Fauna Management Plan

Everleigh - Proposed School Site
432-520 Greenbank Road, Greenbank Qld 4124

Prepared for Mirvac Queensland Pty Ltd
2 October 2019

Job No. 7598

Document Control

Document: Fauna Management Plan for Everleigh (proposed School Site)– 432-520 Greenbank Road, Greenbank (Issue A), prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd.

Document Issue

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Prepared by

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Reports and plans by others may be included in this document.

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Acronyms and Abbreviations

CEMP	Construction Environmental Management Plan
DAF	Department of Agriculture and Fisheries (Qld)
DES	Department of Environment and Science (Qld)
EDQ	Economic Development Queensland (Qld)
EHP	Department of Environment and Heritage Protection (Qld) (former, now DES)
EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EVNT	Endangered, Vulnerable and Near Threatened (as listed in the NCWR)
FTMP	Fauna Translocation Management Plan
NCA	*Nature Conservation Act 1992* (Qld)
NCWR	Nature Conservation (Wildlife) Regulation 2006 (Qld)
NESS	Natural Environment Overarching Site Strategy
PDA	Priority Development Area
PMST	Protected Matters Search Tool
PTRP	Pre-clearing Trapping and Release Plan
SHG	Saunders Havill Group
WHIMP	Wildlife and Habitat Impact Mitigation Plan
WPMP	Wildlife Protection and Management Plan
WWBW	Waterway Barrier Works

Reference Documents

ADR *Acceptable Development Requirements for operational work that is constructing of raising waterway barrier works,* prepared by Queensland Government (dated 3 July 2017

FSRDM *Fauna Sensitive Road Design Manual: Volume 2- Preferred Practices*, prepared by the Department of Transport and Main Roads (dated June 2010).

NESS Natural Environment Site Strategy, dated 18 April 2017 (Approved 2 June 2017 as amended in red, 27 April 2017)

The Code *Code of Practice for Welfare of Wild Animals Affected by Land Clearing and Other Habitat Impacts and Wildlife Spotter /Catchers (Draft)*, prepared by Wildlife Warriors and Voiceless.

VMP *Vegetation Management Plan (9245 School Site),* prepared by SHG (dated July 2019).

1. Introduction

Saunders Havill Group (SHG) was engaged by Mirvac Queensland Pty Ltd (Mirvac) to prepare a Fauna Management Plan (FMP) for proposed clearing on the Everleigh project site associated a proposed state school for the Department of Education. The site is located on land described as 432-520 Greenbank Road, Greenbank and falls within the Greater Flagstone Priority Development Area (PDA) where Economic Development Queensland (EDQ) are the administering authority. Refer to **Figure 1** for Site Context and **Figure 2** for Site Aerial.

The project has the benefit of a Preliminary Approval (PA) for a Material Change of Use generally in accordance with the Greenbank Master Plan, issued by EDQ on 9 August 2017 (DEV2016/748). As part of the Preliminary Approval, the Natural Environment Site Strategy (NESS) (prepared by SHG, amended in red 27 April 2017) was approved by EDQ on 2 June 2017, which details fauna management requirements for the development. In accordance with the NESS, FMPs are to be developed for each stage of development involving vegetation clearing works.

This FMP has been prepared to support a development application to Economic Development Queensland (EDQ) to manage fauna requirements for vegetation clearing associated with the proposed school. The purpose of this FMP is to manage impacts associated with the project and protect native animals, specifically *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey-headed Flying-fox) during clearing and construction.

This FMP includes step by step procedures for the management of fauna prior to, during and post-vegetation clearing and construction activities to reduce potential impacts. Fauna management specifications and principles incorporated into this FMP apply generally to all native animals and focus on incorporating measures to minimise disturbance and avoid conflicts. Compliance with this FMP is compulsory and incorporates the use of expert consultants, including a registered and Department of Environment and Science (DES) approved Fauna Spotter Catcher. This FMP adopts best practice aspects of the *Code of Practice for Welfare of Wild Animals Affected by Land Clearing and Other Habitat Impacts and Wildlife Spotter /Catchers (Draft)* (the Code).

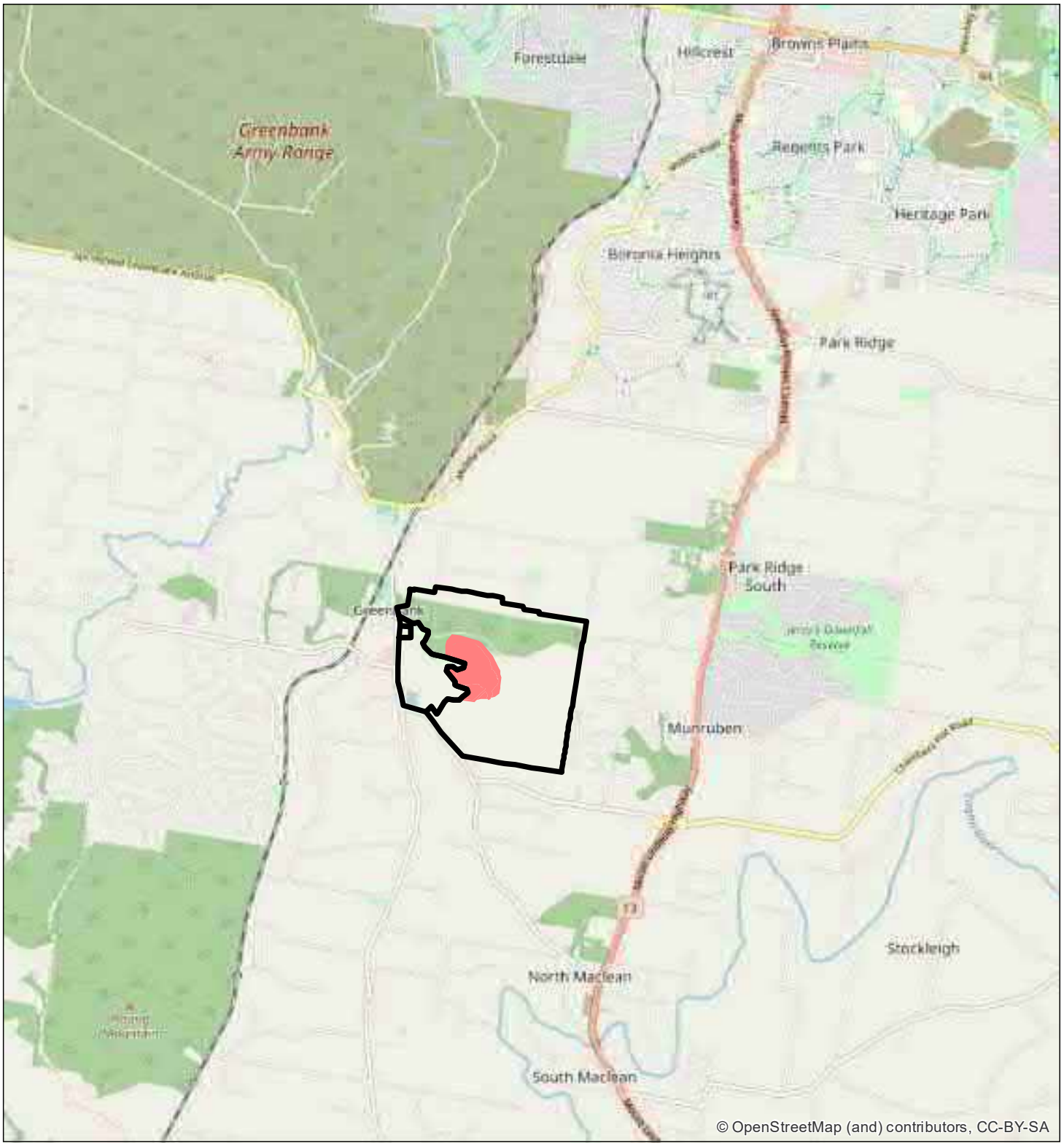
This FMP should be read in conjunction with the School Site Vegetation Management Plan (VMP), prepared by SHG (dated July 2019), which provides details of vegetation to be retained and removed.

1.1. Property Summary

Key site details are provided in **Table 1** below.

Table 1: Property Summary

Address	432-520 Greenbank Road,
RPD	Lot 1 on SP297192
Local Government Area	Logan City Council
Administering Authority	Economic Development Queensland
Priority Development Area	Greater Flagstone PDA
Planning Scheme	Greater Flagstone Urban Development Area Development Scheme
Area Classification / Zone	Urban Living
Existing Land Use	Vacant



Legend

Site DCDB

Clearing area

Figure 1

Site Context

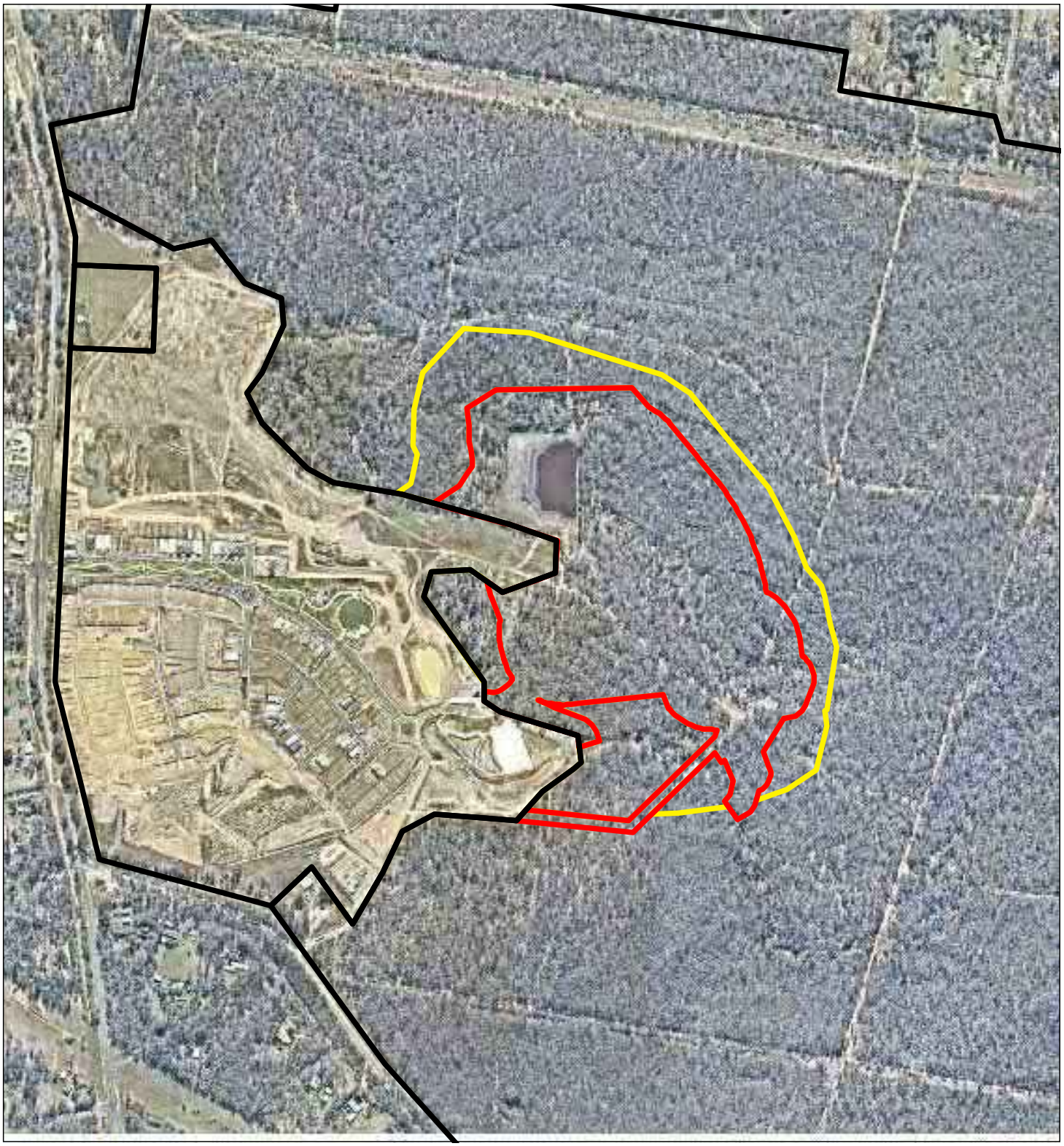
File ref. 7598 E Figure 1 School Site Context B
Date *19/09/2019*
Project *Everleigh*

0 0.5 1 2 *km*

N

Scale (A4): 1:75,000 [GDA 1994 MGA Z56]

Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019.



Legend

- Site DCDB
- Phase 1 civil works extent
- Phase 2

Figure 2

Site Aerial

File ref. 7598 E Figure 2 School Site Aerial B
Date *19/09/2019*
Project *Everleigh*

0 50 100 200 300 400 *m*

N

Scale (A4): 1:10,000 [GDA 1994 MGA Z56]

mirvac

saunders havill group

Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019, Aerial (Nearmap 2019)

2. Legislative Context

2.1. Environment Protection and Biodiversity Conservation Act 1999

The Australian Government's key piece of environmental legislation is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act aims to protect and manage matters of environmental significance which include nationally and internationally important flora, fauna, ecological communities and heritage places.

A Protected Matters Search for the allotment was undertaken through the EPBC Act's online Protected Matters Search Tool (PMST). The search provides a list of wetlands of international significance, threatened ecological communities and threatened species which have the potential to be temporarily or permanently located within a 5 kilometre (km) radius of the development site. **Table 2** lists a summary of these results relevant to site fauna. The complete results of this search are included in **Appendix A**.

Table 2: EPBC Act PMST Fauna Search Results

Wetlands of International Importance (Ramsar)		
Moreton Bay – 20-30km upstream		
Listed Threatened Ecological Communities		
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland – Endangered (community may occur within area) **Lowland Rainforest of Subtropical Australia** – Critically Endangered (community may occur within area) **Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Queensland** - Critically Endangered (community may occur within area) **White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland** – Critically Endangered (community may occur within area)		
Threatened Species		
Scientific Name	**Common Name**	**Status**
Birds		
Anthochaera phrygia	Regent Honeyeater	Critically Endangered
Botaurus poiciloptilus	Australasian Bittern	Endangered
Calidris ferruginea	Curlew Sandpiper	Critically Endangered
Dasyornis brachypterus	Eastern Bristlebird	Endangered
Erythrotriorchis radiatus	Red Goshawk	Vulnerable
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable
Hirundapus caudacutus	White-throated Needletail	Vulnerable
Lathamus discolour	Swift Parrot	Critically Endangered
Numenius madagascariensis	Eastern Curlew	Critically Endangered

Threatened Species		
Scientific Name	**Common Name**	**Status**
Poephila cincta	Southern Black-throated Finch	Endangered
Rostratula australis	Australian Painted Snipe	Endangered
Turnix melanogaster	Black-breasted Button-quail	Vulnerable
Fish		
Maccullochella mariensis	Mary River Cod	Endangered
Insects		
Argynnis hyperbius inconstans	Australian Fritiillary	Critically Endangered
Mammals		
Cahlinolobus dwyeri	Large-eared Pied Bat	Vulnerable
Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered
Petauroides volans	Greater Glider	Vulnerable
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable
Phascolarctos cinereus	Koala	Vulnerable
Potorous tridactylus tridactylus	Long-nosed Potoroo	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable
Plants		
Arthraxon hispidus	Hairy-joint Grass	Vulnerable
Bosistoa transversa	Three-leaved Bosistoa	Vulnerable
Cycas ophiolitica	-	Endangered
Dichanthium setosum	Bluegrass	Vulnerable
Macadamia integrifolia	Macadamia Nut	Vulnerable
Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable
Notelaea ipsviciensis	Cooneana Olive	Critically Endangered
Notelaea lloydii	Lloyd's Olive	Vulnerable
Phaius australis	Lesser Swamp-orchid	Endangered
Plectranthus habrophyllus	-	Endangered
Samadera bidwillii	Quassia	Vulnerable
Thesium australe	Austral Toadflax	Vulnerable
Reptiles		
Delma torquata	Adorned Delma	Vulnerable
Furina dunmalli	Dunmall's Snake	Vulnerable

Threatened Species		
Scientific Name	**Common Name**	**Status**
Saiphos reticulatus	Three-toed Snake-tooth Skink	Vulnerable

2.2. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (protected areas) and protects threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2006 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited. The schedules of this regulation were considered in this FMP using the DES Wildlife Online database search for a 5 km radius of the site. Fauna species listed under the NCWR with the potential to occur around the subject site are shown in **Table 3.** The complete results of this search are included **Appendix B.**

Table 3: NCA Wildlife Online Fauna Search Results

Scientific Name	Common Name	Status
Adelotus brevis	Tusked Frog	Vulnerable
Calyptorhynchus lathami lathami	Glossy Black-cockatoo	Vulnerable
Dasyurus maculatus maculatus	Spotted-tailed quoll (southern subspecies)	Vulnerable
Phascolarctos cinereus	Koala	Vulnerable
Petauroides volans volans	Southern Greater Glider	Vulnerable

3. FMP Framework

This FMP provides a framework for fauna management within the site. This FMP should form part of the Construction Environmental Management Plan (CEMP) for the project. To assist in achieving a leading practice model for fauna management prior to, during and post the completion of the construction works for the site, all land clearing will be managed generally in accordance with the *Code of Practice for Welfare of Animals effected by Land Clearing and Other Habitat Impacts and Wildlife Spotter/Catchers (Draft)*, as prepared by the Wildlife Warriors and Voiceless (the Code). Under the Code, the procedural guide detailed in Sections 3.1.1 – 3.1.3 will been used to inform the framework for clearing works. Consideration should be given to the survey for and management of permit requirements for tampering with animal breeding places under the *Nature Conservation Act 1992.*

This FMP has been informed by the *Natural Environment Site Strategy, dated 18 April 2017 (Approved 2 June 2017 as amended in red, 27 April 2017)* (NESS) and should be read in conjunction with that report and the *Vegetation Management Plan (7598 School Site), prepared by SHG, dated July 208* (VMP), lodged separately.

Fauna management and mitigation strategies are discussed in further detail in Section 4 – Fauna Management Plan Specifications.

3.1.1 Pre-Clearing Survey

Action 1 – Developer to Engage a Fauna Spotter Catcher
Action 1 requires that the developer engage a Fauna Spotter Catcher with full registrations and licences issued by the Queensland Department of Environment and Science (DES).

Action 2 – Developer to Undertake Pre-Clearing Survey
A pre-clearing survey will be undertaken by a DES approved Fauna Spotter Catcher no more than two (2) weeks prior to the commencement of clearing activities at each stage. This survey must include a fauna assessment of the site, particularly for Koalas and animals using hollows, including bats. This survey will inform the Pre-Clearing Trapping and Release Plan (PTRP) containing elements from the Code, as detailed in Section 3.1.2. Results from the pre-clearance surveys will be made available to DES and will form part of the Post-clearing report.

