no connection with continuous good quality native vegetation.

4.3 THREATENED SPECIES, POPULATIONS, AND COMMUNITIES

The Biodiversity Offsets Scheme (BOS) will apply to developments likely to significantly affect threatened species. These are defined as a development that:

- Impacts on an Area of Outstanding Biodiversity, or
- Exceeds the BOS threshold, or
- Is likely to significantly affect threatened species, ecological communities or their habitats according to the test of significance in Section 7.3 of the Biodiversity Conservation Act, 2016.

The Flora and Fauna Constraints Assessment undertaken previously determined that the total clearing of the EEC would be below the threshold and a Biodiversity Development Assessment Report (BDAR). It also noted that clearing is unlikely to result in significant impact. The DPE has requested that a Flora and Fauna Report be prepared so that the impact on the EEC and other threatened species may be considered as part of the planning proposal.

4.3.1 Assessments of Significance

In accordance with Section 7.3 of the BC Act Assessment of Significance (AoS) for the Illawarra Subtropical Rainforest EEC are included at Appendix G. It is concluded that the proposal is not likely to have a significant impact on any of these species or

communities. As such, entry to the BOS is not required.

As outlined in Appendix C, due to the lack of habitats present on the site for other species no other threatened fauna species are considered likely to be impacted by the proposal and no other AoS required other than those listed in section 4.3.2 and 4.3.3.

It is concluded that the proposal is not likely to have a significant effect on any threatened species, populations or communities listed under the BC Act

4.3.2 Threatened flora species

Seven (7) NSW listed threatened flora species have been previously recorded within 10km of the site. An analysis of the potential for the site to provide habitat for these threatened species and populations is shown in Appendix C.

An AoS was prepared for the following species and are presented in Appendix G:

- White-flowered Wax Plant (*Cynanchum elegans)*

No threatened flora or populations were recorded on site.

4.3.3 Threatened Terrestrial Fauna Species or Populations

Forty four (44) listed threatened fauna species have been previously recorded within 10km of the site. An analysis of the potential for the site to provide habitat for these threatened species is shown in Appendix C.

Based on the field assessment, analysis of potential habitat (Appendix C) and consideration of the nature of the proposed works, Assessments of Significance for potential impacts on threatened fauna species are included at Appendix G and discussed in section 4.1.5:

The 5 part test for the AoS was completed for the following species:

- Barking Owl (Ninox connivens)l;
- Powerful Owl (*Ninox strenua*) ;
- Eastern Coastal Freetail-bat (*Micronomus norfolkensis)*
- Southern Myotis (*Myotis macropus)*
- Greater Broad-nosed Bat (*Scoteanax rueppellii) ;*

The AoS are provided in Appendix G

No threatened species are likely to be significantly impacted by the proposed re-zoning.

Additionally, the removal of extensive weed infestations from the site will have a positive impact on habitat for the threatened species present or potentially present in the local area.

4.4 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (EPBC ACT)

Under the EPBC Act, a person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on a Matter of National Environmental Significance (MNES). These matters are listed as:

- •the world heritage values of a declared World Heritage property;
- •the ecological character of a declared Ramsar wetland;
- •a threatened species or endangered community listed under the Act;
- •a migratory species listed under the Act; or
- •the environment in a Commonwealth marine area or on Commonwealth land.

The EPBC Protected Matters report lists four threatened ecological communities, 79 nationally listed threatened species and 55 migratory species that may occur within 10km of the site.

The vegetation on the site did not qualify as any of the EPBC listed EECs.

As outlined in Appendix C, due to the lack of habitats present on the site for other species and the small scale of the proposal, no other EPBC listed species are considered likely to

be impacted by the proposal, and none of the species with AoS were observed onsite.

The EPBC Act does not require Commonwealth approval for the proposal as the matter is not a controlled action because the action will not have a significant effect on a MNES.

5 MITIGATION MEASURES

5.1 PRIOR TO CLEARING, EARTHWORKS AND CONSTRUCTION

The following mitigation safeguards are recommended for implementation prior to commencement of the planned rezoning and subdivision onsite:

- Ongoing weed management as part of a comprehensive bush regeneration plan with particular targeting of weeds of national significance.
- Management of soil stability on slopes particularly below the access road by staged weed removal, stabilisation and revegetation as required.
- Staged removal of shrub layer weeds to retain habitat elements.
- Management of runoff from development site to reduce impacts from changed water quality and quantity to nearby Spring Creek.

5.2 DURING CLEARING, EARTHWORKS OR CONSTRUCTION WORKS

The following mitigation safeguards are required to be implemented during vegetation clearing, earthworks or construction works:

- Weeds are to be removed and disposed of in a manner that does not spread propagules.
- Weed infested soils should not be reused on site, but instead disposed to landfill.
- •All work areas are to be kept clean and tidy, with all rubbish or litter collected and disposed.

5.3 AFTER COMPLETION OF WORKS

The following mitigation measures and safeguards are required to be implemented post-construction:

- Stabilise any disturbed soils.
- Choice of suitable plant species for landscaping with preference for native species that restore the complex tangled ground cover that may be currently used by small mammals and birds onsite

6 CONCLUSION

The proposal for the subject site is to rezone rom RU1 Primary Production to R2 Low Density Residential. Should the rezoning proceed, it would be expected that clearing of vegetation from the subject site would be required to facilitate civil works and the provision of an APZ on the site.

