Appendix A

Compliance with DGRs

cumberland ecology

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
FORM OF THE SPECIES IMPACT STATEMENT	1			
A species impact statement must be in writing	1.1			Section 109 (1)
A species impact statement must be signed by the principal author of the statement and by:	1.2	(a) the applicant for the licence, or (b) if the species impact statement is prepared for the purposes of the Environmental Planning and Assessment Act 1979, the applicant for development consent or the proponent of the activity proposed to be carried out (as the case requires).	Certification	Section 109 (2)
		The applicant or proponent must sign the following declaration: " I…[insert name], of...[address], being the applicant for the development consent at [insert DA number, Lot and DP numbers, street, suburb and LGA names] have read and understood this species impact statement. I understand the implications of the recommendations made in the statement and accept that they may be placed as conditions of consent or concurrence for the proposal."		
CONTEXTUAL INFORMATION	2	The description must include information of the following forms or types:	Chapter 2	
Description of the proposal, Subject Site and study area	2.1	The following are further requirements related to your obligation under Section 110(1) to address the following:	Section 2.1	Section 110 (1)
		A species impact statement must include a full description of the action proposed, including its nature, extent, location, timing and layout.		
		A comprehensive description of the nature, extent, and timing of all components and		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		associated or consequent actions of the proposal must be provided, including actions that have effects both on and off the Subject Site as a result of the proposal. These actions described must include but are not restricted to construction, provision or ongoing use and maintenance of proposed:		
		• buildings or other structures;		
		• utilities such as for sewage, electricity, gas or water;		
		• routes for access and egress; drainage infrastructure and changes made to surface water flows;		
		• bush fire hazard reduction; and		
		• landscaping.		
Land Tenure Information	2.2	Information must be provided about the land tenure across the study area	Section 2.2	
Vegetation	2.3	Vegetation present within the locality must be mapped and described, including documentation of the aerial extent of each vegetation community. Vegetation descriptions should match (or at least refer to) those in the Vegetation Types Database (available at www.environment.nsw.gov.au/resources/nature/Biometric_Vegetation_Type_CMA.xls). Reference should also be made to "the Draft Native Vegetation of the Sydney Metro Catchment Area" mapping (DECCW 2009) and the descriptions of endangered or critically endangered ecological communities as determined by the Scientific Committee. Classification must have regard to both structural and floristic elements.	Section 2.3	

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
Plans and maps	2.4	An aerial photograph (or reproduction of such a photograph), preferably colour, of the locality must be provided, indicating scale, and clearly delineating the Subject Site.	See Section 2.4 for a list of Figures in each chapter of this SIS.	
		A map or maps must be provided, showing:		
		• In the locality:		
		▪ Land tenures and uses including parks and reserves, and areas of high human activity such as townships, regional centres and major roads.		
		▪ Any locally significant areas for threatened biodiversity, such as biodiversity corridors.		
		▪ The locations of any previously known threatened species or endangered populations.		
		▪ The locations and types of vegetation and cleared areas (with reference to the description required in section 2.3)		
		• In the study area:		
		▪ The location, size and dimensions of the study area.		
		▪ The full extent of the proposed works as described in section 2.1 at a scale of not less than 1:1000.		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		▪ Topography of the site and immediate surrounds at a scale of not less than 1:3000. ▪ The locations and types of vegetation and cleared areas (with reference to the description required in section 2.3).		
		▪ The current activities/usage of the land.		
		All maps must indicate scale and have an explanatory legend of any symbols used.		
INITIAL ASSESSMENT	3	The following are further requirements related to your obligation under Section 110(2)(a) to address the following:	Chapter 3	Section 110(2)(a)
		• A general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action.		
		and the requirements under Section 110(3)(a) to address the following:		Section 110(3)(a)
		• A general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action.		
Identifying subject threatened species, populations and ecological communities	3.1		Section 3.1	
Assessment of available	3.1.1	In determining the subject threatened species, populations and ecological communities	Section 3.1	

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
information		likely to be present (the subject species), a full list of threatened species, populations and ecological communities within a 10 km x 10 km radius of the Subject Site must first be compiled. Contact DECCW Wildlife Data Unit to obtain a full Atlas report under licence for a 10 km x 10 km area around the study site. Use of the BioBanking Credit Calculator is also recommended to supplement the list of threatened species that possibly occur on the site (see guidelines at www.environment.nsw.gov.au/threatenedspecies/surveymethods fauna.htm#4). Flora and fauna databases such as the OEH Atlas of NSW Wildlife, and those held by local government, the Australian Museum, the CSIRO, Forests NSW and the Botanic Gardens Trust Sydney must be consulted to assist in compiling the list. The SIS must include the compiled list of threatened species, populations and ecological communities likely to be present at the site or in the locality. Note that the OEH Atlas only holds records for which the OEH is the custodian and does not include records held in other databases, where the conditions of data licences or data exchange agreements prevent the OEH from distributing such information. In many cases, the OEH Atlas may only contain a small subset of the available data. Hence, other databases must also be consulted to assist in making an adequate determination of subject species.		
		A list of subject threatened species, populations and ecological communities likely to be present (the subject species) must then be developed from recent records obtained from the data sources above, as well as any other species likely to be present that may not have been recorded. In developing the list of subject species, populations and		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		ecological communities, consideration must be given to the habitat types present within the study area and the known distribution of threatened species, populations and ecological communities in the locality. The guidelines at www.environment.nsw.gov.au/threatened species/survey methodsfauna.htm#3 for habitat assessment must be followed.		
		The following ecological communities, populations and species must be considered for inclusion in the list of subject species:		
		Endangered or critically endangered ecological communities:		
		Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions*		
		Endangered populations:		
		Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill		
		Koala in the Pittwater Local Government Area		
		Blue Gum High Forest**		
		* indicates species or communities that are listed on the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.		
		This list is not exhaustive. One of the roles of a SIS is to determine which species may be utilising a development site given the limitations of existing databases.		
		The proponent should be aware that additional species, populations and ecological		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		communities could be added to the schedules of the TSC Act between the issue of these requirements and the granting of consent. If this occurs, these additional matters will need to be addressed in the SIS and considered by the consent, determining, or concurrence authority.		
SURVEY	4		Chapter 4	
Requirement to survey	4.1	A fauna and flora survey is to be conducted in the study area. Targeted surveys must be conducted for all subject threatened species, populations, and ecological communities determined in accordance with section 3 and for species, populations and ecological communities identified in section 4.3.	Section 4.1	
		The techniques and timing of these surveys should be commensurate with the biology/ecology of these species and ecological communities in order to maximise the likelihood and accuracy of detection. Survey requirements for certain species are identified in section 4.3. Guidance on appropriate methodologies and level and timing of survey efforts for some other species can be obtained from environmental impact assessment guidelines (see section 9.4), draft or approved recovery plans, scientific or environmental management journals, biodiversity surveys and other sources. The information required to identify the type of impacts and assess their significance on threatened species is the key determinant for the level of survey effort required. Appropriate justification for reducing otherwise recommended levels of survey effort is required to show that impacts are not likely to be significant. Previous surveys and assessments may contribute to addressing this requirement if they have been		

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Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		conducted and documented in accordance with the following provisions.		
		Species of taxonomic uncertainty must have their identification confirmed by a recognised authority such as the Australian Museum or National Herbarium at the Royal Botanic Gardens, Sydney.		
Documentation	4.2		Section 4.2	
Description of survey techniques and survey locations	4.2.1	Survey technique(s) must be described and, where possible, a reference supporting the survey technique employed is to be provided.	Section 4.2.1 - Section 4.2.4	
		The size, orientation and dimensions of quadrats or lengths of transects should be clearly documented for each type of survey technique undertaken. Full AMG grid references for the survey site(s) should be noted. Survey site(s) should be shown on a map or maps, which indicate scale and have an explanatory legend of any information showing symbols used.		
Documenting survey effort and results	4.2.2	Name(s) and contact phone number(s) of surveyor(s) and other personnel must be recorded. Other persons who identified records (e.g., by analysis of Anabat recordings, hair tubes, scats) should also be named.	Section 4.3	
		The date and time and environmental conditions experienced during each survey must be documented.		
		The time invested each time a survey technique is applied must be summarised in the SIS, based on completed proformas. e.g. - number of person hours/transect, duration of call playback, number of nights traps set. It is not sufficient to aggregate all time		

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Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		spent on all survey techniques. Effort must be expressed each time a survey technique is applied.		
		Any limitations (e.g. denied access to private land) to sampling across the study area are to be documented.		
		The locations of any newly recorded threatened species or endangered populations resulting from additional surveys must be mapped and described. The mapping of vegetation required under section 2.3 must reflect any new information resulting from additional surveys.		
Description and mapping of results of vegetation, flora and fauna surveys	4.2.3	In addition to any surveys carried out to assess the subject species, the following targeted surveys must be undertaken: Blue Gum High Forest – Areas of native vegetation on site should be accurately mapped. These areas should include any areas with the potential to regenerate, either naturally or with assistance, to native vegetation. Regeneration potential should be based on presence of native species and knowledge of site history. These areas of native vegetation should be stratified, if required, taking into account any 400m2 quadrats. Quadrats should be placed as randomly as possible, given site constraints. Data to be collected within the quadrat is to include all vascular plant specie3s and their cover abundance score (using a Braun-Blanquet scale, modified if required). The height range and projected foliage cover of each of the structural strata present should also be collected, as well as a total flora species list (native and exotic) for the site. Any areas of exotic vegetation should also be mapped and data on any native species	Section 4.4	

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Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		present (and their percent cover) should be collected. The ecological community on site should be described (including information on dominant species in each strata) and compared to the description of ecological communities in the 'Native Vegetation of the Sydney Metropolitan Area' report (OEH 2013) and the descriptions of the N SW Scientific Committee, in accordance with section 5.1 of these requirements.		
Specific survey requirements	4.3	Assessment of impacts must consider the nature, extent and timing of the proposal and all associated actions, including but not restricted to construction, provision and ongoing maintenance of approved or proposed:	Section 4.4	
ASSESSMENT OF LIKELY IMPACTS ON THREATENED SPECIES AND POPULATIONS	5	• buildings or other structures;	Chapter 5	
		• utilities such as for sewage, electricity, gas or water;		
		• routes for access and egress;		
		• dams and associated infrastructure;		
		• pipelines;		
		• drainage infrastructure and changes made to surface water flows;		
		• bush fire hazard reduction; and		
		• landscaping.		
		Assessment must include the direct and indirect impacts of these activities which may occur both on or off the Subject Site.		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		The following are further requirements related to your obligation under Section 110(2)(b) to address the following:		
Assessment of species likely to be affected	5.1	an assessment of which threatened species or population known or likely to be present in the area are likely to be affected by the action.	Section 5.2	Section 110 (2)(b)
		This requires you to refine the list of subject threatened species and populations (given the outcome of survey and analysis of likely impacts) in order to identify which threatened species or endangered populations may be affected directly or indirectly (including cumulatively), by the proposal. This is to be done taking account of the requirements outlined previously in section 4 of these requirements and information in any relevant Scientific Committee determinations, DECCW threatened species profiles, recovery plans and draft recovery plans, and vegetation assessment and mapping (including the 'Draft Native Vegetation of the Sydney Metropolitan Catchment Management Area' mapping DECCW 2009). Detailed rationale should be provided to demonstrate how the list was derived. If adequate surveys/studies have been undertaken to categorically demonstrate the species does not occur in the study area, or if not resident, will not utilise habitats on site on occasion, or if offsite, be influenced by offsite impacts of the activity, that species does not have to be considered further. Otherwise all species/populations likely to occur in the study area (based on general species distribution information), and known to utilise those habitat types, should be assessed as if present.		
		The requirements in the remainder of this section need only be addressed for those		