3.1.2 Pre-clearing Trapping and Release Plan

Action 3 – Fauna Spotter Catcher to Prepare a Pre-Clearing Trapping and Release Plan
Informed by the pre-clearing surveys, a PTRP containing a Wildlife Protection Management Plan (WPMP) and Wildlife and Habitat Impact Mitigation Plan (WHIMP) Code elements will be developed by a DES approved Fauna Spotter Catcher a maximum of two (2) weeks prior to the commencement of any clearing activities. This report will provide extensive detail of the fauna likely to be impacted by the clearing works.

The PTRP will outline the methodology for the identification, trapping and relocation of native fauna. The PTRP should include the following information:

- a description of the project with reference to impacts on wildlife and/or wildlife habitat;
- a pre-development plan of the site showing habitat areas including nests and hollows, features, corridors, riparian habitats and adjacent areas;
- results of any fauna surveys including pre-clearance surveys;
- contact details of the nearest veterinarian and agencies to be notified of injured wildlife;
- a wildlife and habitat impact assessment based on the proposed development works; and
- confirmation of the release area.

Action 4 – Fauna Spotter Catcher Role at Pre-Start Meeting

Prior to the commencement of any construction works, a pre-start meeting is to be held between the Proponent, Site Supervisor, Environmental Coordinator, Fauna Spotter Catcher and other key project personnel. At the pre-start meeting, the Fauna Spotter Catcher is to outline the clearing process and the requirements of the PTRP.

Action 6 – During Construction

The Fauna Spotter Catcher is to be on-site during all phases of construction which involve potential impacts on wildlife or habitat. This will enable to the Fauna Spotter Catcher to make any necessary adjustments to the approved VMP and the PTRP to cater for any specific issues encountered during the clearing works. Should an animal encountered during vegetation clearing, clearing will cease immediately until the animal preferably moves away of its own accord.

3.1.3 Post-clearing Wildlife Management Report

Action 7 – Post Works Reporting

During the course of all site works, including the pre-clearance surveys, the Fauna Spotter Catcher is to keep an accurate record of all animals encountered and/or captured, and all incidents and disposals for each stage of the project. The records should form part of the Post-Clearing Wildlife Management Report to be issued under licence requirements to DES. The Post-Clearing Wildlife Management Report should consist of the following three (3) sections:

1. PTRP – Aspects of the planning, design, construction and ongoing operation of the project in which risks to wildlife have been identified. This plan should also include recommendations and outline the type, frequency and timeframes for monitoring, as well as updates to describe measures taken to address an incident.

2. Wildlife Capture and Disposal Plan – Should contain details of any animal/s that were caught and/or sighted and released, and the placement of any release/s as well as details of any animals that were destroyed due to injury, given to wildlife rescue groups etc. The following details for each captured animal should be included in the Wildlife Capture and Disposal Plan:

    a. Species.
    b. Identification name or number.
    c. Sex (M, F or unknown).
    d. Approximate Age or Age Class (neonate, juvenile, sub-adult, adult).
    e. Time and date of capture.
    f. Method of capture.
    g. Exact point of capture (GPS coordinates).
    h. State of health.
    i. Incidents associated with capture likely to affect health.
    j. Veterinary intervention or treatments.
    k. Time held in captivity.
    l. Disposal method (euthanasia, translocation, re-release).
    m. Date and time of disposal.
    n. Details of disposal (GPS points of release).
    o. For released animals, location relative to point of capture.

3. Animal Injury and Euthanasia Report – similar details for the Wildlife Capture and Disposal Plan should be included in this report.

The Post-Clearing Wildlife Management Report will be provided to the Proponent and Environmental Coordinator and no more than two (2) weeks after clearing activities have ceased

3.2. Roles and Responsibilities

This section details the key roles and responsibilities for the works.

3.2.1 Proponent

Mirvac Queensland Pty Ltd (Mirvac) is the Proponent for the works.

3.2.2 Environmental Coordinator

Saunders Havill Group (SHG) is the Environmental Coordinator for the project and is responsible for the development of this overarching FMP and documentation for overarching environmental management. SHG will be responsible for managing non-compliance by appointed contractors and sub-contractors, including establishing additional management procedures and determining if EDQ notification should be made

3.2.3 Administering Authority

Economic Development Queensland (EDQ) is the government approval authority for this project.

3.2.4 Site Coordinator

The Site Coordinator is a representative of the project team (typically the project engineer) and is responsible for coordinating the project consultants and construction contractor.

3.2.5 Site Supervisor

The Site Supervisor is a representative of the Construction Contractor (to be appointed) and responsible for overseeing all pre-clearing, clearing and construction activities are undertaken in accordance with the approved FMP, PTRP and subsequent environmental management documentation. The Site Contractor will be responsible for engaging and the commission of the DES approved Fauna Spotter Catcher.

3.2.6 Fauna Spotter Catcher

The Fauna Spotter Catcher must be a person who holds a rehabilitation permit with an extended authority issued by DES, to take, keep or use an animal whose habitat is about to be destroyed by a human activity. A DES approved Fauna Spotter Catcher will be engaged by the Proponent for pre-construction and construction stages of the project. It is noted that the Fauna Spotter Catcher must hold a Rehabilitation Permit and a copy of this permit along with their contact details will be passed on to EDQ and the Environmental Coordinator. The engaged Fauna Spotter Catcher will be responsible for undertaking pre-clearing surveys of the site and developing the PTRP. The Fauna Spotter Catcher must be present on site during all clearing activities and is responsible for the relocation of native fauna. A list of key contacts for the project is contained in Section 7.

4. Fauna Summary

4.1. Fauna Habitat Areas and Opportunities

The purpose of this FMP is to control the impacts of clearing activities on-site and to the surrounding area's fauna communities. The NESS, identified the presence of suitable habitat observed along waterways to be retained as ecological corridors under the development proposal (refer **Plan 1**). The NESS also identified a significant portion of land to the east, outside the School Site area, to be retained as Conservation Parkland. This FMP will outline the process for tree removal and the strategy for installation of nest boxes to replace removed hollows.

This FMP should be read in conjunction with the following documents, to be lodged separately:

- Vegetation Management Plan (7598 School Site), prepared by SHG, dated July 2019 (VMP)
- Natural Environment Site Strategy, dated 18 April 2017 (Approved 2 June 2017 as amended in red, 27 April 2017) (NESS)

Ecological features identified on-site included vegetation on site which provided suitable habitat for native fauna species, including the Koala and Grey-headed Flying-fox, as well aquatic values associated with waterways which traverse the site from the east. The site is not identified as including significant biodiversity corridors or biodiversity values under the Greater Flagstone PDA. The site is bound by Teviot Road to the west, Greenbank Road to the south and existing residential to the north and east. The proposed School Site adjoins existing cleared land in the west developed as Precinct 1.

No clearing within areas of Significant Biodiversity Value as identified by the NESS is to occur as part of the School site proposal. Clearing is contained to predominately non-remnant (Category X) vegetation, within minor encroachment within areas of Low Order Remnant Vegetation comprised of Least Concern RE. The School site does not involve encroachment within Confirmed Waterway Areas. It is noted that a Site Farm Dam formally occupied the proposal site, however has since been dewatered (under EDQ approvals) and infilled (refer **Plan 1**).

Two pockets of vegetation will be retained where clearing for construction access roads will occur. The northernmost road will form the future school site access. Appropriate controls with respect to the direction of clearing to appropriately flush fauna and not trap animals within this area must be addressed as part of the WPMP and WIMP prepared by the appointed Fauna Spotter Catcher, and the shown within the VMP.

The following strategies have been developed as part of this FMP to mitigate the adverse impacts of development on native fauna and provide habitat enhancement and informed the VMP (to be lodged under a separate cover):

1. **Direction of Clearing Plan** – to direct clearing activities from open areas to less open areas allowing fauna to naturally seek shelter in the adjacent habitat;
2. **Fencing Management Strategy** – for the provision of permanent and temporary fencing around roads and construction areas, and
3. **Nest Box/Hollow Strategy** – for the installation of nest boxes and salvaged hollows in mature native trees in retained environmental corridors and the provision of hollow logs and branches to temporarily house translocated animals and provide permanent nesting sites. Habitat features are to be determined by the Environmental Coordinator as part of the VMP.

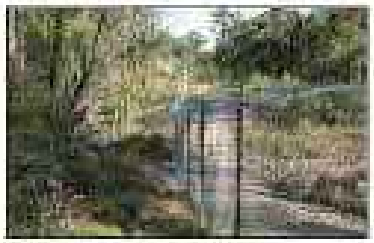
The below images reflect management strategies that may be adopted in this FMP.

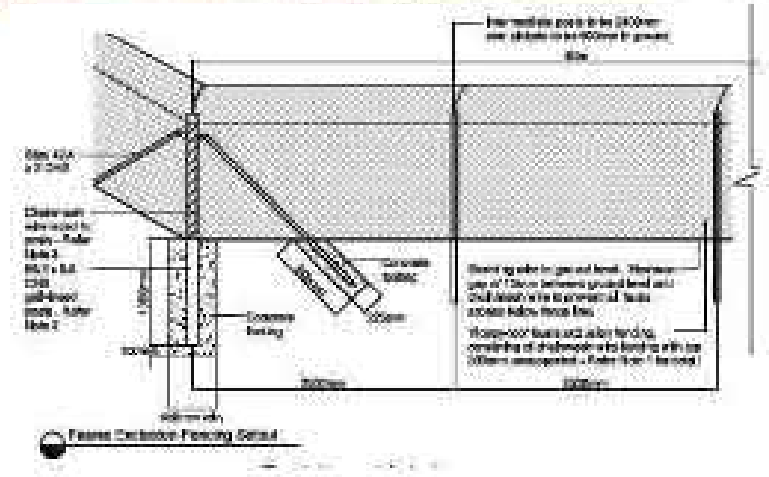
FAUNA SPOTTERS RETRIEVING FAUNA

FAUNA SIGNAGE

FAUNA SPOTTER DURING TREE CLEARING

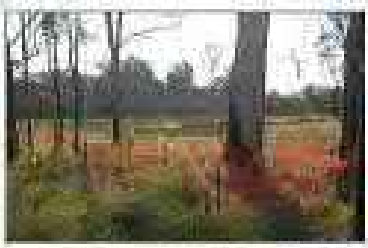
KOALA SIGNAGE





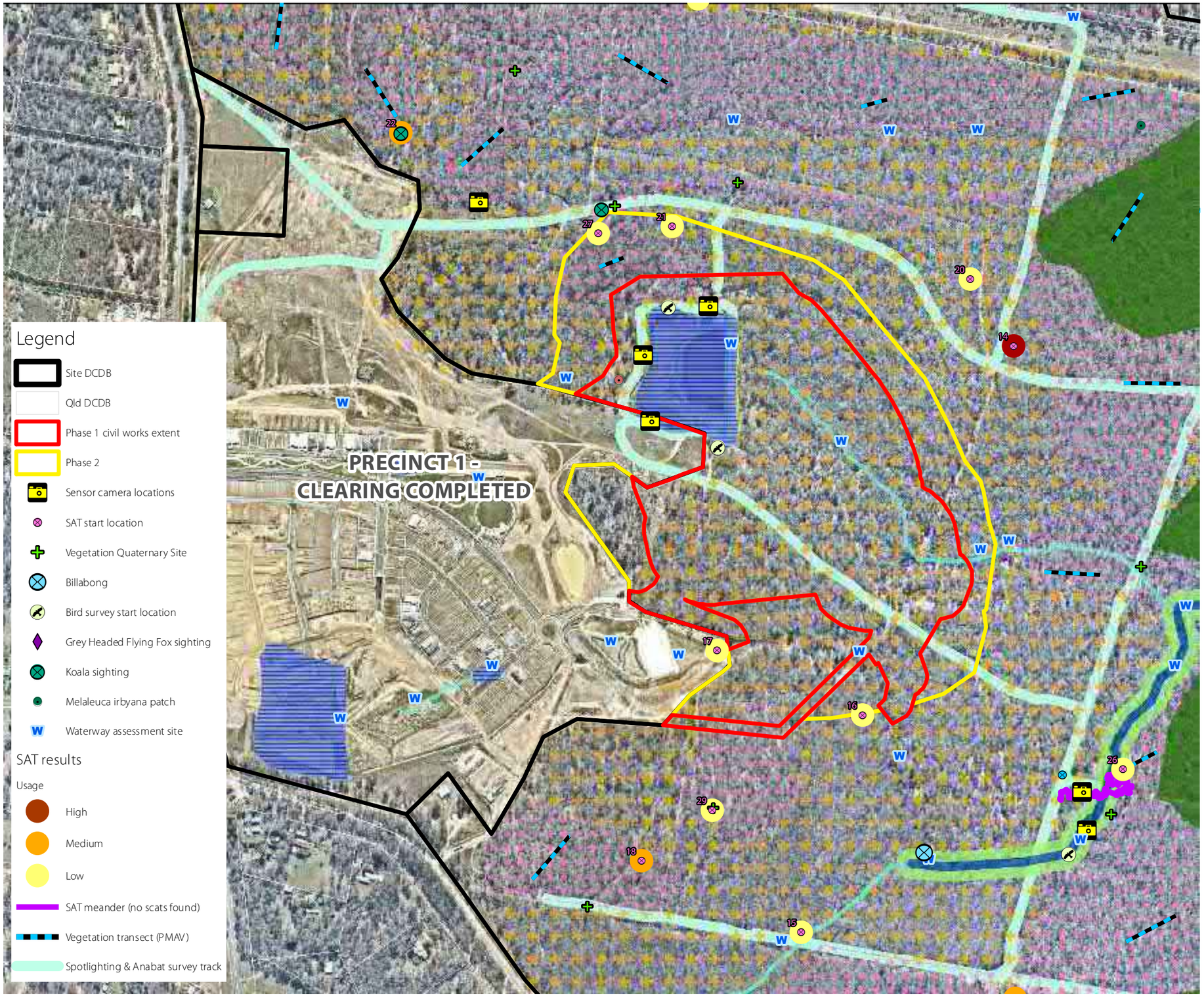
CONSTRUCTION FENCING DETAIL

TREE PROTECTION & EROSION FENCE



SIGNIFICANT TREE PROTECTION FENCING

1. Field Survey Areas



Legend

- Site DCDB
- Qld DCDB
- Phase 1 civil works extent
- Phase 2
- Sensor camera locations
- SAT start location
- Vegetation Quaternary Site
- Billabong
- Bird survey start location
- Grey Headed Flying Fox sighting
- Koala sighting
- Melaleuca irbyana patch
- Waterway assessment site

SAT results

Usage

- High
- Medium
- Low
- SAT meander (no scats found)
- Vegetation transect (PMAV)
- Spotlighting & Anabat survey track

NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
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Aerial Imagery © Nearmap, 2019

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Significant Biodiversity Values

Confirmed Areas of Remnant Vegetation Containing Endangered Regional Ecosystems
Areas proposed and confirmed through Property Map of Assessable Vegetation application as retaining remnant vegetation of an Endangered Regional Ecosystem type (*82.49 hectares*)

Confirmed Waterway Areas
Areas confirmed through field survey. As retaining features consistent with a watercourse within the extent of the Project Site (*3.43 hectares*)

Other Biodiversity Values

Low Order Remnant Vegetation
Of Concern and Least Concern Regional Ecosystem type areas (*125.97 hectares*)

Waterway Buffer Areas
Areas of preferred buffer extent to Project Site watercourses (*13.71 hectares*)

Other Drainage Features & Watercourses
Areas within the site conveying current hydrology flow paths - *varying quality* (*0.39 hectares*)

Project Site Farm Dams
Locations of artificially created farm dams (*6.84 hectares*)

Areas of Juvenile Native Vegetation
Areas of Project Site retaining varying degrees of native regeneration vegetation (*154.0 hectares*)

Issue	Date	Description	Drawn	Checked
B	19/09/2019	Phases amend.	TC	AD

0 30 60 120 180 240 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:7,000 @ A3

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *19/09/2019* *7598 E 01 Field Survey Areas B*

4.2. Observed Fauna

Ecological surveys were undertaken by SHG over 2015 and 2016 to inform the NESS. Full details re provided in the *Technical Ecological Assessment Report – Implementation Guideline 14 & 17 Response for Teviot Road, Greenbank, prepared by SHG (March 2016)*. Refer to Plan 2-Field Survey Effort of the Technical EAR for further detail. Plan 3-Site Survey Zones of the Technical EAR shows that the proposed School Site is located predominately within 'Area 2 – Non-remnant Vegetation' and contains patches of 'Area 4- Remnant Vegetation' and an 'Area 3 -Waterway and Dam'.

A number of detailed fauna surveys were conducted in conjunction with detailed vegetation assessments over the application site. The purpose of these surveys was to identify habitat opportunities, observations of species presence and activity, and undertake targeted searches for actual usage by threatened and significant fauna species. Fauna surveys of the subject site comprised of extensive trapping and recording techniques.

Overall, seventy (70) fauna species made up of three (3) amphibians, forty-nine (49) birds, nine (9) mammals and nine (9) reptiles were recorded (refer **Table 4**). These were primarily common species local to the area, with the exception of two (2) Commonwealth and State listed species, Koala (*Phascolarctos cinereus*) and *Pteropus poliocephalus* (Grey-headed Flying-fox).

The assessment of the sites habitat values resulted in the vast majority of these listed species as having no optimal habitat on site as they are generally associated with less disturbed environments, topography that contains greater areas of rocky outcrops suitable for dens or vegetation communities dominated by rainforest species. Subsequently, the site's ability to support listed threatened fauna species, which are generally highly sensitive, specialised and require particular habitat features, is highly unlikely for the majority of the listed EPBC Act or NCA protected species.