The site has a history of clearing and is currently dominated by exotic vegetation with a small area of vegetation identified as EEC persisting to the southeast. As discussed the rezoning is unlikely to have detrimental impacts on the surrounds, and any potential impacts have been accounted for with mitigation measures suggested.

Illawarra Subtropical Rainforest EEC is present onsite, however aerial imagery from the 1960s shows that the site was previously cleared, inclusive of the area where the EEC patch is located. The native vegetation present onsite would be regrowth The area is in poor condition with high levels of weed invasion causing isolation, and few of the characteristic species present. Additionally the area is small, measuring only 130m^2. Considering the condition and size of the vegetation and the history of extensive clearing on-site, it is unlikely that the removal of this patch will cause undue harm to threatened species in the area. Considering that a large swath of Sub-tropical dry forest, associated will the Illawarra Sub-tropical Rainforest in Sydney Basin (OEH 2011), persists to the south east of the site (3.22 hectares) zoned E2 under Kiama LEP (2011), the removal of the EEC onsite involved with creating and IPA and APZ, is unlikely to reduce the overall amount of good quality EEC in the area. Furthermore, the EEC patch on-site does not form part of a contingent corridor with good quality EEC or native vegetation in the area

No threatened species or endangered population of flora were observed during field survey. Although the site represents potential habitat for some threatened flora and fauna species, the proposal is not likely to have a significant impact on any NSW or Commonwealth listed threatened species, populations or communities.

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APPENDIX A – HISTORICAL SITE PHOTOS

BROADCREST
MAPPING AND SPATIAL SERVICES
broadcrest.com.au | contact@broadcrest.com.au | 1300 554 945
Broadcrest Consulting Pty Ltd | ABN: 622 508 187

Client	Date
TERRA INSIGHT	1964
Location	**LOT**
3 Dido Street, Kiama	3 DP 1018217

Data Source
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TERRA INSIGHT	1974
Location	**LOT**
3 Dido Street, Kiama	3 DP 1018217

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TERRA INSIGHT	1984
Location	**LOT**
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TERRA INSIGHT	1993
Location	**LOT**
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Client	Date
TERRA INSIGHT	2011
Location	**LOT**
3 Dido Street, Kiama	3 DP 1018217

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Client	Date
TERRA INSIGHT	2018
Location	**LOT**
3 Dido Street, Kiama	3 DP 1018217

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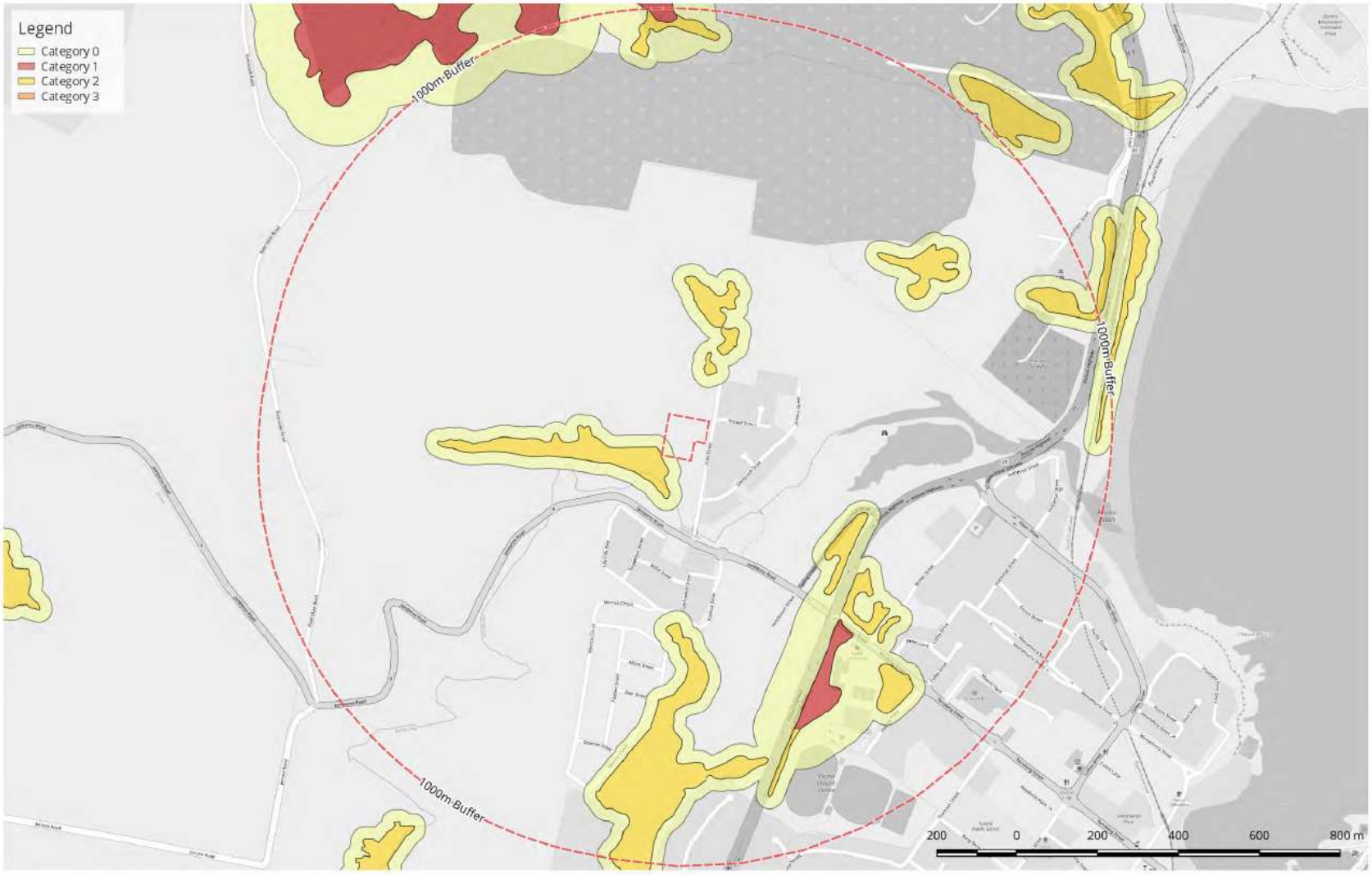
revision	description	drawn	approved	date
	Aerial images	LE	KEG	23/05/18

