TWEED SHIRE COUNCIL

Landscape Management Plan

Eviron Road Quarry and Landfill

Version 2

JULY 2023

Landscape Management Plan

Eviron Road Quarry and Landfill

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Kristy Harvey
Project Environmental Advisor
NSW Public Works
359 Harbour Drive
Coffs Harbour Jetty
NSW 2450
T: 02 6648 2003
W: www.publicworks.nsw.gov.au

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1 Introduction

1.1 Context

This Landscape Management Sub Plan (LMP or Plan) forms part of the Environmental Management Strategy for the Eviron Road Quarry Landfill Project Stage 1(the Project) Approval 08_0068.

This LMP has been prepared to address the requirements of the Minister's Conditions of Approval (hereafter referred to as CoA), the Tweed Shire Council Statement of Commitments (hereafter referred to as SoC), and the safeguards listed in the Project Environmental Assessment (EA) and all applicable legislation.

1.2 Background

The environmental assessment for the Eviron Road Quarry and Landfill Project (Tweed Shire Council 2011) assessed construction and operation impacts on biodiversity.

As part of the Environmental Assessment, a detailed ecological assessment was prepared to address the Environmental Assessment Requirements issued by the Department of Planning and Infrastructure (formerly Department of Planning). The ecological assessment for the Project was included within the EA as Appendix L–Ecological Assessment.

The EA determined that Vegetation Type 3 and 6 contain characteristics consistent with two Endangered Ecological Communities. A stand of five and one juvenile White lace flower (*Archidendronhendersonii*) listed as vulnerable under the *Threatened Species Conservation Act* was recorded at the site. The stand of 5 was located in the footprint of the West Valley Quarry and the juvenile is not proposed to be impacted. The Environmental Assessment also determined that the site contains three rare or threatened Australian plant (ROTAP) species. ROTAP species recorded on site include black walnut, long-leaved tuckeroo (*Cupaniopsisnewmanii*) and smooth scrub turpentine (*Rhodamniamaideniana*). These were recorded in a small patch of vegetation to the north of the proposed haul road (See Figure 49).

The Environmental Assessment identified no hollow bearing trees in the proposed areas to be cleared. Small areas of blackbutt open forest (wet and dry sclerophyll) provide feeding habitat for Koalas. These Vegetation Types will be retained, and a commitment has been made in the Conditions of Approval to provide further Koala feed trees in the site restoration. The Biodiversity Characteristics in Area 1 will be secured via registration on a Section 88B instrument and associated Plan of Management to be developed for the Area.

1.3 Environmental Systems Overview

The overall Environmental Management System for the Project is described in the Environmental Management Strategy (EMS).
The LMP is part of the environmental management framework for the Project, and a sub plan of the Environmental Management Strategy. In accordance with Schedule 4 Conditions

of Approval 29, this Plan has been developed in consultation with the NSW Office of Environment and Heritage (OEH), Division of Resources and Energy within the Department of Trade and Investment, Regional Services and Infrastructure (DRE) and Agriculture Division within the Department of Primary Industries within the Department of Trade and Investment, Regional Services and Infrastructure (DPI Agriculture).
Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS).

EWMS will be developed and reviewed and accepted by project environment and management representatives prior to commencement of the associated works and construction personnel will be required to undertake works in accordance with the identified method statements.

Used together, the Environmental Management Strategy, Contractors Environmental Management Plan, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by personnel and contractors.

2 Purpose and Objectives

2.1 Purpose

The purpose of this LMP is to describe how Tweed Shire Council proposes to manage and protect the biodiversity values during construction of the early works component of the Project. Early Works of the Project include:

- Project Environmental Management Strategy
- Establishment of Meteorological Monitoring Station
- Targeted surveys for threatened flora species on completion of final design footprint.
- Cultural Heritage Management Plan (As listed in the Statement of Commitments)
- Stage 1 of the Landscape Management Plan

- Preconstruction of Internal Haul Road
  - Survey
  - Geotechnical Investigations
  - Road works Design
  - Aboriginal Cultural Induction to project team and contractors

- Construction of the Haul Road from Stott's Creek Resource Recovery Centre to Quirks Quarry

The Landscape Management Plan will be added to as Plans are developed during the course of the project.

2.2 Objectives

The key objective of the LMP is to ensure that impacts to biodiversity values are minimised and within the scope permitted by the planning approval. To achieve this objective, the Tweed Shire Council will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise potential adverse impacts to biodiversity values within the Project.

- Ensure appropriate measures are implemented to address the relevant Conditions of Approval and Statement of Commitments outlined in Table 3.1 and Table 3.3, and the safeguards detailed in the Environmental Assessment.

- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1, Section 3.2 and Section 6 of this plan

3 Environmental Requirements

3.1 Relevant legislation and guidelines

Legislation

Legislation relevant to biodiversity management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Environment Protection and Biodiversity Conservation Act 1999(Commonwealth)*
- *Threatened Species Conservation Act 1995*
- *Fisheries Management Act 1994*
- *Noxious Weeds Act 1993*
- *Native Vegetation Act 2003*
- *Water Management Act 2000*
- *Protection of the Environment Operations Act 1997*

Guidelines

The main guidelines, specifications and policy documents relevant to this Plan include:

- *NSW Government's Best Practice Guidelines, Blue Book Volume 1 and 2D, Managing Urban Stormwater, Soils and Construction,* (Landcom).

- *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (September 2011)*

3.2 Minister's Conditions of Approval

The Conditions of Approval relevant to this Plan are listed in Table 3 1 below. A cross reference is also included to indicate where the condition is addressed in this Plan.

Table 3.1 Conditions of Approval relevant to the Landscape Management Plan

CoA No.	Condition Requirements	Document Reference
Schedule 3, CoA 35	The proponent shall rehabilitate the site to the satisfaction of the Director-General. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the Environmental Assessment and depicted in Appendix 5 and comply with the objectives in Table 2. *Table 2: Rehabilitation Objectives* **Feature** / **Objective** Site (as a whole) — Safe, stable & non-polluting Quirks Quarry Landfill — Suitable for grazing Benched Quarry Walls — Landscaped with native endemic flora species Quarry Pit Floors — Suitable for grazing Other land affected by the project — Restore ecosystem function, including maintaining or self sustaining eco-systems comprising of native endemic species Surface Infrastructure — To be decommissioned and removed, unless the Director-General agrees otherwise	Table 6.1 provides mitigations that will be implemented to achieve rehabilitation objectives 1 and 5. These objectives will also be met during the preparation and implementation of the Rehabilitation and Closure Plan, and through the implementation of the Plan of Management for Area 1 and the Restoration Plan.
Schedule 3, CoA 36	**Progressive Rehabilitation** The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any one time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Table 6.1
Schedule 4, CoA 29	**Biodiversity** By 31 December 2013, unless the Director-General agrees otherwise, the Proponent shall, to the satisfaction of the Director-General:	Submitted following an Extension of Time request

