REVEGETATION PLAN

Broome-Cape Leveque Road Upgrade (SLK 147.3 – 172.2)

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BROOME-CAPE LEVEQUE ROAD UPGRADE

REVEGETATION PLAN

1. PROJECT DESCRIPTION

1.1 Purpose

Main Roads Western Australia (MRWA) has a policy aim to "protect and enhance the environmental values of road reserves". This document has been prepared to ensure compliance with Main Roads' Environmental Policy and Main Roads' statewide Purpose Permit CPS 818/3.

In the process of establishing new roads and upgrading existing roads, there is often a need to undertake revegetation of the road reserve or other affected areas. Where clearing of native vegetation is to occur under Main Roads' statewide Purpose Permit CPS 818/3, a revegetation plan is required for temporary clearing (eg. borrow pits, access tracks, camps etc.). Where the temporary clearing exceeds 0.5ha, the revegetation plan needs to be forwarded to the Department of Environment and Conservation prior to clearing.

This revegetation plan sets out the revegetation requirements for the Broome-Cape Leveque Road Upgrade.

The purpose of the revegetation plan is to identify effective revegetation practices that help accelerate the natural succession processes that occur following the clearing of native vegetation and soil disturbance.

1.2 Background

Main Roads Kimberley Region proposes to upgrade the Broome-Cape Leveque Road SLK 147.3 – 172.2. The existing road is in very poor condition and upgrading will provide significant improvement to traffic safety and accessibility. Maintenance and freight costs will be reduced and an overall better level of service will be achieved for road users.

The proposed upgrade will require:

- constructing a new road generally on and parallel to the existing alignment;
- improving the drainage; and
- sealing the road.

The Shire of Broome is responsible for maintaining the Broome-Cape Leveque Road. However, proposed upgrading of the road will be managed by Main Roads Western Australia (MRWA) in consultation with stakeholders.

1.3 Previous Assessment Work

It has been proposed to complete the entire upgrade over a seven (7) year period in three (3) separate sections. The staging of each section is in the following order:

1. Section 2 (SLK 102 -147.3) – construction work complete
2. Section 1 (SLK 147.3 -195.8) – approved by Environmental Protection Authority (EPA)
3. Section 3 (SLK 12.7 - 102) – environmental approvals to be sought in the near future

Part of Section 1, SLK 172.2 - 195.8, has been cleared and upgrading of the road is almost complete. A Notice of Intent to Clear (NOIC) was submitted and approved for this section on 31 May 2002 which has now expired.

The remaining part of Section 1, SLK 147.3 - 172.2, remains to be cleared for proposed upgrade works, expected to commence in 2007. Clearing for this section will be undertaken in accordance with the Purpose Permit.

An Environmental Impact Assessment and Management Plan (EAMP) was completed in March 2002 by Western Infrastructure for the Broome-Cape Leveque Road upgrade (SLK 102 – 205.6 SLK). Following external agency feedback, additional investigations were undertaken by MRWA to address a number of concerns. Those concerns were resolved and approved by the relevant agencies and the EPA. The outcome was that the project did not require formal assessment (i.e. Not Assessed-No Advice Given).

An Environmental Review was developed in 2007 to update the information compiled in the EAMP and to verify that no environmentally significant impacts would occur as a result of the proposed works.

1.4 Project Description

The upgrade of the Broome-Cape Leveque Road involves the construction of a new road, generally parallel to the existing alignment with some realignment of the existing substandard curves.

The road will be cleared to a maximum width of 20 metres with a raised formation and gravel construction 8.6 metres wide. The road works will include the installation of culverts, construction of roadside table drains and offshoot drains at regular intervals along the alignment.

The areas required to be cleared are as follows:

- Broome to Cape Leveque Rd, 24.9km x 20m 49.8 ha
- Borrow pits for sand (including access tracks), 0.5ha per km 12.45 ha

A total of 62.25 hectares will be cleared for construction works. Of this area, 49.8ha of land will be permanently cleared and 12.45ha of land will be temporarily cleared.

Rehabilitation shall be applied to the following areas:

- Unused sections of the existing road;
- Side and access tracks;
- Gravel/borrow pits and turkey's nests;
- Construction camp; and,
- Machinery/vehicle maintenance sites.

The areas to be rehabilitated are shown in Table 1:

Table 1: Revegetation Area Details

Type	**Area**
Temporary clearing revegetation	12.45 hectares
Other revegetation	Nil

The location and boundaries of the project area are shown on Figure 1 and the areas to be revegetated are shown on Figure 2.