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Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		species that are likely to be affected by the proposal. Subsequently this information should be used in an Assessment of Significance (as required in section 8) for each of those species or populations.		
		The following are further requirements related to your obligation under section 110(2)(d) to address the following:		
Discussion of local and regional abundance and distribution	5.2	an estimate for the local and regional abundance of those species or populations	Section 5.3	Section 110 (2)(d)
		A discussion of other known populations in the locality must be provided. An estimate of the numbers of individuals of each threatened species or population utilising the area and the relative significance of the population(s) in the study are to the populations in the locality must be included.		
Discussion of other known local populations	5.2.1		Section 5.3	
		The following are further requirements related to your obligation under Section 110(2)(f) to address the following:		
Assessment of habitat	5.3	a full description of the type, location, size and condition of the habitat (including critical habitat) of those species and populations and details of the distribution and condition of similar habitats in the region .	Section 5.3	Section 110 (2)(f)
		Specific habitat features must be described (e.g. frequency and location of stags, hollow bearing trees, culverts, rock shelters, rock outcrops, crevices, caves, drainage		

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Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		lines, soaks etc.) and the density of understorey vegetation and groundcover.		
Description of habitat values	5.3.1	The condition of the habitat within the study area must be discussed, including the prevalence of introduced species, species of weeds present and an estimate of the total weed cover as a percentage of each vegetation community, whether trampling or grazing is apparent, effects of erosion, prevalence of rubbish dumping, history of resource extraction or logging and proximity to roads.	Section 5.3	
		Details of the Subject Site's history (e.g. frequency, time since last fire, intensity) and the source of the fires history (e.g. observation, local records), must be provided.		
		A discussion of how individuals use the area (e.g. residents, transients, adults, juveniles, nesting, foraging) and discussion of the significance of the habitat of the study area to the viability of the threatened species or endangered population in the locality must be included.		
Discussion of habitat utilisation	5.3.2		Section 5.3	
		The following are further requirements related to your obligation under Section 110(2)(c) to address the following:		
Discussion of conservation status	5.4	for each species or population likely to be affected, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it	Section 5.3	Section 110 (2)(c)
		and to your obligation under Section 110(2)(e) to address the following:		
		an assessment of whether those species or populations are adequately represented in		Section 110

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Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		conservation reserves (or other similar protected areas) in the region		(2)(e)
		and to your obligation under Section 110(2)(e1) to address the following:		
		an assessment of whether any of those species or populations is at the limit of its known distribution		Section 110 (2)(e1)
		The relative significance of the Subject Site for threatened species or endangered populations in the locality must be discussed. In particular, discussion of other known populations must be provided. Such an assessment must consider and compare the differences in the type, condition, and tenure and long-term security of other areas of known habitats in the locality with those in the study area.		
		Known occurrences in the locality and region of the extinction or degradation of local populations of each affected threatened species or population and of fragmentation, decrease in extent or degradation of its habitat should be documented.		
		The following are further requirements related to your obligation under Section 110(2)(g) to address the following:		
Discussion of the likely affect of the proposal at local and regional scales	5.5	a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region	Section 5.3	Section 110 (2)(g)
		Provision of information to allow adequate determination of the significance of the effects of the proposal in accordance with Section 5A of the EP&A Act is required. The significance of impacts in the study area for conservation of affected threatened species or endangered populations in the locality must be discussed. An assessment		

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Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		of the significance of such impacts must compare and take into account the differences in the type, condition, and the tenure and long-term security, of other areas of known habitats in the locality with those in the study area.		
Significance within a local context	5.5.1		Section 5.3	
		The potential of the proposal to increase fragmentation of the habitat or decrease the ability for movement of individuals and/or gene flow between habitats or populations of a threatened species or population must be appraised.		
Discussion of connectivity	5.5.2		Section 5.3	
		Assessment of effects must not be limited only to threats that are recognised as key threatening processes, but must include other threatening processes that are generally accepted by the scientific community as affecting the species or populations and are likely to be caused or exacerbated by the proposal. Assessment should also include consideration of information in the Priorities Action Statement and any approved of draft recovery plans or threat abatement plans which may be relevant to the proposal.		
Consideration of threatening processes	5.5.3		Section 5.3	
		The following are requirements related to your obligation under section 110(2)(h) to address the following:		
Description of feasible alternatives	5.6	a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed,	Section 5.4	Section 110 (2)(h)

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		having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development.		
		Where a Statement of Environmental Effects, Environmental Impact Statement or Review of Environmental Factors deals with these matters, the SIS may refer to the relevant section of the SEE, EIS or REF as long as the document referred to is provided with the SIS.		
		The SIS must include details of the condition and use of other parts of the subject area and why these can or cannot be considered as feasible alternatives.		
		Assessment of impacts must consider the nature, extent and timing of the proposal and all associated actions, including but not restricted to construction, provision and ongoing maintenance of approved or proposed:		
ASSESSMENT OF LIKELY IMPACTS ON ENDANGERED ECOLOGICAL COMMUNITIES	6	• buildings or other structures;	Chapter 6	
		• utilities such as sewerage, electricity, gas or water;		
		• routes for access and egress;		
		• dams and associated infrastructure;		
		• pipelines;		
		• drainage infrastructure and changes made to surface water flows;		
		• bush fire hazard reduction; and		

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Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		• landscaping		
		Assessment must include the direct and indirect impacts of these activities which may occur both on or off the Subject Site.		
		To assess the impacts from the provision of bushfire protection (e.g. if there will be a requirement to provide fuel free and/or fuel reduced zones in retained bushland), proponents should consider recommendations in 'Planning for Bushfire Protection' (NSW Rural Fire Service 2006) and consider the use of situating required access roads around the roads as an option to meet those requirements but reduce impacts on retained bushland.		
		The impacts to endangered ecological communities from the proposed residential sub-division are likely to arise from:		
		§ fragmentation and isolation of habitat and an incremental decline in its quality and extent;		
		§ loss of locally significant vegetation;		
		§ loss of foraging habitat for threatened fauna and a reduction in their local abundance and distribution; changes in the hydrological regime resulting from altered surface flows and groundwater levels; deterioration in water quality; increased susceptibility, on site and on adjacent and downstream areas, to		

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		competition, disease, predation, insect attack and other disturbances due to increased access and a reduction in vegetative cover;;		
		§ indirect effects of urbanisation e.g. tree removal, rubbish dumping, soil compaction, erosion, weed invasion as well as altered drainage patterns and nutrient levels resulting from increased runoff; and Clearing modification and long term degradation of habitat associated with the provision of asset protection zones.		
		The following are further requirements related to your obligation under Section 110(3)(a) to address the following:		
Assessment of endangered ecological communities likely to be affected	6.1	a general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action.	Section 6.1	Section 110 (3)(a)
		This requires you to refine the list of subject ecological communities (given the outcome of survey and analysis of likely impacts) in order to identify which endangered or critically endangered ecological communities (C) EECs may be affected, directly or indirectly (including cumulatively), by the proposal. This must include reference to the (C) ECCs as described by the NSW Scientific Committee, and to the requirements outlined previously in section 4 of these requirements, and take into account information in any relevant recovery plans and draft recovery plans and vegetation assessment and mapping. Adequate rationale should be provided to demonstrate how the list was derived. If adequate surveys/studies have been undertaken to categorically		

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		demonstrate the EEC does not occur in the study area, or will not utilise habitats on site, or if off-site, be influenced by off-site impacts of the activity, that EEC does not have to be considered further. Otherwise all (C)EECs likely to occur in the study area (based on general distribution information), and known to occupy those habitat types, should be assessed as if present.		
		The requirements in the remainder of this section need only be addressed for those (C)EECs that are likely to be affected by the proposal. Subsequently this information should be utilised in an Assessment of Significance (as required in section 8) for each of those (C)EECs.		
		The following are further requirements related to your obligation under section 110(3)(c) to address the following:		
Description of habitat	6.2	a full description of the types, location, size and condition of the habitat of the ecological community and details of the distribution and condition of similar habitats in the region.	Section 6.2	Section 110 (3)(c)
		An assessment of the habitat of the study area is required and must include:		
Study area	6.2.1	• a description of each (C)EEC, including:	Section 6.2	
		→ a description of those areas where the community may only be represented by soil stored seed with no or few above-ground components, and		
		→ description of disturbance history and recovery capacity. If the site shows signs of disturbance, details should be provided of the site's disturbance history. An assessment should be made of the ability of the (C)EECs to recover to a state		

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		representative of its pre-disturbance condition. This assessment will include consideration of the site's in-situ and migratory resilience and will be accompanied by a map of the recovery capacity of the (C)EECs across the site. Consideration should be given to the results (preliminary or otherwise) of restoration projects being undertaken at other sites that contain the (C)EECs when assessing its recovery capacity.		
		• comparison of the affected community with the ©EECs as determined by the NSW Scientific Committee.		
		• reference to any relevant available recovery plans and draft recovery plans and vegetation assessment and mapping.		
		• maps, consistent with the descriptions provided, showing the extent and condition of the community.		
		A discussion of other occurrences of each (C)EECs populations in the locality must be provided. This must include:		
Locality	6.2.2	• a comparison of other known occurrences and their habitats with those of the study area in terms of remnant sizes, connectivity, species diversity and abundances, quality and condition (including levels of disturbances, weed diversity and abundances).	Section 6.2	
		• the tenure and long-term security of other occurrences and its habitat.		
		• The relative significance of the Subject Site of each (C)EEC in the locality and region.		
		The following are further requirements related to your obligation under Section 110(3)(b) to address the following:		

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Discussion of conservation status	6.3	for each ecological community present, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or any threat abatement plan applying to it.	Section 6.2	Section 110 (3)(b)
		The following are further requirements related to your obligation under Section 110(3)(b1) to address the following:		
		an assessment of whether those ecological communities are adequately represented in conservation reserves (or other similar protected areas) in the region.		Section 110 (3)(b1)
		The following are further requirements related to your obligation under Section 110(3)(b2) to address the following:		
		an assessment of whether any of those ecological communities is at the limit of its known distribution.		Section 110 (3)(b2)
		The relative significance of the Subject Site for each threatened ecological community in the locality must be discussed. In particular, discussion of other known occurrences of each affected threatened ecological community must be provided. Such an assessment must consider and compare the differences in remnant sizes, connectivity, species diversity and abundances, quality and condition (including levels of disturbances, weed diversity and abundances), tenure and long-term security of other known occurrences and habitats in the locality with those in the study area.		
		Known occurrences in the locality and region of fragmentation, decrease in extent or degradation of each ecological community or its habitat should be documented.		