Table 4: Observed fauna species on-site

Species	Common Name
Birds	
Alcedo azurea	Azure Kingfisher
Alectura lathami	Australian Brush-turkey
Anas superciliosa	Pacific Black Duck
Apus pacificus	Fork-tailed Swift
Aquila audax	Wedge-tailed Eagle
Ardea ibis	Cattle Egret
Ardea intermedia	Intermediate Egret
Ardea pacifica	White-necked Heron
Cacatua galerita	Sulphur-crested Cockatoo
Centropus phasianinus	Pheasant Coucal
Chenonettajubata	Australian Wood Duck
Climacteris picumnus	Brown Treecreeper
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Corvus orru	Torresian Crow
Coturnix ypsilophora	Brown Quail
Cracticus nigrogularis	Pied Butchbird

Species	Common Name
Dacelo novaeguineae	Laughing Kookaburra
Dicrurus bracteatus	Spangled Drongo
Egretta novaehollandiae	White-faced Heron
Eolophus roseicapilla	Galah
Ephippiorhynchus asiaticus	Black-necked Stalk
Gallinula tenebrosa	Dusky Moorhen
Geopelia cuneata	Diamond Dove
Grallina cyanoleuca	Magpie-lark
Gymnorhina tibicen	Australian Magpie
Haliaeetus leucogaster	White-bellied Sea-Eagle
Malurus melanocephalus	Red-backed Fairy Wren
Manorina melanocephala	Noisy Minor
Meliphaga lewinii	Lewin's Honeyeater
Merops ornatus	Rainbow Bee-eater
Milvus migrans	Black Kite
Ocyphaps lophotes	Crested Pigeon
Pardalotus striatus	Striated Pardalote
Pavo cristatus	Indian Peafowl
Phalacrocorax sulcirostris	Little Black Cormorant
Phaps chalcoptera	Common Bronzewing
Philemon corniculatus	Noisy Friarbird
Platycercus adscitus	Pale-headed Rosella
Podargus strigoides	Tawny Frogmouth
Psophodes olivaceus	Eastern Whipbird
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Smicrornis brevirostris	Weebill
Taeniopygia bichenovii	Bouble-barred Finch
Threskiornis molucca	Australian White Ibis
Threskiornis spinicollis	Straw-necked Ibis
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet
Trichoglossus haematodus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing
Amphibians	
Litoria caerulea	Common Green Treefrog
Litoria fallax	Eastern Sedgefrog
Rhinella marina	Cane Toad

Species	Common Name
Mammals	
Bos taurus	European Cattle
Canis lupus familiaris	Dog
Lepus europaeus	European Brown Hare
Macropus giganteua	Eastern Grey Kangaroo
Phascolarctos cinereus	Koala
Pteropus poliocephalus	Grey-headed Flying-fox
Trichosurus vulpecula	Common Brushtail Possum
Vulpes vulpes	Red Fox
Wallabia bicolor	Swamp Wallaby
Reptiles	
Cryptoblepharus virgatus	Wall Skink
Dendrelaphis punctulatus	Green Tree Snake
Elseya latisternum	Saw-shelled Turtle
Intellagama lesueurii	Eastern Water Dragon
Lampropholis delicata	Garden Skink
Pogona barbata	Bearded Dragon
Pseudechis porphyriacus	Red-bellied Black Snake
Tiliqua scincoides	Eastern Blue-tongued Lizard
Varanus varius	Lace Monitor

4.3. Potential Fauna Species (Threatened)

Table 2 and **Table 3** list endangered, vulnerable and near threatened (EVNT) species which may occur within the general proximity (5 km) of the development site (refer to **Appendices A & B** for full search results). These species have been identified through the EPBC Act's online PMST and the NCA Wildlife Online database search (discussed in **Section 2**).

Targeted searches were undertaken for Koala (*Phascolarctos cinereus*), *Delma torquata* (Collared delma), *Pteropus poliocephalus* (Grey-headed Flying-fox) and *Lathamus discolor* (Swift Parrot) as they were identified as

A habitat suitability and risk assessment for significant fauna was undertaken by SHG in conjunction with the ecological surveys. The assessment focused on identifying habitat features typically associated with threatened species and native fauna groups. Five (5) significant fauna species were considered as possible occurrences on the site, due to habitat features or recorded presence in the area (refer to **Table 5**) and were subsequently targeted for fauna survey. As a result of the Habitat Suitability and Risk Assessment analysis (**Appendix C**), no migratory species were considered to be at risk from impacts of the proposed development. This is because no suitable habitat was identified on-site as the majority of the species were described as occurring within coastal environments, moist rainforest or lowland forests, or were strictly aerial during their migratory period over the subject area (refer **Appendix C** for detailed analysis).

Table 5: Threatened species with possible suitable habitat on-site

Scientific Name	Common Name	Habitat	EPBC Status	NCA Status
Dasyurus maculatus maculatus	Spot-tailed Quoll	The Spot-tailed Quoll has a preference for mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage.	Endangered	Vulnerable
Delma torquata	Collared Delma	In general, the species occurs on rocky hillsides on basalt and stony lithosol soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket. The ground cover is predominantly native grasses such as Kangaroo Grass, Barbed-wire Grass, Wiregrass and Lomandra.	Vulnerable	Vulnerable
Lathamus discolor	Swift Parrot	This species has been recorded within woodland and forest patches containing *Eucalyptus crebra* (Narrow Leaf Ironbark), *Eucalyptus tereticornis* (Forest Red Gum) as well as yellow box forests and feeds mostly on nectar and mainly from eucalypts.	Endangered	Endangered
Phascolarctos cinereus	Koala	Koalas are found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. The species is known from the surrounding area and evidence has been recorded on-site.	Vulnerable	Vulnerable
Pteropus poliocephalus	Grey-headed Flying Fox	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feed son commercial fruit crops.	Vulnerable	-

4.4. Potential Impacts

Impacts of the proposed development can generally be summarised as the following:

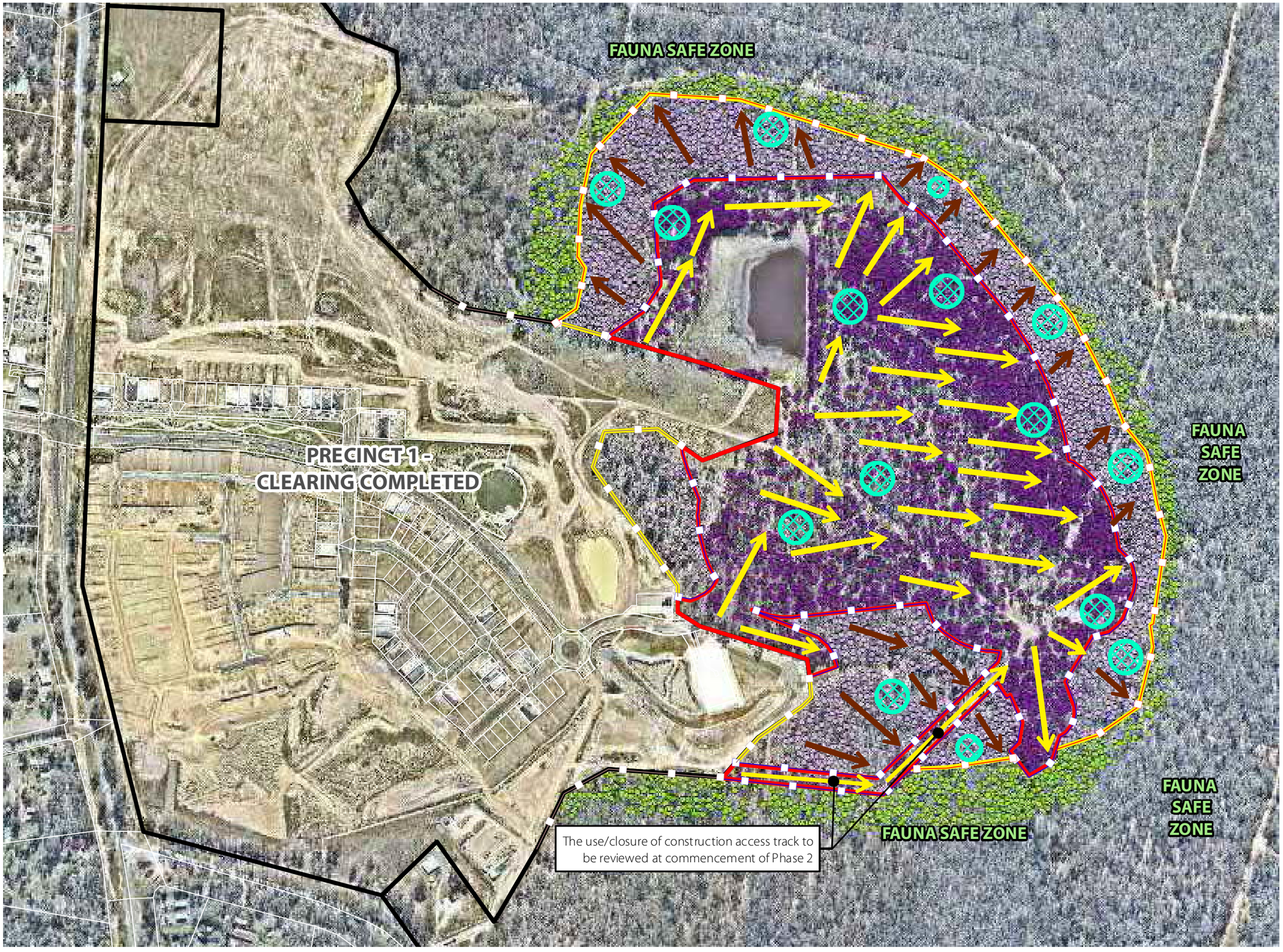
CONSTRUCTION IMPACTS	OPERATIONAL IMPACTS
- Direct removal of site vegetation - Loss of habitat - Loss of food sources - Excavation / compaction/ changes in existing ground levels - Altering of hydrological flows - Noise, vibration and dust - Fragmentation of habitat - Erosion and sedimentation - Threats associated with open cuts etc. and fauna entrapment	- Weed introduction (garden escapees) - Increased hydrology with increased hardstand - Altering of run-off chemical and nutrient components (quality) - Barriers to fauna movement - Vehicle and pedestrian movement and trespass - Introduction of domestic and predatory species

Generally, most impacts for developments are associated directly with vegetation clearing. **Plan 2** provides a development assessment plan showing the vegetation clearing over the proposed footprint.

The VMP will provide provisions for wildlife management to mitigate potential impacts during vegetation clearing and comply with legislative requirements and approval conditions. These will include:

- The Fauna Spotter Catcher (DES approved) must remain on site during all clearing works to undertake pre-clearing inspection, direct clearing activities and relocate fauna.
- Immediately prior to the commencement of clearing of native vegetation, a daily visual inspection of the area must be carried out by a qualified Fauna Spotter Catcher.
- In the event of an animal being located an area of 5 m radius should be established around the tree excluding machinery from the area until the animal has relocated (usually overnight) or, if an animal requires relocating this must be undertaken by a suitably qualified and permitted fauna expert recognised by DES.
- Any native fauna orphaned or injured by the development process must be reported to DES.
- The site supervisor is responsible for the safe management of site fauna and implementation of these specific fauna requirements.
- Dogs will be restricted on-site during construction activities to encourage fauna movement outside construction hours. Dogs brought onto the premises for security must be controlled and contained.

2. Summary Clearing Plan



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

Legend

- Site DCDB
- Qld DCDB
- Phase 1 civil works extent
- Phase 2
- Phase 1 - Tree to remove
- Phase 2 - Tree to remove
- Tree to retain
- Phase 1 tree protection/fauna friendly fencing during clearing works. To be made exclusion fencing post clearing works
- Tree protection/fauna exclusion fencing (retain Precinct 1 fencing)
- Tree protection/fauna friendly fencing (revised locations of fence when Phase 2 commences) To be made exclusion fencing post clearing works
- Phase 1 Clearing direction
- Phase 2 Clearing direction
- Vegetation stockpiling location (indicative)

Issue	Date	Description	Drawn	Checked
B	19/09/2019	Phases amend.	TC	AD

0 50 100 200 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:5,000 @ A3

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *19/09/2019* *7598 E 02 Summary Clearing Plan B*

5. Fauna Management Plan Specifications

5.1. Pre-Construction

Management Item	Responsibility	Timing	Reporting
4.1.1 Temporary Fencing			
Prior to the commencement of clearing activities, the applicant must fence the limits of vegetation strips and install fauna exclusive fencing. This fencing shall be inspected by the Environmental Coordinator. Fencing shall be in accordance with the specifications shown in the approved VMP and if modified by the WPMP. • Fencing shall be fauna friendly and erected to direct fauna towards vegetation retained within the balance land to the east. • Fencing shall be erected prior to the commencement of clearing activities and shall be removed in accordance with the WPMP to enable animals to safely move to refuge areas. • Once terrestrial fauna have safely moved out of the area, temporary fauna exclusion fencing will then be erected for the two polygons of retained vegetation (identified as future sports ovals) to ensure animals do not re-enter these areas and become trapped. • Within the tree protection zone, the following activities are not permitted: storage and mixing of materials, vehicle parking, liquid disposal, machinery repairs and/or refuelling, construction of site office or shed, combustion of any material, stockpiling of soil, rubble or debris, any filling or excavation including trenching, topsoil skimming and/or surface excavation, unless otherwise approved. • Only approved weed management, landscape and revegetation works are to occur beyond the temporary protection fencing. • Fencing shall be reinstated immediately if damaged or knocked down. • Fencing shall remain until the completion of all bulk earthworks and removed just prior to practical completion.	Site Supervisor	No more than two weeks prior to clearing works commencing on-site.	Inspected by Proponent, the Environmental Coordinator, or Site Supervisor.

Management Item	Responsibility	Timing	Reporting
4.1.2 Contractor Education and Awareness			
All site contractors and sub-contractors will be made aware of their responsibilities to protect native fauna. The Construction Contractor will be responsible for the commissioning of the PTRP. This FMP is provided as a working document to assist on-site management and protection of native animals. This FMP will generally form part of education and training in a broader CEMP but as a minimum will include: • A copy of this FMP kept on site (Site Office). • General education and awareness notification of contractors and sub-contractors involved in activities potentially impacting native animals as part of site induction – contractors must know the location of the FMP, key phone numbers including the nominated Fauna Spotter Catcher and DES, and who to report to if potential breaches of the FMP occur. • A list of relevant contact numbers as listed in Section 8 kept in a visible and accessible location in the site office.	Site Supervisor / Proponent.	Prior to the commencement of construction and as part of the site induction for new staff and sub-contractors.	Site Supervisor
4.1.3 Fauna Spotter Catcher			
A DES approved Fauna Spotter Catcher shall inspect the site no more than two (2) weeks prior to clearing works commencing on-site and prepare a PTRP. The report must include a full list of fauna species encountered during the site survey, as well as the marking and identification of significant habitat trees. The report shall be sent to the Environmental Coordinator and Proponent prior to the pre-start meeting, for approval and inspection by the Environmental Coordinator. In addition, the Fauna Spotter Catcher must assess the site for: • The presence of native fauna and/or supporting habitat on-site. • Available habitat suitable for likely fauna species. • The presence of any fauna that is 'protected wildlife' as defined under the *Nature Conservation Act 1992* (protected wildlife).	Site Supervisor / Proponent.	No more than two weeks prior to clearing works commencing on site.	Site Supervisor / Environmental Coordinator

Management Item	Responsibility	Timing	Reporting
• The presence of any species that is a 'listed threatened species' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (listed threatened species).			

Section 6 details the documentation and actions to be taken if the assessment finds suitable habitat present adjacent to the site or protected/listed species present and/or if the relocation of fauna is required.

The DES approved Fauna Spotter Catcher must be present during the pre-start meeting to identify all fauna habitat trees prior to the commencement of works to ensure wildlife is unharmed at the time of tree clearing operations

Note. The DES approved Fauna Spotter Catcher is a person who holds a rehabilitation permit with an extended authority issued by the Department of Environment and Science specifying the holder may take, keep or use an animal whose habitat is about to be destroyed by a human activity.'

5.2. Vegetation Clearing

Management Item	Responsibility	Timing	Reporting
4.2.1 Fauna Spotter Catcher			
For all vegetation clearing: • Immediately prior to the commencement of clearing of native vegetation a daily visual inspection of the area must be carried out. • A Fauna Spotter Catcher must be present during all clearing activities and inspect trees continuously ahead of clearing for Koalas. • In the event of an animal being located, an area within a minimum 5 m radius should be established excluding machinery from the area until the animal has relocated (usually overnight). The no go zone should be determined by the Fauna Spotter Catcher dependant on the species. • If any used hollows or nests are identified from inspection by the Fauna Spotter Catcher, the hollows and nest must be removed by an experienced machinery operator and carefully lowered for inspection and fauna removal by the Fauna Spotter. • Translocation of threatened fauna is not permitted and fauna must move off at its own accord. There is no approval to translocate threatened fauna as part of operational works onsite, refer to Section 6 of this document for further details. • Any native fauna orphaned or injured by the development process must be immediately reported to DES, RSPCA and the Environmental Coordinator and Proponent. • The Site Supervisor is responsible for the safe management of site fauna and implementation of these specific requirements. • All personnel on-site must undertake all works in accordance with all direction/s given by the DES approved Fauna Spotter Catcher. SPECIFIC KOALA MANAGEMENT NOTES A DES approved Koala Spotter is a person who holds a tertiary qualification in Biology or Zoology, or who is demonstrably experienced in the identification and location of Koalas	Fauna Spotter Catcher.	Must be present for pre-start meeting and during all onsite clearing.	Proponent / Site Supervisor / Environmental Coordinator

Management Item	Responsibility	Timing	Reporting
in their natural habitat, and has an authorisation from DES to conduct such activities. For example, demonstrably experienced may include a Koala keeper employed by a licenced Wildlife exhibitor (i.e. a zoo) may be capable of demonstrating competence in location Koalas. Prior to the commencement and during felling operations, it is the responsibility of the DES approved Fauna Spotter to: 1. Be present at the site of felling operations; 2. Identify any tree at the site which a Koala is present, as well as any tree that has a crown which is intermeshed or overlapping with such tree; and 3. Advise the person who is authorised to conduct the felling operation, or that person's representative, of the precise location of each such tree.			
4.2.2 Direction of Clearing			
Vegetation clearing activities must be in accordance with the Direction of Clearing Plan (as shown in the approved VMP or corrected by the WPMP) which directs clearing towards vegetation to be retained.	Site Supervisor / Earthworks Contractor / Sub Contractor.	As part of clearing earthworks operations.	Site Supervisor / Proponent / Environmental Coordinator
4.2.3 Monitoring of Clearing/Earthworks			
Works are to be monitored to ensure on-site success of Direction of Clearing Plan (as shown in the approved VMP or corrected by the WPMP) and for immediate reporting of orphaned, injured, distressed, or killed native animals to DES, RSPCA, Environmental Coordinator and Proponent.	DES Fauna Spotter Catcher as employed by the Construction Contractor.	As part of clearing/ earthworks operations.	Site Supervisor / Proponent/ Environmental Coordinator
4.2.4 Timing of Clearing			
No machinery use for vegetation clearing or damage of any kind shall occur on-site between 6 pm and 6 am.	Site Supervisor / Earthworks Contractor / Sub Contractor.	As part of clearing earthworks operations.	Site Supervisor / Proponent / Environmental Coordinator