<table>
<tr><th>CoA No.</th><th>Condition Requirements</th><th>Document Reference</th></tr>
<tr><td>Schedule 4, CoA 29(a)</td><td>Implement the biodiversity offset strategy as described in the EA, summarised in Table 9, and described in the figure in Appendix 4; and</td><td></td></tr>
<tr><td>Schedule 4, CoA 29(b)</td><td>Make suitable arrangements, in consultation with OEH, to provide appropriate long term conservation security for Area 1,
Table 9: Biodiversity Offset Strategy
<table><tr><th>Area</th><th>Summary of Offset</th><th>Minimum Size</th></tr><tr><td>Area 1</td><td>Retention and management of existing vegetation to be designated as natural area of bushland</td><td>6.5 hectares</td></tr><tr><td>Area 2</td><td>Revegetation of drainage line using locally sourced swamp sclerophyll/koala feed trees and provide alternative corridor for connectivity across cleared area</td><td>1.9 hectares</td></tr><tr><td>Area 3</td><td>Revegetation of ridgeline using koala feed trees and other fauna resources to enhance connectivity along ridgeline</td><td>0.4 hectares</td></tr><tr><td>Area 5</td><td>Retention and management of native vegetation including potential koala feed trees</td><td>1.1 hectares</td></tr><tr><td>Area 6</td><td>Retention of vegetated corridor along ridgeline and connectivity to native vegetation</td><td>2.2 hectares</td></tr></table></td><td>Biodiversity Strategy with Department of Planning for approval. Once approved it will be implemented as per the Strategy.</td></tr>
<tr><td>Schedule 4, CoA 30</td><td>White Lace Flower Translocation Plan
The Proponent shall prepare and implement a Translocation Plan for the White Lace Flower to the satisfaction of the Director-General. This plan must:
Be prepared by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
Be prepared in consultation with OEH;
Be submitted to the Director-General for approval by the end of July 2013 or as otherwise agreed in writing by the Director-General;
Describe the measures that will be implemented to:
Translocate and manage the orchids
Monitor and report on the success of the translocation; and
Ensure suitable contingency measures are implemented if the monitoring suggests the translocation is not working as well as intended; and</td><td>The White Lace Flower Translocation Plan was Submitted to the Director-General for approval on the 28th August 2013, with evidence of OEH consultation provided. Extension granted for submission.
This document will form an Appendix to the LMP when approved.</td></tr>
</table>

CoA No.	Condition Requirements	Document Reference
	Provide for the findings of the translocation process to be published in a suitable scientific publication.	
Schedule 4, CoA 31	The Proponent shall prepare and implement a Landscape Management Plan for the project to the satisfaction of the Director- General. This plan must:	
Schedule 4, CoA 31 (a)	Be prepared in consultation with OEH, DRE and DPI (Agriculture);	In progress
Schedule 4, CoA 31 (b)	Be submitted to the Director- General for approval prior to commencement of quarrying operations;	Submitted prior to any works, in accordance with DoPI request.
Schedule 4, CoA 31 (c)	Describe how the implementation of the Biodiversity Offset Strategy will be integrated with the overall rehabilitation of the site and the proposed Tweed Regional Botanical Gardens Project;	Section 4.2
Schedule 4, CoA 31 (d)	Describe the short, medium and long term measures that will be implemented to Manage remnant vegetation and habitat on site; Minimise the visual impacts of the project on surrounding receivers; Implement the Biodiversity Offset Strategy; and Ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;	Table 6.1
Schedule 4, CoA 31 (e)	Include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and the rehabilitation of the site, including triggering remedial action (if necessary);	To be included in the Plan of Management associated with the Registration of Area 1 on Section 88B instrument. Also implementation of White Lace Flower Translocation Plan, Restoration Plan and through the development of a Site Rehabilitation and Closure Plan.

CoA No.	Condition Requirements	Document Reference
Schedule 4, CoA 31 (f)	Include a detailed description of the measures that will be implemented over the next 3 years, including the procedures to be implemented for: Ensuring the compliance with the rehabilitation objectives and progressive rehabilitation obligations in this approval;	See Table 6.1, Table 8.1 also through internal and external environmental audits.
	Enhancing the quality of remnant vegetation and fauna habitat with a focus on restoring Lowland Forest EEC and providing Koala feed trees;	Biodiversity Offset Strategy and Restoration Plan
	Restoring native endemic vegetation and fauna habitat within the biodiversity offset areas and rehabilitation area;	Biodiversity Offset Strategy
	Maximising the salvage of environmental resources within the approved disturbance area- including vegetative and soil resources- for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area;	Table 6.1
	Collecting and propagating seed;	Translocation Plan and Restoration Plan
	Minimising the impacts on native fauna on site, including undertaking appropriate pre-clearance surveys and providing nest boxes;	Table 6.1
	The White Lace Flower Translocation Plan	Will form an Appendix to the LMP when approved by DOPI
	Controlling weeds and feral pests;	Table 6.1
	Controlling erosion;	Table 6.1
	Managing grazing and agriculture on site;	Table 6.1
	Controlling access; and	Table 6.1
	Bushfire management;	Table 6.1 and EMS
Schedule 4, CoA 31 (g)	Include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria;	See associated Sub Plans and Table 6.1, Table 8.1. Internal and external environmental audits.
Schedule 4, COA 31 (h)	Identify the potential risks to the successful implementation of the Biodiversity Offset Strategy and rehabilitation of the site, and include a description of the contingency measures that will be implemented to mitigate against these risks; and	Section 7, Table 7.1

CoA No.	Condition Requirements	Document Reference
Schedule 4, COA 31 (i)	Include the details of who will be responsible for monitoring, reviewing, and implementing the plan.	Section 6, Table 6.1 and Section 8, Table 8.1
Schedule 4, COA 32	**Conservation & Rehabilitation Bond** Within 6 months of the approval of the Landscape Management Plan, the Proponent shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and the rehabilitation of the site is implemented in accordance with the performance and completion criteria set out in the Landscape Management Plan. The sum of the bond shall be determined by: Calculating the full future cost of implementing the Biodiversity Offset Strategy; Calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of the quarrying operations; and Employing a suitably qualified quantity surveyor or other expert to verify the calculated costs; to the satisfaction of the Director-General.	The conservation rehabilitation bond will be staged. The first assessment will be undertaken on current plans and information available. The first stage of the conservation rehabilitation bond is scheduled to be undertaken by September 2014, 6 months after the programmed endorsement of the LMP. The next assessment for conservation and rehabilitation bond is scheduled to take into account the requirements of the Habitat Management Plan and Rehabilitation and Closure Plan for Quirks Quarry Landfill.
Schedule 4, COA 33	Within 3 months of each Independent Environmental Audit (see Condition 10 of Schedule 6), the Proponent shall review, and if necessary, revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Director- General. The review must consider the; Effects of inflation. Likely cost of implementing the Biodiversity Offset Strategy and rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the project); and Performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.	Will be undertaken post Environmental Audit

3.3 Statement of commitments

Relevant Statement of Commitments are listed in Table 3.2 below. This includes reference to required outcomes, the timing of when the commitment applies relevant documents or sections of the environmental assessment that influence the outcome and implementation.