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		The following are further requirements related to your obligation under Section 110(3)(g) to address the following:		
Discussion of the likely effect of the proposal at local and regional scales	6.4	a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region.	Section 6.2	Section 110 (2)(g)
		Provision of information to allow adequate determination of the significance of the effects of the proposal in accordance with Section 5A of the EP&A Act (see section 8 of these requirements below) is required. The significance of impacts in the study area for conservation of affected (C)EECs in the locality must be discussed. An assessment of the significance of such impacts must compare and take into account the differences in remnant sizes, connectivity, species diversity and abundances, quality and condition (including levels of disturbances, weed diversity and abundances), tenure and long-term security of other known occurrences and habitats in the locality with those in the study area.		
Significance within a local context	6.4.1		Section 6.2	
		The location, nature and extent of habitat removal or modification which may result from the proposed action including the cumulative loss of habitat from the study area (including all proposed DAs and those areas in the subject area already with development consent or identified for development) and the impacts of this on the viability of the (C)EEC in the locality.		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
Extent of habitat removal or modification	6.4.2	This must include an assessment of the proportion of the (C)EEC to be affected by the proposal, in relation to the total extent of the (C)EEC, and the impact of this on the viability of the endangered ecological community at the local level.	Section 6.2	
		The potential of the proposal to increase fragmentation of each (C)EEC, its relation to adjoining vegetation and to exacerbate edge effects or to decrease the ability for movement of individuals and/or gene flow between habitats must be discussed.		
Discussion of connectivity	6.4.3	If connectivity between adjacent remnants of endangered ecological communities is likely to be affected, the impact of the proposal on connectivity must also be discussed.	Section 6.2	
		Assessment of effects must not be limited to threats that are recognised as key threatening processes, but must include threatening processes that are generally accepted by the scientific community as affecting the species or population and are likely to be caused or exacerbated by the proposal. Assessment should also include consideration of information in the Priorities Action Statement and any approved or draft recovery plans or threat abatement plans which may be relevant to the proposal.		
Consideration of threatening processes	6.4.4		Section 6.2	
		The following are further requirements to your obligation under section 110(3)(e) to address the following:		
Description of feasible alternatives	6.5	a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed	Section 6.3	Section 110 (3)(e)

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development.		
		Where a Statement of Environmental Effects, Environmental Impact Statement or Review of Environmental Factors deals with these matters, the SIS may refer to the relevant section of the SEE, EIS or REF.		
		The SIS must include details of the condition and use of other parts of the subject area and why these can or cannot be considered as feasible alternatives.		
AMELIORATIVE MEASURES	7		Chapter 7	
		The following are further requirements related to your obligation under Sections 110(2)(i) and 110(3)(f) to address the following:		
Description of ameliorative measures	7.1	a full description and justification of the measures proposed to mitigate any adverse effect of the action on the species and populations [s.110(2)(i)] [or] ecological community [s.110(3)(f)] including a compilation (in a single section of the statement) of those measures.	Section 7.1	Section 110 (2)(i) and Section (110 (3)(f)
		Ameliorative or compensatory measures proposed to reduce or offset the level of impact should only be considered where it can be shown that they have been successfully applied elsewhere. The likely efficacy of such measures with respect to. the current proposal should be assessed in detail.		
		Consideration must be given to developing long term management strategies to protect areas within the study area which are of particular importance for the threatened		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		species or endangered populations likely to be affected. This may include proposals to restore or improve habitat on site where possible.		
Long term management strategies	7.1.1		Section 7.1.1	
		Where significant modification of the proposal to minimise impacts on threatened species or endangered communities is not possible. then compensatory strategies should be considered. These may include other offsite or local area proposals that contribute to long term conservation of the threatened species, population or endangered ecological community.		
Compensatory strategies	7.1.2	Any proposed offsetting measures should be developed in accordance with the "Principles for the Use of Biodiversity Offsets in NSW" (www.environment.nsw.gov.au/biocertification/offsets.html). The BioBanking Assessment Methodology (www.environment.nsw.gov.au/biobanking/assessmethodology.htm) could also be used to assess the adequacy of any proposed offsetting measures.	Section 7.1.2	
		Where such proposals involve other lands, or where the involvement of community groups is envisaged in such proposals, such groups are to be consulted arid proposals should contain evidence of support from these stakeholders and relevant land managers.		
		Compensatory benefits likely to result from such measures proposed for alternative sites are to be discussed and evaluated along with a discussion of mechanisms of how		

Table A.1 Director General Requirements - Compliance Table

Matters to be addressed	Section within DGRs	Detail	Location within the SIS	TSC Act Section 109/110
		they might best occur. If offsets are proposed, the means by which the offset will be secured will be determined prior to concurrence being granted. Similarly, a vegetation management plan for the offset area shall be developed prior to concurrence. The vegetation management plan shall detail: The methods to be used in the rehabilitation project The monitory and reporting program to be undertaken for the project The commitment (including financial) to long term management of the offset area The financial tool (e.g. bank guarantee) to be used to secure the funding for the offsetting proposal The methods for ongoing monitoring of the effectiveness of the offset.		
		Any proposed pre-construction monitoring plans or on-going monitoring of the effectiveness of the mitigation measures must be outlined in detail, including the objectives of the monitoring program, method of monitoring, reporting framework, duration and frequency. Generally, ameliorative strategies which have not been proved effective should be undertaken under experimental design conditions and appropriately monitored.		
		The OEH does not consider that translocation of threatened species, populations and ecological communities is an appropriate ameliorative strategy for the purposes of considering impacts of a particular development/activity. The OEH strongly supports the view that development proposals which may impact on a significant local		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		population of threatened species, populations or ecological communities as determined by the SIS should aim to:		
Translocation	7.1.3	i. minimise the impacts by considered all possible alternatives to the development, such that a significant impact is not likely; and	Section 7.1.3	
		ii. manage the remaining habitat (if any) to ensure that the local populations continues to exist in the long term.		
		The translocation of threatened species, populations and ecological communities is only supported by the DECC in specific conservation programs (e.g. recovery planning) but only as a last resort, and only when in-situ conservation options have been exhausted. Such programs should only be reconsidered following extensive investigation of a demonstrated long term financial commitment on behalf of the applicant.		
		Based on the detailed SIS assessment and consideration of alternatives and/or ameliorative measures proposed in the SIS, a re-assessment of the significance of impact (section 5A EP&A Act) is to be carried out for each of the entities (threatened species, population or ecological community) identified in this SIS as being likely to be affected. This assessment must be carried out in accordance with the Threatened species assessment guidelines (DECCW 2007) (www.environment.nsw.gov.au/threatenedspecies/tsaguide.htm) and must incorporate the relevant information from sections 5.1 to 7 of these SIS requirements. For each entity an overall conclusion must be drawn as to whether the proposal is still		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		considered likely to have a significant effect.		
ASSESSMENT OF SIGNIFICANCE OF LIKELY EFFECT OF PROPOSED ACTION	8		Chapter 8	
ADDITIONAL INFORMATION	9		Chapter 9	
		The following is your obligation under Sections 110(4) to address the following:		
Qualifications and experience	9.1	a species impact statement must include details of the qualifications and experience in threatened species conservation of the person preparing the statement and of any other person who has conducted research or investigations relied on in preparing the statement.	Section 9.1	Section 110 (4)
		The following are further requirements related to your obligation under Sections 110(2)(j) and 110(3)(g)) to address the following:		
Other approvals required for the development or activity	9.2	a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the species or population or ecological community.	Section 9.2	Section 110 (2)(j) and Section 110 (2)(g)
		Other approvals under NSW law		
		In providing a list of other approvals the following must be included:		
		• Where a consent is required under Part 4 of the Environmental Planning and		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		Assessment Act 1979, the name of the consent authority and the timing of the development application should be included; or		
		• Where an approval(s) is required under Part 5 of the Environmental Planning and Assessment Act 1979, the name of the determining authority(ies), the basis for the approval and when these approvals are proposed to be obtained should be included.		
		Approval under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)		
		An action will require referral to, and may require the approval of, the Federal Minister for the Environment and Water Resources (in addition to any local or state government consent or approval) if that action will have, or is likely to have, a significant impact on the environment or on a matter of national environmental significance. Threatened species and communities listed in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) are considered to be matters of national environmental significance, as are migratory species and a number of other matters. Information regarding matters of national environmental significance may be obtained from www.environment.gov.au/epbc/matters/index.html, on the website of DEWHA or by contacting DEWHA on 1800 803 772. Further information regarding the operation of the EPBC Act in NSW can be found on the NSW Dept of Planning's website at EPBC Act Guide to Implementation in NSW (available at http://www.planning.nsw.gov.au/assessingdev/environmentalassessment.asp) and on the DEW website at www.environment.gov.au/epbc/about/index.html.		

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		Persons conducting flora and fauna surveys must have appropriate licences or approvals under relevant legislation. The relevant legislation and associated licences and approvals that may be required are listed below:		
Licensing matters relating to conducting surveys	9.3	National Parks and Wildlife Act 1974:	Section 9.3	
		• General Licence (Section 120) to harm or obtain protected fauna (this may include . threatened fauna).		
		• Licence to pick protected native plants (Section 131).		
		• Scientific Licence (Section 132C) to authorise the carrying out of actions for scientific, educational or conservation purposes.		
		Threatened Species Conservation Act 1995:		
		• Licence to harm threatened animal species, and/or pick threatened plants and/or damage the habitat of a threatened species (Section 91).		
		Animal Research Act 1985:		
		• Animal Research Authority to undertake fauna surveys.		
		Section 110(5) of the Threatened Species Conservation Act 1995 has the effect of requiring OEH to provide that information regarding the State-wide conservation status of the subject species as it has available, in order to satisfy ss.110(2) & (3) of the Act. To this end, a number of publications have been produced:		
Section 110(5) reports	9.4	i. OEH has produced a set of profiles for a number of threatened species, populations	Section 9.4	

Table A.1 Director General Requirements - Compliance Table				
Matters to be addressed	**Section within DGRs**	**Detail**	**Location within the SIS**	**TSC Act Section 109/110**
		and ecological communities and are available on OEH website (www.threatenedspecies.environment.nsw.gov.au). Some of these may be relevant to the subject species for this development.		
		ii. The Metropolitan Branch Biodiversity Conservation Section has produced a number of profiles and environmental impact assessment guidelines for species, populations and ecological communities. These are also on the DECCW Threatened Species website.		
		Proponents and consultants should note that OEH has no further published information available to satisfy s.110(5) of the Act and that purchase or receipt and use of the above profiles can be taken to have satisfied the requirements of ss.110(2) & (3) in relation to the State-wide conservation status of the listed species, populations and ecological communities.		

