

DRAFT HABITAT RESTORATION PLAN

PREPARATION GUIDELINE

Site-specific guidelines for the ecological restoration
and ongoing management of habitat utilised by
native flora and fauna

(Version February 2012)

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DRAFT HABITAT RESTORATION PLAN PREPARATION GUIDELINE

1.0 WHAT IS A HABITAT RESTORATION PLAN?

A Habitat Restoration Plan (HRP) is a site-specific document that provides guidance on the ecological restoration and ongoing management of terrestrial and aquatic habitat utilised by native flora and fauna.

HRPs are commonly required to mitigate or offset the impacts of development. HRPs may also be used to guide progress of other ecological management works undertaken or overseen by Council.

In the past such plans have been variously named as Vegetation Management Plans, Riparian Rehabilitation Plans, Wetland Restoration Plans and so on. The intent in now naming all plans which guide on-ground works toward a desired outcome as Habitat Restoration Plans is to recognise that each of the remnant, offset or buffer areas to be retained or improved provides essential habitat for Tweed Shire's fauna species and plans must consider and provide suitable habitat, rather than just restoring vegetation on the site.

In most cases the HRP will be in place for a specified period of time during which the developer will be responsible for its implementation. As the Consent Authority, Tweed Shire Council (Council) will be responsible for ensuring compliance with the HRP.

These guidelines aim to synthesize and clarify Council's requirements for assessment and approval of Habitat Restoration Plans

A good quality Habitat Restoration Plan will:

- (1) provide sufficient background information and site assessment to justify the proposed works;
- (2) clearly describe specific ecological restoration and management outcomes including the timeframe required to meet each particular outcome;
- (3) provide details on ongoing monitoring requirements including measurable outcomes; as well as
- (4) contingency planning options in the case of system failure or natural events which hinder progression.

All HRPs should aim for improved environmental outcomes and must be consistent with existing natural resource management legislation and policy, including the principles of Ecologically Sustainable Development.

2.0 SCOPE AND CONTENT OF A HABITAT RESTORATION PLAN

The HRP should contain, but is not limited to, the following information. A checklist by which plans are assessed is provided at the end of this document at **Appendix I**.

2.1 Title, author and date

This section should include the qualifications and experience of the author with reference to Section 3.0.

2.2 Background to the HRP

The HRP should include a short description of the circumstances leading to its preparation.

2.3 Site description

The HRP should include a brief description of the site including:

- Site descriptor (Lot/DP(s)) and location;
- Land tenure and zoning;
- Geology and soils;
- Topography and hydrology;
- Vegetation community types and extent of cover;
- Site features – e.g. waterways and drainage features, buildings, roads and other infrastructure, layout and connectivity ;
- Site history - e.g. when the land was settled, logging and/or clearing history, previous land uses and activities; and
- Current land use(s).

The site should also be placed in the context of the local landscape, often best achieved through the use of a site and locality map.

2.4 Aims and objectives

Aims and objectives are an essential component of the HRP as they form the basis for monitoring and evaluating the effectiveness of its implementation. Aims are overall statements of what is to be achieved with the HRP. Objectives are specific statements indicating how individual actions achieve the aims of the HRP. Aims and objectives should provide for improved environmental outcomes and be consistent with existing natural resource management legislation, policy and relevant guidelines, including the principles of Ecologically Sustainable Development.

Measurable performance indicators should be developed in order to establish if the aims and objectives of the HRP are being met.

For example a restoration aim could be to restore the riparian corridor of a particular creek and the objective may be to revegetate a 50m by 500m riparian buffer. Performance indicators to ensure successful revegetation of the riparian buffer could include; 1) > 90% survival rate of planted stock; 2) Growth of >1 metre by year two and 2 metres by year five for plantings and cumulative cover of 60% by year three; and 3) <10% ground cover of weeds by year three. Monitoring and performance indicators are discussed further in Section 2.14 and example performance indicators to measure restoration in a coastal dune and a coastal riparian habitat are provided in

Appendix A.

2.5 Site plan(s)

One or more thematic maps of the site should be presented in the HRP. At least one map should be overlaid on an aerial photograph with the following standard features and supporting text:

- Title and date;
- Scale and orientation;
- Legend;
- Cadastral boundaries; and
- Key features – e.g. roads and waterways.

Essential thematic layers include:

- Vegetation communities;
- Relevant planning or physical constraints;
- Details of existing and proposed development;
- Significant plant locations and fauna habitat features;
- Management zones; and
- Photo monitoring point locations.

Council can assist with the provision of existing data layers and aerial photography. In general, site plans should be presented at a scale of 1:5000 or smaller (i.e. 1:2000).

The presentation of information regarding the location of threatened flora and/or fauna species susceptible to illegal collection should be negotiated with Council.

2.6 Site constraints

The HRP should specify any relevant planning, legal, physical or other constraints that may affect management of the site. This includes but is not limited to:

- Easements and restrictions on title;

- Zoning provisions;
- State Environmental Planning Policies - e.g. mapped areas of SEPP 14 Coastal Wetlands and/or SEPP 26 Littoral Rainforest;
- Bushfire asset protection zones;
- Development controls and policies;
- Provisions of relevant statutes - e.g. *Native Vegetation Act 2003*, *Threatened Species Conservation Act 1995*;
- Sites of Aboriginal or European cultural heritage; and
- Physical constraints such as slope, acid sulphate soils, stream bank stability and flooding.

Proponents are encouraged to consult with Council to ensure they are aware of all relevant known constraints which exist at the site.

2.7 Vegetation communities

The HRP should include detailed mapping and descriptions of existing vegetation communities at the site. Vegetation should be described according to the structure and floristics of each stratum. Vegetation descriptions should include details of current vegetation condition, including the density and distribution of weed species in all strata. Mapping codes should be related to vegetation codes used in the Department of Environment and Climate Change Vegetation Type Database. A clear explanation of survey effort and method should also be included. All native and exotic plant species recorded at the site should be presented as a list of plant species and included as an Appendix to the HRP. The plant species list should include for each species present at the site:

- Scientific name;
- Common name;
- Life form;
- Relative abundance in each stratum; and
- Conservation or weed status (if applicable).

Plant species list should be ordered according to vegetation community.

2.8 Weed infestations

Detail should be provided in the HRP on:

- The location and degree of infestation of noxious weeds and the class of each noxious weed according to the *Noxious Weeds Act 1993*;
- The location and degree of infestation of highly invasive environmental weeds; and
- The location and abundance of environmental weeds commonly encountered at the site (i.e. major weeds).

Refer to the Far North Coast Weeds for further information on noxious and environmental weeds. This information may take the form of individual maps, or be described in relation to individual management zones (refer to Section 2.12 for detail on management zones).

2.9 Ecological status, significant species and communities

This section should include the following information:

1. An overview of ecological values of the site;
2. The status of threatened and/or significant plants; and
3. The location and status of threatened or significant fauna and their habitats.

2.9.1 Overview of ecological values of the site

The HRP should include:

- An assessment of the condition of the habitats on the site;
- The context of the site within the broader landscape - e.g. remnant size, habitat diversity, habitat fragmentation, corridors and linkages, land uses, etc; and
- The conservation status of individual vegetation communities - e.g. regional depletion and reservation status, threatened ecological communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Tweed Vegetation Management Strategy 2004 provides background data on the values of individual vegetation communities and the ecological status of specific areas. Where possible, maps should be used to depict spatial variations in ecological status.

2.9.2. Location and status of threatened and/or significant plants

The HRP should identify and provide actions for the management of any threatened and/or significant plants occurring at the site. In the case of a threatened plant occurring at the site where restoration works are being undertaken, preparation and implementation of a Threatened Species Management Plan may also be applicable. Vegetation survey methods should be described. Threatened plants include species listed under the TSC Act and/or EPBC Act. Significant plants include: (1) Rare or Threatened Australian Plant (ROTAP) as defined by Briggs and Leigh (1996); (2) Significant vascular plant of the Upper North East New South Wales as defined by Sherringham and Westaway (1995); (3) A species confined to the Council LGA; or (4) A species at the northern or southern limit of its range.

2.9.3 *Location and status of threatened and significant fauna and their habitats*

The HRP should identify and provide for the management of any threatened or significant fauna (and their habitats) likely to occur at the site. This should be approached by: (1) reviewing known records and predicted distributions of threatened and significant species from the site and similar habitats within the locality; and (2) undertaking an assessment of the habitat features of the site in relation to the known requirements of such fauna species.

Resources which may be used to obtain information on threatened and significant flora and fauna of the Tweed LGA include:

- NSW National Parks and Wildlife Service Atlas of NSW Wildlife;
- Commonwealth Department of Environment, Water, Heritage and the Arts Protected Matters search tool;
- BioBanking Assessment Tools;
- Tweed Vegetation Management Strategy

2.10 Management issues, site threats & recommendations

The HRP should identify and describe any issues and threats to biodiversity on or adjacent to the site that are likely to influence ongoing management. Examples include:

- Fire protection and maintenance of bushfire asset protection zones;
- Other planning constraints;
- Potential impacts from adjacent development – e.g. sedimentation;
- Environmental and noxious weeds;
- Pest animals and domestic pets;
- Livestock grazing;
- Climatic hazards – e.g. frost and flood;
- Unauthorised human access – e.g. motorbike use and tracks;
- Rubbish dumping – e.g. garden waste, household and building waste;
- Site fragmentation and isolation;
- Altered hydrology or tidal inundation; and
- Erosion.

The HRP should also acknowledge any Key Threatening Processes listed under the TSC Act, EPBC Act or Fisheries Management Act 1994 where they apply to the site.

The HRP should recommend action(s) to address each management issue/site threat. For example:

- To manage pest animals and domestic pets, management actions may include community education, enforcement, monitoring and pest animal control;

- To manage climatic hazards, management actions may specify timing of planting, use frost tolerant species in plantings, use species that can tolerate high water flow environments or prolonged inundation in plantings, or allow buffers for future landward migration of wetlands (particularly Saltmarsh communities);
- To manage unauthorised human access, management actions may include closing and rehabilitating tracks, signage and enforcement;
- To manage specific known fauna camps, roosts, nest sites or breeding grounds will usually require buffer zones which are rehabilitated and access prevented;
- To manage rubbish dumping, management actions may include rubbish clean up, community education, signage, enforcement, restrictions in site access; and
- To manage site fragmentation and isolation, management actions may include establishing or enhancing corridors and connectivity between remnants.

This section of the HRP should also address any specific mitigation and management requirements relating to specific biodiversity issues. For example, where the restoration site comprises or adjoins a flying fox camp, the HRP should be consistent with management outcomes relating to flying fox camps such as: (1) habitat within the flying fox camp buffer is maintained or restored to its natural (pre-clearing) state; (2) works within the camp and buffer occur outside the flying fox breeding season; (3) bushfire risks are managed to maintain camp integrity and viability; and (4) ongoing threats from development are minimised.