Table 3 2 Statements of Commitment relevant to this Landscape Management Plan

Issue	Commitment	Document Reference
	Council commits to the following actions which are relevant to Schedule 4 Clause 31 of the COA's at the site:	
Environmental Management Plans	Fire Management Plan – The plan would include details of sources of water for firefighting, the need for fire extinguishers on all mobile equipment and suitable training for site based personnel as well as a fire response plan.	Table 6.1
Soils and Land Capability	A Soil, Water and Leachate Management Plan will be prepared to the satisfaction of the EPA as part of the application for an Environmental Protection Licence and will include all detailed measures for managing soils and land capability. As a minimum Council will implement the following measures:	To be prepared during early works
Soils and Land Capability	Minimise soil erosion and sediment mobilisation to the downstream receiving environment. Identification of high risk activities and areas, and the development of appropriate mitigation and control measures for these areas.	Table 6.1
Soils and Land Capability	Topsoil removed for quarrying would be stockpiled and used later for revegetation and rehabilitation of the final landfill cover.	Operational Plans at Quarrying Stage
Soils and Land Capability	Care would be taken to ensure that topsoils and subsoils are not stripped when they are too moist.	Construction EMP

Issue	Commitment	Document Reference
Soils and Land Capability	Topsoil stockpiles would be up to 1m high and subsoil/overburden stockpiles would not exceed 3 m in height.	Table 6.1
Soils and Land Capability	Subsoil and topsoil stockpiles would be located within the footprint of the landfill, quarry or on the upper surface of the completed landfill stages.	Table 6.1
Soils and Land Capability	Stabilisation measures would be used until vegetation is established on the stockpiled soil.	Table 6.1
Biodiversity- Substantially avoid clearing of areas of higher ecological significance	The quarry footprint and haul road have been designed such that they minimise clearing of native vegetation and predominantly avoid areas of higher ecological value vegetation	To be implemented and ensured in final design of haul road.
	Quarry footprint to be revised to reflect haul road concept avoiding any clearing of Vegetation Type 7, and the avoidance of clearing an area of this vegetation that falls within the eastern section of the quarry footprint.	Table 6.1 and confirmed by detailed design of haul road.
	Retain and Manage Higher Ecological Value Areas- restriction on use of a portion of Lot 1 DP 1159532 to be registered on the title imposing a legal obligation in perpetuity to abide by the management actions of the Habitat Management Plan. A plan showing the habitat areas on the lot would be registered with the s88B instrument to identify the area burdened by the restriction.	Plan of Management and Habitat Management Plan
	Areas of higher ecological value will be clearly marked by fencing with high visibility fauna permeable fencing or similar. Include these areas as ‘vegetation protection areas’ in an Environmental Management Plan.	Table 6.1

Issue	Commitment	Document Reference
Biodiversity- Maintain and enhance or restore habitat connectivity	Retain a vegetated corridor along the ridgeline- the quarry footprints have been designed such that they retain a vegetated corridor along the western ridgeline.	Table 6.1
	Develop an east-west movement corridor- To provide future potential habitat and an alternate route for connectivity across the site, planting of suitable riparian/floodplain vegetation will be undertaken adjacent to the watercourse in Lot 1 DP1159352. This will create a vegetated corridor that connects the lowland areas to the ridgeline and effectively connect vegetation adjacent to the eastern side of Quirks Quarry to retain eucalypt open forest in the central western area of the site and link to the ridgeline.	Restoration Plan and Biodiversity Offset Plan
	Restore connectivity along the southern boundary - vegetated corridor would be developed along the southern boundary of Lot 1 DP 34555 along Eviron Road that would contain species consistent with existing remnant vegetation along the ridgeline.	Restoration Plan and Biodiversity Offset Plan
	Undertake works as per finalised Restoration Plan- Plan. A Preliminary Restoration Plan (refer Appendix L) has been prepared by Council to guide works in the abovementioned corridors.	
Biodiversity- Minimise impact to conservation significant fauna species	Manage Clearing- all clearing of vegetation will be undertaken in the presence of an experienced fauna spotter-catcher.	Table 6.1
	Contractor awareness-all contractors (construction and operation) to be made aware of the potential presence of fauna species.	Table 6.1

Issue	Commitment	Document Reference
	All vehicle movement- restricted speed limits to be implemented near to vegetated areas.	Table 6.1
	Environmental Management Plans- management plans will include actions for management of potential direct and indirect impacts to fauna species	Table 6.1
Biodiversity- Locate and translocate threatened plant species	Target surveys for threatened plant species will be undertaken once the final development footprint has been confirmed.	Table 6.1
	A 'Preliminary Translocation Plan for Threatened Plants' has been prepared by Council in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Appendix L).	The finalised Translocation Plan has been submitted to the Department of Planning and Infrastructure for Approval and will form an Appendix to the Landscape Management Plan
	In the event that any additional threatened plant species are located in the development footprint, the 'Preliminary Translocation Plan' would be revised to incorporate additional individuals or species.	This plan is now the finalised White Lace Flower Translocation Plan and provision for updating the plan has been made.
Biodiversity- Maintain Habitat Values	Environmental Management- implement measures detailed in the approved EMP and undertake site works in general accordance with AS 4970- 2009.	Table 6.1
	Maintain habitat – nest boxes will be installed in vegetation to be retained and managed on Lot1 DP 1159532 in order to offset a reduction in hollow recruitment.	Table 6.1
	In relation to vegetation protection: Establish vegetation protection areas prior to construction. Activities permitted in the vegetation protection area would include weed management, habitat management, and restoration/translocation activities.	Table 6.1

Issue	Commitment	Document Reference
	Activities prohibited in the vegetation protection areas would include: the use of or parking of vehicles and equipment (unless associated with a permitted activity), placement of construction materials, refuse, excavated spoils and stockpiling, use of tree trunks as a winch support.	
Visual	Review the vantage point analysis conducted in the Environmental Assessment to include the property 355 Farrants Hill Road (this is not and will not be a site where you would be able to see our operations). If necessary, undertake additional screening planting where feasible or consider other alternatives.	Construction/ Operational West Valley Quarry
	Council will undertake strategic tree planting for screening purposes, including along the drainage line across Lot 1 DP 1159352, which will in the longer term facilitate sheltered movement of species such as Koalas across the presently cleared lowland area of the site.	Biodiversity Offset Strategy
	Progressive rehabilitation and revegetation of all landfill sites would be undertaken to visually blend the landfill capping with the surrounding areas.	Operational Landfill Plans
	The site will be kept clean and tidy at all times as per the LEMP and the Quarry Plan of Management (or other site operations as relevant).	Table 6.1
Revegetation, rehabilitation and post closure management	Preparation and implementation of a Rehabilitation and Closure Plan prepared by a suitably qualified and experienced expert in consultation with EPA.	To be prepared during the Landfill design and construction stages.
	Undertake a program of progressive revegetation in those areas disturbed by the operations taking account of the intended future Botanic Gardens.	Natural values of the site will be enhanced by progressive vegetation as per the management plans.
	Conversion of stormwater detention areas to wetlands following cessation of landfilling activities.	To be undertaken post landfill operations.

Issue	Commitment	Document Reference
	Continue to manage the site following closure of the landfill facility, in accordance with the commitments and procedures to be documented within the Closure Plan. This includes long term monitoring of groundwater, leachate, surface water, landfill gas, revegetation success and capping integrity.	Rehabilitation and Closure Plan, and operational management documents will contain this detail.
Community	Areas not required for project-related activities will be maintained in a manner that enhances their ecological values as described in the Biodiversity and Rehabilitation section. (will be left undisturbed)	Table 6.1, Biodiversity Offset Strategy and the Restoration Plan.
	The site will ultimately be returned as a community asset post closure in the form of an extension to the Tweed Shire Botanic Gardens	Section 4.2

4 Existing Environment

The following sections summarise what is known about biodiversity within the Project.

The key reference documents are Section 9.7, 9.10 and 9.12 of the Report for Eviron Road Quarry and Landfill Proposal Part 3A Environmental Assessment (Tweed Shire Council 2011) and the Ecological Assessment for the Proposed Eviron Road Quarry and Landfill Site - Appendix L of the EA.