Appendix B

Flora Species List

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Trees														
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak		x									adj	adj
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	x											
Euphorbiaceae	*Glochidion ferdinandi var ferdinandi*	Cheese Tree	x	x	x	x	x	x	x	x	10	2	10	3
Fabaceae	**Erythrina sykesii*	Coral Tree							x	x			20	2
Lauraceae	*Endiandra sieberi*	Corkwood				x	x							
Meliaceae	*Synoum glandulosum*	Scentless Rosewood	x		x	x	x							
Moraceae	*Ficus rubiginosa*	Rusty Fig								x			adj	adj
Myrtaceae	*Acmena smithii*	Lilly Pilly			x	x	x	x	x	x	40	10	adj	adj
	Eucalyptus botryoides	Bangalay					x						5	1
	Syncarpia glomulifera	Turpentine							x					
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	x	x	x	x	x	x	x	x	10	3		
Proteaceae	*Banksia integrifolia*	Coast Banksia	x	x		x		x			5	1		
Arecaceae	*Livistona australis*	Cabbage Palm	x			x	x		x	x	5	2	10	2
Sub-canopy														

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Eupomatiaceae	*Eupomatia laurina*	Bolwarra									20	20	2	1
Fabaceae	**Erythrina sykesii*	Coral Tree											15	2
Meliaceae	*Synoum glandulosum*	Scentless Rosewood									10	3	15	4
Moraceae	*Ficus coronata*	Sandpaper Fig											2	1
Myrtaceae	*Acmena smithii*	Lilly Pilly									30	10	5	2
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum									10	5	10	2
Shrubs														
Cyatheaceae	*Cyathea australis*	Rough Tree Fern			x	x		x		x			20	3
	**Cyathea cooperi*	Straw Tree Fern		x					x					
Zamiaceae	*Macrozamia communis*	Burrawang	x	x	x	x	x	x						
Cunoniaceae	**Ceratopetalum gummiferum*	Christmas Bush							x					
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash									<1	1		
Epacridaceae	*Leucopogon juniperinus*	Prickly Beard-heath		x										
Eupomatiaceae	*Eupomatia laurina*	Bolwarra			x	x	x	x		x	20	20	5	10
Euphorbiaceae	*Breynia oblongifolia*	Dwarfs Apples	x			x	x	x			1	3		
	Claoxylon australe	Brittlewood	x										1	1

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
	Glochidion ferdinandi										1	5	2	1
	Homalanthus populifolius	Bleeding Heart											1	2
	Homalanthus nutans	Bleeding Heart	x		x	x	x	x						
Fabaceae	**Acacia baileyana*	Cootamundra Wattle							x					
	**Senna pendula var glabrata*	Cassia	x		x	x	x		x	x				
Lauraceae	**Cinnamomum camphora*	Camphor Laurel				x								
Malaceae	**Eriobotrya japonica*	Loquat			x									
Meliaceae	*Synoum glandulosum*	Scentless Rosewood		x				x		x	5	15		
Monimiaceae	*Wilkiea huegeliana*	Veiny Wilkiea			x	x					1	3	3	2
Myrsinaceae	*Myrsine (was Rapanea) variabilis*	Variable Muttonwood	x										1	2
Myrtaceae	*Acmena smithii*	Lilly Pilly	x								5	10	1	2
	**Eucalyptus sp*								x					
Nandinaceae	**Nandina domestica*	Japanese Sacred Bamboo											<1	1
Ochnaceae	**Ochna serrulata*	Mickey Mouse Plant	x		x	x	x	x			<1	1	<1	2

Table B.1 Flora Species List

			Littoral Rainforest - west		Native and Exotic - west	Littoral Rainforest - north					Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1		RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Oleaceae	**Ligustrum lucidum*	Large-leaved Privet				x		x						1	2
	**L. sinense*	Small-leaved Privet	x			x	x	x	x	x	x	<1	1	1	3
	Notelaea longifolia	Large Mock Olive	x					x	x		x	3	10		
	**Olea africana ssp cuspidata*	African Olive			x	x		x							
Pittosporaceae	*Pittosporum revolutum*	Yellow Pittosporum				x		x				1	5		
	Pittosporum undulatum	Sweet Pittosporum												5	3
Rutaceae	**Citrus limon*		x							x					
	**Murraya paniculata*	Orange Jessamine								x					
Solanaceae	**Cestrum parqui*	Green Cestrum												2	5
	**Physalis peruviana*	Cape Gooseberry								x					
Sterculiaceae	**Brachychiton acerifolius*	Flame Tree				x	x	x							
Theaceae	**Camelia japonica*	Camelia								x					
Verbenaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum					x					<1	1	adj	adj
	**Lantana camara*	Lantana	x		x		x	x		x	x	1	2	5	3
Arecaceae	**Howea fosteriana*	Lord Howe Island Palm									x				
	Livistona australis	Cabbage Palm	x		x	x	x	x	x		x	10	10	20	8

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
	**Phoenix sp*	Vietnamese Date Palm							x					
Herbs - Ferns														
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair Fern	x	x		x	x	x					1	5
	A. hispidulum	Rough Maidenhair					x	x			<1	10	1	5
Aspleniaceae	*Asplenium australasicum*	Birds Nest Fern			x				x		<1	1		
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern				x					35	200	3	10
	Doodia aspera	Rasp Fern			x	x	x	x	x	x	10	500	20	1000
Davalliaceae	*Davallia pyxidata*	Hares Foot Fern		x										
	**Nephrolepis cordifolia*	Fishbone Fern	x						x	x				
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern	x											
Dicksoniaceae	*Calochlaena dubia*	False Bracken Fern		x	x	x	x	x	x		8	20		
Herbs - Dicots														
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	x		x	x	x	x			1	50		
Apiaceae	*Centella asiatica*	Indian Pennywort									<1	20	1	50
Apiaceae	*Hydrocotyle peduncularis*								x					

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Asteraceae	**Ageratina adenophora*	Crofton Weed							x					
	**Bidens pilosa*	Farmers Friends							x	x				
	**Conyza albida*	Tall Fleabane							x					
	**Conyza sumatrensis*	Tall Fleabane											<1	1
	Cotula australis								x					
	**Crassocephalum crepidioides*	Thickhead							x					
	**Gnaphalium sp*	Cudweed							x					
	**Sonchus oleraceus*	Sow Thistle							x					
Balsamaceae	**Impatiens sp*				adj									
Brassicaceae	**Brassica fruticulosa*								x					
	**Cardamine flexuosa*	Wood Bittercress							x					
Cactaceae	**Cactus spp*								x					
Caryophyllaceae	**Stellaria media*	Chickweed							x					
Crassulaceae	**Crassula sp cv*								x					
Fumariaceae	**Fumaria sp*									x				
Geraniaceae	*Geranium homeanum*	Trailing Storksbill												

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Malvaceae	**Sida rhombifolia*	Paddys Lucerne							x					
Ochnaceae	**Ochna serrulata*	Mickey Mouse Plant									<1	20		
Oxalidaceae	*Oxalis sp*		x						x	x				
Polygonaceae	**Acetosa sagitatta*	Turkey Rhubarb							x					
	Rumex brownii								x					
Ranunculaceae	**Ranunculus repens*								x					
Solanaceae	**Solanum chenopodioides*					x							<1	1
	**S. nigrum*	Blackberry Nightshade					x		x		<1	1		
Tropaeolaceae	**Tropaeolum majus*	Nasturtium							x					
Violaceae	*Viola hederacea*	Native Violet			x	x	x						1	50
Herbs - Monocots														
Amaryllidaceae	**Agapanthus sp*	Agapanthus							x	x				
Araceae	*Gymnostachys anceps*	Settlers Flax				x	x			x				
	**Typhonium sp*	Arum Lily							x					
Asparagaceae	**Asparagus aethiopicus*	Ground Asparagus									2	10	2	20
Asparagaceae	**Asparagus densiflorus*	Fern Asparagus	x	x	x	x	x	x	x	x				

Table B.1 Flora Species List

			Littoral Rainforest - west		Native and Exotic - west	Littoral Rainforest - north					Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1		RM2	RM3	RM4	RM5	RM6		RM7	RM8	C	A	C	A
Commelinaceae	*Commelina cyanea*	Native Wandering Jew													1	20
	**Tradescantia fluminensis*	Wandering Jew	x			x	x				x	x			35	1000
Cyperaceae	*Carex sp*								x		x					
	Gahnia ?melanostachys	Black Saw Sedge	x		x											
	Lepidosperma elatius	Tall Sword-sedge				x	x		x				5	20	1	2
	L. laterale	Broad Sword-sedge	x													
Iridaceae	**Iris sp cv*										x					
	**Watsonia sp*		x								x					
Liliaceae	**Aspidistra elatior*	Aspidistra										x				
Lomandraceae		Spiny-headed Mat-rush			x	x	x	x	x							
	L. multiflora	Many-flowered Mat-rush	x													
Alliaceae	**Nothoscordum borbonicum*	Onion Weed														
Orchidaceae	**Dendrobium kingianum*	Pink Rock Orchid			x											
	**D. speciosum*	Rock Orchid			x											
Phormiaceae	*Dianella caerulea var producta*	Rough Flax Lily	x		x		x						<1	3	<1	1
Poaceae	**Ehrharta erecta*	Veldt Grass			x		x				x	x			<1	10

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
	Entolasia marginata	Margined Panic	x								<1	5		
	E. stricta	Wiry Panic	x	x	x									
	Oplismenus imbecillis		x		x	x					<1	20	5	500
	Poa affinis		x		x	x								
	**Stenotaphrum secundatum*	Buffalo Grass							x					
Strelitziaceae	**Strelitzia nicolai*	Giant White Bird of Paradise											3	1
Uvulariaceae	*Schelhammera undulatum*		x		x	x	x	x			<1	20	<1	5
Zamiaceae	*Macrozamia communis*	Burrawang									1	3		
Zingiberaceae	**Hedychium gardnerianum*	Indian Ginger			x	x	x			x			<1	2
Vines														
Asclepiadaceae	**Araujia sericifera*	Moth Vine	x					x						
	Marsdenia rostrata	Milk Vine	x											
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine			x	x		x			<1	2		
Convolvulaceae	**Ipomoea purpurea*	Morning Glory							x	x				
Dilleniaceae	*Hibbertia dentata*	Scrambling Guinea	x											