2.11 Restoration strategy

The HRP should identify appropriate restoration strategies that will be applied across the site. Restoration strategies may vary across the site, with identification of suitable restoration strategies dependant on the degree of habitat disturbance and degradation, the anticipated potential of habitats to recover and the aims and objectives of the HRP. Accepted approaches to site restoration are listed below and described in **Appendix B**.

- Natural Regeneration;
- Assisted Natural Regeneration;
- Reconstruction; and
- Fabrication (type conversion).

The restoration strategy should determine the goal community or communities across the site. This is of particular importance when a reconstruction restoration strategy is chosen, where the aim is to re-establish a vegetation community similar to the original vegetation community in structure, composition and diversity.

In the case where reconstruction is proposed, a reference community (or communities) should be used to determine the structure, composition and diversity of the goal community, and therefore species to be used in planting, planting density, etc. Communities selected as reference communities should be located (where possible) in close proximity to the site, have similar abiotic features and be in good condition with low levels of disturbance.

2.12 Management zones and recommendations

The use of management zones will be necessary where there are spatial or temporal variations in restoration strategies and required management actions across the site. Management zones should be identified on a map and described in the HRP.

Specific implementation strategies should be listed for each management zone, detailing the step by step approach, methods and techniques to be used for each restoration strategy.

For example:

Where planting (i.e. reconstruction) is proposed in a management zone, detailed methods and techniques for planting should be specified, including:

- Sourcing of planting stock;
- Preparation of planting site;
- Timing of planting;
- A list of suitable local native species to be used in the planting (may be included as an Appendix to the HRP);
- Number of each species;
- Planting density;
- Use of mulch and fertiliser; and
- Ongoing maintenance requirements.

Where planting is proposed, species selection and abundance should be consistent with the vegetation community being restored. Seed collection and propagation should be consistent with the principles of genetic integrity. Guidelines for the collection of seed and vegetative material are provided in **Appendix C**.

Where assisted natural regeneration (e.g. fencing to exclude livestock plus weed control to encourage natural regeneration) is proposed in a management zone, detailed methods and techniques for assisted regeneration need to be specified, including:

- Location and type of fencing;
- Primary weed control methods for woody, vine, forb, grass and aquatic weeds;
- Timing of weed control; and
- Follow up weed control requirements including methods, timing & frequency.

Current best practice for specific weed control methods are presented in **Appendix D**.

Specific actions for management zones may also include measures to minimise impacts to flora and fauna during restoration works, including:

- Changing weed control methods or herbicide use when controlling exotic grasses amongst native grasses and forbs, when controlling weeds adjacent a threatened plant species and when controlling weeds in aquatic habitat or habitat of frog species;
- Timing on ground work in the vicinity of significant fauna habitat (raptor nests, flying fox camps) to avoid disturbance to breeding;
- Minimise ground disturbance (i.e. trampling) in sensitive habitats; and

- Specifying hygiene protocols where there is a risk of transmission of disease. For example spread of Chytrid fungus to threatened frog populations or spread of *Phytophthora cinnamomi* to susceptible plant communities.

2.13 HRP implementation

This section should include:

- An Implementation Schedule detailing actions to be undertaken across the whole of site and within each management zone to achieve the aims and objectives of the HRP. The Implementation Schedule should prioritise management actions and specify timing for the implementation of each management action for the duration of the HRP. The Schedule should also include resource requirements (including labour) for each management action. This information may be presented in a table.
- Information on the qualifications of personnel involved in the implementation of the HRP (i.e. on-ground weed control works, monitoring and reporting).
- Any permits or licences required to implement the HRP (i.e. section 132C licence under the *National Parks and Wildlife Act 1974* when undertaking weed control in threatened species habitat). A NPWS Checklist for bush regeneration activities is included as **Appendix E**.
- Record keeping requirements to comply with *Pesticide Act 1999* and Regulation and *Occupational Health & Safety Act 2000* & Regulation. A sample Daily Record Sheet including chemical use is included as **Appendix F**. A sample Job Risk Assessment Form and Matrix is included as **Appendix G**.

2.14 Monitoring strategy

The monitoring strategy should set out the intended monitoring methodology and performance indicators and must specifically address the management aims and objectives of the HRP. The monitoring strategy should set out timing of monitoring (baseline and ongoing), monitoring frequency and specify the qualifications of the personnel undertaking the monitoring. Monitoring methodology and performance indicators are discussed below.

2.14.1 Monitoring methodology

Monitoring for restoration projects is typically undertaken using quantitative methods i.e. transect or quadrat based monitoring and qualitative methods i.e. observations on daily record sheets and photopoint monitoring. The monitoring strategy should be based on the size and complexity of the site and HRP. Monitoring should include at a minimum a selection of photopoints within each management zone. For all HRPs pertaining to areas individually or collectively greater than 0.5 hectares, data collection to measure restoration outcomes is required (refer to 'performance indicators' below). Data should be collected within stratified random quadrats of a minimum size of 20m x 20m. The number and location of quadrats shall be approved by Council prior to submission of the HRP.

For larger or complex projects, Council monitoring must be performed by an independent consultant. An example monitoring and evaluation pro-forma is provided at **Appendix H**.

2.14.2 Performance indicators

Performance indicators are tools to measure the effectiveness of prescribed management and restoration actions. Examples of performance indicators include:

- Composition and relative abundance of each plant species in a revegetation program is as per the reference vegetation community;
- > 90% survival rate of planted stock;
- Growth of >1m by year three and 1.5m by year five for plantings and cumulative cover of 80% by year three;
- Increased recruitment of native species;
- Increased percentage cover of native species; and
- Nil fruiting of weed species after primary treatment.

Therefore the data collected within quadrats needs to be relevant to the proposed performance indicators e.g. growth, survival rate of planted species, height, cover, density of native and introduced species. Example performance indicators to measure restoration in a coastal dune and a coastal riparian habitat are provided in **Appendix A**.

2.15 Reporting procedures

Reporting on the progress of the HRP is required to demonstrate that the restoration project is achieving its aims and objectives. The HRP should specify the reporting requirements including:

- Frequency of reporting;
- Duration of reporting; and
- Who the report will be submitted to.

Progress reports should include:

- Progress on implementation of the Implementation Schedule;
- Monitoring results and compliance with performance indicators;
- Any changes in the Implementation Schedule as a result of adaptive management;
- Progress of ongoing site management issues;
- Any records of threatened flora and fauna species; and
- Recommendations regarding the ongoing management of the site.

Reporting requirements are further discussed in Section 3.4.

2.16 Adaptive management & contingency planning

Provision should be made in the HRP for adjusting the proposed management strategies in response to unanticipated circumstances (e.g. fire, drought, floods, planting failure and insect pests), technical advances and/or regular monitoring. Procedures for variation to an approved HRP are discussed in Section 3.6.

Any minor alterations to any component of the HRP must be approved by Council. Application for minor alterations must be accompanied by an Adaptive Management Statement (AMS) which clearly outlines the plan component to be altered and the reasoning for the alteration. Reasoning would usually be for the purpose of an improved environmental outcome.

Any AMS is of no effect unless signed on each page by the relevant Tweed Shire Council representative, the HRP owner or proponent and the bush regeneration contractor. Any number of adaptations may be applied for in this manner but must be sequentially numbered and dated. A completed signed copy of each AMS must be forwarded to Council for registration.

Procedures for replacement of an approved HRP are discussed in Section 3.6.

2.17 References

List all reference material used in the preparation of the HRP, in particular previous site studies and local research projects.

2.18 Appendices

Typical appendices to a HRP include:

- Species lists – native and weed species by vegetation community;
- Weed control methods;
- Specific weed treatments;
- Planting list (if required);
- Photo points locations, photos and captions;
- Initial monitoring points and baseline data;
- NPWS Checklist for bush regeneration activities;
- Daily Record Sheets including Chemical Use; and
- Job Safety Analysis/Risk Assessment.

3.0 HRP PREPARATION, IMPLEMENTATION, REPORTING & COMPLIANCE

3.1 Plan preparation

The HRP must be prepared by a suitably qualified ecologist with demonstrated experience in ecological restoration in the vegetation communities addressed in the HRP.

Minimum qualifications and experience of a specialist ecological consultant practising in the Tweed Council LGA should comprise a tertiary degree in the natural sciences (or equivalent) and two years documented field experience in ecological restoration in north-eastern New South Wales and/or south-eastern Queensland. Additional TAFE Certificate IV qualifications in Bushland Regeneration or Natural Area Restoration are highly desirable for the practical skills gained.

Qualifications and experience must be stated at the front of the plan and Council may require proof of claim. Equivalent qualifications and/or experience may be considered on a case by case basis and will require documentation of successful on-ground examples.

3.2 Plan implementation

On-ground restoration works must be undertaken by persons with qualifications in the field of bush regeneration. Minimum qualifications and experience to undertake on-ground restoration works should comprise Certificate III in Conservation Land Management (Natural Area Restoration) or equivalent and 2 years experience working in the vegetation type(s) at the site. Equivalent qualifications and/or experience may be considered on a case by case basis and will require the provision of successful on-ground examples under the responsibility of the applicant or referee reports from experienced practitioners eligible for Australian Association of Bush Regeneration accreditation.

Proof of qualifications and experience of on-ground personnel is required to be submitted to Council prior to commencement of works.

Bush regenerators are to hold a current Chemical Users Certificate and other relevant legislative requirements e.g. Section 132C licence to work in the habitat of threatened species.

3.3 Plan duration

Management actions outlined in the HRP shall be maintained for a minimum period of five years to maximise the success of the restoration project. If performance criteria have not been achieved at the end of the five year period, Council will instruct the duration of the HRP be extended until performance criteria are met.

Council may specify a longer plan duration for offset projects or for restoration projects with complex management issues.

3.4 Plan costing

Projected costs for implementation of all phases of the project must be detailed. This is required so that the proponent is aware of the expected five year costs at the beginning of the project and can make an informed decision as to whether such costs can be committed to.

3.5 Monitoring & progress reporting

Monitoring and reporting is to be undertaken by a suitably qualified ecologist with experience in monitoring natural areas and quantitative analysis. The required frequency of monitoring and reporting is:

- Biennially (every six months) for the first two years; and
- Annually to the fifth year, or for the duration of the HRP.

3.5.1 *Circumstances for variation of a reporting interval*

Council may stipulate increased frequency for reporting if considered necessary. Less frequent reporting may be requested by the proponent however such requests must be accompanied by clear justification.