4.1 Existing Landscape

The existing site is located along a spur along the northern ridge of the Condong Range where it meets the floodplain of the Tweed River. It presently contains Quirks Quarry in the eastern portion of the site on Lot 602 DP 10011049. Two valleys known as West Valley and North Valley are located in the southern western and central northern portions of Lot1 DP1159352. Vegetation on and surrounding the site has largely been cleared historically for agricultural purposes prior to quarrying. On the hill slopes, the site contains regrowth closed to open forest dominated by the weed species Camphor Laurel, while vegetation in the lower elevation areas is predominantly grassland with scattered patches of trees.

The cleared floodplain of the Tweed River essentially surrounds the vegetated areas on the site, presenting isolated habitat potential. In addition, the Pacific Highway, located along the eastern boundary, presents a significant movement barrier to most ground and cover dependent species. In the wider area, opportunity for terrestrial fauna movement is present in vegetation along the ridgelines to the south and southwest of the study area (i.e. along Farrants Road, Hammond Drive through Clothiers Creek and Reserve Creek) with generally only minor barriers present such as country roads and some areas of sparser vegetation. The vegetated ridgelines connect along the Burringbar Range to Mooball National Park, with further connectivity south and west to Mount Jerusalem National Park and Nightcap National Park.

The following figure indicates the location of the future development planned at the site over the existing environment.

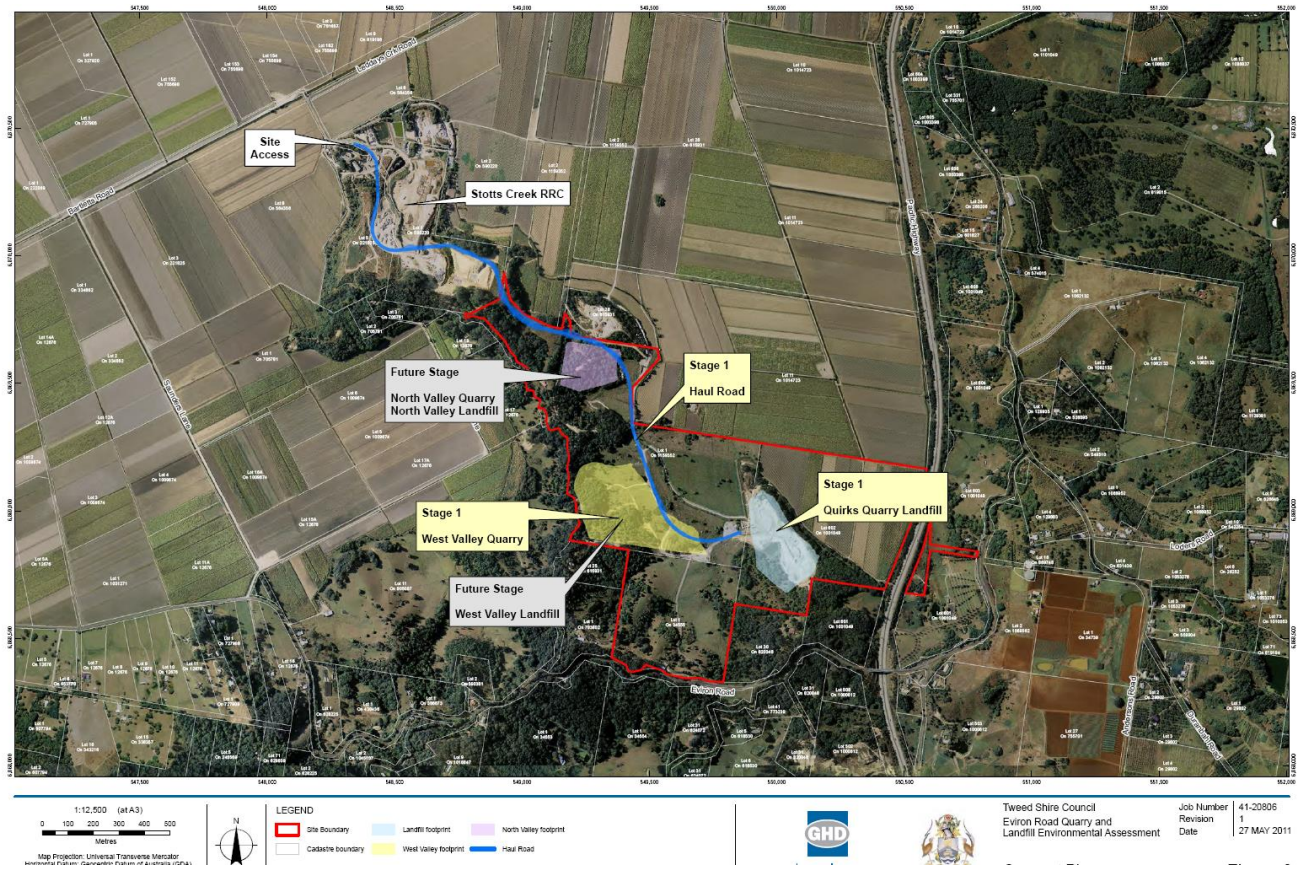

Figure1: Concept Plan for Eviron Road, Quarry and Landfill Site

4.2 Biodiversity

As described in Section 1.2 of this report the site represents a number of biodiversity aspects. To protect the biodiversity values onsite a number of mitigation measures have been provided in Table 6.1. The Environmental Assessment provided a number of mapped depictions of the vegetation types present onsite (please refer to Figures 2,3 and 4 below).

The biodiversity offset strategy (hereafter referred to as the BOS) aims to progressively rehabilitate the site and enhance natural values and connectivity in the localised landscape.

Key items of the BOS will be implemented as the project progresses. Initially, the nominated Area 1 will be fenced, weed management, restoration and translocation activities as described in the BOS and associated Landscape Management Plan/ sub plans will be implemented and steps taken to secure the area with an S88B instrument. Drainage lines and ridgelines will be revegetated as per the BOS and once its capacity is exhausted, the Quirks Quarry Landfill will be rehabilitated as per the restoration plan. This work whilst essentially part of the Project, compliments the concepts for the Tweed Botanic Garden Master Plan. It provides open grasslands, fauna corridors, weed management and encourages protection of existing flora that will ultimately form part of the Tweed Botanic Garden.

The following figures from the Environmental Assessment depict the existing vegetation onsite (Figure 2), the key biodiversity values onsite (Figure 3) and biodiversity management and mitigation measures to be implemented throughout the project (Figure 4).