Management Item	Responsibility	Timing	Reporting
4.2.4 Relocation			
Where works will result in unacceptable risks to health and safety of fauna, a range of measures may be used by the approved Fauna Spotted Catcher to minimise risks, including the temporary removal of animals from the site with the aim or returning animals back to habitat on site at the completion of risk associated works or to suitable habitat adjacent to the site. Appropriate measures are to be determined by the approved Fauna Spotter Catcher. Note: Appropriate wildlife-proof barriers must be used between adjacent habitat and risk associated structures (i.e. roads) where translocation occurs.	DES Fauna Spotter Catcher as employed by the Construction Contractor.	As part of clearing/ earthworks operations.	Site Supervisor / Proponent/ Environmental Coordinator

5.3. Excavation, Earthworks and Access

Management Item	Responsibility	Timing	Reporting
4.3.1 Minimise Entrapment			
Trenches, manholes, excavation for footings, etc. pose threats to native animal entrapment when left open and should be backfilled as soon as possible. In some locations barriers may be required overnight to eliminate the accidental capture of animals moving through the site.	Site Supervisor / Earthworks Contractor / Sub Contractor.	As part of site earthworks.	Site Supervisor / Proponent / Environmental Coordinator
When trenches are not backfilled they are to be inspected at the commencement of each day for trapped or injured wildlife. Note: If during the inspection injured wildlife or entrapped native fauna is observed the Site Supervisor is to contact the Fauna Spotter Catcher immediately.	Site Supervisor	On-going	Site Supervisor / Proponent / Environmental Coordinator
4.3.2 Regular and Defined Access			
To minimise impacts and conflicts between native animals, vehicular movement and access during construction and site access should be controlled via minimal entry and exit points.	Site Supervisor	On-going	Site Supervisor / Proponent / Environmental Coordinator / EDQ.
4.3.3 Stockpile and Rubbish Locations			
Stockpiled vegetation, topsoil and other materials can quickly become temporary habitat for animals displaced during the actual clearing and earthworks. Rubbish, waste and litter provides opportunistic food source for native and exotic animals alike and often encourages predatory and feral species. Locations for stockpiles, designated rubbish points etc. should occur in cleared sections of the site, away from retained areas, limiting interaction between these areas and core retention areas.	Site Supervisor	On-going	Site Supervisor / Proponent / Environmental Coordinator

5.4. Nest Box / Hollow Maintenance and Monitoring

Management Item	Responsibility	Timing	Reporting
4.4.1 Installation			
As part of the VMP the Environmental Coordinator will determine the number of lost habitat values (hollows) that will require replacement. The specific location of nest boxes to be in installed in retained vegetation bordering along the waterways and as directed in the VMP prepared by the Environmental Coordinator. The VMP will require that all nest box locations are to be GPS recorded and coordinates provided to the Environmental Coordinator, Proponent and EDQ.	Environmental Coordinator	Nest boxes and salvaged hollows installed commensurate with clearing progression.	Site Supervisor / Proponent / Environmental Coordinator / EDQ
4.4.2 Maintenance and Monitoring			
Nest boxes are to be monitored and maintained for 12 months. Maintenance activities include, but are not limited to, the following: • The replacement of failed or damaged next boxes • The removal of invasive species • The removal of invasive species will be determined by the engaged DES Fauna Spotter Catcher or suitably qualified person.	Nest Box Contractor	12 months	Site Supervisor / Proponent / Environmental Coordinator / EDQ
4.4.3 Reporting Schedule and Pro forma			
A reporting schedule and pro forma must be completed to report all nest box maintenance and monitoring activities throughout the construction period of the development. A copy of the reporting schedule and pro forma must be provided to the Environmental Coordinator and Proponent.	Nest Box Contractor	Throughout the construction period of the development.	Site Supervisor / Proponent / Environmental Coordinator / EDQ

5.5. Non-compliance, Monitoring and Reporting

Management Item	Responsibility	Timing	Reporting
4.5.1 Non-Compliance			
Despite the provisions in this FMP, in the unlikely event of a non-compliance or breach, where a contractor or sub-contractor witnesses or is involved in activities which do not comply with this FMP the following procedure shall be followed: • All breaches of the FMP must immediately be reported to the Proponent. • If possible, prior approval / or communication on the breach should be discussed with the Environmental Coordinator. The Environmental Coordinator is responsible for establishing additional management procedures or determining if EDQ notification should be made. • Non-compliance activities should be halted immediately and impacts rectified (fencing reinstalled, stock piling relocated, etc.). • Site staff should notify the site supervisor who is responsible for either rectifying actions or contacting the Environmental Coordinator. • All major breaches which fundamentally do not achieve the overall outcomes of the FMP and result in lost habitat or distress to native animals must be reported to the Environmental Coordinator, Proponent and applicable regulatory authorities.	Site Supervisor	On-going	Site Supervisor / Proponent / Environmental Coordinator / EDQ
4.5.2 Monitoring and Reporting			
The site shall be monitored at all times. This should include: • Daily inspections by the Site Supervisor. • Periodical inspections by the Environmental Coordinator. • Random and periodical inspections by the Proponent. The Fauna Spotter Catcher employed during pre-construction and on-site works shall provide a Post-clearing Report, to be given to the Environmental Coordinator and Proponent no more than two (2) weeks after clearing has finished, specifying the following:	All Site Staff	On-going	EDQ / Environmental Coordinator / Proponent

- Length and time of clearing;
- Details of any fauna that were caught and/or released and the placement of any release/s;
- Inventory of species encountered during tree removal;
- Brief summary of any fauna handling, mortalities or other relevant fauna related incidents that may have occurring during tree removal; and

The Fauna Spotter Catcher Post-clearing Report is to be submitted to the Environmental Coordinator, Proponent and EDQ following the completion of tree clearing activities and prior to commencement of the use of the premises.

4.5.3 Orphaned or Injured Fauna			
All native animal fatalities must be reported immediately to the Environmental Coordinator, the Proponent and DES. Where any site staff (contractors or sub-contractors) witnesses or locates distressed, injured or orphaned animals they should immediately contact the Environmental Coordinator and Proponent. Works within the area of the animal must cease until further instruction is provided by one of the above authorities. Refer to Section 8 for a list of key contacts.	All Site Staff	On-going	EDQ / DES / Environmental Coordinator / Proponent

Refer to Section 8 for the contact details of responsible entities. The Environmental Coordinator's role has been to prepare this FMP and liaise with EDQ, the Proponent and the approved Fauna Spotter Catcher (to be appointed) and the Construction Contractor (to be appointed) to achieve the outcomes of this plan.

6. Fauna Spotter Catcher Assessment

The Fauna Spotter Catcher assessment as part of the pre-clearing surveys and PTRP may reveal suitable fauna habitat on adjacent land for protected/listed species present on the site and/or the requirement for relocation of threatened fauna. The following table details the actions to be taken in these events.

Fauna Spotter Catcher required – threatened species and their habitat present adjacent to the site	If the engaged Fauna Spotter Catcher's assessment determines that no protected wildlife or listed species are present but such threatened fauna may be present within suitable habitat existing adjacent to the site, the following must be included in the PTRP: • Fauna Spotter Catcher credentials and for handling of anticipated protected species • A list of anticipated species; and • A Wildlife Protection Management Plan (WPMP) and Wildlife Habitat Impact Mitigation Plan (WHIMP)
Fauna Spotter Catcher required – threatened species present and/or relocation required	If the Fauna Spotter Catcher's Assessment determines that any protected wildlife or listed species are present, and/or threatened fauna are to be systematically relocated, a Fauna Translocation Management Plan (FTMP) must be prepared in accordance with the PTRP. The FTMP must be submitted to DES for endorsement. The following must then by submitted to EDQ with a development application for operational works (vegetation clearing): • Fauna Spotter Catcher credentials and for handling of anticipated protected species • A list of anticipated species; and • DES endorsement of the proposed FTMP; and • A copy of the DES endorsed FTMP.

7. Koala Habitat

The site is not identified as within a State mapped assessable Koala habitat area, however, does include Koala habitat mapped under State planning Policy and the following should be complied with as part of this FMP to ensure safe removal should any Koalas be encountered on site:

- During construction phases measures are taken in construction practices to not increase the risk of death or injuries to Koalas.
- Native vegetation clearing is undertaken as sequential clearing under the guidance of a Koala spotter where the native vegetation is a non-juvenile Koala habitat tree.
- Landscape activities provide food, shelter and movement opportunities for Koala consistent with the site design.

8. Site Contacts

Role	Contact Details
Proponent	Mark Clancy (Development Manager) Mirvac Queensland Pty Ltd (07) 38295305
Site Supervisor	*To be appointed.*
Environmental Coordinator	Andrew Davies Saunders Havill Group Ph. (07) 3251 9444
Administering Authority	Brandon Bouda Economic Development Queensland Ph. (07) 3452 7422
Council	Adam Avalos Logan City Council Ph. (07) 3412 4874
Construction Contractor	*To be appointed.*
Fauna Spotter and Catcher	*To be appointed.*
Veterinarian (in closest proximity to application site)	The Bloomin' Vet 15 Pub Lane Greenbank QLD 4124 (07) 3297 6666 (all hours) Monday-Friday, 8am-6pm Saturday, 9am-5pm Sunday, 9am-2pm *After Hours (24 Hours & Public Holidays)* Animal Emergency Services 1 Lexington Road Underwood QLD 4119 (07) 3423 1888
Department of Environmental and Science	For wildlife incidents and licensing and permits: Ph. 1300 130 372
RSPCA Queensland	For reporting injured, sick or orphaned wildlife: Ph. 1300 ANIMAL (1300 264 625)

9. Appendices

Appendix A

Protected Matters Search Tool

Environment Protection and Biodiversity Conservation Act 1999

Appendix B

Wildlife Online Search

Nature Conservation Act 1992

Appendix C

Habitat Suitability Assessment

Appendix A

Protected Matters Search Tool

Environment Protection and Biodiversity Conservation Act 1999

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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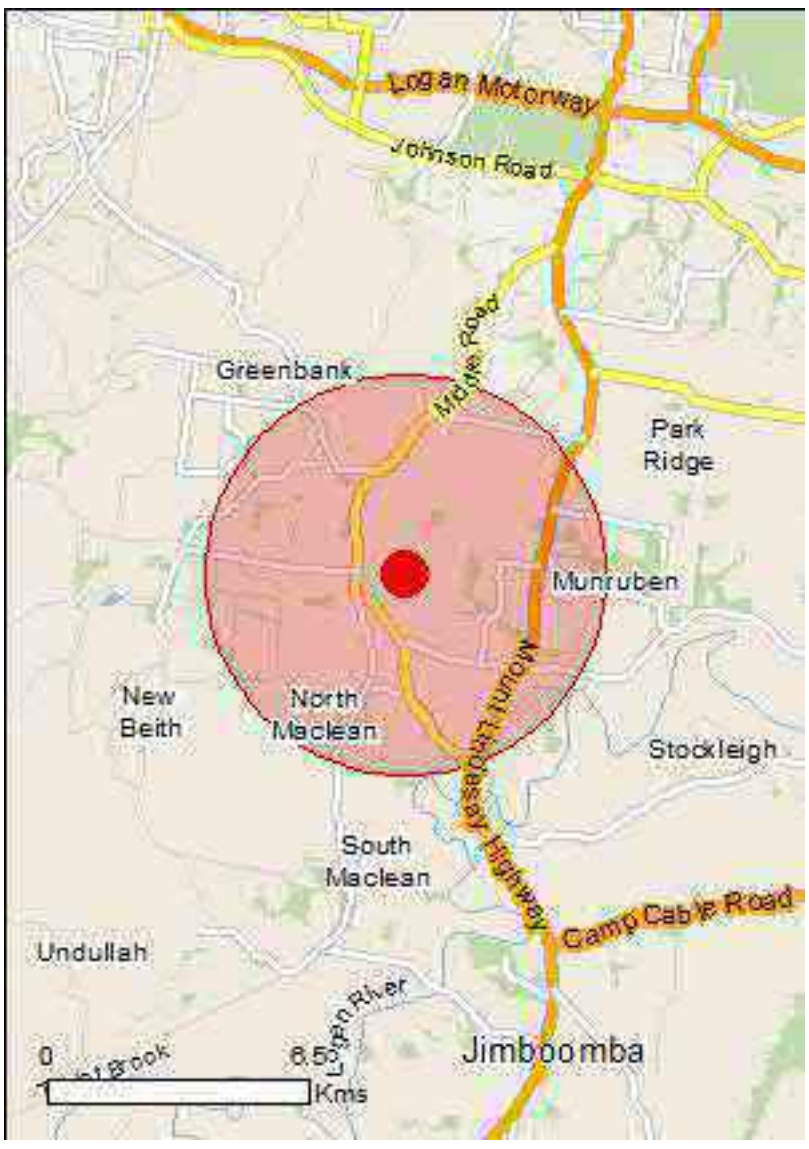

Coordinates

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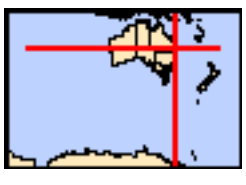

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	37
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	42
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Moreton bay	20 - 30km upstream
Moreton bay	20 - 30km upstream

Listed Threatened Ecological Communities	[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Queensland	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Maccullochella mariensis Mary River Cod [83806]	Endangered	Translocated population known to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cycas ophiolitica [55797]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Macadamia integrifolia		
Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla		
Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Notelaea ipsviciensis		
Cooneana Olive [81858]	Critically Endangered	Species or species habitat may occur within area
Notelaea lloydii		
Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Plectranthus habrophyllus		
[64589]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata		
Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus		
Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - GREENBANK TRAINING AREA

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Greenbank Military Training Area (part)	QLD	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
[Anseranas semipalmata](#) Magpie Goose [978]		Species or species habitat may occur within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardea alba](#) Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Monarcha trivirgatus](#) Spectacled Monarch [610]		Species or species habitat likely to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
A and T Koala Billabong	QLD
Koolena	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		

Name	Status	Type of Presence
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Greenbank Army Training Area C	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.73849 152.99634

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B

Wildlife Online Search

Nature Conservation Act 1992

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -27.7392
Longitude: 152.9965
Distance: 5
Email: keiragrundy@saundershavill.com
Date submitted: Wednesday 17 Jul 2019 17:20:20
Date extracted: Wednesday 17 Jul 2019 17:30:02

The number of records retrieved = 6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		2
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		1
animals	mammals	Dasyuridae	*Dasyurus maculatus maculatus*	spotted-tailed quoll (southern subspecies)		V	E	8
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	183
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		V	V	3/1
plants	Equisetopsida	Myrtaceae	*Melaleuca irbyana*			E		2/2

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C

Habitat Suitability Assessment

Scientific Name	Common Name	Habitat/ Impact	EPBC Status	NCA Status	Potential to occur
Adelotus brevis	Tusked Frog	Wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat ie ponds and slow-moving sections of creeks. Also found in cleared, open country.		Vulnerable	Unlikely
Anthochaera phrygia	Regent Honeyeater	Regent Honeyeaters mostly occur in dry Box-Ironbark Eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes (for feeding). Areas containing the aforementioned habitat features are limited across the site.	Critically Endangered		Unlikely
Botaurus poiciloptilus	Australasian Bittern	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate southeast and southwest. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The Australasian Bittern occurs in the far South-East of Queensland; it has been reported North to Baralaba and West to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.	Endangered		Unlikely
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However in South-east Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations. Absence of suitable habitat requirements from site.	Vulnerable		Unlikely
Crinia tinnula	Wallum Froglet	Restricted to freshwater swamps in lowland coastal areas and is found in associated vegetation communities such as heath, sedgeland and woodland on nutrient-poor sandy soils. Acidic swamps and lakes in these areas provide essential breeding habitat for wallum-dependent frog species. The wallum froglet has also been observed in disturbed heath habitat.		Vulnerable	Unlikely
Cyclopsitta diophthalma coxeni	Coxen's Fig-parrot	The Coxen's fig Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. Food is mainly taken from figs however other species fruit have been recorded in their diet including Elaeocarpus grandis, Syzygium corynanthum, Litsea reticulata and Grevillea robusta. No rainforest habitat occurs at this site.	Endangered		Unlikely
Dasyornis brachypterus	Eastern Bristlebird	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedge land, heathland, swampland, shrub land, sclerophyll forest and woodland, and rainforest. It occurs near the coast, on tablelands and in ranges. The Eastern Bristlebird is found in habitats with a variety of species compositions, but is defined by a similar structure of low, dense, ground or understorey vegetation—which is observed to be limited at this site.	Endangered		Unlikely
Dasyurus hallucatus	Northern Quoll	lives in a range of open woodland and open forest types preferring rocky areas. Northern quolls have also been recorded in vineforest, mangroves, sugarcane farms and urban areas. Their greatest breeding	Endangered		Unlikely

Scientific Name	Common Name	Habitat/ Impact	EPBC Status	NCA Status	Potential to occur
		success is known to occur at sites near water. Present distribution in Queensland is fragmented into a number of populations, with the highest densities found in Cape York, the Atherton Tablelands and the Mackay-Whitsunday area. Occasionally there are records of northern quolls as far south as Maleny.			
Dasyurus maculatus maculatus (SE mainland	Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Preference for mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This predominantly nocturnal species rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. individuals require an abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage. Suitable habitat on site is limited.	Endangered		Unlikely
Delma torquata	Collared Delma	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket. Suitable habitat on site is limited.	Vulnerable		Unlikely
Erythrotriorchis radiatus	Red Goshawk	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.	Vulnerable		Possible visitor
Furina dunmalli	Dunmall's Snake	Found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the South-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.	Vulnerable		Unlikely
Geophaps scripta scripta	Squatter Pigeon (southern)	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	Vulnerable		Unlikely
Lathamus discolor	Swift Parrot	Swift Parrots breed in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations. While the species is very uncommon in south-east Queensland, its occurrence cannot be completely discounted. No habitat opportunities observed on site.	Endangered		Unlikely