3.5.2 *Content of progress reports*

Progress reports should include:

- A summary of works completed by management zone (including all information recorded on Daily Record sheets);
- Quadrat and/or transect data;
- Photo points;
- Evaluation against performance indicators;
- Discussion of any other management issues and solutions;
- Resources used including labour; and
- Any adaptive management approaches used or proposed.

3.5.3 *Acknowledgement of progress reports*

Progress reports will be acknowledged by Council and a response issued after the report is reviewed. A responsible officer will notify the proponent if the report is satisfactory or if changes and/or additions are required.

3.5.4 Additional requirements

A site visit by Council after submission of a progress report may be required to assess the progress of works. Larger projects will require periodic meetings with the proponent and consultant in conjunction with the biennial or annual reports.

3.6 Non-compliance with an approved plan/ failure to achieve performance criteria

Council reserves the right to ensure compliance with an approved HRP and to ensure agreed performance criteria are met. If at the end of the HRP duration, performance criteria are not achieved or the proponent does not comply with any component of the HRP, Council may require:

- An independent auditor to undertake an audit of the project against the management actions and performance criteria;
- An extension of the duration of the HRP until management actions are implemented and the performance criteria are met; or
- Any bond paid by the proponent be retained by Council and used to implement management actions in order to achieve performance criteria (refer to Section 3.8 regarding payment of bonds).

3.7 Variation of an approved HRP

The proponent may apply to vary the existing HRP by submitting an amended HRP to Council for a new approval. Once approved, the new HRP replaces the old one.

Approval of an amended HRP will be subject to the same assessment process as the original HRP. Justification for the amendments, including an analysis of the implementation, maintenance and success of the existing HRP will be taken into account in assessment of the amended HRP.

3.8 Security and tenure

The proponent shall provide proof of their ability to undertake or contract the works as proposed in the HRP.

The area(s) subject to the HRP shall be made '**Protected Habitat**' within six months of its implementation. Protected Habitat includes lands protected in perpetuity under one or more of the following:

- (1) Environmental Protection zone or similar (e.g. E2 Environmental Conservation) under Council's Local Environmental Plan;
- (2) SEPP14 Coastal Wetland or SEPP 26 Littoral Rainforest;
- (3) a restrictive covenant in favour of Council under Sect 88B of the Conveyancing Act 1919;
- (4) Nature Conservation Trust covenant (Nature Conservation Trust Act 2001);
- (5) Voluntary Conservation Agreement under the National Parks and Wildlife Act 1974);

- (6) Planning Agreement under the Environmental Planning and Assessment Act 1979;
- (7) land owned by Council (community land) or other Public Authority and reserved for environmental protection purpose.

3.9 Payment of a bond

Council may require payment of a bond to ensure all works are completed and maintained satisfactorily for the period as specified in the HRP. The bond is to be paid by the proponent prior to issue of a Subdivision or Construction Certificate.

The amount of the bond will be consistent with Tweed Shire Council Development Control Plan Section A5 Subdivision, that is <135%> of the agreed estimated value (or contract value if applicable) of implementing the HRP for its duration. All valuations are to include GST and any other statutory costs. The bond shall be in the form of cash or an unconditional, unlimited time bank guarantee lodged with Council.

3.10 Acquittal and transfer of the HRP site to Council

When the management obligations for the site have been completed (i.e. the management period has come to an end and the performance criteria have been achieved) and in cases where land is to be transferred to Council, the acquittal and the transfer of the HRP site to Council would involve:

- (1) documentation to demonstrate that all performance criteria have been achieved;
- (2) a site visit with Council officers, the proponent and the consultant: and
- (3) formal correspondence will be forwarded to the proponent notifying Council acceptance of the management of the HRP site and release of any bond if applicable.

3.11 Format and presentation

The HRP shall be submitted to Council in A4 hardcopy and digital copy (.pdf) formats. Two copies of each are required, with one hard copy being returned to the proponent on approval of the HRP.

All accompanying plans, aerial photos and maps shall be printed at A4 or A3 size and shall be in colour. All plans shall also be provided in digital format (.pdf)
Council is able to assist with the provision of aerial photos and associated data layers.

4.0 REFERENCES

Briggs, J.D. & Leigh, J.H. (1996) Rare or Threatened Australian Plants. CSIRO Australia

Joseph, R. (2001) Course Notes from Certificate II in Bushland Regeneration. TAFE, Wollongbar.

Sherringham, P. & Westaway, J. (1995) Significant Vascular Plants of Upper North East New South Wales. New South Wales National Parks and Wildlife Service.

Society for Ecological Restoration International Science & Policy Working Group (2004). *The SER International Primer on Ecological Restoration*. www.ser.org & Tucson: Society for Ecological Restoration International.

APPENDICES

APPENDIX A:	Example Performance Indicators
APPENDIX B:	Approaches for the rehabilitation / restoration of natural areas
APPENDIX C:	Guidelines for collecting seed and vegetative material
APPENDIX D:	Weed Control Methods
APPENDIX E:	NPWS checklist for bush regeneration in threatened species habitat or an endangered ecological community
APPENDIX F:	Sample Daily Record Sheet
APPENDIX G:	Sample Project Risk Assessment Form and Matrix
APPENDIX H:	Monitoring and Evaluation proforma
APPENDIX I:	Weeds severity categories

APPENDIX A: EXAMPLE PERFORMANCE INDICATORS

Performance indicators will be site specific and will also be dependent on the type of habitat being restored. For example, performance indicators for plant growth rates and vegetative cover for reconstruction of a riparian rainforest community growing on rich alluvial soils will not be the same as for reconstruction of a coastal Banksia forest growing on sand, with differing environmental factors and abiotic conditions in these habitats affecting the rate of plant growth.

The below example performance indicators are from restoration projects undertaken on the Tweed Coast., in a dune and riparian habitat both on coastal sand.

Example Performance Indicators for a Coastal Dune Habitat

- Frontal and secondary dune vegetation maintained in good condition.
- Complete prevention of blowouts.
- Sustained reduction of weed species to a level that ensures natural recruitment by native species is not suppressed or excluded.
- Nil fruiting of weed species after primary treatment.
- No inappropriate genetic material used in plantings.
- High (>70%) survival rate of planted stock and naturally recruited native species.
- Growth of tree species to achieve an average height of >1metre by the end of the fifth year of the Plan.
- A density of trees to average 1 per 5m² over the whole dunal area at the end of the fifth year of the Plan.
- Colonisation and use of the site by native flora and fauna.
- Effective restriction of access by pedestrians, vehicles and domestic and feral animals to the revegetation sites.

Adapted from Aspect North (2000) *Dune Management Plan for Kings (Casuarina) Beach*.

Example Performance Indicators for a Coastal Riparian Habitat

- Primary treatment of all weeds in the riparian zone by the end of year three.
- Nil fruiting of weed species after primary treatment.
- Increased number and abundance of native species.
- Increased recruitment of native species.
- Increased percentage canopy of native species.
- No inappropriate genetic material used in plantings.
- >70% survival rate of planted stock and naturally recruited native species.
- Growth of >1 metre by year three and 1.5 metres by year five for rainforest plantings and cover (cumulative cover from ground level to canopy) of 60% after 3 years and 80% after five years for sclerophyll plantings.
- Increased colonisation and use of the site by native fauna.
- Effective restriction of access by pedestrians, vehicles and domestic and feral animals to the revegetation sites.
- No net increase in streambank erosion.

Adapted from Aspect North (2002) *Cudgen Creek Riparian Plan, SALT*.

APPENDIX B: APPROACHES FOR THE REHABILITATION / RESTORATION OF NATURAL AREAS

Definitions for ecological restoration and rehabilitation according to the Society for Ecological Restoration International Science & Policy Working Group (2004) are given below.

Restoration

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. A restored ecosystem:

- Contains a characteristic assemblage of the species that occur in a reference community;
- Consists of indigenous species to the greatest practicable extent;
- Contains all functional groups necessary for the continued development and/or stability of the restored ecosystem;
- Is capable of sustaining reproducing populations;
- Functions normally for its ecological stage of development;
- Is suitably integrated into a larger ecological landscape;
- Potential threats to the health and integrity of the restored ecosystem have been eliminated or reduced as much as possible;
- Is sufficiently resilient to endure normal periodic stress events in the local environment; and
- Is self sustaining to the same degree as a reference community.

Rehabilitation

Rehabilitation emphasises the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure (Society for Ecological Restoration 2004).

Accepted approaches to site restoration are provided in the table below. The restoration approach chosen will be dependent on the degree of habitat disturbance and degradation, the anticipated potential of habitats to recover and the aims and objectives of the HRP.

Natural Regeneration	
Applies:	<ul style="list-style-type: none">• To relatively large, intact and weed-free areas of native vegetation.• Where native plants are healthy and capable of regenerating without human intervention.• When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.• Where the plant community has a high potential for recovery after any short-lived disturbance, such as a fire or cyclonic winds.• When preventative action is all that is required to avert on-going disturbance e.g. erection of fencing to prevent intrusion by cattle.
Affect of planting:	Planting in such areas can work against the aims of restoration by interfering with natural regeneration.

Goal vegetation community:	The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.
Assisted Natural Regeneration	
Applies:	<ul style="list-style-type: none"> • To natural areas where the native plant community is largely healthy and functioning. • When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water. • Where the natural regeneration processes (seedling germination, root suckering, etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc. • When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration. • When the main management issue is weed infestation.
Affect of planting:	Planting in such areas can work against the aims of restoration by interfering with natural regeneration.
Goal vegetation community:	The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.
Reconstruction	
Applies:	<ul style="list-style-type: none"> • Where the site is highly degraded or altered. • When the degree of disturbance has been so great and long-standing that the pre-existing native plant community cannot recover by natural means. • To sites such as areas of fill, sites affected by stormwater flow, areas that have been drastically cleared, either mechanically or by stock even though there may be a few remaining native trees or shrubs. • When a greater degree of human intervention is required, such as weed removal, cessation of grazing and/or slashing, amelioration of soil conditions such as importation of soils, drainage works or re-shaping of the landscape.
Affect of planting:	Importation of native species to the area is required, either through planting or direct seeding (in some situations). Natural regeneration and recruitment is insufficient to re-establish the original vegetation.
Goal vegetation community:	The re-establishing planted community should be similar to the original vegetation in structure, composition and diversity.
Fabrication (Type Conversion)	
Applies:	<ul style="list-style-type: none"> • Where site conditions have been irreversibly changed. • When it is not possible to restore the original native plant community. • Where a better-adapted local plant community can be

	<p>planted that will function within the changed conditions.</p> <ul style="list-style-type: none"> • In situations such as the construction of a wetland plant community to mitigate increased urban storm-water run-off.
Affect of planting:	Revegetation (planting) is the major component in a fabrication program.
Goal vegetation community:	<p>The re-establishing planted community should be similar to a naturally occurring plant community of the same type e.g. freshwater wetlands in structure, composition and diversity. Sometimes a combination of approaches is required. For example, when remnant native vegetation is surrounded by cleared and degraded lands, an assisted natural regeneration approach is appropriate for the remnant and a re-construction approach for the surrounding lands. If increased storm water run-off is a threat to the recovery of these areas, it may be necessary to establish a wetland plant community (fabrication) that will slow run-off and increase nutrient uptake, thus improving the quality of water entering a natural area.</p>

APPENDIX C: GUIDELINES FOR COLLECTING SEED AND VEGETATIVE MATERIAL

Guidelines for collecting seed and vegetative material for planting in rehabilitation/restoration projects in or near natural areas are detailed below.