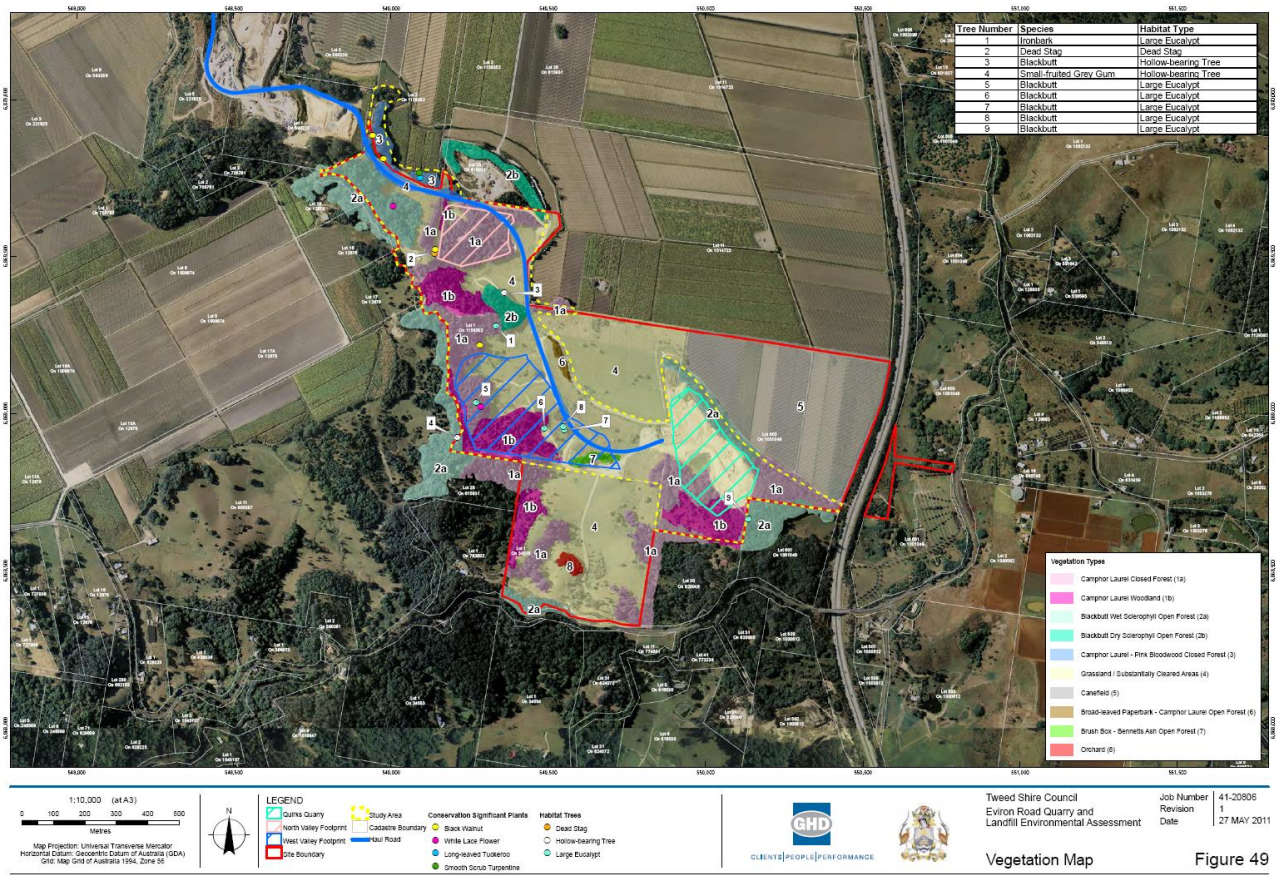

Figure 2: Existing Vegetation Onsite

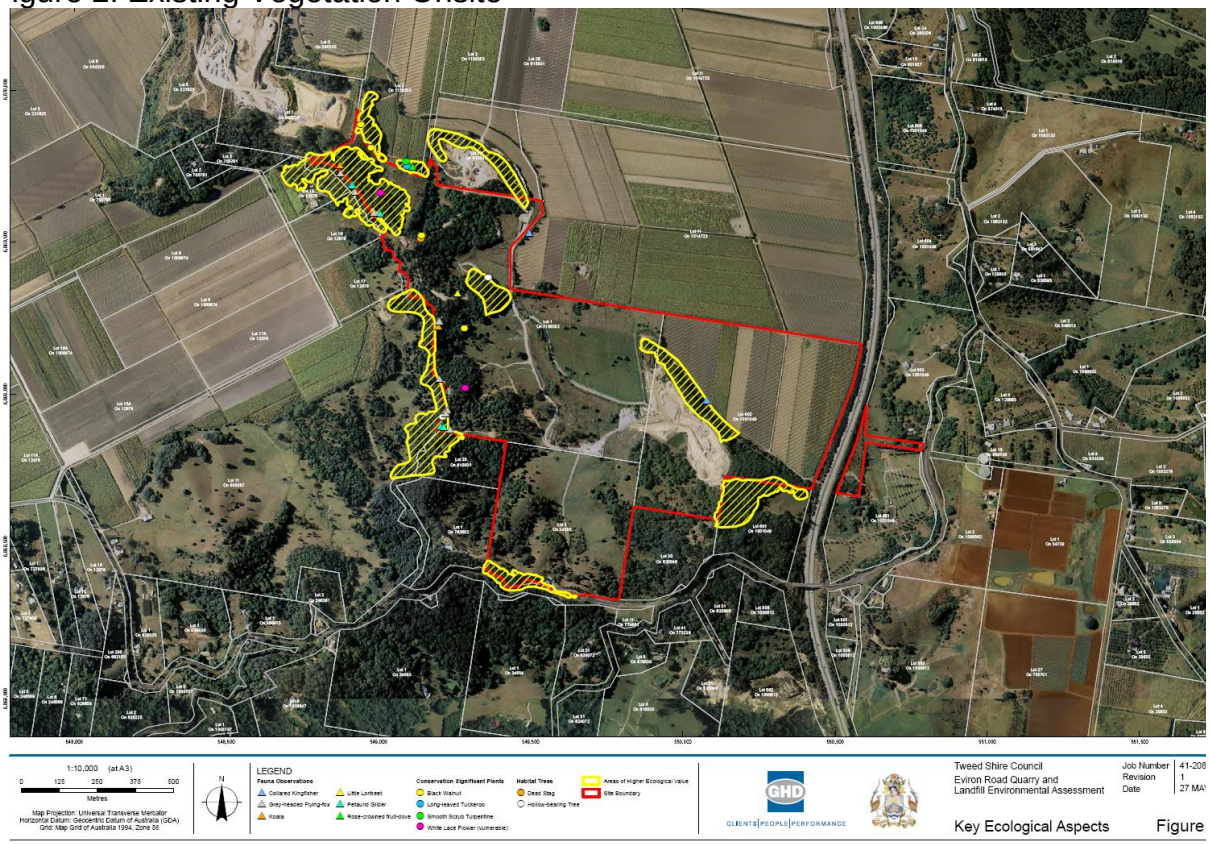

Figure 3: Key Biodiversity Values On Site

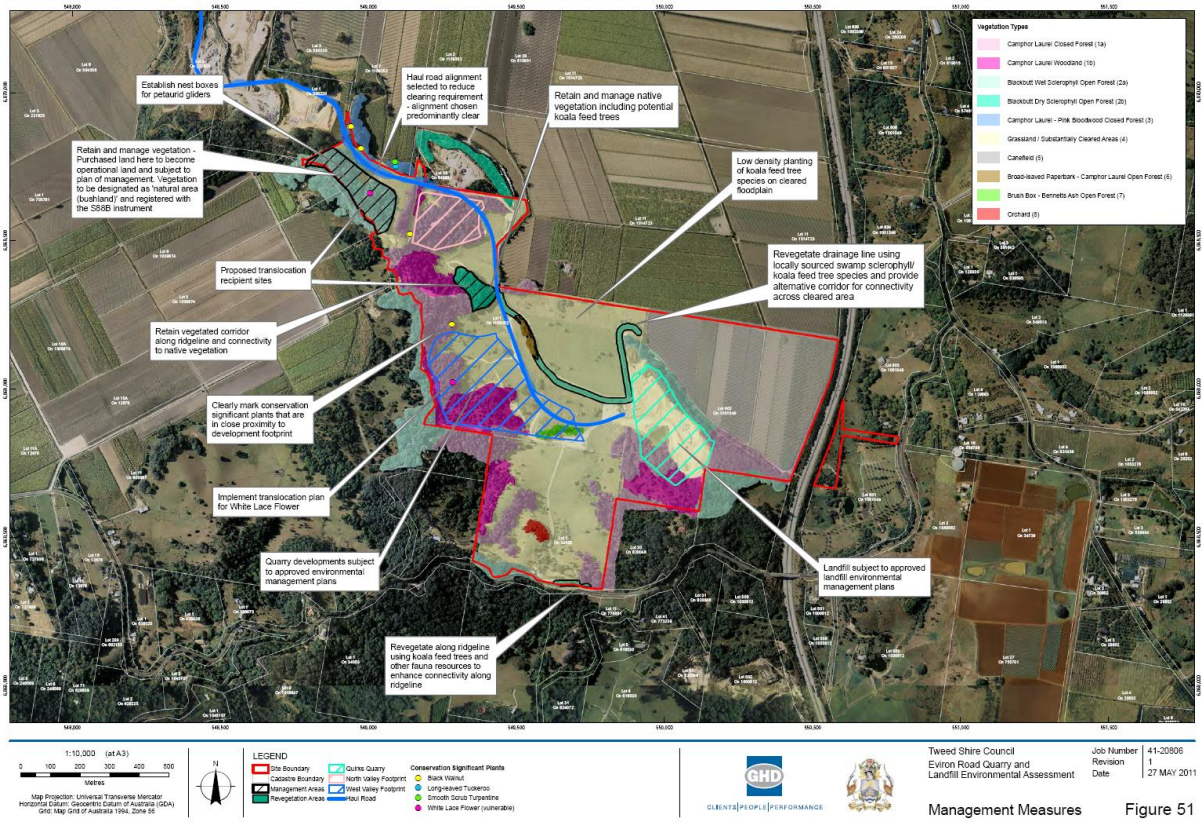

Figure 4: Biodiversity and Visual Management and Mitigation Measures

5 Environmental Aspects and Impacts

5.1 Construction activities

Key aspects of the project that could result in adverse impacts to biodiversity during construction include:

- Vegetation clearing (loss of some habitat, narrowing of vegetation corridor along the ridge line, translocation of five white lace flower (*Archidendronhendersonii*) plants);
- Movement of heavy vehicles;
- Stockpiling of resources.
- Operational Activities

Key aspects of the project that could result in adverse impacts to biodiversity during operation include:

- Staged Vegetation clearing for the Quarry;
- Movement of heavy vehicles;
- Drilling, blasting, and processing (screening and crushing);
- Stockpiling of resources;
- Landfilling.

6 Environmental Control Measures

The following table details the mitigations and procedures for managing risk to biodiversity throughout the Project.

Table 6.1 Landscape Management and Mitigation Measures

LEGEND

PM	Project Manager	
TSCPE	Tweed Shire Council Project Ecologist	Construction Contractor (includes Cleaning Contractor)
CS	Consultant	

Note: Overall responsibility for the Project rests with the Project Manager. The PM will be assisted in this role by various specialists throughout the project.

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
V1	Vegetation Clearing	Review the environmental assessment maps and associated documentation for the project to identify features.	Pre-clearing Process Throughout the project	PM & TSCPE
V2	Vegetation Clearing	Consult with ecologist to determine the location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process or habitat removal. Mark the pre-determined habitat identified for fauna release on a map.	Pre-clearing Process	PM & TSCPE
V3	Vegetation Clearing	The extent of vegetation required for clearing is to be pegged by a surveyor, approved by the Project Ecologist, and then demarcated with flagging rope or similar. No clearing is to occur outside of this delineation.	Pre-clearing Process	PM & TSCPE
V4	Vegetation Clearing	Identify tree protection zones on treed areas to be excluded from clearing. The tree protection zone (TPZ) represents the area around the tree that should not be disturbed. Exclusion fencing and tree protection in accordance with the AS 4970-2009 Protection of trees on development sites shall be implemented. Tree dripline zones to be protected in retained vegetation.	Pre-clearing process and throughout construction.	PM & TSCPE

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
V5	Vegetation Clearing	Confirm the locations of biodiversity features	1-2 weeks prior to clearing	PM & TSCPE