TERRA INSIGHT

client:	SET Consultants		
project:	Proposed residential subdivision Lot 3 DP 1018217 Dido Street, Kiama		
scale	NTS	title:	Historical Aerial Images
original size	A3	project no: TERRA18228	figure no: FIGURE 2

APPENDIX B–BUSHFIRE PRONE LAND MAP AND CONCEPT PLANS

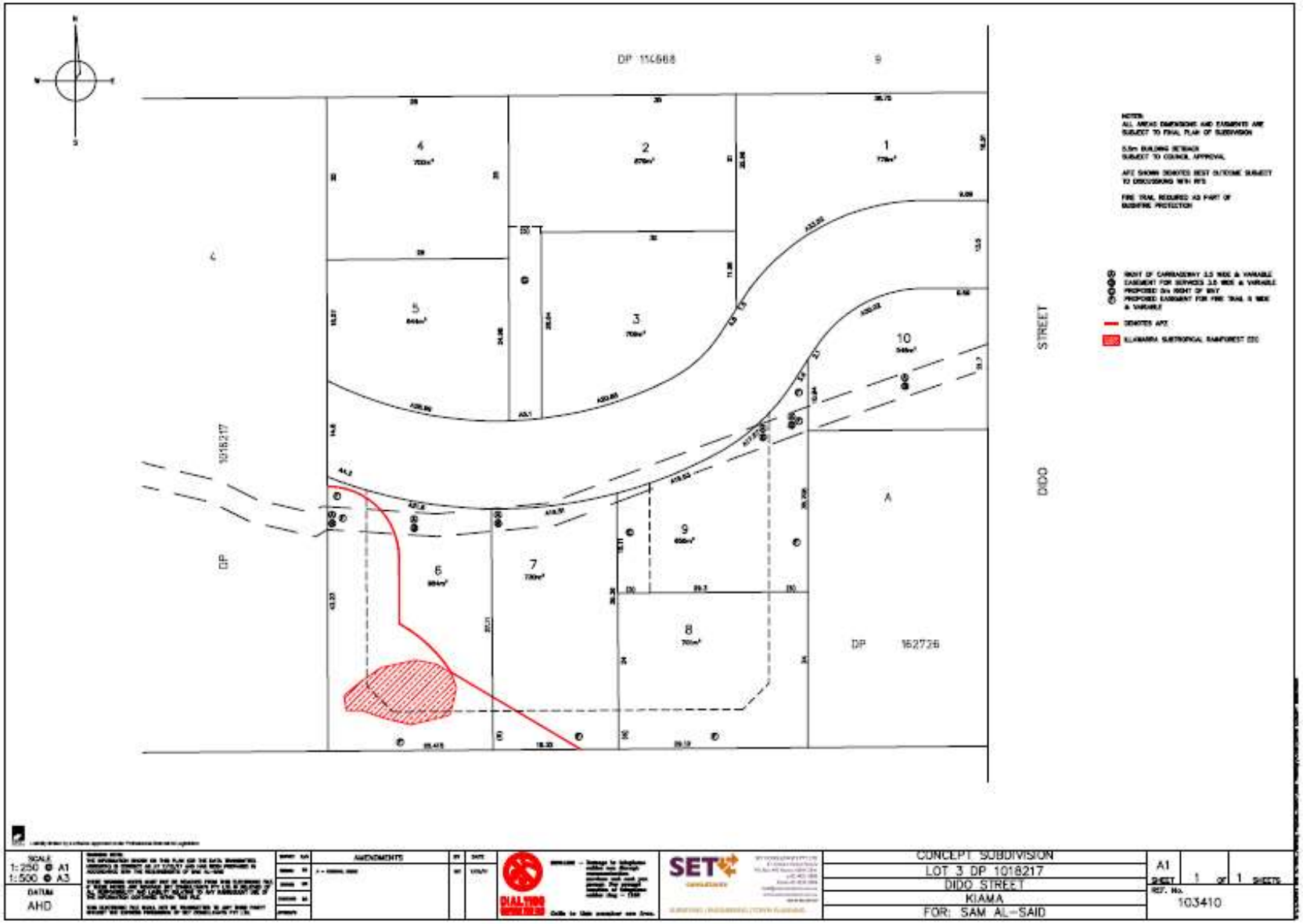


BROADCREST
MAPPING & SPATIAL SERVICES
broadcrest.com.au | contact@broadcrest.com.au | 1300 554 945
Broadcrest Consulting Pty Ltd | ABN: 622 508 187

Client: TERRA INSIGHT	Map: Bushfire Prone Land
Location: 3 Dido Street, Kiama	LGA: THE COUNCIL OF THE MUNICIPALITY OF KIAMA