Seed Collection

It is important to consider the issue of genetics in the selection of seeds and seedlings. The following guidelines have been developed to provide practical assistance when collecting seeds for use in rehabilitation/restoration projects:

- Collect in an area within the local catchment, preferably with the same aspect, and no further than a 10-kilometre radius (the extent of the area will vary depending on the method of seed dispersal which affects the ease of gene flow).
- Collect from as many "wild" growing plants as possible to ensure variation. Seeds should not always be gathered from a favourite or easy-to-access site, nor should they be picked only from well-laden or easy-to-reach specimens (all of which ensure lack of variation).
- Collect seed from several (at least 10) well-spaced plants to reduce the possibility of them being related. Mix together equal amounts of seed from each plant before planting. This is particularly important if planting uncommon or rare species. Make sure that a section 132C licence under the National Parks and Wildlife Act has been obtained if collecting seed from any protected native plant, or any plant that is a threatened species or is part of an endangered population or an endangered ecological community.
- If the planting program is to be ongoing, identify each seed collection plant so that different plants can be used in the following years.
- Do not collect only from "good looking" specimens. Such plants may be in this condition because they are responding to certain favourable environmental conditions present at the time. If these conditions change in any way so may their ability to survive.
- Try not to collect from isolated plants, as self-pollination and/or inbreeding may have occurred and this can often yield low quality seed.
- Seed collection from plantations and other planted specimens requires caution. A plantation will be a poor source of seed if it was derived from the seeds of a single plant, or from seeds of unsuitable provenance.
- Seed collected from woodlands or forests where only a few trees have flowered well will also tend to be more inbred than seed collected after a heavy flowering year when it is likely that greater rates of out-crossing have occurred.
- Be careful not to strip plants of their seeds as they may be important food for wildlife. Over-harvesting may also negatively impact on the local seed bank available for natural regeneration in the area of collection.

Collection of vegetative material

The use of vegetatively propagated plants in restoration/rehabilitation projects may be necessary if insufficient local viable seed is available or if germination of seeds is prolonged, erratic or difficult. Vegetative propagation can be a useful tool, especially when propagating ground layer plants that spread by bulbs, corms, rhizomes or stolons, such as native grasses, Matrush *Lomandra spp.*, Flax Lillies *Dianella spp.* and Native Ginger *Alpinea spp.*

Vegetative propagation includes the use of stem or root cuttings, aerial layering or division, and plants produced through these methods are genetically identical to parent plants. There is a lack of genetic variability within a planting and thus the possibility of increased susceptibility to disease and insect attack.

The following guidelines for collection of vegetative material are recommended:

- Collect in an area within the local catchment, preferably with the same aspect, and no further than a 10-kilometre radius.
- Collect material from as many "wild" growing plants as possible to ensure variation within the parent plants.
- Collect material from several (at least 10) well-spaced plants to reduce the possibility of parent plants being related. Make sure that a section 132C licence under the National Parks and Wildlife Act has been obtained if collecting material from any protected native plant, or any plant that is a threatened species or is part of an endangered population or an endangered ecological community.
- If the planting program is to be ongoing, identify each collection plant so that different plants can be used in the following years.
- Do not collect only from "good looking" specimens. Such plants may be in this condition because they are responding to certain favourable environmental conditions present at the time. If these conditions change in any way so may their ability to survive.
- Propagative material collected from isolated plants, plantations and other planted specimens requires extra caution. These will be a poor source of vegetative material if derived from inbred plants or plants of unsuitable provenance.

References & further information

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Indigenous Flora & Fauna Association Inc. Conservation Genetics (1992). What does it mean? How can we use it? In *Indigenotes Volume 5, Number 11, November 1992*.

Playford, J. (1997). Seed Sources – Conservation versus Preservation. In Big Scrub Rainforest Landcare Group 2005 *Subtropical Rainforest Restoration*. A practical manual & data source for landcare groups, land managers & rainforest regenerators. BSRLG Bangalow NSW.

Playford, J. (1998). Genetic issues in Bush Regeneration. In S. Horton (ed.) 1999, *Rainforest Remnants - a decade of growth*. Proceedings of a conference. NSW National Parks & Wildlife Service, Hurstville NSW.

APPENDIX D: WEED CONTROL METHODS

Current best practice methods for weed control are described below.

Please note: (1) It is the responsibility of the herbicide user to hold an off-label permit (obtained from the National Registration Authority for Agricultural and Veterinary Chemicals) for herbicide use that is not consistent with conditions specified on the label; and (2) The methods and herbicide use rates provided below are current best practice methods. It is the responsibility of the operator to ensure methods used are current best practice and are suitable for the site and any environmental constraints experienced at the site.

Cut-scrape-paint

This weed control method applies to all woody shrubs, trees and some vines.

- Cut plant low to the ground at an angle.
- Apply Glyphosate immediately at the rate of 1 part Glyphosate to 1.5 parts water, with a paintbrush approximately 1.5 centimetres wide.
- Scrape sides lightly to reveal green tissue and apply the herbicide to the scraped area.
- Take care that the brush is not contaminated with soil.
- Note - all seed that has high viability and longevity, e.g. *Senna spp.* and other members of the Fabaceae family, or plants with a high invasive potential, such as Umbrella Tree *Schefflera actinophylla*, must be removed from the parent and either composted on site or removed from the site.

Gouge-paint

This weed control method applies to those plant species that have a fleshy root system, such as rhizomes or large bulbs. It is particularly appropriate for the treatment of *Asparagus spp.*

- Gouge out sections of the fleshy base with a knife (if using on *Asparagus*, first cut the stems at shoulder height and also at the base).
- Apply 1 part Glyphosate to 1.5 parts water immediately, with a paint brush approximately 1.5 centimetres wide.

Stem Injection

This weed control method applies to all woody trees and shrubs with a diameter of about six to ten centimetres or greater.

- With a tomahawk, make a cut the width of the blade, at a slight angle, into the trunk. Note - it is important not to make cuts too deep.
- Apply herbicide immediately into the cut using a tree-injecting device (if using Glyphosate, apply at the rate of 1 part Glyphosate to 1.5 parts water).
- Repeat this procedure in a brickwork pattern around the circumference of the tree, as close to the ground as possible. Where the presence of a crotch angle makes this difficult, make a cut above it. Note - two rows of cuts will be sufficient for trees with trunks of six to ten centimetres; larger trunk diameters will need correspondingly more.
- Treat all visible lateral roots as per dot point 1.

Scrape-ditch-paint

This weed control method is applicable to many species of vines where it is desirable to treat the vines intact, particularly those with aerial tubers such as Madeira Vine *Anredera cordifolia* or those which will propagate from segments, e.g. Cape Ivy *Delairia odorata*.

- Scrape the stem tissue on one side of the stem only for at least 20-30 centimetres if possible. Note - on Madeira Vine, it is necessary to scrape heavily. Scrape as many sections of the stem as possible.
- Apply undiluted Glyphosate with a paintbrush.
- On stems that are thicker or horizontal, make a ditch into the stem with a knife and apply herbicide. Tubers and side roots should be treated the same way. Note - care must be taken not to sever the stem.

Spraying

This weed control method is carried out using a 15 litre backpack spray unit with a modified spray nozzle that gives a solid spray pattern. Glyphosate is the main herbicide used with the addition of a marker dye. For plants that show some resistance (e.g. Madeira Vine) or where growing conditions are not optimal, an acidifying agent, LI700®, is added. Metsulfuron methyl can also be used for resistant species and grasses. It should be used with a surfactant, such as Agral®.

Where both Glyphosate and Metsulfuron methyl are recommended for a species, it may be possible to use a commercially available compound of these two herbicides. This approach is currently under trial and is not suitable for operators unskilled in precision spraying.

Dilution rates for Glyphosate and Metsulfuron methyl are in accordance with the manufacturer's recommendations and any variation requires a permit from the National Registration Authority.

Dilution rates for Glyphosate to water for treatment of some weed species are provided below:

- Plants with more or less succulent leaves, e.g. Wandering Jew *Tradescantia fluminensis*, Madeira Vine *Anredera cordifolia* (autumn to winter is the suggested time for spraying these plants), Spider/Ribbon Plants *Chlorophytum spp.* etc - 1 part Glyphosate to 50 parts water + LI700® 0.5%
- Lantana *Lantana camara* - 1 part Glyphosate to 100 parts water
- Other soft-leaved plants, annuals and grasses - 1 part Glyphosate to 100 parts water
- Bitou Bush *Chrysanthemoides monilifera subsp. rotundata* - 1 part Glyphosate to 150 parts water to 1 part Glyphosate to 400 parts water

Typical dilution rates for Metsulfuron methyl to water are - 1.5g Metsulfuron methyl to 10 litres water + 20 millilitres Agral® to 10 litres water.

Overspray

This weed control method is applicable to large, dense infestations of such plants as *Lantana camara*, where it is desirable to leave the dead plants intact to prevent erosion and over-exposure of large areas, protect native seedlings from predators such as wallabies, and avoid trampling by humans.

- Spray over the top of the infestation, using a weak solution of Glyphosate.

- Any native plants that may be under the weed will be protected by the foliage cover of the weed.
- Leave the sprayed plants intact so that native seedlings can establish under the shelter provided.
- The rate for overspraying of Lantana is 1 part Glyphosate to 100 parts water.

Alternatively, weeds can be cut and flattened with bush-hooks or loppers and the subsequent regrowth sprayed with Glyphosate. In many cases it is preferable to overspray wherever practicable as this will cause less erosion and trampling of suppressed native plants, such as ferns and seedlings. However, handwork will be necessary to cut-scrape-paint any unsprayed Bitou Bush or Lantana that surrounds native plants.

Crowning

This weed control method is applicable to weeds which have their growing points below the surface of the ground (corms, bulbs, rhizomes, clumped or fibrous root systems, etc. e.g. *Asparagus spp.*, *Chlorophytum comosum* and grasses).