Scientific Name	Common Name	Habitat/ Impact	EPBC Status	NCA Status	Potential to occur
Maccullochella mariensis	Mary River Cod	The Mary River Cod occurs mainly in pools within relatively undisturbed tributaries. They prefer relatively large and deep shaded pools with abundant, slowly flowing water. No suitable habitat to support this species was observed throughout the assessment area.	Endangered		Unlikely
Mixophyes iteratus	Giant Barred Frog	The Giant Barred Frog occurs in rainforests and wet sclerophyll forests in upper to lower catchment areas. This species has been observed to prefer a closed forest canopy with a relatively light cover of vegetation at ground level. No habitat opportunities observed on site.	Endangered	Endangered	Unlikely
Nannoperca oxleyana	Oxleyan Pygmy Perch	Prefers slow flowing or still waters. It appears only to be found in slightly acidic and tannin-stained water including swamps, streams and dune lakes that lie in the lowland, coastal 'wallum' heaths. It shelters near or within emergent vegetation or among the roots of riparian plants that grow into the water from undercut or vertical banks. It has a restricted and patchy distribution that runs along the coast from Tin Can Bay, just north of the Noosa River drainage system to the Richmond River in northern New South Wales. No habitat opportunities observed on site.	Endangered	Vulnerable	Unlikely
Numenius madagascariensis	Eastern Curlew	The species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. No habitat opportunities observed on site.	Critically Endangered	Vulnerable	Unlikely
Phascolarctos cinereus	Koala	They are found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. The species is known to occur within 5 kilometres of the site.	Vulnerable	Vulnerable	Possible
Phyllodes imperialis smithersi	Phyllodes imperialis smithersi	The Pink Underwing Moth is found below the altitude of 600m in undisturbed, subtropical rainforest. It occurs in association with the vine Carronia multisepalea. No suitable habitat to support this species was observed throughout site.	Endangered		Unlikely
Poephila cincta cincta	Black-throated Finch (southern)	The Black-throated Finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by Eucalyptus, Corymbia and Melaleuca, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. It occurs at two general locations: in the Townsville region, where it is considered to be locally common at a few sites around Townsville and Charters Towers; and at scattered sites in central-eastern Queensland (between Aramac and Great Basalt Wall National Park). It has been absent from Brisbane and its surrounds since the 1930s.	Endangered		Unlikely
Potorous tridactylus tridactylus	Long-nosed Potoroo (SE mainland)	Occurs in a range of vegetation types from subtropical and warm temperate rainforest through tall open forest with dense understory to dense coastal heaths. Its main requirement is thick groundcover, which it needs for protection and nesting material. It also prefers light soils that are easy to dig in for the underground roots and fungi that it eats. The home range size of the long-nosed potoroo varies from 2-5 ha, and it is often influenced by habitat quality. It has a patchy distribution from Queensland to south-east South Australia. In Queensland there are scattered populations that extend from south-east Queensland to northern New South Wales. There is limited thick groundcover over the site to provide protection and nesting material for the species.	Vulnerable		Unlikely

Scientific Name	Common Name	Habitat/ Impact	EPBC Status	NCA Status	Potential to occur
Pteropus poliocephalus	Grey-headed Flying - fox	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feed son commercial fruit crops. No individuals or roosting camps were observed throughout the assessment area. Suitable feeding habitat and possible roosting habitat was recorded on site. This species is highly likely to occur when the Eucalypts are in flower.	Vulnerable	-	Likely (during flowering)
Rostratula australis	Rostratula australis	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.	Endangered		Unlikely
Turnix melanogaster	Black-breasted Button-quail	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.	Vulnerable		Unlikely
Xeromys myoides	Water Mouse	In south-east Queensland Water Mouse habitat includes the upper tidal areas on the shoreward side of the mangrove zone often support sedgelands or salt meadows, comprised of Juncus kraussii, Baumea juncea, B. rubiginosa, Fimbristylis ferruginea and Sporobolus virginicus. The adjacent terrestrial communities are typically freshwater wetland, coastal woodland or wet heathland dominated variously by species such as Melaleuca quinquenervia, Corymbia intermedia, Casuarina glauca, Eucalyptus robusta, Leptospermum liversidgei, Gahnia sieberiana and Caustis blakei.	Vulnerable		Unlikely

Impact Management Plan
Melaleuca irbyana

432-520 Greenbank Road, Greenbank
Prepared for Mirvac Queensland Pty Ltd
3 July 2018

Job No. 7598

Document Control

Document: Impact Management Plan for 432-520 Greenbank Road, prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd.

Document Issue

Issue	Date	Prepared By	Checked By
A	14.02.2018	KG / JG	AD
B	03.07.2018	JG	AD

Prepared by

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Reports and plans by others may be included in this document.

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Abbreviations and Acronyms

DES Department of Environment and Science (Qld) (formally EHP)
EDQ Economic Development Queensland (Qld)
EHP Former Department of Environment and Heritage Protection (Qld) (now DES)
EVNT Endangered, Vulnerable or Near Threatened (as defined by the NCA)
NCA *Nature Conservation Act 1992* (Qld)
NCWR Nature Conservation (Wildlife) Regulation 2006
PDA Priority Development Area (herein referencing the Greater Flagstone Priority Development Area)
SHG Sunders Havill Group

1. Introduction

Saunders Havill Group (SHG) was engaged by Mirvac Queensland Pty Ltd (Mirvac) to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* (Swamp Tee Tree) specimens located within the Greenbank project area located at 432-520 Greenbank Road, Greenbank.

The Greenbank project was referred to the Commonwealth Department of the Environment and Energy (DEE) on behalf of Mirvac by SHG and deemed a Controlled Action for potential impacts on the Koala and Grey-headed Flying-fox under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be assessed on Preliminary Documentation. Of note, Area 1 was approved by the DEE to be excised from the referral area. The Preliminary Documentation for the assessment of the project is nearing completion.

The Greenbank project has received preliminary approval under the Greater Flagstone Urban Development Area Development Scheme 2011 (PDA Development Scheme) by Economic Development Queensland (EDQ) who are the administering authority for development in the Greater Flagstone Priority Development Area (PDA).

As part of a protected plants flora trigger survey in accordance with the Protected Plants Guidelines, specimens of *M. irbyana*, listed as Endangered under the *Nature Conservation Act 1992* (NCA), were recorded within the Greenbank project area. This IMP has been prepared to support a clearing permit (protected plants) application to the Department of Environment and Science (DES) in accordance with Section 3.2 of the *Nature Conservation (Wildlife Management) Regulation 2006 – Protected Plants Assessment Guidelines*.

The IMP has been prepared in accordance with Section 3.2.1 of the *Protected Plants Assessment Guidelines,* as follows:

> **3.2.1 Impact management plan**
>
> An impact management plan must include the following sections:
>
> - attempts to avoid and minimise impact
> - nature of impact
> - management of impact
> - justification of impact management
> - survival of plant in the wild

Contextually, the site is located 30 kilometres (km) south of Brisbane and 10 km west of Logan Village, within the western suburb of Greenbank. The site is bound by Greenbank and Teviot Roads to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 500 metres east of the Brisbane – Sydney Railway Line. An infrastructure easement traverses the site parallel to the northern boundary. The site remains one of the last large rural properties in the immediate landscape predominately comprised of rural residential development. Refer to Figure 1 for the site context and Figure 2 for the site aerial.

The proposed clearing works will be undertaken over parts of the 412 hectare (ha) site to facilitate a master planned development and will be subject to future operational works approvals from EDQ. It is noted that a NCA Protected Plants Flora Survey has been undertaken and exemption obtained from the DES, formally the Department of Environment and Heritage Protection (EHP), for clearing over Area 1 to the west (Lot 2 & Lot 3 on SP297192 and along the boundary fence

line to support existing operational works approvals (Ref: APP0007102, APP0007278, respectively). No EVNT species were recorded within these clearing areas.

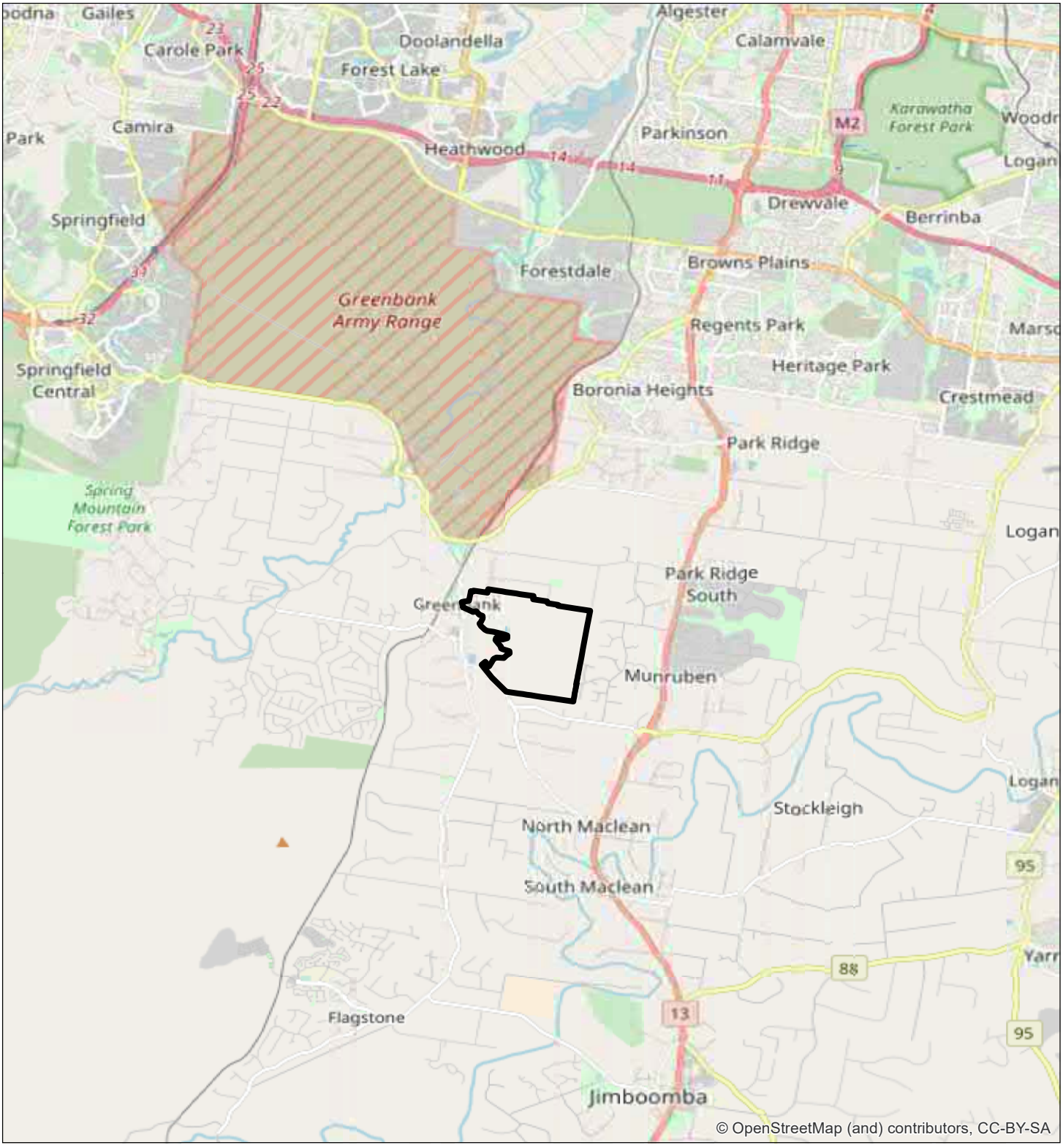
Flora surveys were conducted where clearing is proposed, including within areas mapped as 'High risk' under the Protect Plants Flora Survey Trigger Map High Risk (refer Figure 3) and as per the Flora Survey Guidelines – Protected Plants.

1.1. Property Summary

Key site details are provided in Table 1 below.

Table 1: Property Summary

Address	423-520 Greenbank Road, Greenbank
RPD	Lot 1 on SP297192
Local Government Area	Logan City
Administering Authority	Economic Development Queensland
Priority Development Area	Greater Flagstone PDA
Planning Scheme	Greater Flagstone PDA Development Scheme
Area Classification / Zone	Urban Living
Existing Land Use	Rural



Legend

Site DCDB

Figure 1

Site Context

File ref. 7598 E Figure 1 NCA 2 Site Context B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 1,000 2,000 3,000 4,000 *m*

N

Scale (A4): 1:125,000 [GDA 1994 MGA Z56]

mirvac

saunders havill group

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017)

Legend

Project Site DCDB

Qld DCDB

Figure 2

Site Aerial

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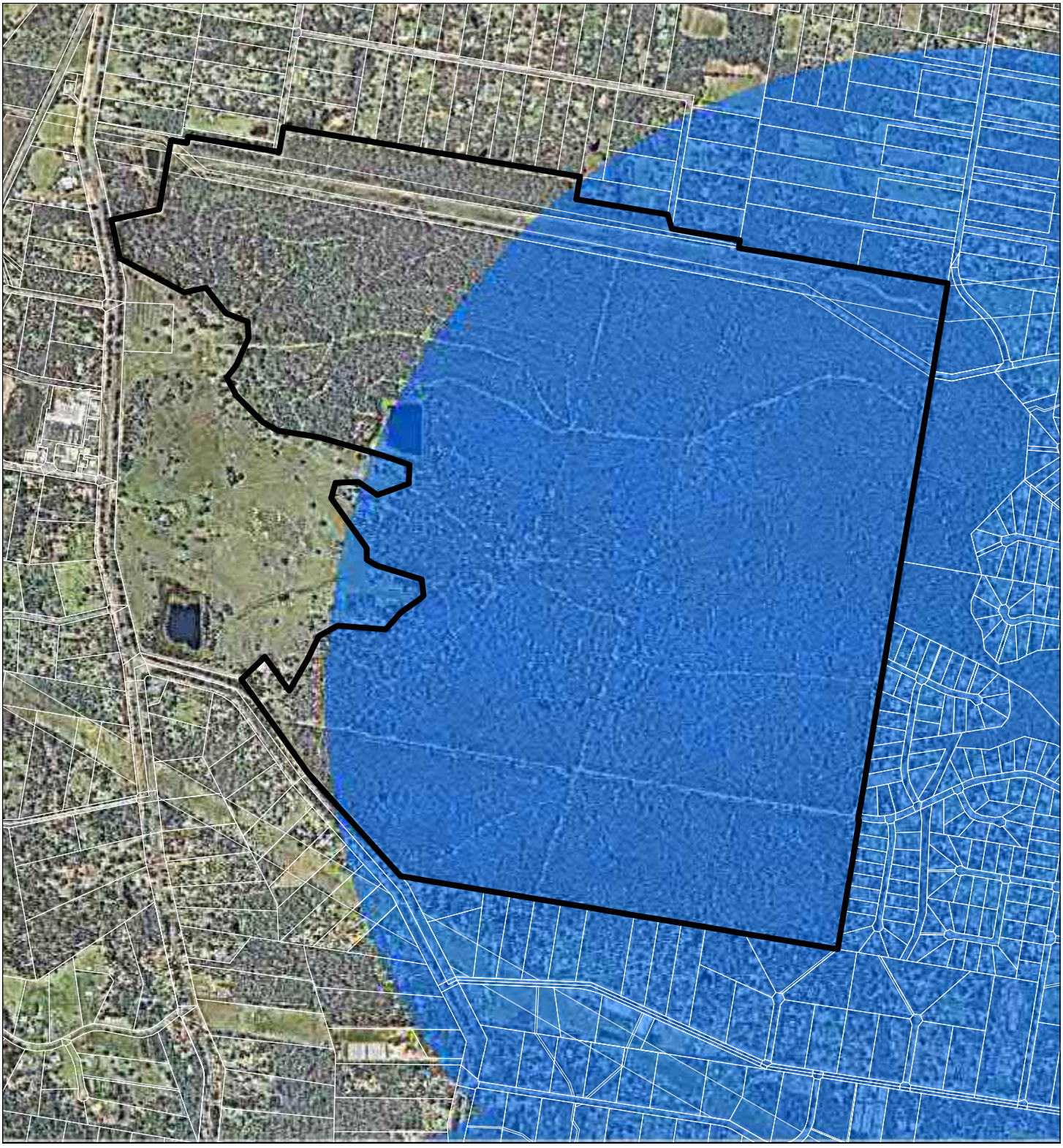
File ref. 7598 E Figure 2 NCA 2 Site Aerial B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:17,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017), Aerial (Nearmap 2017)



Legend

- Project Site DCDB
- Qld DCDB
- Flora survey trigger area

Figure 3

NCA - Protected Plants Flora Survey Trigger Mapping

File ref. 7598 E Figure 3 NCA 2 Protected Plants B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:17,000 [GDA 1994 MGA Z56]

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Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017), aerial (Nearmap 2017)

1.2. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2006 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited.

The Queensland Government has adopted a regulatory framework that captures activities that pose a high risk to plant biodiversity. Under the framework, when a non-exempt clearing activity is proposed within a 'High Risk' area, the proponent of that activity is required to complete a flora survey prior to commencement of clearing. The Protected Plants Flora Survey Trigger Map shows 'High Risk' areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location.

A search of the Protected Plants Flora Survey Trigger Mapping indicated proposed clearing areas within the subject site are overlayed as 'High Risk' and so are subject to flora survey requirements (refer Figure 3).

Prior to flora surveys, the schedules of the NCWR were considered in this report using a Wildlife Online Database Search with a 10 km radius from the site. Three (3) flora species listed under the NCWR were identified as having the potential to occur on site and are presented in Table 1. Refer to Appendix A for full search results.

Table 2: Wildlife Online Search Results–Flora

Scientific Name	Common Name	NCA Status
Marsdenia coronata	Slender Milkvine	Vulnerable
Plectranthus habrophyllus	-	Endangered
Melaleuca irbyana	-	Endangered

2. Nature of the Impact

2.1. Background

The only EVNT species located within the Greenbank project area was *Melaleuca irbyana* (Swamp Tea Tree). The profile of this species is detailed below in Section 2.2.