Data Source: NSW Planning and the Environment | Obtained on 18.07.2018
Creative Commons 3.0 - Commonwealth of Australia
Base map: Tiles Maps | Obtained on 2.10.2018
Creative Commons 3.0 - OpenStreetMap Contributors

Scale: 1:10000
Project: 206


DP 114868
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8
A
DP 1018217
DP 162736
DIDO STREET
NOTES
ALL AREAS DIMENSIONS AND EASEMENTS ARE SUBJECT TO FINAL PLAN OF SUBDIVISION
5.0m BUILDING SETBACK SUBJECT TO COUNCIL APPROVAL
APZ SHOWN DENOTES BEST OUTCOME SUBJECT TO DISCUSSIONS WITH RFS
FIRE TRAIL REQUIRED AS PART OF BUSHFIRE PROTECTION
DENOTES APZ
SCALE
1:250 @ A1
1:500 @ A3
DATUM
AHD
AMENDMENTS
CONCEPT SUBDIVISION
LOT 3 DP 1018217
DIDO STREET
KIAMA
FOR: SAM AL-SAID
A1
SHEET 1 OF 1 SHEETS
REF. No.
103410

APPENDIX C – LIKELIHOOD OF OCCURRENCE

Table 1 Threatened fauna recorded within 10 km of site. BC Act Status codes: Vulnerable (V); Endangered (E1); Critically Endangered (E4A). EPBC Act status codes: Vulnerable (V); Endangered (E); Critically Endangered (CE). Refer to table 3 below for Likelihood of occurrence criteria

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
Amphibia							
Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E1	V	10	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (T*ypha spp*.) or spikerushes (*Eleocharis spp*.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Whalebone Tree - Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion is listed habitat.	Moderate
Aves							
Accipitridae	*Circus assimilis*	Spotted Harrier	V	-	4	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Moderate
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea Eagle	V	C	9	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs,	Moderate

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V		3	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Low
Accipitridae	*Pandion cristatus*	Eastern Osprey	V		2	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. .	Low
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	C,K,J	2	White-throated Needletails are aerial birds and for a time it was commonly believed that they did not land while in Australia. It has now been observed that birds will roost in trees, and radio-	None

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						tracking has since confirmed that this is a regular activity. White-throated Needletails are non-breeding migrants in Australia. Breeding takes place in northern Asia. The eggs are laid on a platform sticks placed in a hollow or similar crevice high in a tall conifer.	
Ardeidae	*Ardea ibis*	Cattle Egret		C,J	6	The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps, and is often seen with cattle and other stock.	Low
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	E1	E	2	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp*.) and spikerushes (*Eleocharis spp*.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.	None
Ardeidae	*Egretta sacra*	Eastern Reef Egret		C	5	The Eastern Reef Egret lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs	None
Artamidae	*Artamus*	Dusky	V		3	Primarily inhabit dry, open eucalypt forests and	Moderate

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
	cyanopterus cyanopterus	Woodswallow				woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E1	-	1	Largely nocturnal, inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	Low
Diomedeidae	*Diomedea exulans*	Wandering Albatross	E1	E	2	Wandering albatross spend the majority of their time in flight, soaring over the southern oceans. Breed biennially in small, loose colonies among grass tussocks, using a large mud nest.	None
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V	-	7	Favours rocky headlands, rocky shelves, and exposed reefs with rock pools, beaches and muddy estuaries.	None
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	E1	-	8	Favours intertidal flats of inlets and bays, open beaches and sandbanks.	None
Jacanidae	*Irediparra gallinacea*	Comb-crested Jacana	V		1	Inhabit permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation.	None

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
Laridae	*Hydroprogne caspia*	Caspian Tern		C,J	5	Caspian Terns are usually found near the coast, in extensive wetlands, on coastal and interior beaches and sheltered estuaries.	None
Laridae	*Sterna hirundo*	Common Tern		C,J,K	1	The Common Tern is mainly coastal when not breeding and found in offshore waters, ocean beaches, estuaries and large lakes.	None
Laridae	*Sternula albifrons*	Little Tern	E1	C,J,K	2	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.	Low
Meliphagidae	*Epthianura albifrons*	White-fronted Chat	V		2	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs.	Low
Petroicidae	*Petroica phoenicea*	Flame Robin	V		1	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more	Low

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas.	
Procellariidae	*Ardenna grisea*	Sooty Shearwater		C,J	1	The Sooty Shearwater mostly lives over deep ocean waters, but is sometimes found in onshore areas particularly in rough weather.	None
Procellariidae	*Ardenna pacificus*	Wedge-tailed Shearwater		J	5	The wedge-tailed shearwater breeds in colonies on small tropical islands.	None
Procellariidae	*Ardenna tenuirostris*	Short-tailed Shearwater		J,K	3	The Short-tailed Shearwater is found in coastal waters.	None
Psittacidae	*Lathamus discolor*	Swift Parrot	E1	CE	1	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland	Low

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.	
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper		C,J,K	2	The Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores.	None
Scolopacidae	*Arenaria interpres*	Ruddy Turnstone		C,J,K	1	They are mainly found on exposed rocks or reefs, often with shallow pools, and on beaches.	None
Scolopacidae	*Calidris alba*	Sanderling		C,J,K	1	Sanderlings are found on open sandy beaches at the edge of the waves, on sandbars and spits. They roost on bare sand in the dunes or behind piles of kelp.	None
Scolopacidae	*Gallinago hardwickii*	Latham's Snipe		C,J,K	1	They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture.	Low
Scolopacidae	*Numenius phaeopus*	Whimbrel		C,J,K	1	Whimbrels are found mainly on the coast, on tidal and estuarine mudflats, especially near mangroves.	None
Strigidae	*Ninox connivens*	Barking Owl	V		1	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.	High – not observed onsite