- Grasp the leaves or stems and hold them tightly so that the base of the plant is visible. Plants with sharp leaves or stems should be cut back first.
- Insert the knife close to the base of the plant at a slight angle, with the tip well under the root system.
- Cut through the roots close to the base. Depending on the size of the plant, two or more cuts may be needed to sever all the roots.
- Remove the plant. Make sure that the base of the plant where the roots begin is completely removed.

Adapted from Joseph (2001)

APPENDIX E: NPWS CHECKLIST FOR BUSH REGENERATION IN THREATENED SPECIES HABITAT OR AN ENDANGERED ECOLOGICAL COMMUNITY

The following guidelines are derived from the relevant sections of NPWS Draft Checklist for Bush Regeneration Activities in the Habitat of Threatened Species, Endangered Populations and Endangered Ecological Communities.

Management Planning:	yes	no	more info attached
The proposed activities will be in accordance with a management plan or site plan (map). Please attach the plan or relevant sections of the plan or strategy to the licence application.			
The project has been discussed with the relevant Landcare coordinator. If not, provide details of any other professional advice you have sought, e.g. from a qualified bush regenerator.			
A NPWS Wildlife Atlas database search of a 5km radius of the site has been undertaken to identify threatened flora/fauna species known or likely to occur on the site.			
Prior to commencing any works on site, a permit or permission will be obtained from the relevant landowner(s) or land manager(s).			
Training and supervision:	yes	no	more info attached
All activities by workers will be regularly checked and approved by the co-ordinator.			
All workers will be informed of any threatened species or endangered ecological communities known from the area or which may occur in the area and the potential impacts of activities on these species/communities e.g. vines on the edge of a littoral rainforest remnant may protect the remnant from salt-bearing winds.			
All workers have adequate weed and native plant identification skills i.e. all workers can identify and differentiate between weeds and native plants that occur on the site.			
Workers will be familiar with the identifying features of threatened flora that are known or likely to occur in the project area. Where threatened species known from the area are similar to weed species, the distinguishing features between these will be understood prior to commencing the work.			
Access to site:	yes	no	more info attached
All vehicular access to the site will be restricted to formed roads.			
Unnecessary damage to sites will be avoided e.g. avoid working in wet weather to lessen soil compaction.			
To reduce the possibility of introducing plant diseases and weeds the following measures will be applied: (1) Secateurs will be sharp and cleaned with methylated spirits; and (2) Footwear will be cleaned of loose soil and preferably treated with bleach between sites.			

Impacts on flora:	yes	no	more info attached
Prior to any works being undertaken, the presence or absence of threatened flora will be determined by a thorough walking search of the area.			
All threatened flora will be tagged with highly visible flagging tape before work commences. If a number of individuals occur in a clump, the area should be marked out with flagging tape.			
Cutting or damaging of threatened flora will be avoided.			
All plants will be positively identified before they are removed (pulled, cut, poisoned etc).			
Weed removal within two metres of a threatened species will be undertaken by hand.			
Impacts on fauna:	yes	no	more info attached
All workers will be aware of any threatened fauna that are known or likely to occur on site, and the potential impacts of the proposed activities on those species.			
The habitat and refuge potential of weeds and rubbish will be considered prior to removal e.g. Lantana can provide cover for threatened fauna such as the Bush-hen. Dead Lantana and poisoned Camphor Laurels should, where possible, be left in situ.			
Weeds will be removed gradually in areas where an infestation is extensive. Ideally, 50% of weeds that may provide habitat should be left until native plant species have re-established and provide alternative refuge.			
Disturbance to, and removal of rocks, logs and other potential refuge sites will be avoided.			
A herbicide registered for use near waterways will be used within five metres of waterways.			
Herbicide spraying will be restricted to a distance greater than five metres from watercourses where threatened frogs are known or likely to occur and within a ten metre radius of records of threatened frogs.			
A buffer of one metre along other watercourses will be maintained in which no herbicide will be sprayed.			
Care will be taken to minimise disturbance to shy or cryptic species e.g. the Marbled Frogmouth roosts in vine 'curtains'.			
Care will be taken to minimise disturbance to the leaf litter layer.			
Reconstruction through revegetation: (Note - this section does not address propagation or planting of threatened species. This activity would need to be separately addressed).	yes	no	more info attached
Seed collection or cuttings will be from species, populations or ecological communities other than those listed as threatened (unless licensed)			
Prior to collecting any seed or cuttings permission will be obtained from the relevant landholder or manager of the site e.g. a licence is required to collect native plants on National			

Parks estate.			
Seed collection from any one species will be limited to less than 10% of the available crop at that site.			
Seed collection from any individual plant will be limited to less than 10% of the available crop.			
If your seed source is used by other seed collectors, has consideration been given to minimising any cumulative impacts to the source plants? Some individual plants are known as a reliable seed source and their seed is collected extensively. This may result in – (1) a reduction in genetic diversity); and (2) an impediment to the individual's natural ability to regenerate.			
When collecting propagation material from a wild population, collection will be random from as many individuals as possible across the population to ensure a representative range of genetic material is collected. Collectors will avoid selection of propagation material on the basis of physical attributes e.g. tallest, most attractive, greatest amount of seed or flowers.			
Plantings will be sourced from stock of local provenance.*			
Will propagated material collected only be used at the subject site? i.e. excess material will only be used at other sites if it meets the provenance criteria.			
(Plants are likely to be purchased from reputable commercial nurseries – appropriate seed collecting techniques assumed)			
A buffer of five metres will be maintained around all threatened plant specimens. Planting will only be undertaken outside this buffer. This requirement is intended to protect the roots of the threatened plant from damage or introduction of disease.			
Care will be taken to ensure that mulch does not introduce weeds or impede natural regeneration at the site.			
Care will be taken to ensure that weeds and/or <i>Phytophthora cinnamomi</i> are not introduced to a site from pots of cultivated plants.			
Consideration will be given to the possible impacts of plantings on the ecological requirements of threatened species at the site e.g. reduced light, competition, etc.			
Species will be planted within their natural habitat and range. Plantings will be guided by the plants' local habitat preferences e.g. the species used for plantings along watercourses should be those that naturally occur in that habitat in your local area.			
Herbicide use: (Note - A permit from the National Registration Authority for Agricultural and Veterinary Chemicals PO Box E240, Kingston ACT 2604 may be required for herbicide use that is not consistent with conditions specified on the label).	yes	no	more info attached
A buffer of two metres will be maintained around all threatened plant specimens. Herbicide use will only be undertaken outside this buffer.			
Herbicide use will cease where there are any signs of threatened species being affected by herbicide e.g. browning off, wilting or deformed growth.			
All herbicide spray operators will be capable of undertaking precise and effective weed control.			

Spray will be directed away from threatened flora.			
Herbicide will only be sprayed in suitable weather conditions when the impact of spray drift (windy) or run-off (wet) on threatened flora is minimised.			
Marker dyes e.g. white field marker' will be mixed with herbicide before use. Marker dye enables the worker to see where the spray is landing.			
Reporting and data records:	yes	no	more info attached
Any new records of threatened species will be provided within three months to NPWS. These records will be in a format appropriate for entry into the Wildlife Atlas, once identification of a threatened species is confirmed by a recognised authority.			

*Local provenance species should be regarded as those species propagated from material that has been collected from a natural wild population as close as possible to a site. For example, within the local catchment, which may be based on a local creek.

APPENDIX F: SAMPLE DAILY RECORD SHEET

Site Name / Location: _____

Date: _____ Time: _____ to _____

Team / Staff: _____

Growing conditions	Temperature / Humidity		Weather conditions		Wind direction / Speed			
Zone(s) / Work locations	Hours	Weeds treated			Method	New T.S. encountered / location		
Chemicals used / Rates / Totals						Notes and comments		
Equipment used	Glyphosate	Met-methyl	Herbicide	Additive	Other	Water	Number mixed	*include batch number and brand
Daily Chemical Totals								

APPENDIX G: SAMPLE PROJECT RISK ASSESSMENT FORM AND MATRIX

Sample Risk Assessment Form

HAZARD IDENTIFIED	RISK RATING	CONTROL MEASURE RISK ASSESSMENT
Traffic Hazard Working in close proximity to roads		<input type="checkbox"/> Use traffic controller <input type="checkbox"/> Use of safety signs <input type="checkbox"/> Use of warden hats or temporary barrier <input type="checkbox"/> High visibility clothing
Sun Exposure Hot conditions		<input type="checkbox"/> Reduce exposure time – rest breaks <input type="checkbox"/> Provide ample water <input type="checkbox"/> Protective clothing and sunscreen
Working With Chemicals		<input type="checkbox"/> Current MSDS held <input type="checkbox"/> Adequate washing facilities <input type="checkbox"/> Hazardous substances stored and labelled correctly <input type="checkbox"/> Use of personal protective clothing <input type="checkbox"/> Rotate tasks to avoid prolonged exposure
Biological Hazard Needle stick injury		<input type="checkbox"/> Inspect site before work commences <input type="checkbox"/> Provide appropriate waste disposal container <input type="checkbox"/> Personal protective equipment
Manual Handling Handling heavy objects		<input type="checkbox"/> Use correct lifting and carrying techniques <input type="checkbox"/> Use lifting aids <input type="checkbox"/> Use wheelbarrow etc wherever possible <input type="checkbox"/> Ensure clear area before lifting <input type="checkbox"/> Share the load <input type="checkbox"/> Rotate activities or rest breaks <input type="checkbox"/> Appropriate personal protective clothing
Crush Impact Cut, crush and impact		<input type="checkbox"/> Knowledge and correct use of tools <input type="checkbox"/> Appropriate personal protective clothing <input type="checkbox"/> Correct tool for job
Slips, Trips and Falls		<input type="checkbox"/> Avoid carrying awkward or heavy objects on uneven ground <input type="checkbox"/> Remove all potential hazards if possible or mark with coloured tape <input type="checkbox"/> Do not leave tools lying in pathways <input type="checkbox"/> Do not run <input type="checkbox"/> Ensure boots are firmly laced
Hazardous Plants Plants that may cause allergic reaction		<input type="checkbox"/> Identify plants which may cause allergic reactions <input type="checkbox"/> Mark area with coloured tape
Bites and Stings		<input type="checkbox"/> Create disturbance on site before beginning work <input type="checkbox"/> Apply insect repellent <input type="checkbox"/> Wear appropriate personal protective equipment

Sample Risk Assessment Matrix

How severely could it hurt someone Or How ill could it make someone	Very likely - could happen anytime	Likely - could happen sometime	Unlikely - could happen, but very rarely	Very unlikely - could happen, but probably never will
☠ kill or cause permanent disability or ill health	1	1	2	3
Long term illness or serious injury	1	2	3	4
Medical attention and several days off work	2	3	4	5
! First aid needed	3	4	5	6

APPENDIX H: MONITORING AND EVALUATION PROFORMA

A guide to completing this form is included in the appendices of the SAP guidelines. This form should be completed for each management **zone** within a work site. Assessment should be made of the zone as a whole.