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
		Flower												
Fabaceae	*Glycine clandestina*								x					
Menispermaceae	*Sarcopetalum harveyanum*	Pearl Vine			x	x		x			5	20	1	2
	Stephania japonica	Snake Vine											2	5
Nyctaginaceae	**Bouganvillea sp cv*	Bouganvillea					x							
Oleaceae	**Jasminum sp cv*	Jasmine							x					
Passifloraceae	**Passiflora edulis*	Passionfruit	x		x	x	x	x			<1	1		
	P. herbertiana	Native Passionflower			x								<1	1
	**P. sp*								x					
	P. caerulea	Blue Passionflower											<1	1
Rubiaceae	*Morinda jasminoides*	Jasmine Morinda			x	x	x				5	50	2	10
Solanaceae	**Solanum seaforthianum*								x					
Vitaceae	**Cissus antarctica*	Simple-leaved Water Vine							x				1	2
	C. hypoglauca	Five-leaved Water Vine	x			x	x	x			3	5		
Araceae	**Philodendrum selloum*								x					

Table B.1 Flora Species List

			Littoral Rainforest - west	Native and Exotic - west	Littoral Rainforest - north				Urban Native and Exotic		Q1 - Littoral Rainforest		Q2 – Littoral Rainforest	
			RM1	RM2	RM3	RM4	RM5	RM6	RM7	RM8	C	A	C	A
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	x		x	x	x	x			1	5	2	10
	Geitonoplesium cymosum	Scrambling Lily	x										<1	5
Smilaceae	*Smilax australis*	Prickly Supplejack				x	x				3	10	3	5
	S. glyciphylla	Sarsaparilla	x		x	x	x	x			3	50		

*Notes: * = introduced species*

X = Species present in meandering transect

adj = occurs adjacent to quadrat

C = Cover (projective foliage cover)

A = Abundance (indicative count of the number of stems within quadrat)

Appendix C

Fauna Species List

Table C.1 Fauna Species List

	Family	Scientific Name	Common Name	Exotic	Survey		
					GEC 2007	Abel (2006)	CE 2015
Aves	Acanthizidae (formerly Pardalotidae)	*Acanthiza lineata*	Striated Thornbill		X		
	Acanthizidae (formerly Pardalotidae)	*Acanthiza nana*	Yellow Thornbill		X		
	Acanthizidae (formerly Pardalotidae)	*Acanthiza pusilla*	Brown Thornbill				X
	Acanthizidae (formerly Pardalotidae)	*Acanthiza reguloides*	Buff-rumped Thornbill		X		
	Acanthizidae (formerly Pardalotidae)	*Gerygone mouki*	Brown Gerygone		X		
	Acanthizidae (formerly Pardalotidae)	*Sericornis frontalis*	White-browed Scrubwren		X		X
	Acanthizidae (formerly Pardalotidae)	*Smicrornis brevirostris*	Weebill		X		
	Alcedinidae	*Dacelo novaeguineae*	Kookaburra		X	X	
	Artamidae	*Cracticus (was Gymnorhina) tibicen*	Australian Magpie		X	X	
	Artamidae	*Strepera graculina*	Pied Currawong		X	X	
	Cacatuidae	*Cacatua sanguinea*	Little Corella				X

Table C.1 Fauna Species List

Family	Scientific Name	Common Name	Exotic	Survey	
Climacteridae	*Cormobates leucophaea (was leucophaeus)*	White-throated Treecreeper		X	
Columbidae	*Geopelia striata*	Peaceful Dove		X	
Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove		X	
Columbidae	*Streptopelia chinensis*	Spotted Dove	*	X	
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo		X	
Cuculidae	*Cacomantis (was Cuculus) pallidus*	Pallid Cuckoo		X	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		X	
Meliphagidae	*Phylidonyris niger*	White-cheeked Honeyeater			X
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		X	X
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		X	
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler		X	
Podargidae	*Podargus strigoides*	Tawny Frogmouth			X
Psittacidae	*Platycercus elegans*	Crimson Rosella		X	X
Psittacidae	*Trichoglossus chlorolepidotus*	Scaly-breasted Lorikeet		X	
Psittacidae	*Trichoglossus haematodus*	Rainbow Lorikeet		X	X
Psophodidae (was Cinclosomatidae)	*Cinclosoma punctatum*	Spotted Quail-thrush			X

Table C.1 Fauna Species List

	Family	Scientific Name	Common Name	Exotic	Survey		
	Psophodidae (was Cinclosomatidae)	*Psophodes olivaceus*	Eastern Whipbird		X	X	X
	Strigidae	*Ninox strenua*	Powerful Owl		X		
	Timaliidae (was Zosteropidae)	*Zosterops lateralis*	Silvereye		X	X	
Mammalia	Muridae	*Rattus fuscipes*	Bush Rat		X	X	
	Muridae	*Rattus rattus*	Black Rat	*	X	X	
	Peramelidae	*Perameles nasuta*	Long-nosed Bandicoot		X	X	
	Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum		X	X	
	Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum		X	X	X
	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox		X		
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat		X		
	Vespertilionidae	*Miniopterus australis*	Little Bentwing-bat				X
	Vespertilionidae	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat				X
Amphibia	Myobatrachidae	*Crinia signifera*	Common Eastern Froglet		X		X

Notes: Surveys References:

GEC = Gunninah Environmental Consultants, 2007 (SIS, draft report version 3)

Abel = Abel Ecology, 2007 (report for Legal Priveledge of Mallesons Stephen Jacques)

CE = Cumberland Ecology, 2015

Appendix D

Survey Proformas

Date: 19/3/15 Waypoint: 125 | Job #: 15023 | Site: Newport | Q: 1

Personnel: B.E, V.O. Easting: Quadrat size: ☑ 20x20m ☐ 20x50m

Photo ID: 628-634 Northing: Aspect: 30 Slope:

Community: Litt. rain. Soil: Sandy organic.

Canopy	C	A
Liv. austral.	5	2
Eloch. perd.	10	2
Acmena smith.	40	10
Banksia integr.	5	1
Pitto. undul.	10	3

Sub-canopy	C	A
Acmen. smith.	30	10
Expo. laurina	20	20
Syncarpia glaud.	10	3
Pitto undul.	10	5

Ferns and Allies	C	A
Doodia aspera	10	500
Calloch. dubia	8	20
Blechnum cartilag.	35	200
Asplenium austral.	<1	1
Adiantum hisp.	<1	10

Climbers/Vines	C	A
Morinda jasmin.	5	50
Smilax. aust.	3	20
Sarco. hurveg.	5	20
Smilax glyc.	3	50
*Passiflora edul.	<1	1
Eustreph. lat.	1	5
Pandorea pand.	<1	2
Cissus hypo.	3	5

Shrubs	C	A
Wilkiea huegl.	1	3
Synoum glaud.	5	15
Acmena smith.	5	10
Notel. long.	3	10
Eloch. perdu	1	5
Livistona aust.	10	10
Expo. laurina → O. asperifolius (s) Expo. laurina	20	20
*Ochna serr.	<1	1
*Lig sinense	<1	1
*Lantana cam.	1	2
~~Syncarpia glaud.~~		
Pitto. revol.	1	5
Clerodendrum tom	<1	1
Elaeo carp. retic.	<1	1
Breynia oblong.	1	3

Dicots	C	A
*Ochna (seedling) serr.	<1	20
~~Breynia oblong.~~		
Pseuderanth. var.	1	50
Centella asiat.	<1	20
*Solanum nigr.	<1	1

Monocots (Grasses)	C	A
Oplis. imbecill.	<1	20
Entol. marg.	<1	5

Monocots (Other)	C	A
*Asparag. aeth.	2	10
Macro. comm.	1	3
~~Caprosma quad.~~		
Dianella caerulea var. producta	<1	3
Lepido. elatius	5	20
Schelhammera und.	<1	20
Dendrobium "large leaf"	<1	1

(Call juncea)

Parameter	Tree	Small tree	Shrub	Groundcover	Bare (%): 10
Height (m)	10-15	7-10	1-7	0.1-0.5	Litter (%): 10
PFC (%)	60	~~80~~ 70		~~80~~ 70	Rock (%): 10
Weeds (%)	—	—	~~10~~ 5	5	Moss (%): lots

but not on ground

C score	A measure or estimate of the appropriate cover measure for each recorded species; recorded from 1–5% and then to the nearest 5%. If the cover of a species is less than 1% and the species is considered important, then the estimated cover should be entered (e.g. 0.4)
A score	A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000 or specify a number greater than 1000 if required

ID:

CUMBERLAND ECOLOGY

Date: 19/3/15	Personnel: VO & BF	Project no: 15023	Site: Newport	Plot: 1 WP 125

CUMBERLAND ECOLOGY

Regenerating Canopy Species	
R	Species
	≠100 %

Fallen Logs Data	
Log #	Log Length (m)
1	5
2	1
3	1.2
4	2
5	4.5
6	2.5
7	1
8	3.0
9	0.6
10	6
11	4.5
12	3
13	0.5
14	4.2
15	1.3
16	
17	
18	
19	
20	

Hollow Data								
Tree #	Species	Height	DBH	0-5	5-10	10-15	15-20	20+
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Class	Value	Calculation
OR Regenerating canopy species	100	See other quadrats within vegetation zone. Value for all quadrats will be % of canopy species regenerating within the vegetation zone.
FL Fallen log length	42.3	Total length of fallen logs
NTH Trees with hollows	0	Total number of **trees** with hollows

Date: 19/3/15	Personnel: VO / BF	Project #: 15023	Site: Newport	Plot: 1

CUMBERLAND ECOLOGY

Presence/Absence (1m interval)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
NGCG Native Grasses								1			1							1	1							
NGCS Native Shrubs							1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
NGCO Other Natives	1	1	1	1		1	1	1	1	1	1	1	1	1			1	1	1			1		1	
EPC(a) Exotics (groundcover/shrubs)																				1	1				

Projective Foliage Cover (5m interval)	5	10	15	20	25
NOS Canopy Cover Native	~~50~~ 75 %	70 %	50 %	~~30~~ 40 %	45 %
NMS Mid-Storey Cover Native	70 %	%	30 %	%	35 %
EPC(c) Exotics (canopy)	~ %	%	%	%	%
EPC(b) Exotics (mid storey)	~ %	%	%	%	%

Presence/Absence (1m interval)	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
NGCG Native Grasses																									
NGCS Native Shrubs	1	1	1	1	1	1	1										1	1							
NGCO Other Natives	1		1			1	1	1		1	1	1	1	1	1	1	1	1	1	1	1				1
EPC(a) Exotics (groundcover/shrubs)	1		-				1	1		1	1													1	1

Projective Foliage Cover (5m interval)	30	35	40	45	50
NOS Canopy Cover Native	20 %	~~30~~ %	50 %	50 %	30 %
NMS Mid-Storey Cover Native	60 %	80 %	40 %	15 %	~~10~~ %
EPC(c) Exotics (canopy)	%	%	%	%	%
EPC(b) Exotics (mid storey)	%	%	%	%	%

-15

Class	Value	Calculations
NGCG Native Grasses	8	Add total **NGCG** 'hits' and multiply by 2
NGCS Native Shrubs	50	Add total **NGCS** 'hits' and multiply by 2
NGCO Other Natives	72	Add total **NGCO** 'hits' and multiply by 2
EPC Exotics	6	[(Add **EPC(a)** 'hits' and multiply by 2)+(Add **EPC(b)** values/10)+(Add **EPC(c)** values/10)] and divided by 3
NOS Canopy Cover Native	45	Add **NOS** values and divide by 10
NMS Mid-Storey Cover Native	38.5	Add **NMS** values and divide by 10

157 (?)
~~128~~

Job #: 15023 | Site: Newport | Q: 2

Date: 15/6/15 | Waypoint: ~~128~~ | Quadrat size: ☑ 20x20m ☐ 20x50m

Personnel: B.F | Easting: | Aspect: SE | Slope: 40

Photo ID: 102-129, 130 | Northing:

Community: Lith. rain. | Soil: Sand.