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
Strigidae	*Ninox strenua*	Powerful Owl	V	-	1	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis,* Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.	High – not observed onsite
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis		C	2	The Glossy Ibis requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves and rice fields	Low
Mammalia							
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V	E	4	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	Moderate

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks.	
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V	-	1	Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Moderate
Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V		5	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Low
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Freetail-bat	V	-	1	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	High –not observed onsite
Otariidae	*Arctocephalus forsteri*	New Zealand Fur-seal	V		1	Prefers rocky parts of islands with jumbled terrain and boulders.	None
Otariidae	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V		1	Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.	None

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
Phascolarctidae	*Phascolarctos cinereus*	Koala	V	V	1	Inhabit eucalypt woodlands and forests, generally inactive in the day, feeding and moving between trees at night. SEPP 44 feed tree species: •Swamp mahogany •Forest red gum •Grey gum •Tallowwood •Ribbon or manna gum •River red gum •Broad leaved scribbly gum •Scribbly gum •White box •Bimble box or poplar box	Low
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	67	It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and orchards. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water and in vegetation with a dense canopy.	Moderate
Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V	-	1	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Moderate
Vespertilionidae	*Myotis macropus*	Southern Myotis	V	-	5	Found in coastal areas. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water	High – not observed onsite

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat/comments	Likelihood at subject site
						channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface	
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V	-	1	This species utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings and forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	High-not observed onsite
Reptilia							
Cheloniidae	*Chelonia mydas*	Green Turtle	V	V	1	Ocean-dwelling species spending most of its life at sea.	None

Source: NPWS BioNet Atlas and EPBC Protected Matters 24th July 2019.

Table 2 Threatened flora recorded within 10 km of site. BC Act Status codes: Vulnerable (V); Endangered (E1); Critically Endangered (E4A). EPBC Act status codes: Vulnerable (V); Endangered (E); Critically Endangered (CE). Refer to table 3 below for Likelihood of occurrence criteria

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat	Likelihood at subject site
Apocynaceae	*Cynanchum elegans*	White-flowered Wax Plant	E1	E	17	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. integrifolia coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub.	High-not observed onsite
Monimiaceae	*Daphnandra johnsonii*	Illawarra Socketwood	E1	E	41	Occupies the rocky hillsides and gullies of the Illawarra lowlands, occasionally extending onto the upper escarpment slopes. Associated vegetation includes rainforest and moist eucalypt forest.	High- none observed onsite

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat	Likelihood at subject site
Myrtaceae	*Gossia acmenoides*	Gossia acmenoides population in the Sydney Basin Bioregion south of the Georges River	E2		5	Found in subtropical and dry rainforest on the ranges and coastal plain of eastern Australia. Estimated less than 100 mature plants, through approximately 30 sites. Occurring often as a single individual or small group.	Moderate
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	E4A		4	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of *R. rubescens* typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m. in areas with rainfall of 1,000-1,600mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Moderate
Rutaceae	*Zieria granulata*	Illawarra Zieria	E1	E	205	The typical habitat is dry ridge tops and rocky outcrops on shallow volcanic soils, usually on Bumbo Latite. Less frequently found on the moist slopes of the Illawarra	Moderate

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat	Likelihood at subject site
						escarpment and in low-lying areas on Quaternary sediments. Associated vegetation includes Bracelet Honey-myrtle *Melaleuca armillaris* scrub, Forest Red Gum E*ucalyptus tereticornis* woodland and rainforest margins, although the species has been recorded from a number of other vegetation types. Most vegetation types are also listed as Endangered Ecological Communities.	
Solanaceae	*Solanum celatum*		E1	-	2	Grows in rainforest clearings, or in wet sclerophyll forests. Flowers August to October and produces fruit December to January.	Moderate
Thymelaeaceae	*Pimelea spicata*	Spiked Rice-flower	E1	E	5	In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites. The IIllawarra populations usually occur in one of two communities - a woodland or a coastal grassland. Woodland sites are dominated by forest red gum (*E. tereticornis*) and	Low

Family	Scientific name	Common name	BC Act Status	EPBC Act Status	Records within 10km (n)	Habitat	Likelihood at subject site
						stringybark (*E. eugenioides*), with a groundcover dominated by kangaroo grass (*Themeda australis*) and matrush (*Lomandra longifolia*). The grassland sites are dominated by kangaroo grass (*Themeda australis*) and matrush (*Lomandra longifolia*), with blady grass (*Imperata cylindrica*). A shrubby layer, where present, is dominated by coastal wattle (*Acacia sophorae*) and coast rosemary (*Westringia fruticosa*) with coast banksia (*Banksia integrifolia*).	

Source: NPWS BioNet Atlas and EPBC Protected Matters 24th July 2019.