Date		Observer	
Site name		Site location	
Zone		Area	

Dominant Vegetation Community

--

Dominant Species Canopy			
Dominant Species Mid			
Dominant Species Ground			

Notes and Comments (including Threatened Species observations, presence of EEC, variations in veg types and location)

--

Structural and Compositional Integrity						
Stratum	Height Range (m)	%Cover			Disturbance Type / Stratum	Score (1-4)
		Native s	Exotic s	Total		
Emergent						Native Vegetation Cover
Canopy						Age Class Diversity
Mid						Native Species Composition
Ground						Overstorey Regeneration
						Growth Stage
Notes and Comments:						Overall Score (average)

Habitat Features (Score 0-3)

Hollows(>5cm)		Glossy Black Cockatoo FT	
Fallen Logs		Koala FT	
Native Grass/Reed/Sedge		Blossom bat FT	
Riparian/Wetland		Flying Fox Camp	
Gullies		Other Feature	
Rock/Boulders			
Cave/Overhangs		Raw Score	
Low Cover/Thickets		Habitat Assessment Score	

Dominant Weed Assessment

% cover

Species	Upper	Mid	Lower

Weed Density Score =

- 5_ Few or no weeds observed (No or Light Infestation).
- 4_ Weeds mainly edges /very scattered (Light to Mod)
- 3_ Weeds common, but patchy or scattered (including canopy)
- 2_ Weeds throughout excluding canopy (Heavy infestation)
- 1_ Weeds throughout including the canopy (Heavy infestation)

Weed Severity Score =

- 5_ No problem weeds present
- 4_ Infestation is mostly Cat 3 weeds
- 3_ Infestation a mix of Cat 2 & 3 weeds
- 2_ Infestation mostly Cat 2 or a Cat 1 weed present
- 1_ 2 or more major weeds present

Weed Total Score = (2-10)

Other weeds

Threats:

Other Threats	Score
---------------	-------

Management notes:

Erosion Control	
Structural Works	
Rubbish removal	
Contamination	
Pest Control	
Fire Management	
Other	

Erosion	
Grazing	
Dumping	
IFR	
Vehicles	
Clearing	
Underscrubbing	
Other	
Raw Score	
Scaled Score	

Fencing

Fence Type	Length	Cost
Fencing Notes:		

Photo points

Photo point No.	Description	Direction (N,S,E,W)	GPS co-ordinates	
			Easting	Northing

Guide to completing Bush Futures Site Attribute and Habitat Assessment Data Sheet.

- A data sheet should be completed for **each management zone** as defined by the Site Action Plan. Therefore more than one data sheet should be completed for each work site.
- The scoring methodology was developed to create a score of overall health of the area which can be assessed over time to determine if management actions are having a positive impact on the site resulting in a increase score of the site over time.
- Data sheets should be complete prior to on-ground works and then by each progress report period as defined by council.
- Data sheet information will be entered into council database to monitor and report on project outcomes.

1. Record date, site name, location, observers, and approximate area of management unit.

Dominant Vegetation Community

2. Record a brief Vegetation Description for the management Unit noting dominant floristics and structure
3. Record the three dominant species in each strata (canopy, mid and ground).
4. Note variation in vegetation communities recording presence of minor vegetation communities and relevant notes of significance regarding threatened species occurring on the site.

Structural and Compositional Integrity Assessment

5. Record which strata are present in the area and the height range of each strata.
6. Record the percentage canopy cover (natives, exotic and total vegetation) for the canopy and emergent strata (% of sample site within the vertical projection of the periphery of the crowns)
7. Record the percentage cover of the other strata (natives, exotics and total vegetation) (% of sample site occupied by the vertical projection of the foliage and woody branches.)
8. **Native Vegetation Cover Score:** Use vegetation benchmarks (provided below) and professional judgement and **score (1-4)** for native vegetation cover %:
 - 4- All strata OK – within benchmarks for all strata (woody or non –woody communities),
 - 3 - Only overstorey OK – within over-storey benchmarks for woody communities,
 - 2 – Only lower strata OK – within lower strata benchmarks only
 - 1 - Other – other observation.
9. **Age Class Diversity Score:** score (1-4) for forests and woodlands only (not shrublands or non woody communities)
 - 4 – All Strata OK – range of age classes within all strata (or within normal limits),
 - 3 – Only overstorey OK – range of age classes (or within normal limits) within overstorey only;

2 – Only lower strata OK- range of age classes (or within normal limits) within lower strata only.

1 – Other. Other (woody or non-woody vegetation communities)

10. Native Species Composition: Score (1-4) for native species composition. Assess both woody and non woody communities. Native species composition (NSC) includes both species richness and relative abundances (use professional judgement for normal limits). Do not assess weeds.

4- All Strata OK –NSC within normal limits and weed cover < 10 % in all relevant strata (woody /non woody),

3 – Only overstorey OK - NSC within normal limits and weed cover < 10 % within the overstorey (woody communities only),

2 – Only lower strata OK – NSC within normal limits and weed cover < 10% in lower strata only (woody communities only),

1 – Other – Other (woody or non woody vegetation communities)

11. Overstorey Regeneration: Score (1-4) overstorey regeneration. Assess regeneration (young canopy species - overstorey species up to 5 cm diameter at breast height (dbh).

4 – Common – native regeneration common throughout,

3 – Patchy – native regeneration common but patchy,

2 – Minimal – native regeneration observed but minimal,

1 – None, No native regeneration observed.

12. Growth Stage: Score (1-4) for growth stage of vegetation. Assess successional stage of vegetation unit as an indication of disturbance history.

4 Old growth – Mature forest or other vegetation with common age related features (fallen logs, senescent trees, stags, tree hollows, epiphytes, buttresses, large trees, emergents etc).

3- Mature vegetation – well developed vegetation; e.g. > 5 yrs old for non woody vegetation; >8yrs for shrublands; >40 yrs for forests.

2 - Advanced regrowth – intermediate successional development e.g. 1 – 5 yrs old for non woody vegetation; 3 – 8 yrs for shrublands; 10 – 40 yrs for forests.

1 – Early successional development e.g. < 1 yr old for non-woody vegetation; < 3 yrs for shrublands; < 10 yrs for forests.

13. Note the overall (average) site score for steps 9 – 16.

14. Note any relevant disturbances observed and the relevant stratum

15. Can note any relevant comments / observations

Habitat Feature Assessment

16. Abundance of habitat features within the management unit where for each habitat feature:

0= Absent,

1 = Few observed,

2 = common,

3 = abundant.

Raw score = sum of all scores

Scaled score: will be converted into an index or %.

Weeds and other Threat Assessment

17. Rank the 5 dominant weed species (in order of abundance) across the site noting species and the % cover for relevant strata.

Dominant weed: weed which is recorded = or > 5% cover of any stratum.

Record all other weeds present on the site in *Other Weeds* box.

18. Weed Density Score within the management unit:

- 1 – Weeds throughout the canopy (Heavy infestation),
- 2- Weeds throughout excluding canopy (Heavy infestation),
- 3 - Weeds common, but patchy or scattered (including canopy),
- 4 – Weeds mainly around edges or very scattered (Light to Mod),
- 5 – Few or no weeds observed (No or Light infestation)

19. Weed Severity Score. Assess dominant weeds only. See table below for weed categories. If no dominant weeds present but some are problem weeds the use category 4.

- 1 –2 or more category 1 weeds are present,
- 2- Infestation mostly category 1 &/or 2 weeds present,
- 3 –Infestation a mix of category 2 & 3 weeds,
- 4 – Infestation is mostly category 3 weeds,
- 5 –No problem weeds present:

20. Total Weed Score is the sum of the Weed Density and Weed Severity scores (2 – 10)

21. Other Threats: Score the presence of other threats .Where threat is present a score of -1 is given.

22. Scaled score will be converted

23. Site score will be calculated on all field assessed values

24. Site ranking will be calculated in relation to all other sites entered in database.

Fencing and Management notes

25. For **fencing** note type (Standard, Electric), length, cost and any relevant notes/ issues.

26. Brief comments on any other potential or recommended management actions can be noted

next to the relevant action.

Photo Points

A minimum of 1 photo point must be established in each management zone. For larger more complex zones additional photo points should be established.

Photo points should be established at the start of the project before on-ground work begins and included in the site action plan if possible.

Record relevant photo point number, site identifier or description of shots, direction facing and GPS co-ordinates (easting and northing).

- Photo point location must be marked using a star-picket with flagging tape tied to the top.
- Photos should be taken at the same time of the day each time.
- The camera lense and angle of the photo should be the same for each photo.
- The star-picket must be located in a similar location in each photo to provide a reference point.

DRAFT

APPENDIX I: WEEDS SEVERITY CATEGORIES

ComName	ScName	Category	Form
Asparagus Fern(s)	<i>Asparagus spp.</i>	1	Groundcover/Vine
Balloon Vine	<i>Cardiospermum grandifolium</i>	1	Vine
Cats Claw Climber	<i>Macfadyena unguis-cati</i>	1	Vine
Glory Lily	<i>Gloriosa superba</i>	1	Groundcover
Madeira Vine	<i>Anredera cordifolia</i>	1	Vine
Morning Glory	<i>Ipomoea spp.</i>	1	Vine
Moth Vine	<i>Araujia sericifolia</i>	1	Vine
Privet(s)	<i>Ligustrum spp.</i>	1	Tree
Salvinia	<i>Salvinia molesta</i>	1	water weed
Camphor Laurel	<i>Cinnamomum camphora</i>	2	Tree
Broad Leaf Pepper Tree	<i>Schinus terebinthifolia</i>	2	Tree
Cape Ivy	<i>Delairea odorata</i>	2	Vine
Chinese Celtis	<i>Celtis sinensis</i>	2	Tree
Dutchman's Pipe	<i>Aristolochia elegans</i>	2	Vine
Firethorn	<i>Pyracantha spp</i>	2	Shrub / Tree
Fishbone Fern	<i>Nephrolepis spp.</i>	2	Groundcover
Green-leaved desmodium	<i>Desmodium intortum</i>	2	Vine
Hairy Commelina	<i>Commelina benghalensis</i>	2	Groundcover
Hawthorn	<i>Crataegus monogyna</i>	2	Shrub
Honeysuckle	<i>Lonicera japonica</i>	2	Vine
Monbretia	<i>Crocosmia X crocosmiiflora?</i>	2	Groundcover
Mother of Millions	<i>Bryophyllum spp.</i>	2	Groundcover
Ochna	<i>Ochna serrulata</i>	2	Shrub
Silver-leaf Desmodium	<i>Desmodium uncinatum</i>	2	Vine
Siratro	<i>Macroptilium atropurpureum</i>	2	Vine
Smooth Senna	<i>Senna X floribunda</i>	2	Shrub
Thorny Poinciana	<i>Caesalpinia decapetala</i>	2	Vine
Turkey Rhubarb	<i>Acetosa sagittata</i>	2	Vine
Umbrella Tree	<i>Schefflera actinophylla</i>	2	Tree
Watsonia	<i>Watsonia meriana cv. Bulbillifera</i>	2	Groundcover
Ardisia	<i>Ardisia crenulata</i>	2	Shrub
Winter Senna	<i>Senna pendula var glabrata</i>	2	Shrub
Brazilian Cherry	<i>Eugenia uniflora</i>	2	Shrub / Tree
Coffee	<i>Coffea arabica</i>	2	Shrub