2.2. Protected Plant Profile

Melaleuca irbyana, a member of the Myrtaceae family, is listed as a threatened species under Schedule 2 of the *Nature Conservation (Wildlife) Regulation 2006* (NCWR) and is classified as "endangered". *Melaleuca irbyana* is also included as part of Endangered Regional Ecosystems (RE) 12.3.18, 12.3.19, 12.9-10.11 and 12.9-10.27 under the *Vegetation Management Act 1999* (VMA). This vegetation community is also listed as a Critically Endangered when present as a Threatened Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

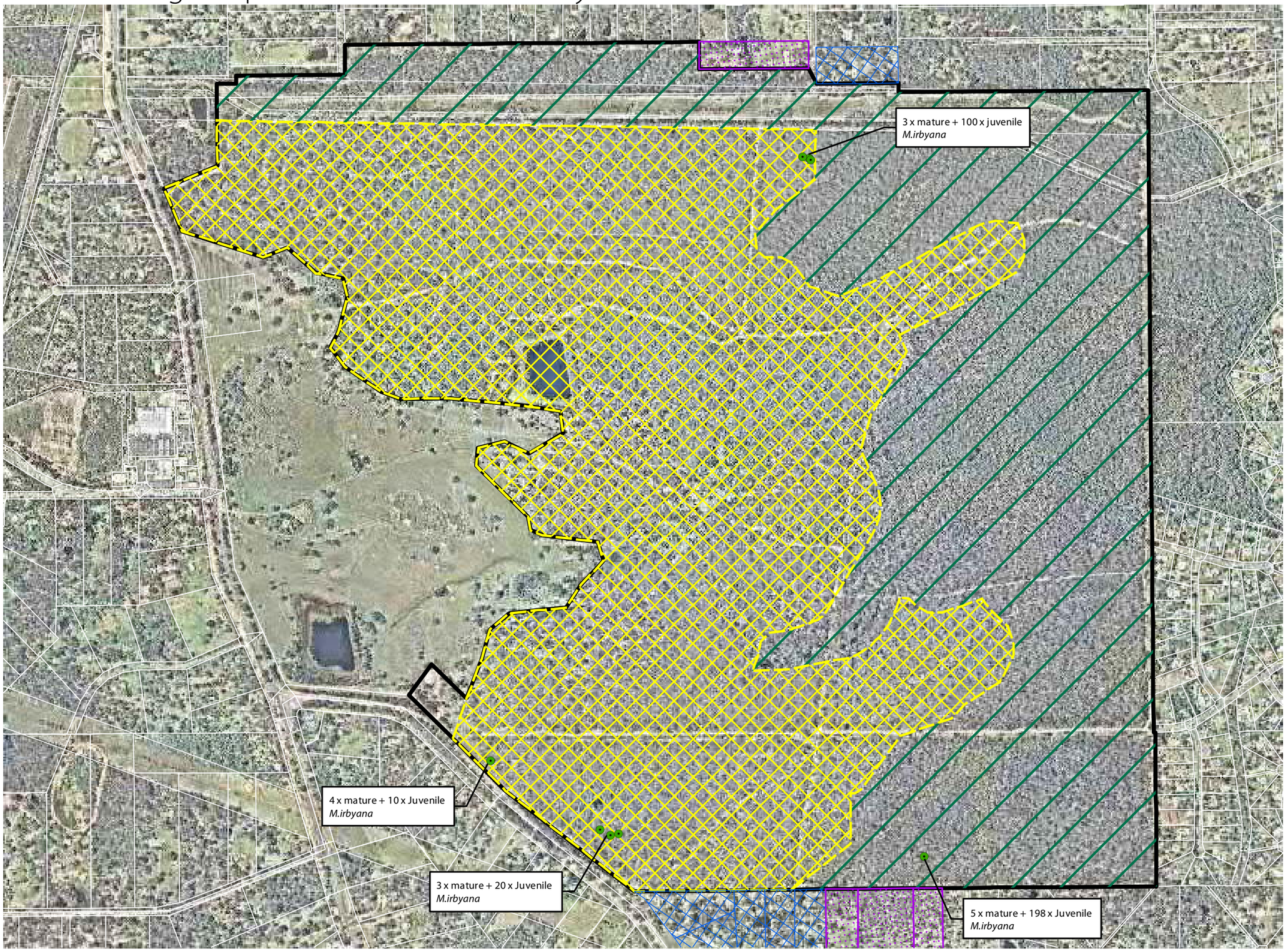
M. irbyana forms communities that occur in two (2) structural forms: the more common form consists of a dominant eucalypt canopy with an understorey containing *M. irbya*na thickets 8-12 metres in height; the less common form is an open forest or thicket of *M. irbyana* with emergent eucalypt trees. The understorey is sparse and can comprise of grasses, sedges, and herbs with a few shrubs, vines and possibly orchids present. There are fairly clear descriptions of *M. irbyana* communities, however, there are no clear indications of the point at which an individual tree or small number of trees are considered to be part of a community. An individual tree may still contribute reproductively to a community, or may have the potential to regenerate and in time create a community.

Logan City Council defines an *M. irbyana* community as, "*where Melaleuca irbyana occur in a patch size of 0.25 hectares or greater, or where a patch of Melaleuca irbyana less than 0.25 hectares adjoins a second patch and the sum of the patches is greater than 0.25 hectares*". This definition has been determined using methodology from the *Melaleuca irbyana* (Swamp Tea-tree) Community 1:25,000 Scale Mapping Project (Ryan, 2010).

2.3. *Melaleuca irbyana* On-site

The entire site was traversed as part of previous and contemporary NCA searches. While *Melaleuca irbyana* were not previously recorded in the Clearing Impact Area associated with Area 1 and the Perimeter Clearing works extents, surveys conducted as part of this reporting, over the balance of the site, recorded the species in four (4) separate locations. Refer to Plan 1 for *Melaleuca irbyana* onsite locations.

1. Clearing Impact - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2016). Aerial (Qld Gov. and Google 2016)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- No Access under NCA Exemption (AP0007102)
- Surveyed under NCA Exemption (AP0007102)
- Mature *Melaleuca irbyana* specimen

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	5/03/2018	Preliminary	TC	AD
B	11/06/2018	Updated impact area	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @A3

0 50 100 200 300 400 m

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 11/06/2018 7598 E 01 NCA 2 Impact Plan B

Location 1:

Location 1 is situated in the northern aspect of the site, adjacent to the power easement. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. Refer to Plan 1 for *Melaleuca irbyana* on site locations and Table 3 for a description of the Regional Ecosystems). This patch of *Melaleuca irbyana* (Swamp Tea-tree) consisted of three (3) established specimens and one-hundred (100) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy.

Photo Plate 1: Location 1

Location 2:

Location 2 is situated towards the south-western property boundary, adjacent to Greenbank Road. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This *Melaleuca irbyana* (Swamp Tea-tree) patch consisted of three (3) established specimens and twenty (20) juveniles. This patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Allocasuarina littoralis* (Black She-oak) and *Acacia spp*. regrowth.

Photo Plate 2: Location 2

Location 3:

Location 3 is situated towards the south-western property boundary, adjacent to Greenbank Road and approximately 380 m west of Location 2. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consisted of four (4) established specimens and ten (10) juveniles. The patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth.

Photo Plate 3: Location 3

Location 4:

Location 4 is situated towards the southern property boundary, approximately 800 m east of Location 2. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. These Regional Ecosystems are described in Table 3 below. This patch consists of five (5) established specimens and one hundred and ninety-eight (198) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy.

Photo Plate 4: Location 4

Table 3: Regional Ecosystems Descriptions

Status	Code	Description
Endangered	12.9-10.12	Corymbia intermedia, Angophora leiocarpa, Eucalyptus seeana +/- E. siderophloia, E. tereticornis, E. racemosa subsp. racemosa, C. citriodora subsp. variegata woodland to open forest. Lophostemon suaveolens is often present as a sub-canopy or understorey tree. Occasional Melaleuca quinquenervia on lower slopes. Does not include areas dominated by Eucalyptus racemosa subsp. racemosa. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 9g).
Of Concern	12.9-10.7:	Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora leiocarpa, E. melanophloia woodland. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 13c).
Of Concern	12.3.11	Eucalyptus tereticornis +/- E. siderophloia and Corymbia intermedia open forest to woodland. Corymbia tessellaris, Lophostemon suaveolens and Melaleuca quinquenervia frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include Angophora leiocarpa, E. exserta, E. grandis, C. trachyphloia, C. citriodora subsp. variegata, E. latisinensis, E. tindaliae, E. racemosa and Melaleuca sieberi. E. seeana may be present south of Landsborough and Livistona decora may occur in scattered patches or low densities in the Glenbar SF and Wongi SF areas. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y. (BVG1M: 16c)
Least Concern	12.3.6:	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest to woodland with a grassy ground layer dominated by species such as Imperata cylindrica. Eucalyptus tereticornis may be present as an emergent layer. Occurs on Quaternary floodplains and fringing drainage lines in coastal areas. (BVG1M: 22a)
Least Concern	12.9-10.2:	Corymbia citriodora subsp. variegata open forest or woodland usually with Eucalyptus crebra. Other species such as Eucalyptus tereticornis, E. moluccana, E. acmenoides and E. siderophloia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of Lophostemon confertus (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 10b).

Based on the information provided in **Section 2.2**, the specimens located on site are not consistent with a *Melaleuca irbyana* community due to the patches predominately containing juvenile individuals with very few mature specimens. Importantly, these patches are not associated with Endangered Regional Ecosystems. Locations 1 and 4 were confirmed via a certified PMAV to be located within composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 while locations 2 and 3 were located within non-remnant areas.

While Location 1 contains a substantial amount of juvenile species, overall, the significance of these patches is considered less than if they formed part of a broader existing community. The habitat value they currently provide is considered relatively limited, with no obvious noteworthy habitat for flora or fauna observed at the time of survey.

2.4. Avoidance and Minimisation of Impact

The proposed works are for the development of Greenbank master planned development in the Greater Flagstone PDA. Preliminary approval for the context plan and master plan has been issued by EDQ. These plans were informed by detailed analysis of the site by specialist consultants, including a detailed ecological analysis by SHG. Subsequently, areas for development shown are concentrated to areas of least constraint. Areas of highest ecological value have been identified for retention as conservation.

The proposed works will include the creation of residential allotments, a proposed school site, new roads, park and conservation areas and corridors. Minimisation of overall clearing impacts are evident through location of the proposed development, located outside Endangered remnant vegetation and waterway corridors. Rehabilitation of conservation areas and waterways is proposed as part of the development.

The proposed earthworks to facilitate the development footprint will require the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens, and ongoing property boundary maintenance within 100 m of a fourth patch. These specimens are located within Of Concern and non-remnant regrowth areas (refer Plan 1).

As per the EDQ endorsed Natural Environment Site Strategy, extensive conservation of greater than 89 hectares of proposed Conservation Parkland adjoining Norris Creek and Wearing Park is proposed as part of the development. In accordance with best practice management, restoration and rehabilitation works will seek to stabilise and reverse the negative effects of ongoing habitat fragmentation. The intent is for managed areas of rehabilitation and restoration to rectify canopy gaps and restore bare or denuded areas to provide additional habitat and refugia within the lower strata to maintain connectivity with external approval corridors and improve terrestrial corridor viability. Rehabilitation works within the conservation area and waterway corridors will include weed management and replanting with native species consistent with mapped Regional Ecosystems to augment ecological values and enhance connectivity.

Melaleuca irbyana grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. The species prefers poorly draining, heavy clay soils (Byrnes 1984; Barlow 1987). The proposed conservation land rehabilitation works will include establishing a *Melaleuca irbyana* thicket within remnant woodland forest to the north of the central waterway. This land is relatively low lying and adjoins an ephemeral waterway that contains permanent billabongs. The proposal *Melaleuca irbyana* planting site is therefore considered ideal for the species, which is dependent on specific groundwater and / or surface water hydrology. Impacts to *Melaleuca irbyana* have been minimised to the greatest practical extent and include establishing a *Melaleuca irbyana* community, on the project site, within future conservation land and managing potential impacts from ongoing works that will occur within 100 m of a retained patch.

2.5. Survival of the Plant in the Wild

Based on the current disturbed nature of the site and the locations of the *Melaleuca irbyana* specimens along property boundaries, it is not anticipated that the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens will significantly hinder the future success of the species in the area. Importantly, the fourth patch is to be preserved within the conservation area and proposed rehabilitation works seek to establish a *Melaleuca irbyana* community on the site allowing the community to be protected in perpetuity.

3. Offset Assessment

The *Protected Plants Assessment Guideline* states that an offset compensates for residual impacts after impact management requirements of the guideline have been met. The specimens located are not considered to constitute ecological communities (as described in Section 2.2.), and therefore the viability of *Melaleuca irbyana* local populations are not considered to be impacted by this proposal.

The proposed earthworks to facilitate the development footprint will require the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens. In consideration of the extensive rehabilitation works proposed within the onsite conservation land, including the establishment of an *Melaleuca irbyana* thicket, the proposed rehabilitation works will ensure a net gain in *Melaleuca irbyana* across the site. IN light of rehabilitation efforts, the removal of small patches of *Melaleuca irbyana* specimens is not considered to impose a Significant Residual Impact, as defined under the DES policy, and therefore offsets are not considered applicable in this case.

3.1. Rehabilitation works

It is considered that the proposed rehabilitation works will mitigate the impact to the extent that the impact on the Matter of State Environmental Significance (MSES) would not be considered significant.

To demonstrate this mitigation of impact, a response to the four (4) points of consideration within Section 1.2 of the *Significant Residual Impact Guideline* is provided below.

- **The extent and duration of impact on the matter and its sensitivity to disturbance.**

  The impact on the matter is the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens from former paddock areas that have already been subject to high disturbance from cattle grazing and historical clearing. A fourth patch will be retained with ongoing adjoining works within 100 m limited to the maintenance of the nearby property boundary. The sites are described in detail in Section 2.3, shown in Plan 1 and summarised below:

  - Location 1: 3 x mature s + 100 juvenile specimens, located within the north-east along a drainage feature
  - Location 2: 4 x mature + 10 juvenile specimens, located along the southern boundary
  - Location 3: 3 mature +20 juvenile specimens, located along the southern boundary
  - Location 4: 5 mature + 198 juvenile specimens, located along the southern boundary in the south-west

- **Timeframe for rehabilitation relative to the impact occurring and the ability of the matter to maintain its viability during this timeframe.**

  The rehabilitation proposed is the planting of six hundred and twenty-five (625, equates to 140 cleared specimens at 4:1 plus an additional 65 specimens over 5,000 m^2 at 1 per 8 m^2) advanced tube stock specimens of *M. irbyana* within a relatively isolated portion of the central waterway corridor of the conservation zone (refer Plans 2 to 4). Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *M. irbyana* ecological community as possible and maintained as part of the extensive rehabilitation works for the conservation zone. The area of planting of this thicket adjoins the central waterway corridor and is not within 100 m of future development areas. This location has been chosen to avoid human disturbance and as far away as possible from conflicting uses.

It is noted that the rehabilitated creek corridor will be handed over to Logan City Council following the on-maintenance period. Further, the fourth patch of *M. irbyana* that is to be retained within the conservation area will be subject to regular compatible weed suppression and monitored for persistence as part of site maintenance due to its proximity to ongoing property boundary maintenance works within 100 m.

- **Likely success of rehabilitation works to return the impacted matter to its original condition, and;**

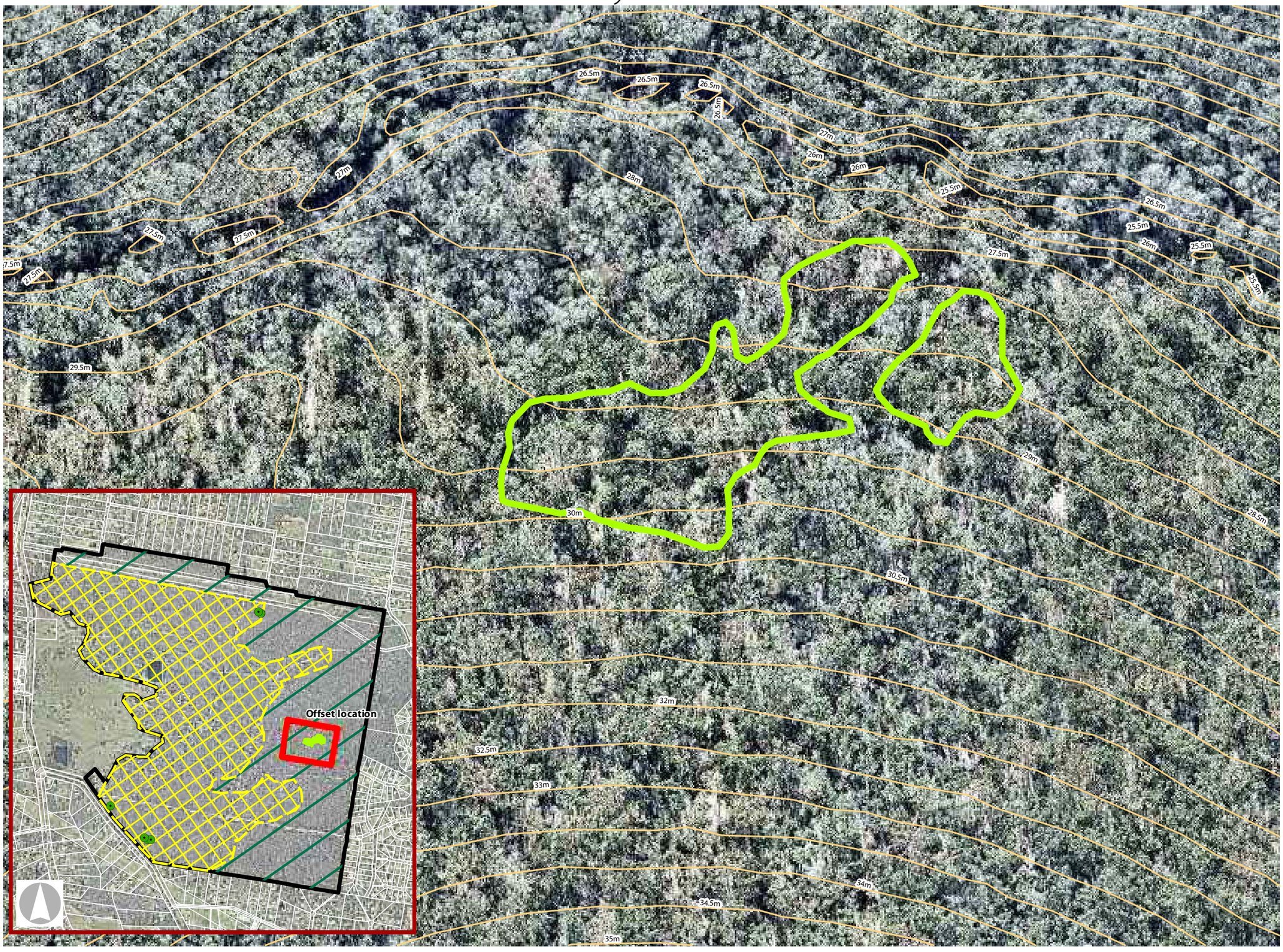
  It is important to note that the Regional Ecosystems within and adjoining the creek corridor reflect those where the *M. irbyana* patches are currently located on-site. The proposed rehabilitation area was chosen after detailed ecological survey of site attributes, including the prevailing low-lying topography, proximity to the creek, and canopy gaps with limited existing understorey (refer Plans 2 & 4). Thus, the planting of *M. irbyana* in the creek corridor has a high likelihood of success given the suitable landscape and habitat. Given that the impact is the removal of a 140 single individual specimens of *M. irbyana* which are almost entirely juveniles, the planting of six hundred and twenty-five (625) specimens of *M. irbyana* as a thicket within the conservation zone to be rehabilitated will far exceed the original condition of the impacted matter at an offset ratio of greater than 4:1.

- **The time-lag effect—between impact and rehabilitation successfully delivering the original condition for the matter—on the matter's viability.**

  As mentioned previously, the removal of three small patches of *M. irbyana* is not considered to significantly impact upon the viability of local populations nor remove significant habitat values. Although there will be a time-lag between the removal of the predominantly juvenile *M. irbyana* specimens and the maturity of the tube stock of *M. irbyana* to be planted. Overall, the rehabilitation proposed is considered a far superior ecological outcome for viability of local populations.