Table 3 Likelihood of occurrence criteria

Likelihood	Criteria
Recorded	The species was observed in the study area during the current survey
High	It is highly likely that a species inhabits the study area and is dependant on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

APPENDIX D – BIODIVERSITY VALUES MAP

Figure 8: Biodiversity values map (NSW DPIE) accessed 24 July 2019

APPENDIX E – OBSERVED SPECIES LISTS

Table 1: Flora species observed during site survey

Species	Common Name
Lantana camara	Lantana
Olea europaea subsp. cuspidata	African Olive
Pittosporum multiflorum	Orange Thorn
Delairea odorata	Cape Ivy
Citriobatus pauciflorus	Orange Thorn
Solanum mauritianum	Wild Tobacco Bush
Gomphocarpus physocarpus	Balloon Cotton Bush
Geitonoplesium cymosum	Scrambling Lily
Brachychiton acerifolius	Illawarra Flame Tree
Pittosporum undulatum	Sweet Pittosporum
Streblus brunonianus	Whalebone Tree
Grevillea robusta	Silky oak
Ligustrum lucidum	Broad-leaved privett
Pteridium esculentum	Bracken fern
Nephrolepis cordifolia	Fishbone fern
Notelaea venosa	Veined mock-olive
Planchonella australis	Black apple
Alchornea ilicifolia.	Native Holly
Pellaea falcata	Sickle fern
Adiantum formosum	Giant maidenhair
Gymnostachys anceps.	Settlers Flax
Tradescantia fluminensis	Wandering Jew/Trad
Rubus fruticosus	Blackberry
Alectryon subcinereus	Native Quince
Ficus coronata	Sandpaper fig
Acacia maidenii	Maiden's wattle
Parsonsia straminea	Common silk pod
Ipomoea purpurea	Morning Glory
Senecio madagascariensis	Fireweed
Poeacea sp.	Exotic grass
Bidens pilosa	Cobbler's pegs

Table 2: Fauna Species observed during site survey

Species	**Common Name**
*Vulpes vulpes**	Fox
*Oryctolagus cuniculus**	European Rabbit
Cracticus tibicen	Australian Magpie

APPENDIX F – BIOSIS VEGETATION MAP

Figure 9: Vegetation mapping prepared by Biosis (2017)

APPENDIX G – ASSESSMENTS OF SIGNIFICANCE

Eastern Freetail-bat (*Micronomus norfolkensis*)

The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams.

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW.

Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.

Roost mainly in tree hollows but will also roost under bark or in man-made structures.

Usually solitary but also recorded roosting communally, probably insectivorous

The Eastern Freetail Bat is listed as Endangered under the BC Act

There is one BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may utilise the area for feeding or roosting. No tree hollows, flaking bark or man-made structures suitable for roosting habitat were observed on site, and no bats were observed during spotlighting. Furthermore, a large intact area of potentially suitable vegetation persists the southwest of the site adjacent to Spring Creek which could provide alternative foraging and roosting habitat for this species. It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

> *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
>
> *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

> *(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
>
> *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
>
> *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality*

The proposed works will remove a relatively small amount of potential habitat for the Eastern Freetail Bat. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site provides a relatively small, highly modified habitat in the form of exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for the species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site.

Conclusion:

Based on consideration of this Assessment of Significance the proposed development is not likely to have a significant impact on the Eastern Freetail Bat.

Barking Owl (*Ninox Connivens*)

The Barking Owl is medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It has bright yellow eyes and no facial-disc. Upperparts are brown or greyish-brown, and the white breast is vertically streaked with brown. The large talons are yellow. Males are typically larger than their mate and have a squarer crown.

The Barking Owl is found throughout continental Australia except for the central arid regions.

Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas.
Roost in shaded portions of tree canopies, including tall mid-storey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance.

Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits

The barking owl is listed as Vulnerable under the BC Act.
There is one BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may utilise the area for feeding or roosting. No tree hollows were observed on site. One owl was observed during spotlighting however a positive identification could not be made. Furthermore, a large intact area of potentially suitable vegetation persists the southwest of the site adjacent to Spring Creek which could provide alternative foraging and roosting habitat for this species It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed works will remove a relatively small amount of potential habitat for the Barking owl, particularly in the construction phase. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site provides a relatively small, highly modified habitat in the form of exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for the species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site.

Conclusion:
Based on consideration of this Assessment of Significance, the proposed development is not likely to have a significant impact on the Barking Owl.

Powerful Owl (*Ninox Strenua*)

The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length; have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches.

The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria.

The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well.

The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpia glomulifera)*, Black She-oak (*Allocasuarina littoralis)*, Blackwood (*Acacia melanoxylon)*, Rough-barked Apple (*Angophora floribunda)*, Cherry Ballart (*Exocarpus cupressiformis*) and a number of eucalypt species
.
The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.

The powerful owl is listed as Vulnerable under the BC Act.
There is one BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may utilise the area for feeding or roosting. No tree hollows were observed on site for roosting or shelter for prey species. No Greater Gliders, Common Ringtail Possums or Sugar Gliders or signs thereof were observed during the field assessment.
One owl was observed during spotlighting however a positive identification could not be made. Furthermore, a large intact area of potentially suitable vegetation persists the southwest of the site adjacent to Spring Creek which could provide alternative foraging and roosting habitat for this species It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed works will remove a relatively small amount of potential habitat for the Powerful owl, particularly in the construction phase. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site provides a relatively small, highly modified habitat in the form of exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for the species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site.

Conclusion:
Based on consideration of this Assessment of Significance the proposed development is not likely to have a significant impact on the Powerful Owl.