Coral Tree	<i>Erythrina spp</i>	2	Shrub / Tree
Freckle Plant	<i>Hypoestes phyllostachya</i>	2	Groundcover
Ginger Lily	<i>Hedychium gardnerianum</i>	2	Shrub
Guavas	<i>Psidium spp</i>	2	Shrub / Tree
Mother-in-law's Tongue	<i>Sansevieria trifasciata</i>	2	Groundcover
Passionfruit	<i>Passiflora spp.</i>	2	Vine
Singapore Daisy	<i>Wedelia trilobata</i>	2	Groundcover
Tradescantia (Wandering Dew)	<i>Tradescantia fluminensis</i>	2	Groundcover
White Butterfly	<i>Syngonium podophyllum</i>	2	Vine
White Trumpet Flower, Monkey's Comb	<i>Pithecoctenium crucigerum</i>	2	Vine
Green Cestrum	<i>Cestrum parqui</i>	2	shrub
Creeping Inch Plant	<i>Callisia repens</i>	2	ground cover
Orange Trumpet Vine	<i>Pyrostegia venusta</i>	2	vine
Yucca	<i>Yucca elephantides</i>	2	shrub
Fucreae	<i>Fucreae sp</i>	2	shrub
Bana Grass	<i>Pennisetum purpurea</i>	2	grass
Para grass	<i>Brachiaria mutica</i>	2	grass
Bitou Bush	<i>Chrysanthemoides monilifera</i>	3	Shrub
Aerial Yam	<i>Dioscorea bulbifera</i>	3	Vine
African Olive	<i>Olea europaea ssp. africana</i>	3	Tree
Black-eyed Susan	<i>Thunbergia alata</i>	3	Vine
Blackberry	<i>Rubus fruticosus agg. Spp</i>	3	Vine
Blue Skyflower	<i>Thunbergia grandiflora</i>	3	Vine
Bush Lemon	<i>Citrus lemonia</i>	3	Shrub / Tree
Busy Lizzie	<i>Impatiens walleriana</i>	3	Groundcover
Butterfly Bush	<i>Buddleja madagascariensis</i>	3	Vine
Cadagi	<i>Eucalyptus torelliana</i>	3	Tree
Callisia	<i>Callisia fragrans</i>	3	Groundcover
Canna Lily	<i>Canna indica</i>	3	Shrub
Cape Honeysuckle	<i>Tecoma capensis</i>	3	Vine
Caster Oil Tree	<i>Ricinus communis</i>	3	Shrub / Tree
Century plant	<i>Agave spp.</i>	3	Shrub
Coast TeaTree	<i>Leptospermum laevigatum</i>	3	Shrub / Tree
Cocos Palm	<i>Syagrus romanzoffianum</i>	3	Tree
Coral Berry	<i>Rivina humilus</i>	3	Shrub
Duranta	<i>Duranta repens</i>	3	Shrub
Evening Primrose	<i>Oenothera spp</i>	3	Groundcover

Golden Rain Tree	<i>Koelreuteria paniculata</i>	3	Tree
Jacaranda	<i>Jacaranda mimosifolia</i>	3	Tree
Japanese Daisy	<i>Tithonia diversifolia</i>	3	Shrub
Lantana	<i>Lantana camara</i>	3	Shrub
Large-leaf Abutilon	<i>Abutilon grandiflorum</i>	3	Shrub
Loquat	<i>Eriobotrya japonica</i>	3	Tree
Mistflower	<i>Ageratina riparia</i>	3	Groundcover
Mulberry	<i>Morus sp</i>	3	Tree
Nightshades	<i>Solanum spp</i>	3	Shrub
Orange Jessamine	<i>Murraya paniculata</i>	3	Shrub
Pellaea viridis	<i>Pellaea viridis</i>	3	Groundcover
Periwinkle	<i>Vinca major</i>	3	Groundcover
Prickly Pear	<i>Opuntia spp</i>	3	Shrub
Tecoma	<i>Tecoma stans</i>	3	Shrub / Tree
Variegated Ribbon Grass	<i>Chlorophytum comosum</i> cv. <i>Variegatum</i>	3	Groundcover
Devil's Fig	<i>Solanum chrysotrichum</i>	3	Tree
Broad-leaved Paspalum	<i>Paspalum wettsteinii</i>	3	Grass
Pigeon Grass	<i>Setaria spp.</i>	3	Grass
Callisia	<i>Callisia repens</i>	3	Groundcover
Whisky Grass	<i>Andropogon virginicus</i>	3	grass
Trumpet Flower	<i>Campsis radicans</i>	3	shrub
Introduced grasses (other than those on list)	<i>Introduced grasses</i>	3	
Slash Pine	<i>Pinus elliottii</i>	3	Tree
Tabebuia	<i>Tabebuia chrysotricha</i>	3	tree
Icecream Bean	<i>Inga</i>	3	tree

This table displays the vegetation benchmarks for various community types in the Northern Rivers. This is used, combined with professional judgement, to score the **Native Vegetation Cover**.

Veg type benchmarks: NORTHERN RIVERS										
	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)	
Veg Type Name	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Subtropical Rainforests	50	100	10	100	0	5	0	20	10	60
Littoral Rainforests	40	100	10	100	0	10	5	15	5	50
Dry Rainforests	20	100	10	60	0	25	5	25	5	40
Coastal Swamp Forests	10	70	0	80	0	50	0	60	5	60
Coastal Heath Swamps	0	80	0	80	0	20	20	75	1	60
Wallum Sand Heaths	0	10	0	60	0	40	20	80	5	60
Coastal Floodplain Wetlands	10	50	5	70	1	70	0	10	1	80
Coastal Headland Heaths	0	5	0	50	5	75	5	80	1	40
Mangrove Swamps	5	100	0	5	0	5	0	1	0	5
Coastal Dune Dry Sclerophyll Forests	10	50	0	60	5	60	5	60	5	60
North Coast Wet Sclerophyll Forests	15	100	25	100	0	90	0	25	10	50

This table was adapted from the Vegetation Benchmark database. Further detail can be found at:

<http://www.environment.nsw.gov.au/biobanking/vegbenchmarkdatabase.htm>

Example Subtropical rainforest: Native overstorey cover must be 50%-100% to be within benchmark. Native mid-story cover must be between 10%-100% to be within benchmark etc.

Example Coastal Swamp Forest: Native Overstorey cover must be 10%-70% to be within benchmark (as 70% is maximum FPC for this veg type.) Native mid-story cover must be between 0%-80% to be within benchmark (i.e. no weeds present) etc.

APPENDIX I: RESTORATION PLAN CHECKLIST

CONSENT CONDITION if relevant

{insert relevant consent condition(s) or compliance action requirement}

**SUMMARY OF ISSUES RELATING TO THE CONSENT AND/OR COMPLIANCE
(eg 50 m buffer to be dedicated to Council, compensation, restoration)**

1) General Requirements

- ☐ Habitat Restoration-Rehabilitation-Regeneration-Vegetation Management Plans was undertaken and prepared by a qualified and experienced ecological consultant and/or a qualified and experienced bush regenerator.
- ☐ Data presented in the reports is quantitative (numeric figures were used eg, to quantify the area of habitat available)
- ☐ Defined terminology and glossary of definitions used are provided in the reports.
- ☐ Language is definitive and quantifiable (eg when discussing methods, areas)
- ☐ The use of intangible language has been adequately justified and where relevant alternatives were provided.
 - ☐ could, would, should, maybe, ideally
 - ☐ where possible, when possible, if possible, probably, possibly
- ☐ Numeric figures were used to describe the following
 - ☐ the area of habitat available
 - ☐ the area of habitat loss
 - ☐ the proposed area of habitat replacement
 - ☐ amount of habitat features
- ☐ A copy of the report is provided to Council electronically as a word document
- ☐ All maps are at the same scale and can be overlaid

CONTENTS OF PLAN

2) General

- ☐ Cover Page
 - ☐ Name of Site and Location
 - ☐ Biodiversity Conservation Management Plan
 - ☐ Period for which Plan is Operational (minimum 5 years)
 - ☐ Prepared by
 - ☐ Prepared for
 - ☐ Year Prepared
 - ☐ DA Number and if relevant Consent Condition Number
- ☐ Executive Summary
- ☐ Contents Page
- ☐ Introduction
 - ☐ Statement of Qualifications and experience of the author
 - ☐ Background Information

- ☐ Rationale for the Plan
- ☐ Aims and Objectives of the Plan (specific and measureable with timeframes)

3) Description of the Subject Site and Study Area

- ☐ Description of location in the landscape
- ☐ Relationship to development (proposed and approved)
- ☐ Ecological Status (Tweed Vegetation Management Plan)
- ☐ Security of Land Tenure
- ☐ Site size and dimensions
- ☐ Land Use
 - ☐ Current and Future Land Use
 - ☐ Historic Land Use
 - ☐ Adjacent Land Use
- ☐ Site Characteristics
 - ☐ Landform
 - ☐ Geology and Soils
 - ☐ Extant water regime
 - ☐ Description of Vegetation Assemblages, Aquatic Habitats (incl. map/plan & key)
 - ☐ Environmental Conditions (geology, soils, landscape, water regime, noise, light etc)
- ☐ Study Area
 - ☐ Expansion of subject site to include relevant area(s) of off-site impacts
 - ☐ Adjacent Land Cover
- ☐ Provision of Maps and Plans
 - ☐ Details of the Proposal
 - ☐ Management Zones
 - ☐ Landscaping Plans
 - ☐ Tree Survey
 - ☐ Proposed Infrastructure and Ancillary Development

Description of the Biodiversity Conservation Values – Baseline Data (derive from, at least in part, from initial ecological assessment methods)