Canopy	C	A
Eythryna x sykesii	20	2
Livist. aust.	10	2
Gloch. ferd.	10	3
Euc. bot.	5	1
Acmen. smith.		
Allo. lit.		
Ficus rubig.		

Sub-canopy	C	A
Synoum gland.	15	4
Erythrina x sykesii	15	2
Ficus coron.	2	1
Acmena smith.	5	2
Pitto undul.	10	2
Empo. laurin.	2	1

Ferns and Allies	C	A
Doodia asp.	20	1000
Adiantum aeth.	1	5
Blech. cart.	3	10
Adiantum hispid.	1	5

Climbers/Vines	C	A
Morinda jas.	2	10
Eustreph. lat.	2	10
Smilax aust.	3	5
Stephan. japon.	2	5
Sarco. hart.	1	2
Passiflora herbert.	<1	1
Cissus ant.	<1	2
Gentano cymos.	<1	5
Passiflora caerul.	<1	1

Shrubs	C	A
Leptosp. Ligust. sin.	1	3
Lantan. cam.	5	3
Livist. aust.	20	8
Myrsine variabil.	1	2
Gloch. ferd.	2	1
Homalanth. pop.	1	2
Lig. ineid.	1	2
Eupomat. laur.	5	10
Ochna serr.	<1	2
Cyathea cunhats.	20	3
Lestrum parqui.	2	5
Wilkiea huegl.	3	2
Clagxylon apet.	<1	1
Pitto. undul.	5	3
Ornament. bambus.	<1	1
Acmena smith.	1	2
Cleodend. tom.		

Dicots	C	A
Viola hed.	1	50
Centella asiat.	1	50
Solanum chen.	<1	1
Conyza sum.	<1	1

← Nandina domestica

Hedychium gardnerianum →

Monocots (Grasses)	C	A
Oplis. imb.	5	500
Ehrhart ered.	<1	10

Monocots (Other)	C	A
Trad. fluv.	35	1000
Aspar. aeth.	2	20
Ginger lily	<1	2
Lepido. elat.	1	2
Schelham. undul.	<1	5
Dianella rae. prod.	<1	1
Comm. cyanea	1	20
Massive	3	1
~~Strel. juncifol.~~ Strelitzia nicolai		

Parameter	Tree	Small tree	Shrub	Groundcover
Height (m)	10 - 18	7 - 10	0.5 - 6	0.1 - 0.5
PFC (%)	45	45	60	70
Weeds (%)	—	15	8	~~35~~ 40

Bare (%): 10
Litter (%): 10
Rock (%): 10
Moss (%): —

C score	A measure or estimate of the appropriate cover measure for each recorded species; recorded from 1–5% and then to the nearest 5%. If the cover of a species is less than 1% and the species is considered important, then the estimated cover should be entered (e.g. 0.4)
A score	A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000 or specify a number greater than 1000 if required

ID:

CUMBERLAND ECOLOGY

Date:	Personnel: R.F	Project no:	Site:	Plot: 2

CUMBERLAND ECOLOGY

Regenerating Canopy Species	
R	Livist. aust.
R	Gahn. ferd.

Fallen Logs Data		
Log #	Log Length (m)	
1	0.5	3
2	1	2
3	4	1
4	1	3
5	3	0.5
6	2	
7	1	
8	3	
9	0.5	
10	0.5	
11	2	
12	1	
13	1	
14	1	
15	5	
16	0.5	
17	0.5	
18	0.5	
19	1	
20		

Hollow Data								
Tree #	Species	Height	DBH	0-5	5-10	10-15	15-20	20+
1	Nest boxes	3	✓	3				
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Class	Value	Calculation
OR Regenerating canopy species	100%	See other quadrats within vegetation zone. Value for all quadrats will be % of canopy species regenerating within the vegetation zone.
FL Fallen log length	38.5	Total length of fallen logs
NTH Trees with hollows		Total number of **trees** with hollows

Date: 15/6/15	Personnel: B.F	Project #: 15023	Site: New Port.	Plot: 2

CUMBERLAND ECOLOGY

Presence/Absence (1m interval)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
NGCG Native Grasses				1								1													
NGCS Native Shrubs	1	1	/	1	1						1	1	1		1	1	1	1	1	1	1	1	1	1	1
NGCO Other Natives	1	1	/	1	1	1		1	1	1		1		1	1		1	1							
EPC(a) Exotics (groundcover/shrubs)						1	1	1	1	1	1	1	1	1	1										

Projective Foliage Cover (5m interval)	5		10		15		20		25	
NOS Canopy Cover Native	—	%	40 20	%	80	%	—	%	40	%
NMS Mid-Storey Cover Native	40	%	30	%	5	%	60	%		%
EPC(c) Exotics (canopy)	20	%	—	%	—	%	—	%		%
EPC(b) Exotics (mid storey)	—	%	—	%	—	%	—	%		%

Presence/Absence (1m interval)	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
NGCG Native Grasses							/				1														
NGCS Native Shrubs					1	1	/	1	1	1	1	1	1	1	1	1	1	1			1				
NGCO Other Natives	1						/													1					
EPC(a) Exotics (groundcover/shrubs)	1	1	1	1	1	1	/	1		1	1	1	1	1	1			1	1	1	1	1	1	1	1

Projective Foliage Cover (5m interval)	30		35		40		45		50	
NOS Canopy Cover Native	25	%	10	%	—	%	—	%	80	%
NMS Mid-Storey Cover Native	20	%	80	%	100	%	5	%	10	%
EPC(c) Exotics (canopy)	—	%	/	%	—	%	—	%	—	%
EPC(b) Exotics (mid storey)	—	%		%	—	%	—	%	—	%

Class	Value	Calculations
NGCG Native Grasses	4	Add total **NGCG** 'hits' and multiply by 2
NGCS Native Shrubs	64	Add total **NGCS** 'hits' and multiply by 2
NGCO Other Natives	30	Add total **NGCO** 'hits' and multiply by 2
EPC Exotics	21.33	[(Add **EPC(a)** 'hits' and multiply by 2)+(Add **EPC(b)** values/10)+(Add **EPC(c)** values/10)] and divided by 3
NOS Canopy Cover Native	27.5	Add **NOS** values and divide by 10
NMS Mid-Storey Cover Native	35	Add **NMS** values and divide by 10

Call Play-back surveys

Survey Details	**1**	**2**	**3**	**4**	**5**
Name of Surveyor	Alex Pursche	Alex Pursche	Alex Pursche	Alex Pursche	Alex Pursche
Contact Number	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066
Date of Survey	22 June 2015	23 June 2015	24 June 2015	25 June 2015	26 June 2015
Type of amplification (loudhaler, tape deck only)	Loudhaler	Loudhaler	Loudhaler	Loudhaler	Loudhaler
Duration of call playback (minutes)	15	15	15	15	15
Duration of listening (minutes)	15	15	15	15	15
Location Details					
Location Description	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport
Map Number	9130-1S	9130-1S	9130-1S	9130-1S	9130-1S
Map Name	Mona Vale	Mona Vale	Mona Vale	Mona Vale	Mona Vale
Full MGA reference(s) for survey site or transect	GDA94	GDA94	GDA94	GDA94	GDA94
AMG Zone	56	56	56	56	56
Easting (6 digits)	344346	344346	344346	344346	344346
Northing (7 digits)	6275715	6275715	6275715	6275715	6275715
Start time (24 hr)	2030	1930	1930		
End time (24 hr)	2100	2030	2000		
Playback Details					
Time	15	15	15	15	15
Species Name	Ninox strenua, Ninox connivens, Petaurus norfolcensis.	Ninox strenua, Ninox connivens, Petaurus norfolcensis.	Ninox strenua, Ninox connivens, Petaurus norfolcensis.	Ninox strenua, Ninox connivens, Petaurus norfolcensis.	Ninox strenua, Ninox connivens, Petaurus norfolcensis.
Response					
Time	no response	no response	no response	no response	
Species Name					
Count					
Comments	Common Ringtail Possum, Tawny Frogmouth		Common Ringtail Possum		

Bat call detection surveys using ANABAT Detector

Survey Details	Unit 2	Unit 3
Name of principle surveyor	Alex Pursche	Alex Pursche
Contact Number	(02) 9868 2066	(02) 9868 2066
Name of person analysing calls	Alex Pursche	Alex Pursche
contact number	(02) 9868 2066	(02) 9868 2066
Date of survey	22 June - 26 June	22 June - 26 June
GMA Handheld or set and left	Set and left	Set and left
Location Details		
Location Description	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport
Time delay used - yes/no	Yes - Activate between 18:00 and 06:00	Yes - Activate between 18:00 and 06:00
Start details or point location		
Map name	Mona Vale	Mona Vale
Map number	9130-1S	9130-1S
Full MGA reference(s) for survey site or transects	GDA94	GDA94
AMG Zone	56	56
Easting (6 digits)	344346	344271
Northing (7 digits)	6275718	6275715
Start time (24 hr)	18:00	18:00
Finish time (24hr)	6:00	6:00

ANABAT Records - Call Analysis

Unit	Date	Definite	Probable	Possible
2	22/06/2015	*Miniopterus australis*		
2	23/06/2015	*Miniopterus australis*		
3	22/06/2015	*Miniopterus australis*		
3	22/06/2015	*Miniopterus schrebersii oceansis*		
3	23/06/2015		*Miniopterus schrebersii oceansis*	

Spotlighting Surveys

Survey Details	Night 1	Night 2	Night 3	Night 4	Night 5
Date	22 June 2015	23 June 2015	24 June 2015	25 June 2015	26 June 2015
Name of principle surveyor	Alex Pursche	Alex Pursche	Alex Pursche	Alex Pursche	Alex Pursche
Contact Number	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066	(02) 9868 2066
On foot or in vehicle	On foot	On foot	On foot	On foot	On foot
Number of surveyors	1	1	1	1	1
Total effort expressed in person hours	0.5	0.5	0.5	0.5	0.5
Length of transect	100	100	100	100	100
Number of lights	1	1	1	1	1
Lumens of spotlight	900	900	900	900	900
Location Details					
Location Description	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport
Map name	Mona Vale	Mona Vale	Mona Vale	Mona Vale	Mona Vale
Map number	9130-1S	9130-1S	9130-1S	9130-1S	9130-1S
Full MGA reference(s) for survey site or transects	GDA94	GDA94	GDA94	GDA94	GDA94
AMG Zone	56	56	56	56	56