Locality Plan

Section 1 Section 2 Section 3

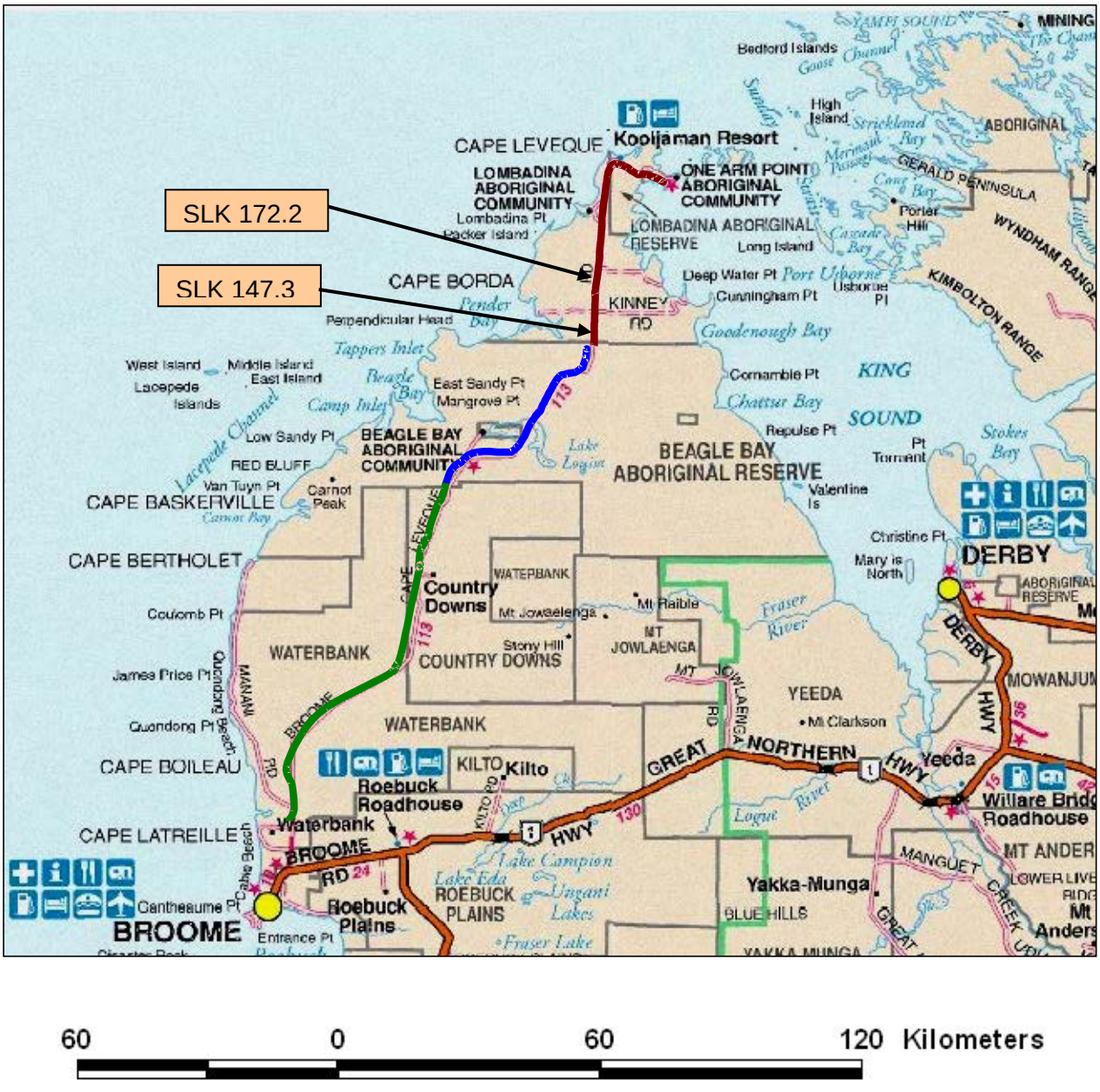

Figure 1 Locality Plan showing sections of the Broome-Cape Leveque Road upgrade

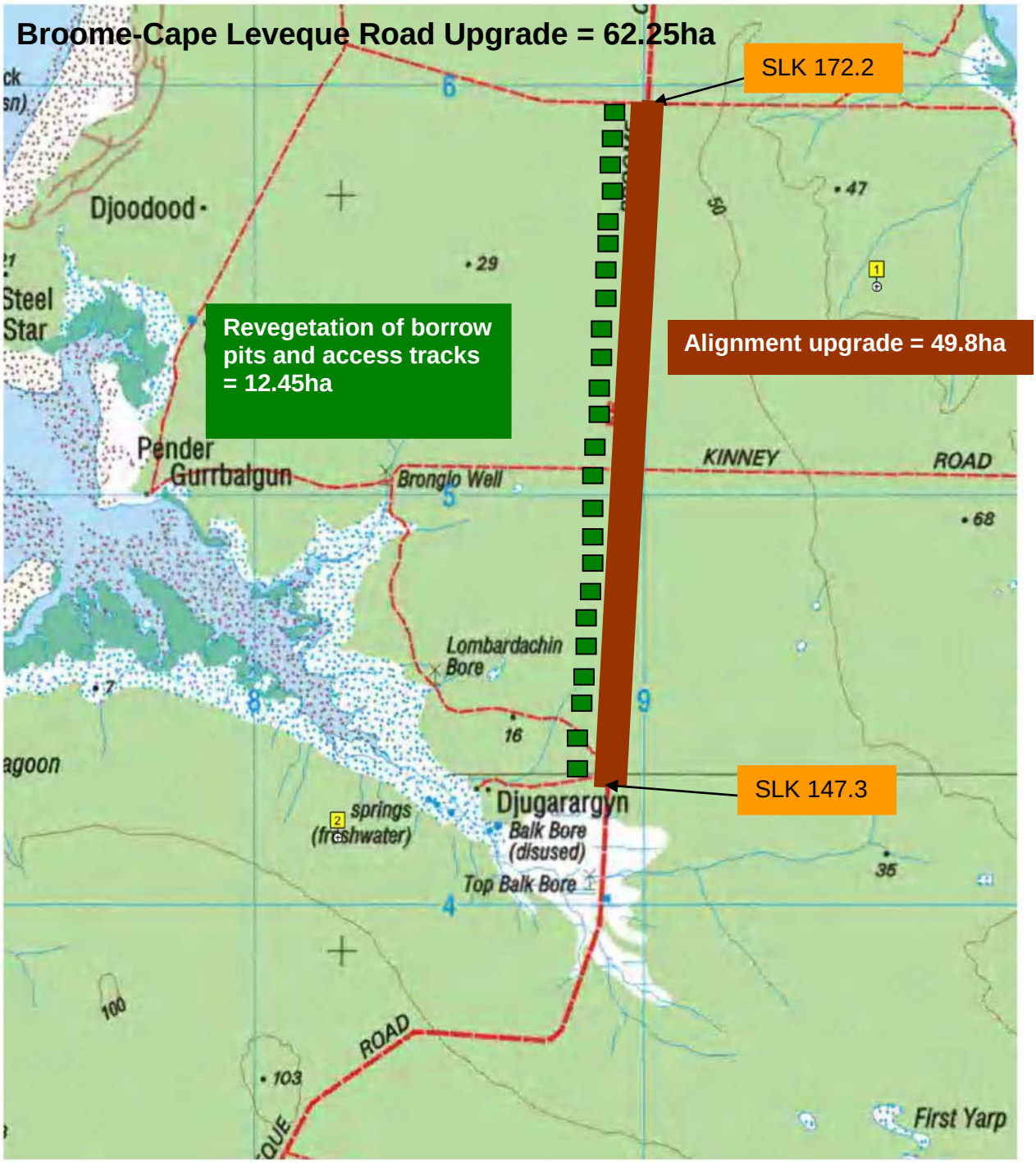

Figure 2 Location of Revegetation Works, Broome-Cape Leveque Rd Upgrade

1.5 Existing vegetation

The vegetation in the vicinity of the project area is comprised of the following types:

- North of Broome along the length of the Dampier Peninsula: *Acacia tumida* shrubland with *Eucalyptus tectifica* and *E. grandifolia* medium woodland over curly spinifex (*Plectrachne pungens*) and some ribbon grass (*Chrysopogon fallax*);
- North of Pender Bay the trees are mainly woolybutt *Eucalyptus miniata* with *E. tectifica,* while *Acacia tumida* is joined by *A. platycarpa*, the ground layer consisting of curly spinifex and some ribbon grass;
- Between the pindan and the sea on the Dampier Peninsula there are extensive flat coastal plains of grey mud fringed by a zonation of mangroves, hypersaline bare mud flats and samphire communities.