- ☐ Biodiversity at the Landscape Level
 - ☐ Wildlife Corridor
 - ☐ Fragmentation-Isolation and Opportunities for Re-colonisation
 - ☐ Connectivity
 - ☐ Local and Regional Significance
 - ☐ Stepping Stone-Contiguous
- ☐ Vegetation
 - ☐ Vegetation Assemblages (species richness, structure, condition)
 - ☐ Ecological Communities
 - ☐ Flora Species
 - ☐ Fauna
 - ☐ Fauna Species (threatened, protected)
 - ☐ Birds

- ☐ Mammals
 - ☐ Reptiles
 - ☐ Frogs
 - ☐ Invertebrates
 - ☐ Habitat Attributes (abundance and spatial distribution)
 - ☐ Significant Species
 - ☐ Biodiversity at the Genetic Level
 - ☐ Exotic (Weed and Feral) Species (include abundance)
 - ☐ Ecosystem Resilience
 - ☐ Habitat Mapping
-

4) Management Issues and Actions

- ☐ Actual or Potential Threats to Biodiversity (list and then detail) NB: Can also be derived from previous assessment and/or additional issues identified by consent authority or consultants, stakeholders)
- ☐ Key Threatening Processes to Be Managed
- ☐ Baseline Information
 - ☐ Ecosystem Requirements (e.g. ecological processes, fire, flooding, drying)
 - ☐ Ecosystem/Vegetation Condition (map/plan & key)
 - ☐ Species and Population Requirements (e.g. fire, flooding, shelter, shade, pollination, habitat present, absent)
- ☐ Ecological Restoration Framework
 - ☐ Ecological Restoration Strategies Applicable to Site (e.g. Natural regeneration, assisted natural regeneration, reconstruction, type conversion [fabrication]).
 - ☐ Vegetation Assemblage/Aquatic Habitat and Ecological Restoration Strategy by Management Zones (includes map/plan & key)
 - ☐ Ecological Restoration Objectives (Measurable) per each Vegetation Assemblage and/or Aquatic Habitat
 - ☐ Fauna Habitat Attributes per Management Zone: Retain and/or Restoration and/or Reconstruction/re-introduction (includes map/plan & key)
 - ☐ Links between ecological restoration and landscape plan (includes map/plan & key)
- ☐ Weed Management (Terrestrial & Aquatic)
 - ☐ Weed Species and Abundance by Management Zone (includes map/plan & key)
 - ☐ Weed dispersal (to and from site) and management
 - ☐ Noxious weeds
 - ☐ Management techniques, including potential to impact on habitat values
 - ☐ Monitoring and Evaluation
 - ☐ Qualifications of Regenerators
- ☐ Timeframes
- ☐ Habitat Reconstruction
 - ☐ Planting Design by Management Zone (includes map/plan & key)
 - ☐ Planting List

- ☐ Propagule Selection (includes rationale why and where from)
- ☐ Fauna Habitat Reconstruction (e.g. nesting boxes, woody debris, vegetation structural complexity)
 - ☐ Hygienic Considerations
 - ☐ Translocation of Threatened Plants (if applicable)
 - ☐ Techniques, including potential to impact on habitat values
 - ☐ Monitoring and Evaluation
 - ☐ Qualifications of Regenerators
 - ☐ Timeframes
- ☐ Landscape Plan
 - ☐ Extant native vegetation (trees, shrubs, groundcovers etc)(Plan includes those for removal)
 - ☐ Application of Australian Standard: Protection of trees on development sites (AS4970-2009)
 - ☐ Planting List avoids environmental weeds & genetic pollution
 - ☐ Planting Design (includes plan & key)
 - ☐ Propagule Selection
 - ☐ Fauna considerations
 - ☐ Hygienic Considerations
 - ☐ Techniques, including potential to impact on habitat values
 - ☐ Monitoring and Evaluation
 - ☐ Timeframes
- ☐ Fire Management
 - ☐ Fire History
 - ☐ Appropriate Fire Regimes (intensity, frequency, season, spatial) for each habitat (link to management zones)
 - ☐ Asset Protection & Habitat Management
- ☐ Aquatic Habitats Protection & Management
 - ☐ Aquatic Habitats (natural/semi-natural, artificial)
 - ☐ Appropriate Water Regime (flow, timing, duration, frequency, extent, depth, variability)
 - ☐ Natural/semi-natural Aquatic Habitat Management
 - ☐ Artificial Wetland Management (e.g. farm dam, detention basin, garden pond/wetland)
- ☐ Soil Management
 - ☐ Erosion Control
 - ☐ Acid Sulphate Soil Management
- ☐ People & Traffic Management (if applicable)
 - ☐ Pedestrian Access
 - ☐ Noise
 - ☐ Lights
 - ☐ Recreational Access
 - ☐ Roads (e.g. fauna crossing, run-off, weed dispersal)
 - ☐ Pest & domestic animal management (e.g. Dogs, Cats, Foxes Cane Toads, Indian Myna)
- ☐ Provision and Management of Buffers
 - ☐ provision of location details (plans), purpose of each buffer-management details
 - ☐ details of how the will protect flora and fauna
- ☐ Provision and Management of Fencing
 - ☐ details of the type, location and purpose of fencing, including the provision of human exclusion fencing and fauna-friendly fencing

☐ details, including amendments to plans, to ensure permanent and temporary fencing is “fauna-friendly” and appropriately located and designed to act as relevant as a filter/barrier/corridor, identifying the measures taken to make fence fauna friendly in that area

☐ details of considerations to providing an integrated approach to facilitating fauna movement, preventing crossing and guiding to crossing points, species likely to use and why (feeding, breeding, access to water etc.)

☐ Noise

☐ Lighting

5) Description of the Proposed Methods – relationship to development (proposed or approved)

☐ General Description of the proposal

☐ Details of all associated actions and the stage of the implementation of the proposal the action will be undertaken (pre-construction, construction and occupational/operational).

☐ Details of the area to be affected, either directly or indirectly, by the proposal, on and off the subject site.

☐ Details of the location and type of infrastructure associated with the proposal on and off the subject site

- ☐ subdivision details
- ☐ dwellings/buildings
- ☐ sewerage
- ☐ power
- ☐ phone-communications
- ☐ water supply
- ☐ stormwater drainage
- ☐ walking tracks
- ☐ parking
- ☐ fences-retaining walls
- ☐ bushfire protection zones
- ☐ bushfire management measures
- ☐ transport routes-access driveways
- ☐ fill/earthworks
- ☐ changes to surface water flows
- ☐ landscaping beds/areas

☐ Timetable

☐ action

☐ timing of action (pre-construction, construction, operational)

☐ duration of the action

☐ frequency of the action (one-off, monthly, annually etc)

☐ months of year when the action will be undertaken

☐ conditions when the action will be undertaken

6) Methodology of Proposed Restoration/Rehabilitation/Regeneration/Vegetation Management Works

- ☐ Consistent with Restoration Guidelines
 - ☐ Information Review - Desktop
 - ☐ Ground-truthing
 - ☐ Planning and Rationale for Technique Selection
 - ☐ natural regeneration
 - ☐ assisted natural regeneration
 - ☐ reconstruction
 - ☐ fabrication
 - ☐ planting
 - ☐ species selection
 - ☐ timing of planting
 - ☐ planting design
 - ☐ provenance selection
 - ☐ closing/rehabilitation tracks
 - ☐ timing in relation to fauna
 - ☐ after-care
 - ☐ minimising disturbance
 - ☐ hygiene protocols
- ☐ Implementation
 - ☐ statement that work to be undertaken by qualified Bush Regenerators
- ☐ Documentation of Effort, Times, Weather Conditions and Techniques
- ☐ Data Analysis and Interpretation
- ☐ Limitations of the Restoration/Regeneration/Rehabilitation
 - ☐ intensity
 - ☐ locations
 - ☐ ability to detect target species
 - ☐ ground visibility
 - ☐ influence of season and weather conditions
- ☐ Management Zones
 - ☐ Map of Management Zones
 - ☐ Map of each Management Zone
 - ☐ Management Zone Number and Description
 - ☐ Management Issues being addressed in Each Management Zone
 - ☐ Management Approach
- ☐ Implementation Timetable
 - ☐ action
 - ☐ timing of action (pre-construction, construction, operational)
 - ☐ duration of the action
 - ☐ frequency of the action (one-off, monthly, annually etc)
 - ☐ months of year when the action will be undertaken

☐ conditions when the action will be undertaken (e.g. consider in terms of season-months).

☐ Performance Criteria

- ☐ related to objectives
- ☐ specific
- ☐ measurable
- ☐ meaningful to the purposed

☐ Monitoring and Evaluation

☐ include spatial monitoring from source of disturbance-impact to point of no impact

☐ details in terms of sample size and location including intensity, frequency, timing and extent (designed to determine whether disturbance-impacts are Type I (do not cause a response-change in a population), Type II (cause a temporary, long-term or permanent change in population) or catastrophic (destruction of population and its habitat))

☐ designed to minimise false change errors and missed change errors, and to detect real changes

- ☐ data analysis technique
- ☐ Monitoring Sampling (discuss relevant subset)
- ☐ Analytical methods
- ☐ Survey & monitoring limitations

☐ Adaptive Management and Corrective Action

☐ Reporting Requirements (annual report for 5 years of consent), baseline data monitoring report progress and annual monitoring report, monitoring and worksheets, frequency of reporting, duration of reporting, who reports to be sent to, final reports, implementation of works progress, monitoring results, changes re adaptive management, recommendations for future works, non-compliance with plan (audit)

Appendices (not limited to the following potential)

- ☐ Appendix – Baseline Data Survey and Monitoring Program
- ☐ Appendix – On-going Monitoring Program
- ☐ Appendix – Flora Species List and Abundances
- ☐ Appendix – Fauna Species List and Abundances
- ☐ Appendix – Site Recording Forms
- ☐ Appendix – Weed Control Techniques
- ☐ Appendix – Habitat Regeneration Techniques
- ☐ Appendix – Habitat Restoration Techniques
- ☐ Appendix – Species Specific Management Guidelines
- ☐ Appendix – Specific Ecological Communities Habitat Management Guidelines
- ☐ Appendix – Pre- Construction and Construction Management Guidelines and Checklist for Workers
- ☐ Appendix – Staff Training Checklist
- ☐ Appendix – Compliance Checklist
- ☐ Appendix – Compliance Audit Program

Figures (not limited to the following)

- ☐ Figure – Location Map
- ☐ Figure – Map of Subject Site
- ☐ Figure – Management Zones
- ☐ Figure – Habitat Mapping, particularly features such as hollow distribution
- ☐ Figure – Tree Plan (trees to be retained, removed, threatened species)
- ☐ Figure – Easements/titles on land
- ☐ Figure – mapped SEPP areas/other legislative constraints
- ☐ Figure – mapped Asset Protection Zones/stormwater detention facilities/recreational facilities – outside of restoration zones