V6	Vegetation Clearing	Identify fauna that may have the potential to be disturbed as a result of clearing activities.	1-2 weeks prior to clearing	PM & TSCPE
V7	Vegetation Clearing	Ensure an ecologist checks for the presence of threatened flora and fauna species that were identified in the Environmental Assessment as likely to occur. Undertake these checks during optimal conditions for the target species where possible.	1-2 weeks prior to clearing	PM & TSCPE
V8	Vegetation Clearing	Record the details of any hollow bearing trees/trees containing threatened fauna or threatened flora.	1-2 weeks prior to clearing	PM & TSCPE
V9	Vegetation Clearing	Mark habitat features to be protected during construction.	1-2 weeks prior to clearing	PM & TSCPE
V10	Vegetation Clearing	Confirm the location of pre-determined habitat identified for the release of any fauna encountered on site.	1-2 weeks prior to clearing	PM & TSCPE
V11	Vegetation Clearing	Licensed wildlife carers and/or ecologists should capture and /or remove fauna that have the potential to be disturbed as a result of clearing activities.	24 hours before clearing	PM
V12	Vegetation Clearing	Relocate fauna into pre-determined habitat identified for fauna release.	24 hours before clearing	PM
V13	Vegetation Clearing	All fauna handling to be carried out by licensed wildlife carers and/ or ecologists.	24 hours before clearing	PM
V14	Vegetation Clearing	Inform clearing contractors of any changes to the sequence of clearing if required.	24 hours before clearing	PM

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
V15	Vegetation Clearing	Contact vets and wildlife carers before works start to ensure they are willing to assist in treating injured animals if necessary. Provide their contact details to the site manager and clearly display them at the site office. Record all fauna fatalities or injuries and details of any relocated fauna.	Clearing	PM
V16	Vegetation Clearing	A licensed wildlife carer and/or ecologist should be onsite during habitat removal.	Clearing	PM
V17	Vegetation Clearing	Carry out staged habitat removal – (for example clearing non-habitat trees followed by any habitat trees) so as to allow respite between the initial disturbance of the clearing process and the final removal of habitat.	Clearing	PM
V18	Vegetation Clearing	Identified habitat should be left for at least 24 hours after removing the non-habitat vegetation to allow fauna to escape. A licensed wildlife carer and/or ecologist should check trees for fauna before felling. If necessary, fauna may need to be trapped and relocated to pre-determined habitat identified for fauna release.	Clearing	PM
V19	Vegetation Clearing	Fell potential habitat trees carefully to avoid injury to any fauna remaining in the trees. Where possible use equipment that would allow for any habitat trees to be lowered to the ground with minimal impact (i.e. claw extension). Do not fell trees towards exclusion zones.	Clearing	PM