1.6 Weeds

The following weed species are known to occur in the project area:

- *Passiflora foetida* – Stinking passion flower
- *Stylosanthes hamata* – Caribbean stylo
- *Chloris barbata* – Purple top chloris
- *Cenchrus biflorus* – Gallons curse
- *Cenchrus ciliaris* – Buffel grass
- *Hyptis sauveoleus*
- *Gossypium hirsutus* – Upland cotton
- *Malvastrum americanum* – Spiked malvatrum

2. SITE PREPARATION

2.1 Vegetation clearing, mulching and re-use

All vegetation will be cleared from the works area and non-weed infested vegetation will be stockpiled. Stockpiled vegetation will not be placed on the very edge of the approved cleared area in order to prevent machinery going outside the cleared area to push the stockpile forward again. Weed infested vegetation will be disposed of at an appropriate site. Burning of the cleared vegetation will not be permitted.

2.2 Topsoil stripping and re-use

Topsoil will be stripped to a maximum depth of 100 mm. Topsoil will be stored in a weed free (as far as possible) area, as close as possible to the area to be rehabilitated. The topsoil will be placed in windrows of less than 1.5m in height and reinstated as soon as possible, to prevent deterioration to the in-situ seeds and maintain seed viability.

3. WEED CONTROL

Adequate control measures will be incorporated to ensure weeds are killed or not transported to other areas. Control measures include removal of weeds to an approved dump site or treatment of weeds such as using herbicide spraying.

Herbicide spraying shall only be carried out by licensed operators and herbicide shall be mixed and applied in accordance with manufacturer's instructions.

Where practicable, weeds should not be removed when they are in flower or seeding.

All machinery shall be free of built up soil and vegetative material before entering and leaving the site to help minimise the transportation of weeds and their seeds.

Exposed areas such as bare batters and borrow pits shall be promptly rehabilitated to reduce the ingress of weeds.

Where works are adjacent to good quality vegetation, weeds within the project area will be removed or killed once a year for 5 years.

4. REVEGETATION THROUGH REGENERATION

4.1 Revegetation objectives

The revegetation objectives are to:

- Ensure roadside stability and minimise ongoing maintenance;
- Ensure that conservation values and biodiversity are protected; and
- Ensure local amenity and aesthetics are enhanced.

4.2 Required vegetation cover

The roadside vegetation should be similar in structure and content to comparable naturally occurring vegetation in the local area and will reflect the vegetation communities present in the road reserve and adjacent bushland. The width of the vegetation setbacks and clearances will be appropriate for the specific location and will be dependent on an assessment of the road design speed, road alignment and the roadside batter slopes.

4.3 Revegetation Techniques

The following rehabilitation works shall be undertaken on areas of disturbed earth requiring rehabilitation:

- Topsoil will be uniformly respread to a minimum depth of 100mm over the area; and
- Area to be ripped to a minimum depth of 200mm deep with rip lines approximately 300mm apart. Where slopes are present, rip lines shall be along contours.

The following rehabilitation work shall be undertaken at borrow/gravel pits:

- Overburden and then topsoil shall be uniformly and evenly spread over the disturbed areas of the pit. Depending on the slope of drainage lines within the pit, it may be necessary to form small swales from the topsoil to reduce erosion velocities and encourage the deposition of seeds.
- The existing pit floor shall be ripped to a depth of 300 – 500mm deep with rip lines between 500 - 800mm apart, if the material in the floor of the pit is able to be ripped. The whole area of the pit, including drainage lines, shall be ripped.
- All stockpiled vegetation shall be spread along the contour and pit floor to help promote seed deposition and further reduce erosion velocities.

5. VEGETATION ESTABLISHMENT PERIOD

The vegetation establishment period will be for at least twelve months following the completion of the works. During this period, the maintenance and monitoring will be undertaken, see Section 6.

6. ONGOING MAINTENANCE AND MONITORING

Maintenance and monitoring of the project shall be ongoing to measure regeneration effectiveness and to control weeds.

6.1 Maintenance and Monitoring

After revegetation works, revegetated areas will be inspected every six months for a total of 12 months to monitor and control weeds and to measure the effectiveness of revegetation works.

Monitoring will comprise the use of criteria. Essentially, this involves visual assessment to ensure the revegetation works have been implemented as planned. Table 2 shall be used as the monitoring guide to assess the success or otherwise of the revegetation plan.

Due to the variable rainfall patterns in pastoral areas, revegetation works may not be successful, despite the use of best management practices.

Table 2: Revegetation Monitoring Guide

Criterion	Target	After three months	After one year	After three years
Mean vegetation foliage cover (%) excluding weeds.	>50	0	20	40
Mean weed foliage cover (%).	<20	<20	<20	<20
Amount of bare soil areas >4m^2 (%).	<30	<100	<80	<70