Hairtube Surveys

Survey Details	Transect 1	Transect 2
Name of principle surveyor	Alex Pursche	Alex Pursche
Contact Number	(02) 9868 2066	(02) 9868 2066
Name of person analysing hairs		
contact number		
Date traps set	22 June 2015	22 June 2015
Date traps collected	26 June 2015	26 June 2015
Number of Tube	5	5
Spacing between tube	5	5
Bait used	Peanut butter, oats, and honey mix	Peanut butter, oats, and honey mix
Length of transect	20	20
Location Details		
Location Description	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport
Map name	Mona Vale	Mona Vale
Map number	9130-1S	9130-1S
Full MGA reference(s) for survey site or transects	GDA94	GDA94
AMG Zone	56	56
Transect Start Easting (6 digits)	344308	344347
Transect Start Northing (7 digits)	6275723	6275727
Transect End Easting (6 digits)	344283	344335
Transect End Northing (7 digits)	6275713	6275748

hair sample collected from trap #061 - sent for analysis
30.6.15 to Scats About

Infra-red Camera Surveys

Survey Details	IR Camer 8	IR Camera 7
Name of principle surveyor	Alex Pursche	Alex Pursche
Contact Number	(02) 9868 2066	(02) 9868 2066
Name of person analysing images	Alex Pursche	Alex Pursche
contact number	(02) 9868 2066	(02) 9868 2066
Date of survey	22 June - 26 June	22 June - 26 June
Location Details		
Location Description	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport	Lot 1 DP408800 and Lots 21 and 22 DP1036400, Hillside Rd Newport
Time delay used - yes/no	No	No
Start details or point location		
Map name	Mona Vale	Mona Vale
Map number	9130-1S	9130-1S
Full MGA reference(s) for survey site or transects	GDA94	GDA94
AMG Zone	56	56
Easting (6 digits)	344353	344322
Northing (7 digits)	6275742	6275738

No records, camera operational. No records, camera operational.

Appendix E

Staff Resumes

David Robertson

Director

Dr David Robertson is a senior ecologist with more than 30 years experience in ecological survey and research. David has been the director of Cumberland Ecology since 2003. He has a bachelor of science with majors in botany and zoology and a PhD in ecology.

Examples of consultancy work has included:

- Participation as senior ecological consultant for Department of Planning on the South Coast Environmental Panel;
- Provision of expert testimony, acting as a Court appointed expert for the Land and Environment Court;
- Management of high level flora and fauna investigations for Environmental Impact Assessments;
- Development of ecological management plans;
- Habitat reconstruction;
- Development of packages for compensatory habitats; and
- Management of negotiations about the level of mitigation measures required for flora and fauna impacts.

David is also very experienced at public speaking and has regularly provided expert testimony in court concerning ecological issues.

In previous work David was employed as the senior ecologist in charge of the Ecological Services Practice for ERM Australia. He also lectured in ecology and aquatic biology at Charles Sturt University, and was employed as a senior ecologist with the Australian Museum.

David has skills that allow him to work in both aquatic and terrestrial fields, management of threatened species, ecological risk assessment, wetland rehabilitation and management, and ecological research for environmental impact assessment.

Key Industry Sectors

- Mining and Rural Assessments;
- Linear Infrastructure (power, water, transport);
- Urban Development and Infrastructure.

Education

- Bachelor of Science (Honours), Ecology, University of Melbourne, 1980.
- Doctor of Philosophy, Ecology, University of Melbourne, 1986.

Professional Affiliations

- Ecological Society of Australia
- CEnvP
- EIANZ

International Experience

David has International experience in threatened species assessments have been completed in Hong Kong, China and Sri Lanka.

Work on threatened species has included preliminary survey and impact assessment, detailed impact assessment and mitigation, monitoring and plans of management.

His experience includes working for the KCRC Habitat Creation and Management Plan, assessments of impacts of construction on rare fishes for the West Rail project, development of mapping units for mapping Hong Kong flora and fauna habitats for the SUSDEV project and for the Green Island Ecological assessments.

Dr Robertson is familiar with the West Rail project and has helped write the Habitat Creation and Management Plan. He has visited the sites proposed for the wetland creation project and understands the habitat requirements of the target species such as the Painted Snipe and the Narrow-mouthed Frog.

David also has mangrove and tropical rainforest management experience in western Sri Lanka.

Key Competencies

Ecological Impact Assessment

David has directed numerous large ecological impact assessments for major projects in a variety of service sectors. These include the power industry, water supply, road construction and mining. Experience in ecological impact assessment for the power industry includes work done for Pacific Power, Transgrid, Powercoal, NorthPower and Powerlink.

Threatened Species Assessment

David has directed or managed numerous threatened species assessments in Australia and overseas on threatened species.

Across Australia, he has completed numerous projects on threatened species in response to state and commonwealth threatened species legislation. Such legislation includes the NSW *Threatened Species Conservation Act 1995*, *Queensland Nature Conservation Act 1994* and the *Victorian Flora and Fauna Conservation Guarantee 1998* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Provision of Strategic Ecological Advice

Strategic ecological advice has been provided to aid the selection of potential development sites in Australia, Hong Kong, Sri Lanka and China. Examples include: a model to help minimise problems with threatened species issues developed for use by Landcom.

Bushfire Assessments

A range of bushfire assessments have been prepared for sites ranging from small allotments for single dwellings to bushfire management plans for large sites (eg the ADI site at St Marys and Majura Field Firing Range in the ACT).

EPBC Experience

David has extensive experience with assessments under the EPBC Act. He has also worked many times with the Department of the Environment (DoE) in Canberra and has an extensive amount of experience in communicating with that organisation.

David has prepared numerous referrals for a wide range of projects since the gazettal of the EPBC Act. These have included referrals for projects in Victoria, ACT, NSW and Queensland and have entailed such diverse projects as coal mines, highways, transmission lines, residential and tourist developments and water supply projects.

David has also worked on complex ongoing assessments that are required for controlled actions to obtain approvals. He has done this for open cut coal mines, transmission lines, tourist developments, golf courses and water supply projects.

David is an excellent negotiator and presenter – and is adept at giving effective presentations to DoE and other organisations when required. Previously, for a number of projects he has also given direct presentations to Ministers. David has a thorough understanding of the EPBC process and can manage the passage of difficult projects in order to gain approvals.

He has also worked on several Brush-tailed Rock Wallaby projects including impact assessments and management plans for Rock Wallabies on the Timbarra Plateau, Shannon Creek and Chambigne Nature Reserve. As part of his work at Shannon Creek, David is working on an eight year monitoring project for Brush-tailed Rock-wallaby and foxes (which are a major threat to the wallaby).

Recent consultancy work has included:

- Work for the Land and Environment Court as an expert witness;
- Work for Department of Defence as expert on kangaroo management;
- Management of high level flora and fauna investigations for Environmental Impact Assessments;
- Threatened species investigations;
- Development of management plans;
- Development of packages for compensatory habitats;
- Ecological risk assessment.

Aquatic Assessments

David has been the senior ecological adviser for many environmental impact assessment and management projects that have entailed mangroves and saltmarsh. Examples of such projects have included:

- An independent review of the impacts of the proposed Tillegra Dam upon the Hunter Ramsar wetlands, which are listed as wetlands of international importance and matters of national environmental significance;
- Groote Eylandt Eastern Leases: baseline aquatic surveys in ephemeral waterways of a proposed manganese mine expansion on Groote Eylandt, Northern Territory;
- Project Stone: baseline aquatic survey in streams and wetlands of proposed open cut coal site, Galilee Basin;
- Project Katrina: baseline aquatic survey in streams and wetlands of proposed open cut coal site, Bowen Basin;
- James Ruse Drive Camellia – Parramatta Riverbank Management Plan to rehabilitate mangrove area from asbestos contamination from adjacent James Hardie site;
- Mt Thorley aquatic pollution Land and Environment Court case: Assessment of swamp and creek area following sediment contamination from mine;
- Tweed Land and Environment Court Case: Requirement for additional assessment of impacts of proposed development on aquatic flora/fauna;
- Morton St. Parramatta: Impacts of residential development on adjacent mangrove/ saltmarsh along Parramatta River; and
- Saltmarsh and mangrove assessments along Duck River.

Key Court Proceedings

David Robertson has extensive court experience as an expert witness. He is recognised as highly qualified due to a combination of his knowledge, skill and experience, and has been called as an expert witness in a variety of court cases, panels and tribunals.

Class 1 Proceedings

Project Venture Management Pty Limited v Warringah Shire Council & Anor [2006] NSWLEC 754

B T Goldsmith Planning Services Pty Limited v Blacktown City Council [2007] NSWLEC 229

Hanson South Coast Pty Limited v Eurobodalla Shire Council [2007] NSWLEC 493

Maybrook Manor Pty Limited v Warringah Council [2008] NSWLEC 1160

Mohamad El Dana v Bankstown City Council [2008] NSWLEC 1484

Champions Quarry Pty Limited v Lismore City Council [2011] NSWLEC 1071

Eco-Villages Australia Pty Ltd v Pittwater Council [2012] NSWLEC 49

Blakeney v Mosman Council [2013] NSWLEC 37

Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited [2013] NSWLEC 48

SHCAG Pty Ltd v Minister for Planning and Infrastructure and Boral Cement Limited [2013] NSWLEC 1032

Anglican Retirement Villages, Diocese of Sydney v Wollongong City Council [2013] NSWLEC 1181

Baclon Pty Ltd v Tweed Shire Council [2013] NSWLEC 1239

Penrith Lakes Development Corporation Ltd v Penrith City Council [2015] NSWLEC 9

Rocla Materials Pty Ltd & Anor ats The Trustee for the Gerald and Catherine Barnard Family Trust t/a Australian Walkabout Wildlife Park Pty Ltd. NSW Land and Environment Court Proceedings No. 10024 of 2014 (Decision Pending)

Class 3 Proceedings

Kalambaka Pty Limited v Minister Administering the Environmental Planning and Assessment Act 1979 [2009] NSWLEC 57

Maloney v Minister Administering the Environmental Planning and Assessment Act 1979 [2011] NSWLEC 121

Class 4 Proceedings

Hoxton Park Residents Action Group v Liverpool City Council (No 4) [2012] NSWLEC 67

Class 5 Proceedings

Director-General of the Department of Environment, Climate Change and Water v Walker Corporation Pty Ltd (No 2) [2011] NSWLEC 229

Chief Executive of the Office of Environment and Heritage v Rinaldo (Nino) Lani [2012] NSWLEC 115

Environment Protection Authority v Coal and Allied Operations Pty Ltd. [2013] NSWLEC 134

Environment Protection Authority v Riverina (Australia) Pty Ltd. [2014] NSWLEC 191.

Peer Reviews

Cumberland Ecology (2010). Review of Response to Submissions Relating to Continued Operations at Ulan Coal. Prepared for Department of Planning. Carlingford Court, NSW.