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
V20	Vegetation Clearing	Native woody vegetation including hollows and dead trees and bush rock is to be salvaged where possible for reuse in habitat areas. Carry out removal, stockpiling, transportation and relocation of coarse woody debris (CWD) and/or bush rock in a manner that minimises disturbance to native vegetation (including the canopy, shrubs, dead trees, and fallen timber and groundcover species) and avoids the spread of weeds.	Clearing	PM
V21	Vegetation Clearing	An experience and licensed wildlife carer and/or ecologist should inspect the habitat once it is removed (eg. After the tree has been felled). Animals that emerge should be captured, inspected for injury then relocated to pre-determined habitat identified for fauna release.	Clearing	PM & TSCPE
V22	Vegetation Clearing	Reporting – The outcomes of the clearing process are to be recorded. Reports are to be submitted to the Project Manager and Environmental Advisor.	Clearing	PM & TSCPE
V23	Vegetation Clearing	Vegetative clearing waste to be taken to green waste landfill. Camphor Laurel may be mulched providing the seeds and foliage are not mulched.	Clearing	PM
F1	Fauna	Project site induction should ensure that all personnel do not feed the wildlife that may be encountered on construction sites (especially birds or lizards)	Throughout the Project	PM
F2	Encountering Wildlife-Koalas	In the event that a Koala is detected in vegetation approved for clearing, the following procedure is to be followed: -An exclusion zone with a 30m radius is to be established around the tree that the Koala inhabits	Throughout the Project	PM

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
		-No clearing is permitted in this exclusion zone, including no clearing of the understorey. - No site staff are to enter the exclusion zone, unless under the supervision of the Project Ecologist. Clearing of this vegetation cannot occur until the Koala has left the tree of its own volition.		
F3	Unexpected Threatened Species Find	Threatened flora or fauna species unexpectedly encountered. Procedure us as follows: STOP WORK Notify the Project Manager. Project Manager would arrange for an ecologist to conduct an assessment of significance of the likely impact, develop a management options and notify OEH, DPI and DSEWPC as appropriate. If an impact is not likely to occur, work can recommence and regular inspections will be maintained. If an impact is likely to occur, consultation will be had with OEH, DPI or DSEWPC as appropriate. Licences, approvals or permits will be then obtained as required. Works will recommence once advice is sought and necessary approvals, licences and permits are obtained. The species will be included in subsequent inductions, toolbox talks and the environmental plans will be updated.	Throughout the Project	PM &C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
N1	Nest boxes	6 Nest boxes in Area 1 in order to offset a reduction in hollow recruitment in Eucalypts. Further nest boxes to be installed should any hollow bearing trees be impacted by the proposed works. Tweed Shire Council Project Ecologist will advise on nest box installation onsite. Taking into consideration the aspect, proximity to food resources and presence of Common Mynas.	Construction	PM
N2	Nest boxes	Nest box design to be for use of petaurid gliders. Dimensions of nest boxes to be 400mm in height with internal dimensions 250mm x 300mm. The entrance diameter to be 450mm. The nest box lid will have at least 4cm overlap at sides and 8-10cm at the front. The nest boxes will be placed approximately 6m height above ground and be attached to trees by the Habisure method if possible. Nest boxes to be installed approximately100m apart.	Construction	PM
N3	Nest box Maintenance	Monitoring of nest boxes, once per year for the first two years, skip the third year and check nest boxes on the fourth year. The need for future monitoring will be reviewed at this stage.	Construction and operation	PM
B1	Biodiversity Offset Security	Area 1 to be secured as per Table6.2	Throughout the Project. As per the Biodiversity Offset Plan.	PM
B2	Restoration/Rehabilitation	Implement Plan of Management including Habitat Management Subplan. and Rehabilitation and Closure Plan	Throughout the Project	PM

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
B3	Translocation	White Lace Flower Translocation Plan	Collect seed June-January, Pre-clearing target surveys and associated propagule collection and propagation.	PM & TSCPE
B4	Establish vegetation protection areas	Establish prior to construction	Pre-construction	PM
B5	Vegetation Protection Areas	Activities permitted in the vegetation protection areas would include: Weed management, Habitat management, Restoration/translocation activities.	Construction	PM & C
B6	Protection of vegetation protection areas	Activities prohibited in vegetation protection areas include: -use of or parking of vehicles and equipment (unless associated with a permitted activity), Placement of construction materials, refuse, excavated spoils and stockpiling. Use of tree trunks as a winch support.	Construction	PM & C
B7	Weeds	Implementation of Restoration Plan the Northern and Southern Ridgeline Corridor.	Construction	PM
B8	Weeds	Ecologist or person trained in weed identification and management should undertake a site weed assessment to identify and describe weed infested areas to be disturbed by the proposed Early Works.	Undertaken in Restoration Plan	PM & TSCPE
B9	Weeds	Haul Road Corridor As haul road construction commences effective weed control will be implemented in disturbed areas for early works for the weeds identified onsite in	Construction	PM& C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
		Appendix B of the Restoration Plan. <u>Noxious Weeds</u> Groundsel Bush (*Baccharishalimifolia*)- Class 3 Camphor Laurel (*Cinnamomumcamphora*) Class 4 Lantana- Class 4 <u>Weeds associated with a TSC Act Key Threatening Process listed under TSC Act</u> Exotic vines or scramblers (*Ipomoea cairica*) Exotic perennial grasses (i.e. *Paspalum urvillei* and *Setariasphacelata*.		
B10	Weeds	Clean machinery, vehicles, and footwear before entering site and/or moving to a new work location.	Construction	PM & C
B11	Weeds	Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles.	Construction	PM & C
B12	Weeds	Dispose of weed contaminated soil at an appropriately licensed waste management facility or topsoil recovered from areas of low weed infestation can be reused onsite with treatment but should be stockpiled separately.	Construction	PM & C
B13	Weeds	Remove weeds immediately onto suitable trucks and dispose without stockpiling.	Construction	PM & C
B14	Weeds	Separate weeds from native vegetation where native vegetation is to be used for mulch.	Construction	PM & C
B15	Weeds	Dispose of weeds to an appropriate waste management facility; do not use weeds for mulch.	Construction	PM & C
B16	Weeds	Removal of Camphor Laurel in Haul Road access will require monitoring and treatment for weed infestation post clearing.	Construction	PM & C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
B17	Weeds	Send samples of topsoil being imported onto site to a National Association of Testing Authorities (NATA) approved soil laboratory to ensure it contains no weed seeds or propagules (vegetative parts of plants such as buds or offshoots that can grow into new individuals).	Construction	PM & C
B18	Pest Management	Site to be kept clean and tidy at all times with no uncontrolled solid waste.	Construction and Operation	PM & C
B19	Pest Management	Domestic food scraps and waste not to be left onsite.	Construction and Operation	PM & C
B20	Pest Management	Waste receptacles are to be provided at any site compound facilities and amenities. These waste receptacles to be maintained and waste removed from site lawfully in accordance with legislation.	Construction and Operation	PM & C
B21	Grazing	Management of Cattle entering site from adjacent properties will be undertaken, either by removal or fencing barriers around revegetation clusters.	Construction and Operation	PM
BF1	Fire Management	Schedule 3 Conditions of Approval 25 and 26.	Prior to operation of the landfill	PM
BF2	Fire Management	Water source for fire fighting is via existing water tanker on Stotts Creek Landfill.	Construction	PM
BF3	Fire Management	No hot work without hot works fire permit onsite	Construction	PM & C
BF4	Fire Management	Fire extinguishers to be located on all mobile plant	Construction	PM
BF5	Fire Management	Refer to Emergency Response Plan in Section 5.6 of the Environmental Management Strategy.	Construction	PM & C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
T1	Movement of Heavy Vehicles	Traffic Management Plan.	During haul road, Quirks Quarry Landfill and West Valley Quirks Quarry construction, and the operation of West Valley and Quirks Quarry Landfill.	PM & C
T2	Movement of Heavy Vehicles	Heavy vehicle movements to occur only during designated working hours, therefore avoiding many species foraging hours.	Construction	PM & C
I1	Induction Package	Induction package to be developed by contractor and Project Manager to induct minor contractors.	Preconstructio n	PM
S1	Erosion and Sediment Control/drainage	Erosion and sediment control measures to be implemented as per the 'Blue book'.	Construction	PM & C
S2	Erosion and Sediment Control/drainage	Dust suppression to be undertaken to avoid earth works degrading adjacent habitat by dust.	Construction	PM & C
S3	Erosion and Sediment Control/drainage	Install, operate and maintain all erosion and sediment control measures	Construction	PM & C
S4	Erosion and Sediment Control/drainage	Minimise extent and duration of soil disturbance	Construction	PM & C
S5	Erosion and Sediment Control/drainage	Control the location and velocity of drainage flow	Construction	PM & C
S6	Erosion and Sediment Control/drainage	Promptly revegetate/stabilise all exposed and/or unstable soil surfaces.	Construction	PM & C
S7	Erosion and Sediment Control/drainage	Maintain undisturbed and rehabilitated/revegetated area as filters for sediment from disturbance above.	Construction	PM & C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
S8	Erosion and Sediment Control/drainage	Stage operations with a view to minimise disturbed/active areas onsite at any given time to minimise the volume of runoff to be managed from the contributing catchment area that is active at any particular time.	Construction	PM
S9	Erosion and Sediment Control/drainage	Maintain all stormwater runoff from disturbed areas as diffuse as possible to minimise sediment loads and maximise the opportunities for vegetation to strip sediment from the runoff.	Construction	PM & C
S10	Erosion and Sediment Control/drainage	Keep sources of different quality water separate from each other namely: -'leachate' drainage from the base of the landfill and the active landfill area; - 'dirty' runoff containing sediment from quarrying and landfill active areas; and - 'clean' runoff from vegetated areas with no waste or quarry related activities.	Construction	PM
S11	Erosion and Sediment Control/drainage	Provide adequate stormwater detention volume and ensure that sufficient water is available for construction requirements.	Construction	PM
S12	Erosion and Sediment Control/drainage	Re-use or dispose of water on site: -re-use of 'dirty' runoff for dust suppression and - divert 'clean' runoff into dams for supplementary water supply or overflow off site.	Construction	PM & C
S13	Erosion and Sediment Control/drainage	Employ strategic placement of bunds in the quarry and landfill working areas to ensure that water falling in active areas is managed appropriately	Construction	PM & C
S14	Stockpiling	Topsoil stockpiles would be up to 1m high and subsoil/overburden stockpiles would not exceed 3 m in height.	Construction	PM & C