  The extent and number of *M. irbyana* to be planted is intended to establish a self-sustaining thicket of *M. irbyana* in a safe and secluded buffer environment that is capable of mitigating the proposed impacts. It is acknowledged that any future unavoidable loss of *M. irbyana* from the development area will be assessed by DES on a case by case basis.

2. Offset Assessment - *Melaleuca irbyana*



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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2016). Aerial (Nearmap 2018)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- Mature *Melaleuca irbyana* specimen to be impacted by clearing works
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	11/06/2018	Preliminary	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

0 5 10 20 30 40 m

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Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 11/06/2018 7598 E 02 NCA 2 Offset Plan A

3. Melaleuca Irbyana - Rehabilitation/Planting Site Notes

INTRODUCTION

Saunders Havill Group (SHG) was engaged by MIRVAC to prepare an Impact Management Plan (IMP) for the clearing of 140 *Melaleuca irbyana* (Swamp Tree Tree) specimens. The replacement plants will be located within the approved conservation area of the Everleigh project (herein referred to as 'the site'). The clearing works, current and future will facilitate the creation of residential lots, a school and internal roads for the site's ultimate development layout.

The rehabilitation proposal for the clearing of 140 *Melaleuca Irbyana* is the planting of four (4) advanced tube stock specimens of *Melaleuca Irbyana* per tree cleared. A total of 625 (560+65 additional) *Melaleuca Irbyana* will be planted as a result. The planting area is proposed within the site's conservation zone (refer Plan 2) and will cover 5,000 m^2. The specific location of the planting area was determined onsite by Ecologists from SHG. The percentage of exiting canopy cover and the land zone features were taken into consideration when determining the optimal location for planting. Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *Melaleuca Irbyana* ecological community as possible and maintained as part of the rehabilitation works for the conservation zones. The area of planting of this thicket is centralised within the conservation zone and adjacent the waterway corridor, as stipulated by the EDQ approved NESS, and not within 100m of future development areas.

This Rehabilitation Plan is drafted to identify and manage the site disturbances for the planting of the 625 *Melaleuca Irbyana* specimens within a 5,000m^2. The planting will involve low impact weed removal and the retention of any existing native vegetation in the immediate area.

SITE PREPARATION

Once the planting locations have been determined not to impact existing native vegetation, the location is to be spot sprayed prior to soil cultivation. Herbicides must be applied by appropriately qualified/supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.

The planting will provide a net benefit of greater than 4 to 1 in an area protected under the NESS.
Rehabilitation treatment is to generally include the following points:

- A number of weeds are recorded for removal within shrub & ground layer
- Weed removal and management will utilise low impact methods
- Planting of the 625 specimens will be planted at approximately 1 per 8m^2 to form a *Melaleuca Irbyana* thicket.

Ecologists from SHG have assessed the site's vegetation. Broadly, it was determined that the assisted natural regenerate approach will be used on site. This approach is described below:

ASSISTED NATURAL REGENERATION

Applies:

- 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 control, 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 and/or current land use practices

Role of planting:

- Planting in such areas should be limited to where species cannot return to site without direct intervention.

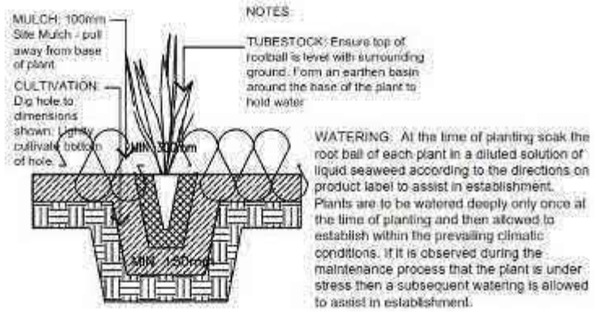
Goal vegetation community:

- The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation

MULCH

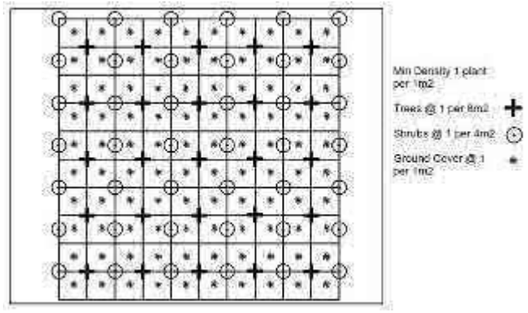
Areas to be blanket mulched to a minimum depth of 100mm leaving a 50mm gap surrounding the trunk of planted stock. Areas which are too steep or where overland flows may occur, a combination of mulch and Jute mat and or suitably anchored natural fibre weed mat installed to manufactures specifications have been specified.

Each individual planting location should be spot cultivated to at least 2 times the depth and twice the width of the plant stock size. Refer detail for more specifications:



PLANTING

Planting locations shall be generally set out in accordance with a typical random grid pattern as shown on this drawing sheet below with the *Melaleuca Irbyana* to be planted at 1 per 8m^2.



All stock shall be advanced tube stock specimens of *Melaleuca Irbyana*, well formed, and hardened off to suit final revegetation location, nursery stock. The root system should be well formed without being tube bound or large roots extruding from the tube container. The environmental coordinator has the right to inspect and reject stock prior to planting.

INSTALLATION

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimise plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced and qualified bush regenerator. All works shall be in accordance with the provisions of this sheet, local government policies and Australian Standards. Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged.
- Plants are to be planted immediately after delivery to the planting site. If not possible, they should be stored in the shade and watered sufficiently during the day.
- Planting is to be undertaken in accordance with the planting grid contained within this drawing sheet.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient depauperate, hydrophobic etc.) and above areas of potential frequent inundation and water flow, topsoil may be used or the ground mechanically ripped where access is feasible.
- Pre-water plant hole, if soil is dry, to decrease root stress upon planting and assess the infiltration of water through the soil
- Incorporate into the planting substrate the appropriate quantity of prepared water crystals or other suitable hydrating product such as Hortex 'Rainsaver' or 'Moisturaid'.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10mm or any more than 20mm of planting medium
- Plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as required during the construction phase of the development depending on climatic conditions. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, slow release fertiliser is recommended, and is to be administered appropriately during planting. Top dressing with slow release fertiliser is preferred to avoid toxic levels of fertiliser accumulating in the plant hole around the plant roots.
- To ensure successful establishment, all planting surfaces must be covered in:
    - 100mm layer of high quality weed-free composted chip mulch (site mulch) - Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 200mm
    - suitable individual anchored natural fibre weed mat; or
    - As presented within other section, where available mulch material will be sourced from cleared vegetation material if adequately seasoned.
- A long term slow release fertiliser, such as Nutricote or similar product should be used for all plantings after initial plant establishment.
- Seedlings and saplings are to be encouraged and maintained throughout the establishment period.

MAINTENANCE & MONITORING

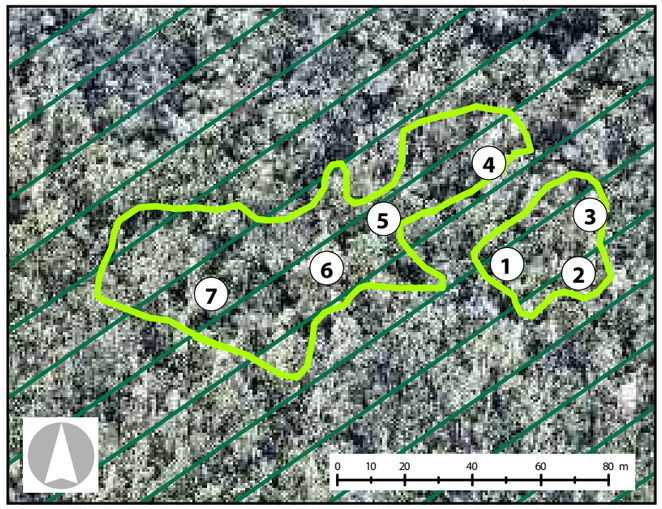
MAINTENANCE SCHEDULE

Maintenance schedule for revegetation areas of the proposed development as specified on the Landscape Plans

ESTABLISHMENT	*Establishment is to occur at the completion of the primary and secondary weed removal phases and any rehabilitation planting. During this period any failed stock are to be replaced and/ or defects identified then reparations are to be made to site works.*
1. Watering	Watering shall be carried out to ensure establishment of revegetation.
	At the time of planting soak the root ball of each plant in a diluted solution of liquid seaweed according to the directions on product label to assist in establishment.
	Plants are to be watered deeply only once at the time of planting and then allowed to establish within the prevailing climatic conditions. If it's observed during the maintenance process that the plant is under stress then a subsequent watering is allowed
2.Weed Removal	Weeds evident during the Establishment period but should be removed as part of a monthly weed management program. Best Practice weed management techniques should be employed for weed removal amongst revegetation areas.
	Where grass seeding or turf establishes within planted areas it should be treated with approved herbicide for waterways.
MAINTENANCE	*(Weeks 13- 2 years)*
1. Watering	No specified watering regime is provided during the maintenance period. The intent is for the area to become self sufficient in utilising natural rain patterns and run off. Watering should occur during extended dry periods to ensure continued establishment
2. Weed Removal	Weeds should be tended to on a monthly program. Treatment techniques vary within the landscape planted areas versus revegetation and retention areas.
3. Management	Throughout the establishment and maintenance periods areas where planting stock has not achieved a 90% success survival additional planting shall be installed.
4. Erosion Control	Prior to the commencement of works and to remain throughout the establishment and maintenance period an erosion and sediment control measures shall be employed over the rehabilitaion area of the site.

Issue	Date	Description	Drawn	Checked
A	3/07/2018	Preliminary	TC	MS

4. Melaleuca Irbyana - Rehabilitation/Planting Site Photos



LEGEND

- Project DCDB
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- Conservation area
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- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

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Issue	Date	Description	Drawn	Checked
A	11/06/2018	Preliminary	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

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Everleigh

4. Summary and Conclusion

Saunders Havill Group has been engaged by Mirvac Queensland Pty Ltd to complete an Impact Management Plan (IMP) for *Melaleuca irbyana* located within the extent of works for the Everleigh Greenbank project. This IMP is intended to support a clearing permit (protected plants) application to the Department of Environment and Science (DES) in accordance with the *Nature Conservation (Wildlife Management) Regulation 2006 - Protected Plants Assessment Guidelines*.

Earthworks associated with the development will necessitate the removal of three (3) relatively small patches of predominantly juvenile *M. irbyana* and the retention of a fourth within the conservation area but within 100 m of ongoing property boundary maintenance. The Protected Plants Assessment Guideline states that an offset compensates for residual impacts after impact management requirements of the guideline have been met. Activities are not anticipated to adversely impact on the viability of any localised *M. irbyana* ecological communities, and the removal of three small *M. irbyana* patches is not considered to impose a Significant Residual Impact as defined under the DES policy in consideration of proposed rehabilitation works within the central creek corridor of the conservation zone. Therefore, offsets are not considered applicable in this case. It is important to note that investment in the conservation zone rehabilitation works proposed, i.e. revegetation and weed removal and the establishment of 625 tube stock *M. irbyana* plantings, is considered to provide a superior ecological outcome relative to the removal of a single specimen at an offset ratio greater than 4:1.

5. Appendices

Appendix A

Wildlife Online Search

Nature Conservation Act 1992

Appendix A

Wildlife Online Search

Nature Conservation Act 1992

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -27.7401
Longitude: 152.9975
Distance: 10
Email: keiragrundy@saundershavill.com
Date submitted: Wednesday 14 Feb 2018 16:50:28
Date extracted: Wednesday 14 Feb 2018 17:00:02

The number of records retrieved = 13

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		3
animals	amphibians	Myobatrachidae	*Crinia tinnula*	wallum froglet		V		3/3
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		3
animals	birds	Falconidae	*Falco hypoleucos*	grey falcon		V		1
animals	birds	Psittacidae	*Lathamus discolor*	swift parrot		E	CE	1
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		5
animals	mammals	Dasyuridae	*Dasyurus maculatus maculatus*	spotted-tailed quoll (southern subspecies)		V	E	15
animals	mammals	Macropodidae	*Petrogale penicillata*	brush-tailed rock-wallaby		V	V	2
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	515
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		V	V	12/2
plants	higher dicots	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		2/2
plants	higher dicots	Lamiaceae	*Plectranthus habrophyllus*			E	E	6/6
plants	higher dicots	Myrtaceae	*Melaleuca irbyana*			E		7/6

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

ATTACHMENT 6 - Demarcation Fencing

Area Inspected	Stage 1 - Phase 2
Location	Everleigh Greenbank
Flagging Installed by	Goldings
Date of Inspection	28th November 2019
Fencing Extent checked by	David Havill (Saunders Havill Group)

ID	Longitude	Latitude
1	152.9944	-27.7416
2	152.9931	-27.7412
3	152.9927	-27.7410
4	152.9930	-27.7392
5	152.9940	-27.7389
6	152.9940	-27.7384
7	152.9931	-27.7381
8	152.9922	-27.7375
9	152.9925	-27.7372
10	152.9924	-27.7367
11	152.9924	-27.7362
12	152.9929	-27.7359
13	152.9954	-27.7359
14	152.9957	-27.7362
15	152.9960	-27.7363
16	152.9970	-27.7374
17	152.9973	-27.7378
18	152.9976	-27.7383
19	152.9977	-27.7386
20	152.9979	-27.7392
21	152.9944	-27.7418
22	152.9927	-27.7408
23	152.9928	-27.7391
24	152.9918	-27.7378
25	152.9964	-27.7414
26	152.9961	-27.7411
27	152.9960	-27.7409
28	152.9943	-27.7411
29	152.9940	-27.7411
30	152.9937	-27.7410
31	152.9941	-27.7412
32	152.9946	-27.7413
33	152.9948	-27.7415
34	152.9948	-27.7417
35	152.9929	-27.7409
36	152.9931	-27.7408
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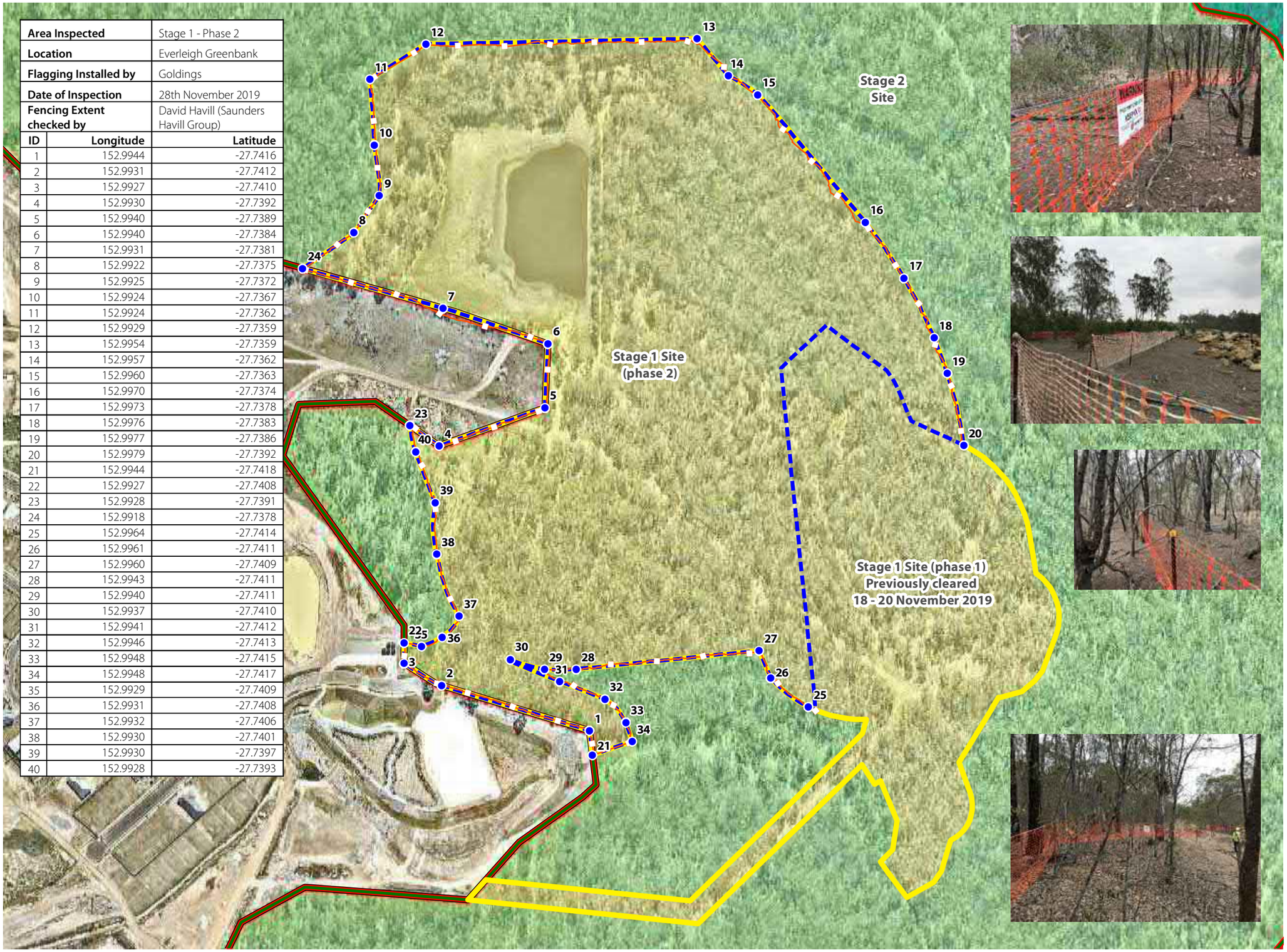
40	152.9928	-27.7393



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Layer Sources
Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

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Legend

- Impact area
- Stage 1 site (29 ha)
- Stage 1 Phase 2 fence location (Survey data)
- Stage 1 Phase 2 fence demarcation (GPS log <1m)
- Stage 2 site (201 ha)
- Onsite conservation (180 ha)

Issue	Date	Description	Drawn	Checked
A	28/11/2019	Preliminary	MC	KG

0 10 20 40 60 80 100 m

1:3,500 @ A3

Transverse Mercator | GDA 1994 | Zone 56 |

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Everleigh

ADDRESS/RPD: Greenbank Road, Greenbank *28/11/2019* *7598_E_06_School_ph2_demarc_fence_A*

Wildlife Protection and Management Plan (WPMP)

Everleigh School – Phase 1 (Stage 2), Teviot Road, Greenbank

Tomewin Wildlife Consultancy
25th November 2019

Table of Contents

1. Introduction

1.1 Project Background

Tomewin Wildlife Consultancy (TWC) was commissioned by Golding Contractors on behalf of Mirvac Property Group ('the Proponent') to produce a pre-clearing fauna management report in accordance with the 'Queensland Code of Practice for the Welfare of Wild Animals Affected by Land-Clearing and Other Habitat Impacts and Wildlife Spotter / Catchers (Draft), prepared by Hanger, J. and Nottidge, B. 2009' ('the Code') for proposed clearing works associated with Everleigh(proposed school site). This report also encompasses the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland *Nature Conservation Act 1992* (NCA) and 'Fauna Management Plan for Everleigh (proposed School Site)– 432-520 Greenbank Road, Greenbank,(Issue A), prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd.