Southern Myotis (*Myotis Macropus)*

This species is now most often referred to as *Myotis macropus* or the Southern Myotis, but has previously been called the Large-footed Myotis (*M. adversus*). It has disproportionately large feet; more than 8 mm long, with widely-spaced toes which are distinctly hairy and with long, curved claws. It has dark-grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm.

The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.
Forage over streams and pools catching insects and small fish by raking their feet across the water surface.

The Southern Myotis is listed as Vulnerable under the BC Act.
There are five BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may utilise the area for roosting. However, no tree hollows, caves or suitable man-made structures were observed on site for roosting. No bats were observed during spotlighting. The site does not contain any water sources and as this species is heavily reliant on watercourses and pools to forage, it is highly unlikely that it would utilise the site for foraging. Furthermore, a large intact area of potentially suitable vegetation persists the southwest of the site adjacent to Spring Creek which could provide alternative foraging and roosting habitat for this species It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed works will remove a relatively small amount of potential habitat for the Southern myotis, particularly in the construction phase. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site provides a relatively small, highly modified habitat in the form of exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for the species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site.

Conclusion:
Based on consideration of this Assessment of Significance the proposed development is not likely to have a significant impact on the Southern Myotis.

Greater Broad-Nosed Bat (*Scoteanax rueppellii*)

The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle. It is dark reddish-brown to mid-brown above and slightly paler below. It is distinguished from other broad-nosed bats by its greater size. While similar to the Eastern False Pipistrelle (*Falsistrellus tasmaniensis)*, it differs by having only two (not four) upper incisors.
The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland.

Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.Although this species usually roosts in tree hollows, it has also been found in buildings.

Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.

The Greater Broad-nosed bat is listed as Vulnerable under the BC Act.
There is one BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may utilise the area for feeding or roosting. No tree hollows, caves or suitable man-made structures were observed on site for roosting. Additionally, no creek or river line is present on-site and nearby waterlines will not be affected by the proposed rezoning. The site does not contain any water sources and as this species flies along water corridors to forage, it is highly unlikely that it would utilise the site for this purpose. Furthermore, a large intact area of potentially suitable vegetation persists the southwest of the site adjacent to Spring Creek which could provide alternative foraging and roosting habitat for this species No bats were observed during spotlighting. It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed works will remove a relatively small amount of potential habitat for the greater broad-nosed bat, particularly in the construction phase. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site provides a relatively small, highly modified habitat in the form of exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for the species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site.

Conclusion:
Based on consideration of this Assessment of Significance the proposed development is not likely to have a significant impact on the Greater Broad-nosed bat.

White-Flowered Wax Plant (*Cynanchum elegans*)

A climber or twiner with a highly variable form. Mature stems have a fissured corky bark and can grow to 10 metres long and 3.5 cm thick. The leaves are paired (or rarely in threes), ovate to broadly ovate in shape, 1.5 to 10.5 cm long, and 1.5 to 7.5 cm wide. The flowers are white, tubular, and up to 4 mm long and 12 mm wide. The fruit is a dry pointed pod to 8 cm long, which contains up to 45 seeds with long silky hairs attached to one end.

Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree (*Leptospermum laevigatum*) – Coastal Banksia (*Banksia integrifolia subsp. integrifolia* coastal scrub); Forest Red Gum (*Eucalyptus tereticornis*) aligned open forest and woodland; Spotted Gum (*Corymbia maculata*) aligned open forest and woodland; and Bracelet Honeymyrtle (*Melaleuca armillaris*) scrub to open scrub.

The White-flowered wax plant is listed as Endangered under the BC Act and Endangered under the EPBC Act.
There are 17 BioNet Atlas records of this species within 10 km of the site

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

This species may occur on the edge of dry rainforest vegetation which occurs in a small area onsite. This area is in poor condition, has a history of clearing and weed invasion is high, no evidence of this species occurring was observed during site surveys. It is not considered that the proposed activity will have an adverse effect of the life cycle of the species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed works will remove a relatively small amount of potential habitat for the White flowered wax plant, particularly in the construction phase. The decrease in habitat is not going to make any area become fragmented or isolated from other areas of habitat. The area of habitat to be removed is not important for the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Not applicable – this is not an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed re-zoning will not involve clearing of native vegetation, which is listed as a key threatening process.The site is small, highly modified and dominated by exotic canopy and understory and a patch of poor quality native EEC of which are not likely to be utilised as primary habitat for this species. Permanent habitat is likely to be in the adjacent E2 zoned vegetation and the riparian vegetation adjacent to Spring Creek south of the subject site. This area appears to have been retained temporally and has less severe weed infiltration.

Conclusion:
Based on consideration of this Assessment of Significance the proposed development is not likely to have a significant impact on the White-flowered wax plant.

Illawarra Subtropical Rainforest in the Sydney Basin Bioregion

Illawarra Subtropical Rainforest (ISR) is a rainforest community that occupies high nutrient soils in the Illawarra region, south of Sydney. Characteristic tree species include *Baloghia inophylla* (Brush Bloodwood), *Brachychiton acerifolius* (Flame Tree), *Dendrocnide excelsa* (Giant Stinging Tree), *Diploglottis australis* (Native Tamarind), Ficus spp., *Pennantia cunninghamii* (Brown Beech), and *Toona ciliata* (Red Cedar). Species of Eucalyptus, Syncarpia and Acacia may also be present as emergents or incorporated into the dense canopy. While rainforest canopies are generally closed, in highly disturbed stands the canopy of ISR may be irregular and open. The height of the canopy varies considerably, and structurally some stands of ISR are scrub.