ID	Environmental Aspect	Resources Needed/ Requirement/Mitigation	When to Implement	Responsibility
S15	Stockpiling	Subsoil and topsoil stockpiles would be located within the footprint of the landfill, quarry or on the upper surface of the completed landfill stages.	Construction	PM & C
S16	Stockpiling	Stabilisation measures would be used until vegetation is established on the stockpiled soil.	Construction	PM & C
S17	Stockpiling	Stockpiling out of the drip line of trees.	Construction	PM & C
A1	Access Control	Access to and from the site will be controlled as both entrances are gated and locked.No unauthorised access would be permissible	Throughout the Project	PM
Visual1	Visual Impact	The impact of the works will progressively become screened over time by detailed design and implementation of the Biodiversity Offset Strategy and Restoration Plan.	Throughout the Project	PM & TSCPE

The following table is an extract from the Biodiversity Offset Strategy and provides the program for the gazetting of conservation protection for Area 1. The timing of the rehabilitation objectives as depicted in Figure 4 of the LMP is also contained in the Biodiversity Offset Strategy, Restoration Plan, and White Lace Flower Translocation Plan.

Table 6.2: Conservation security planning mechanisms and schedule of milestones

Planning mechanism	Milestones	Relevant section of legislation	Estimated time to complete milestone	Estimated time to achieve conservation security
Area 1 to be reclassified from operational land to community land – Natural Area / Bushland		Local Government Act (LG Act), Section 33		
	Council resolution to support reclassification – prepare Council report and send to Council meeting.	LG Act, Section 27	~ 60 days	2 months
	Public notification.	LG Act, Section 34	Period of no less than 28 days	3 months
	Preparation of Plan of Management.	LG Act, Section 35	~ 60 days	5 months
	Council endorsement – prepare Council report accompanied by finalised PoM and send to Council meeting.		~ 60 days	7 months
S88B instrument attained for Area 1	Prepare s88B application and get registered on land title. s88B instrument will identify Area 1 and specify the PoM that details its management requirements.	Conveyancing Act 1919, Section 88B	~90 days	10 months

7 Biodiversity Offset Strategy Implementations Risks and Mitigations

As discussed above the Biodiversity Strategy forms an Appendix to the LMP

Table 7.1 Risks to the implementation of the biodiversity offset strategy implementation

Risk	Mitigation
Inadequate growing conditions (drought, flooding rains,etc)	Drought – implement hand watering Flood – provide protection from erosion and additional maintenance of plants
Registration of covenant being overturned by Council	Would require a Council Resolution and community consultation.
Covenant being appealed before the Land and Environment Court	Inconsistent with Council long term objective of Botanic Garden rehabilitation goal.
Rezoning of the land by Council in the future	Would require Council Resolution and community consultation.
Availability of Council funding to implement the plan of Management	COA Schedule 4 Clause 32- Conservation and Rehabilitation Bond

8 General Environmental Management/Monitoring

The general environmental controls will be monitored and recorded weekly and actioned as required. The construction contractor for the haul road will be required to manage the environmental construction aspects of the haul road. The remaining areas of site will be monitored as per the sub plans and under the responsibility of the Project Manager.

Table 8.1: Responsibility for monitoring, reviewing, and implementing the LMP

Environmental Responsibilities		
Title	**Name and Contact Number**	**Responsibility**
Project Manager	Rodney Dawson Tweed Shire Council 0428864440	Approving Management Plans. Ensuring the environmental measures are implemented in accordance with the Project Plans and contract documents. Monitoring environmental controls and ensuring employees and subcontractors are acting in accordance with the environmental actions tabulated in 6.1 above.
Environmental Manager	Mitchell Cambridge Tweed Shire Council 66702745	Planning, and assessing environmental compliance. Reviewing Construction Environmental Management Plans for the Proposed works. Carrying out Internal Audits of systems and processes.
Site Foreman- Haul Road Construction	Shaun Halberstater Tweed Shire Council 0427407099	Monitoring environmental controls and ensuring employees and subcontractors are acting in accordance with the environmental actions tabulated in 6.1 above and other contractual plans.
Quality and Safety Manger	WHS Tweed Shire Council	Reviewing Safety Management Plans for the Proposed works.
Council contacts for ongoing plan implementation	Shaun Halberstater Tweed Shire Council 0427407099	Ensure continued ongoing maintenance of plans once construction is complete.

9 Appendix

Appendices: Restoration Plan, Biodiversity Offset, White Lace Flower Translocation

Future Relevant Plans: Plan of Management for Area 1, Habitat Management Plan, Rehabilitation and Closure Plan.

TWEED
SHIRE COUNCIL

Customer Service | 1300 292 872 | (02) 6670 2400

tsc@tweed.nsw.gov.au
www.tweed.nsw.gov.au

Fax (02) 6670 2429
PO Box 816
Murwillumbah NSW 2484