Cumberland Ecology (2010). Re: Review of Revised Statement of Commitments and Offset Strategy - Moolarben Coal Project. Prepared for Department of Planning. Carlingford Court, NSW.

Cumberland Ecology (2011). Peer Review of Wallarah Underground Coal Project. Prepared for Hansen Bailey. Carlingford Court, NSW.

Cumberland Ecology (2011). Peer Review of EcoLogical Report: "Proposed Framework for Assessing the Cumulative Risk of Mining on Natural Resource Assets in the Namoi Catchment". Prepared for Aston Resources. Carlingford Court, NSW.

Cumberland Ecology (2012). Peer Review of State and Commonwealth Ecological Impact Assessment Reports for the Proposed Mount Penny Coal Mine, Bylong. Prepared for Wells Environmental Services. Carlingford Court, NSW.

Vanessa Orsborn

Project Manager/Ecologist

Vanessa Orsborn has ten years' experience in ecology and project management. She primarily manages flora and fauna assessments and related assessments under the EP&A Act and the EPBC Act. As an accredited BioBanking Assessor, Vanessa provides strategic advice for clients and assists in negotiations for offset agreements.

Recent consultancy experience has included:

- Negotiation of offsets for resources sector project using the BBAM or BCAM tools;
- Provision of strategic advice for legal privilege;
- Impact Assessments for urban development; and
- Preparation of management plans for offset lands.

Fields of Competence

- Accredited BioBanking and BioCertification Assessor;
- Commonwealth and State environmental approvals;
- Ecological survey and monitoring, particularly assessment of threatened species and ecological communities; and
- Report writing and liaison with stakeholders.

Key Industry Sectors

- Urban development;
- Natural resource management; and
- Power and renewable energies.

Education

BEnvSci. Australian Catholic University, 2004.

Key Projects

Offset Negotiations

As an accredited BioBanking Assessor, Vanessa has been involved in several project in NSW that are in the process of negotiating biodiversity offsets. The application of the Biodiversity Banking Assessment Methodology (BBAM), both for formal and informal offset 'credit' calculations, have been used for a variety of projects.

Upper Hunter Strategic Assessment

Vanessa has been involved in the development of the Upper Hunter Strategic Assessment, which is a combined offsetting scheme for future mining projects in the Upper Hunter Valley. The Biodiversity Certification Assessment Methodology (BCAM) is used to dictate offset contributions for future mine projects, to be paid to an Offsets Fund managed by the NSW Office of Environment and Heritage. Vanessa has prepared BCAM reports for Coal and Allied and RioTinto owned mines.

Ecological Management Projects

Vanessa has prepared numerous ecological management plans; for vegetation management, pest species management and also over-abundant native species management. These have primarily included projects in the Sydney Basin as well as the Hunter Valley and South Coast of NSW. Recent projects have included preparation of a detailed Offset Area Management Programme (OAMP) report for the implementation of biodiversity conservation and restoration works within four offset properties, as part of the Ravensworth Mine Complex approval conditions.

Urban Development Projects

Impact assessments have been prepared by Vanessa for projects across the greater Sydney area and the NSW north and south coasts. Recent Species Impact Statement (SIS) reports for sites in Sydney's north, and west have involved offset negotiations with Council or the NSW Government for approvals.

Vanessa has been involved with the progression of the former ADI site at St Marys, mainly in the preparation of impact assessments and also annual macropod population impact monitoring. Recent assessments have included the preparation of a large scale Species Impact Assessment for the Western Precinct development proposals.

Bryan Furchert

Project Manager / Botanist

Bryan Furchert is a Project Manager and Botanist at Cumberland Ecology, based in Sydney. He has a Bachelor of Biodiversity and Conservation.

Bryan has six years' experience in bushland regeneration as a Team Leader. He has experience in assessment of degradation of native vegetation communities and identification of factors contributing to exotic weed invasion of communities on a site by site basis.

Bryan has extensive experience in vegetation management and community restoration within Hawkesbury Sandstone soil communities. He has undertaken botanical surveys of vegetation communities throughout the Sydney Basin Bioregion and the Brigalow Belt South Bioregion in New South Wales, and within the Northern Brigalow Belt Bioregion in Queensland.

Bryan also has experience in Geospatial Information Systems (MapInfo), statistical analysis of biodiversity values with biodiversity indices, and population census of fauna species.

Recent consultancy work has included:

- Vegetation Management Plans;
- Flora and fauna impact assessment;
- Species Impact Statements; and
- Monitoring studies.

Fields of Competence

- NSW *Noxious Weeds Act 1993*
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- NSW *Threatened Species Conservation Act 1995*;
- Weeds of National Significance (WoNS) – identification and control; and
- Botanical surveys.

Key Industry Sectors

- Urban development;
- Industrial and logistics;
- Infrastructure; and
- Extraction.

Education

Bachelor of Biodiversity and Conservation, Macquarie University, 2012.

Diploma of Conservation and Land Management, Belmont TAFE, 2009.

Completed professional development courses have included:

- Recognising Water Weeds (DPI), and
- Aboriginal Site Awareness (The Aboriginal Heritage Office).

Key Projects

Bushland Restoration

Bryan worked on the restoration of natural bushland areas in a number of Hawkesbury Sandstone soil derived coastal vegetation communities (including endangered ecological communities) between 2006 and 2012. Tasks included weed management, including noxious weeds and WoNS, revegetation, preparation for ecological and fuel reduction burns, and erosion control.

Botanical Surveys

Bryan regularly undertakes botanical surveying for site and BioBanking assessments, targeted threatened species searches, and identification and mapping of Critically Endangered and Endangered Ecological Communities.

State Significant Projects and Development Applications

Bryan has undertaken vegetation mapping for large extraction projects and prepared Vegetation Management Plans, Ecological Constraints Analyses, Ecological Impact Assessments, Flora and Fauna Assessments and Species Impact Statements for Development Applications.

Long-term Monitoring

Bryan has also undertaken flora monitoring and reporting for long term restoration projects for urban bushland remnants, and large biodiversity offset areas.

Cecilia Eriksson

GIS Technician / Ecologist

Cecilia Eriksson is a Sydney based GIS Technician and Ecologist at Cumberland Ecology, with experience in the interpretation and production of digitised mapping, including topographic modelling and classification, and feature extraction using aerial photography and satellite imagery.

Cecilia has detailed knowledge and experience in using the BioBanking Assessment Methodology, and the Framework for Biodiversity Assessment (FBA) for Major Projects, and has completed the 'BioBanking and BioCertification Assessor Accreditation Course'.

Additionally, she has extensive experience in complex statistical analyses in the fields of environmental and social sciences, with competency in SPSS and Primer.

Recent consultancy work has included:

- Vegetation and threatened flora and fauna mapping for large – and small – scale projects in New South Wales, Queensland, and Northern Territory;
- GIS mapping for and performing BioBanking Assessments on large and small development and offset sites;
- GIS mapping for and performing assessments using the FBA for Major Projects;
- GIS mapping and analysis for Environmental Impact Assessments, Species Impact Statements, Biodiversity Management Plans, and Flora and Fauna Assessments.

Fields of Competence

- Geographic Information Systems (GIS);
- BioBanking Assessment Methodology and FBA;
- Statistical analysis (SPSS and Primer); and
- Data and project management.

Key Industry Sectors

- Urban Development; and
- Extraction Industry.

Education

Master of Science in Marine Science and Management
University of Technology Sydney (2013)

Bachelor of Science (Honours) in Marine Biology
University of Technology Sydney (2008)

Key Projects

NSW Infrastructure Projects

Cecilia has been responsible for the GIS mapping of vegetation communities, threatened flora and fauna species, field maps for pre-clearing surveys, and the production of high-quality maps for clearing reports. She has also carried out calculations of clearance areas of native vegetation.

Extraction Industry Projects

Cecilia has been involved in the production of soil and geology maps, as well as detailed mapping of vegetation communities over 5000 ha, and threatened species habitat mapping for large-scale projects relating to mining in New South Wales, Queensland, and the Northern Territory.

BioBanking Assessments

Cecilia has been involved in the mapping for and assessment of projects using the BioBanking Assessment Methodology, for small and large development and offset sites. She has extensive experience in using the BioBanking Credit Calculator, and in producing high quality maps for BioBanking Assessment Reports.

Other Projects

Cecilia has also worked on a wide range of small to large scale housing development projects in Sydney. This has involved the use of GIS for vegetation mapping, evaluation of watercourses, mapping of threatened species, LIDAR-data mapping, and production of field maps.

Dr Alexander Pursche

Project Manager/Ecologist

Alex Pursche was a Project Manager and Ecologist at Cumberland Ecology between October 2013 and May 2016. He has a PhD in Ecology, and a Bachelor of Science (Hons) in Ecology.

Alex has eight years experience in fauna monitoring, six of which have been gained working as an environmental contractor for mining and infrastructure clients in New South Wales, Queensland, and the Northern Territory. This included assessment of offset properties, subsidence monitoring, and environmental impact assessment studies for powerlines, pipelines, roadways, rail tracks, urban developments, and mines.

He has extensive experience in identifying terrestrial and marine vertebrate fauna including birds, mammals, reptiles, amphibians, and fish. Alex has experience operating in remote conditions and consistently delivers large scale surveys to clients in a timely manner.

Alex has experience in Geographic Information Systems (GIS - ArcMap) and uni-/multi-variate statistical analysis relevant for testing hypotheses for complex ecological interactions. Alex also has the capacity to produce reports to a high standard suitable for publication in peer reviewed scientific journals.

Recent consultancy work has included:

- Biodiversity Management Plans and monitoring;
- Species Impact Statements;
- Biodiversity Assessment Reports under the Framework for Biodiversity Assessment for State Significant Projects
- Biodiversity Assessment reports under the BioBanking Assessment Methodology
- EPBC referrals;
- Production of digitised maps; and
- Ecological impact assessment.

Education

Doctor of Philosophy, University of NSW 2013

Bachelor of Science (1st Class Honors) 2006

Key Industry Sectors

- Mining;
- Linear Infrastructure;
- State significant developments;
- Due Diligence and compliance reporting;
- Residential development; and
- Conservation.

Fields of Competence

- Fauna Surveys;
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- NSW *Threatened Species Conservation Act 1995*;
- NSW *Fisheries Management Act 1994;*
- NT *Territory Parks and Wildlife Conservation Act 2000*; and
- QLD *Nature Conservation Act 1992*.

Key Projects

Ecological Impact Assessments for residential developments

Alex has written fauna and flora impact assessments for residential developments for Great Lakes, Port Stephens, The Hills, Penrith, Bankstown, Warringah, and Pittwater LGAs.

Fauna Monitoring

Since 2010, Alex has worked monitoring vertebrate fauna for large scale mining and infrastructure projects in NSW, QLD, and NT. Tasks included general fauna assessment as well as targeted searches for listed threatened species.