Recorded from the local government areas of Wollongong, Shellharbour, Shoalhaven and Kiama, but may occur elsewhere in the Sydney Basin Bioregion. The main occurrences of ISR are located between Albion Park and Gerringong (referred to as the Illawarra Brush in Mills & Jakeman 1995) and on the Berkeley Hills north of Lake Illawarra (referred to as the Berkeley Brush in Mills & Jakeman 1995). Outlying occurrences extend south to the Shoalhaven River and west into the Kangaroo Valley.

Remnants are small and fragmented and their long term viability is threatened. Weed invasion is a major threat and invasive exotic species include *Lantana camara, Araujia sericiflera, Ageratina riparia, Ageratina adenophora, Delairea odorata, Senna pendula*var*glabra, Senna septemtrionalis, Tradescantia fluminensis, Cinnamomum camphora, Olea europea*subsp*. africana, Hedychium gardnerianum, Ligustrum lucidum, Ligustrum sinense, Passiflora subpeltata* and *Solanum mauritianum*. Other threats include further clearing, quarrying, grazing, inappropriate fire regimes, rubbish dumping and hobby farm developments.

Occupies the Illawarra coastal plain and escarpment foothills, rarely extending onto the upper escarpment slopes. Usually found on Permian volcanic rocks, but can occur on a range of rock types.

Illawarra Subtropical Rainforest is listed as an Endangered Ecological Community (EEC) under the BC Act.

An action is considered likely to have a significant impact on an EEC if:

a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable to EECs

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

The proposed rezoning will have an effect on the EEC present onsite.

The site is predominantly cleared, however a small area of EEC has been located onsite. It is likely that this is not remnant EEC and is more likely recent regrowth as evidenced through historical imagery dating to 1964 which showed that the area which is the present location of the EEC had been historically cleared.

The EEC was found to be in poor condition. There were six of the characteristic species associated with the community identified as occurring in the vegetation patch, which is a small subset of the 29 characteristic species listed in the Scientific Determination for this community. Furthermore, the majority of individual species are of mature age and there was little evidence of juvenile recruitment indicative of a healthy and temporally stable vegetation patch.

The EEC is also isolated by severe weed infiltration causing it to be disconnected from remnant vegetation corridors such as the large area of EEC of the same type located south east of the site.

Considering the condition and size (130m^2) of the remnant vegetation and the history of extensive clearing on-site, it is unlikely that the removal of this patch will cause undue harm to threatened species in the area. Considering that a large swath of Sub-tropical dry forest persists to the south east of the site (3.22 hectares) the removal of the EEC onsite is unlikely to reduce the overall amount of good quality EEC in the area. Furthermore, the EEC patch on-site does not form part of a contingent corridor with good quality EEC or native vegetation in the area and thus the removal of the EEC onsite will not place its local occurrence at risk of extinction.

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

The area of potential habitat to be disturbed is very small in comparison to the large swath of Sub-tropical dry forest persists to the south east of the site (3.22 hectares) the removal of the EEC onsite is unlikely to reduce the overall amount of good quality EEC in the area.

A range of control and mitigation measures are proposed in Section 5 of the report to reduce the adverse effects of clearing on surrounding good quality vegetation.

The proposed works will not adversely modify the composition of the ecological community in the proximity of the site such that its local occurrence is likely to be placed at risk of extinction.

c) in relation to the habitat of a threatened species, population or ecological community:

i. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity

The entire small patch of EEC is proposed to be removed; including any characteristic species that persist. The EEC is in relatively poor condition and has a high level of weed invasion. Therefore, its removal is unlikely to have a detrimental effect on any good quality native vegetation or EEC in the area.

ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity

The subject site is mostly cleared with high levels of weed invasion. The patch of EEC identified onsite is recent regrowth of low condition presenting: few of the characteristic species, isolation by weed infiltration, high edge effects, disconnection from remnant vegetation corridors, and small area size. It is therefore unlikely that this patch of vegetation further isolate the EEC in the area as it does not form part of a continuous area of good quality vegetation. .

iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The subject site has been extensively cleared historically and the EEC identified onsite is regrowth and is in sub-optimal condition presenting: few of the characteristic species, isolation by weed infiltration, disconnection from remnant vegetation corridors, and small area size. A large swath of related EEC persists to the south east of the site (3.22 hectares) that is both continuous and has lower weed infiltration It is therefore considered that the habitat to be removed, modified, fragmented or isolated is not of critical importance to the long-term survival of the EEC in the locality.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

There are no AOBV on the site. The riparian area in the locality south of the subject site is mapped; however the works are unlikely to impact this area. Although no civil works are associated with the re-zoning, subsequent works, should the proposal be approved, will need to employ the measures outlined in Section 5 of this report, which includes an erosion and sediment control plan to prevent sediment run-off infiltrating Spring Creek.

e) Whether proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Although no civil works are associated with the re-zoning, subsequent works, should the proposal be approved, construction work has potential to increase key threatening processes related to clearing, weed and pathogen spread. However, this will be managed with mitigation measures detailed within this report to prevent impacts both on site and in the study area, particularly the riparian areas around Spring Creek and the E2 zoned EEC present to the south of the site..

The proposed works are considered minor and are not likely to increase the impact of any key threatening process on the EEC.

Conclusion

Based on consideration of this Assessment of Significance the proposed activity is not likely to have a significant impact on the Illawarra Subtropical Rainforest in the Sydney Basin Bioregion.