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The objective of this report is to summarize the existing fauna values present and detail mitigation and management strategies applicable to fauna species likely to be present within clearing areas or retained habitat within the balance of the site. Targeted searches for EPBC Act and NCA listed species including, Koala and Grey-headed Flying-fox, were made.

1.2 Site Location and Description

The site specific proposed clearing zone is located to the east of Teviot Road within the Greenbank locality with the specific project being tree clearance for residential estate construction. The site is prior rural land-use area of minor slope containing wattle/Eucalypt re-growth and larger early mature to mature eucalypts, located adjacent to recent residential development with assessment of fauna value detailed below.

Figure – Phase 2 Site Clearing Limits

1.3 Permits and licences

TWC is a specialist Fauna spotter-catcher consultancy approved under the Queensland Department of Environment and Science (DES) and retain a Rehabilitation Permit(unrestricted species / schedules) no: **WA0014500** valid from 18.2.1019 to 17.2.2022.
Tomewin Wildlife Consultancy has a staff of three with two spotter-catchers having a minimum of ten years' experience. All staff has undergone extensive in-house training of core skills including development process awareness, clearing process awareness wildlife identification and handling. Tomewin Wildlife Consultancy has had lengthy experience on a range of large scale projects particularly addressing of Koalas and arboreal fauna associated with habitat trees.

Project experience has involved both long distance narrow easement and broad hectare clearing of green field development sites. Recent works includes responsibility for fauna management in the Moreton Bay Rail project and in large scale clearing of areas within the Coomera area.

2. Survey Methodology

The following survey techniques applied were utilized to confirm the actual and anticipated wildlife present on site.

2.1 Specific methodology for Koalas

- Observation of vegetation for Koalas, current feed values and prior indications of feed usage, ground searches for scats trace specifically in relation to Koalas.

2.2 Current fauna activity

- Consideration of time of year, actual and anticipated wildlife and prior spotter-catcher duties to determine fauna value.

- Diurnal survey including observation of tree canopy for current fauna values including active bird nests, visibly hollow bearing trees hollows or potentially hollow bearing trees. and prior accessed termite mounds
- Observation of site to locate and identify actual wildlife present.

3. Results

Survey occurred on the 25/11/2019 during late spring early summer being an activity period of the yearly breeding cycle for all faunal groups currently reduced by an extended dry spell.

3.1 Terrestrial habitat features

- The site is of minor slope containing impoverished compacted soils from prior rural land-use with no significant rock exposure sparse understory vegetation or fallen timber contains limited terrestrial shelter value.

- The site is currently in an extended dry spell with minimal ground water (excluding existing dam) with the majority of trees having reduced leaf cover and minimal active growth of ground cover vegetation.

- The site browse, blossom and insect feed values impacted by current dry conditions.

- Site drainage lines within designated clearing zones noted with eroded bank edges that may provide shelter value for small terrestrial fauna

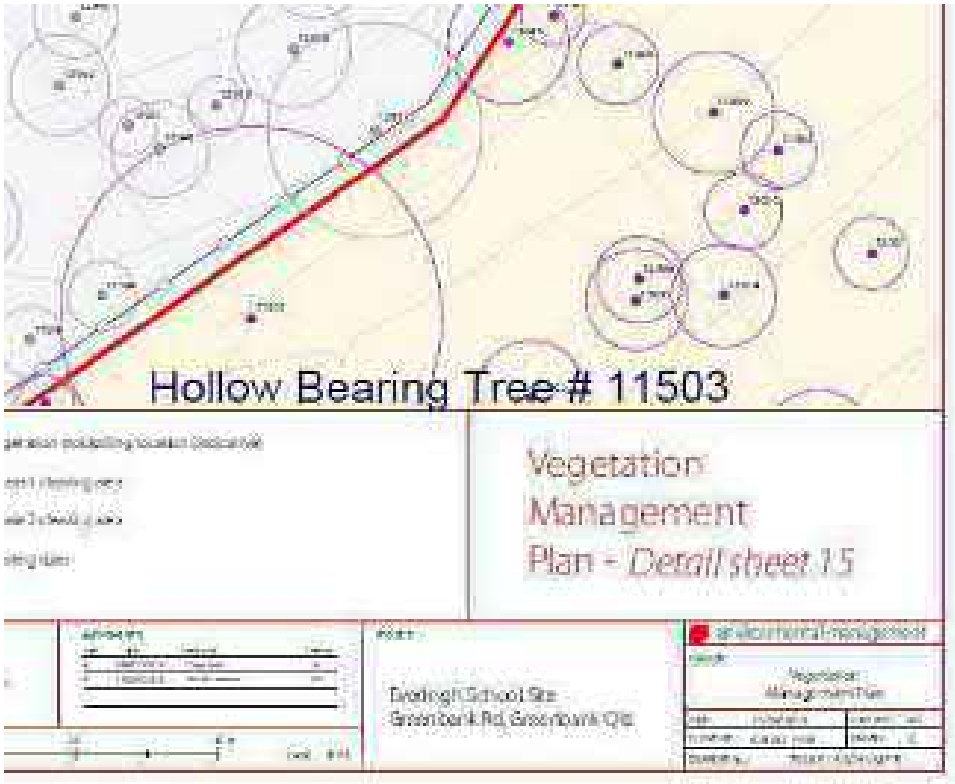
3.2 Arboreal habitat features

- The site contains a sparse wattle/Eucalypt re-growth substrata and larger early mature to mature eucalyptus canopy

- juvenile to early mature eucalyptus trees *Eucalyptus tereticornis, Corymbia maculata, Eucalyptus crebna* noted as Koala feed species.

- No significant visibly hollow-bearing trees noted. A large number of termite arboretums (46)with prior access holes noted during survey; the absence of other habitat trees increases the potential of fauna utilization

- Potential hidden hollows within complex branching or dead scaffolds associated with largest trees noted. Three inactive stick nest structures were located.
  One significant Hollow-bearing tree (fauna value 4/5) containing multiple hollow entrances of varied diameter entrance was noted during survey.



- Sacred Kingfisher and Dollar birds territorial breeding calls noted

3.3 Actual & / or Anticipated fauna species List

Fauna	Scientific name	Method of Detection	Conservation status
Grey Kangaroo	*Macropus giganteus*	observed	Least concern
Swamp Wallaby	*Wallabia bicolor*	observed	Least concern
Red-neck Wallaby	*Macropus rufogriseus*	observed	Least concern
Koala	*Phascolarctus cinereus*	Anticipated	Vulnerable
Grey-headed Flying-fox	*Pteropus poliocephalus*	anticipated	Vulnerable
Brush-tail Possum	*Trichosurus vulpecula*	scats	Least concern
Yellow-footed Antechinus	*Antechinus flaviceps*	anticipated	Least concern
Sugar Glider	*Petaurus breviceps*	Trace	Least concern
Goanna	*Varanus varius*	observed	Least concern
Bearded Dragon	*Pogona barbata*	observed	Least concern
Dubious Dtella	*Gehyra dubia*	Anticipated	Least concern
Robust Velvet Gecko	*Oedura robusta*	Anticipated	Least concern
Barred-sided Skink	*Eulampus tenuis*	Anticipated	Least concern
Green tree Snake	*Dendrelaphis punctulata*	Anticipated	Least concern
Yellow-faced Whip-snake	*Demansia psammophis*	Anticipated	Least concern
Red-bellied Black Snake	*Pseudechis porphyriacus*	Anticipated	Least concern
Eastern Brown Snake	*Psuedonaja textilis*	Anticipated	Least concern
Carpet Snake	*Morelia variegata*	Anticipated	Least concern
Kookaburra	*Dacelo novaeguineae*	observed	Least concern
Dollarbird	*Eurystomus orientalis*	observed	Least concern
Sacred Kingfisher	*Todiramphus sancta*	observed	Least concern
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*	observed	Least concern
Red-backed Wren	*Malurus melanocephalus*	observed	Least concern
Insect bats		Anticipated	Least concern
Common territorial birds	Magpie, noisy miner, butcher bird, kookaburra, crow	observed	Least concern

3.4 Threatened Species

Results of a using the EPBC Act Protected Matters Search Tool and NCA Wildlife Online Search, identified the potential for conservation significant fauna species to occur within proximity of the site.

Scientific name	Common Name	Habitat	EPBC Status	NCA status
Daysurus maculatus maculatus	Spotted Tail Quoll	The Spot-tailed Quoll has a preference for mature wet forest requiring complex habitat features for den sites and a large home range for predatory foraging.	Endangered	Vulnerable
Delma torquata	Collared Delma	The Collared Delma is a terrestrial legless lizard requiring rocky terrain and a woodland /groundcover habitat to forage	Vulnerable	Vulnerable
Lathamus discolor	Swift Parrot	The Parrot has been previously recorded feeding in *Eucalyptus Crebna* and *Eucalyptus tereticornis*	Endangered	Endangered
Phascolarctus cinereus	Koala	The Koala occurs within the general area with the site specific containing feed trees *Corymbia maculata, Eucalytus tereticornis, Eucalyptus crebna.*	Vulnerable	Vulnerable
Pteropus poliocephalus	Grey headed Flying fox	The flying fox generally roosts in large camps proximal to watercourses foraging within melaleuca swamps, eucalyptus forests to rainforests	Vulnerable	

3.5.1 Koala

Pre clearing surveys identified the presence of mature Koala fodder species within the works extent including, *Corymbia maculata, Eucalytus tereticornis, Eucalyptus crebna. State Planning Policy 2017* (SPP) mapping also identified the site is mapped as containing areas of low value and medium value Rehabilitation Habitat for the Koala.

3.5.2 Grey Headed Flying Fox

Pre clearing surveys identified the presence of mature Eucalyptus species that may provide forage value for Grey Headed Flying Fox within the works extent including, *Corymbia maculata, Eucalytus tereticornis, Eucalyptus crebna.*

4. Wildlife Habitat Impact Assessment

The development of the Everleigh Estate will have a direct impact on fauna habitat features observed by the pre-clearance survey. It is also important to consider direct impacts associated with existing and future residential developmental areas.

Impacts to fauna as a result of vegetation clearance will include the following:

- Loss of trees for foraging, roosting and nesting;
- Loss of hollow-bearing trees for nesting and refuge;
- Loss of habitat and foraging areas for terrestrial species;
- Loss of overall habitat; and
- Potential loss of abundance of some local species.

Other impacts may include:

- Injury or death during felling of trees;
- Injury or death from machinery; and
- Alteration of nesting, foraging and general activities due to disturbance.

The Everleigh School clearing extent adjoins vegetated areas to the east, allowing for broad face dispersal options for terrestrial and arboreal fauna that may occur onsite .

Overall the site contains low value refugial opportunities for arboreal and terrestrial fauna species. The species expected within the site are likely to reflect common fauna for the region, with the exception of the Koala which is listed at both the Commonwealth and State level and the Grey-head Flying Fox protected at the Commonwealth level. Specific methodologies for this species will be detailed within the Wildlife and Habitat Impact Mitigation Plan (WHIMP). A number of conclusions and recommendations will be presented in the WHIMP, to ensure facilitate minimal impact to fauna during the vegetation clearing.

It is recommended that all identified fauna habitats onsite be inspected by Department of Environment and Science approved Fauna Spotter prior to vegetation clearing and all vegetation removal activities be supervised during the clearing process (as per the FMP). Fauna captured will be relocated to adjacent habitat. The directives given by Fauna Spotter Catchers should embrace a "best practice" in accordance with 'the Code' and must include implementation of proven specific management techniques for identified habitat types and compliance with legislation relevant to the activity.

It is recommended that in the event any nests which contain chicks are identified during clearing be left until fledged, and those that are in a construction phase should be dismantled to prevent further nesting activity.

Wildlife Habitat and Impact Mitigation Plan

Everleigh School - Phase 1 (Stage 2) Clearing, Teviot Road, Greenbank

Tomewin Wildlife Consultancy
25/11/2019

Table of Contents

1. Introduction

1.1 Project Background

Tomewin Wildlife Consultancy (TWC) was commissioned by Golding Contractors on behalf of Mirvac Property Group ('the Proponent') to produce a pre-clearing fauna management report in accordance with the 'Queensland Code of Practice for the Welfare of Wild Animals Affected by Land-Clearing and Other Habitat Impacts and Wildlife Spotter / Catchers (Draft), prepared by Hanger, J. and Nottidge, B. 2009' ('the Code') for proposed clearing works associated with Everleigh(proposed school site). This report also encompasses the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland *Nature Conservation Act 1992* (NCA) and 'Fauna Management Plan for Everleigh (proposed School Site)– 432-520 Greenbank Road, Greenbank,(Issue A), prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd..

The objective of this report is to summarize the existing fauna values present and detail mitigation and management strategies applicable to fauna species likely to be during pre-clearing works areas or within specific habitat areas to be retained within the site. Targeted searches for EPBC Act and NCA listed species including, Koala and Grey-headed Flying-fox, were made.

1.2 Site Location and Description

The site specific including proposed clearing zone and retained areas is located to the east of Teviot Road within the Greenbank locality with the specific project being tree clearance and dam de-watering for residential estate construction. The site is prior rural land-use area of minor slope containing wattle/Eucalypt re-growth and larger early mature to mature eucalypts, located adjacent to recent residential development with assessment of fauna value detailed below.

Figure 1 – Extent of Phase 2 Clearing

1.3 Permits and licences

TWC is a specialist Fauna spotter-catcher consultancy approved under a QLD Rehabilitation Permit(unrestricted species / schedules) no: **WA0014500** valid from 18.2.1019 to 17.2.2022.

Tomewin Wildlife Consultancy has a staff of three with two spotter-catchers having a minimum of ten years' experience. All staff has undergone extensive in-house training of core skills including development process awareness, clearing process awareness wildlife identification and handling. Additional completed training courses are listed below. Tomewin Wildlife Consultancy has had lengthy experience on a range of large scale projects particularly addressing of Koalas and arboreal fauna associated with habitat trees.

Project experience has involved both long distance narrow easement and broad hectare clearing of green field development sites. Recent works includes responsibility for fauna management in the Moreton Bay Rail project and in large scale clearing of areas within the Coomera area.

Qualifications and experience required to complete the task	Personnel, Duties and Responsibilities (Supervisory staff and others)
Rehabilitation permit, Registered with D.E.H	Frank Court
General safety induction card	Frank Court, Brendan Lackey, Adam Baker, Evan Court
Clearing processes awareness – internal training	Frank Court, Brendan Lackey, Adam Baker, Evan Court
Development processes awareness– internal training	Frank Court, Brendan Lackey, Adam Baker, Evan Court
Prior experience in Australian fauna – 4 years minimum	Frank Court, Brendan Lackey, Adam baker, Evan Court
Prior experience in clearing processes– 4 years minimum	Adam baker Frank Court, Brendan Lackey,
Chainsaw operation ticket	Frank Court, Brendan Lackey , Adam Baker, Evan Court
Fell small trees	Frank Court, Evan Court
EWP operators ticket	Frank Court
Working safely at heights ticket	Frank Court, Brendan Lackey, Adam baker, Evan Court
Certificate 3 in Arboriculture	Evan Court
Electrical Awareness	Frank Court, Brendan Lackey,
Operate a 4wd vehicle in the field	Frank Court, Brendan Lackey
Canoe & water safety > 2 Meters	Frank Court, Brendan Lackey, Evan Court
Lyssa Virus vaccination	Frank Court,
Safe venomous course snake Handling	Frank Court,

2. Mitigation and Management Measures

2.1 Fauna Spotter

A Department of Environment and Science (DES) accredited Fauna Spotter Catcher must be present during all vegetation clearing activities. Inspection of fauna habitats and features identified during the pre-clearance survey must be inspected by the Fauna Spotter Catcher prior to clearing

2.2 Fauna Fencing

Temporary fencing has already been installed around the perimeter of the project and will aid in minimizing the movement of large fauna including highly mobile macropods onto roads and into adjacent estates.

2.3 Felling procedures

The following actions will effectively reduce potential fauna mortality due to removal of vegetation and construction techniques as part of the proposed development.

- It is intended that, in regard to the clearing process and associated staff, the spotter-catcher shall confirm that the tree felling operation shall occur in a manner set out below that allows safe dispersal or capture of fauna, O.H.S. issues notwithstanding.

- One Fauna spotter-catcher per clearing machine will be required for all clearing; tree-felling, raking/staking and shearing processes.

- All static fauna valued ground features and trees will be clearly identified with high visibility tape or marker spray paint.

- The clearing of the under-story prior to felling of canopy trees, will occur after a final inspection to confirm absence of current or anticipated fauna activity. Removal of canopy trees prior to addressing static fauna values reduces the potential of secondary injury to arboreal fauna dispersing into trees to be removed.

- Hollow-bearing trees will be excluded from clearing processes for a period of 24 hours to allow for fauna to disperse due to disturbance and provide for greater observation opportunities to locate potential fauna shelter

- Addressing of static fauna values, specifically the hollow-bearing trees or termite mounds where wildlife may occur. Techniques applicable to this stage of spotter-catcher duties vary due to the site specifics regarding topography, structure and stature of trees and OHS limitations.

- Habitat trees with potential to provide shelter for arboreal fauna will require sympathetic direction and de-accelerated felling technique to be applied successfully to reduce ground impact.

- Hollow-bearing trees will be accessed and examined with torch, chainsaw, buffer rags with all fauna located during spotter-catcher duties to be assessed for injury, maturity prior to being placed in a cotton capture bag.

- Hollow-bearing trees will be excluded from processing for a period of 24 hrs to allow natural dispersal of small fauna unlikely to be located.

- Where required, WHS limitations notwithstanding, the usage of an certificate 3 in arboriculture tree climber or elevated working platform will occur to access Hollow-bearing trees with significant species or numbers of breeding birds prior to clearing and further processing.

- Captured fauna will be held in suitable ambient conditions prior to release within normal activity times for the animal concerned. All fauna captured will be released in adjacent bushland, containing suitable habitat, outside the clearing zone and within 500 m of the proposed clearing zone.

Figure 2 – Location of captured fauna release

2.4 Terrestrial and Arboreal Fauna

Overall the site contains low value refugial opportunities for arboreal and terrestrial fauna species due to prior land-use impacts on habitat values. The species expected within the site are likely to primarily reflect common fauna assemblages for the region however provisions are proposed directly for common fauna and species of conservation significance. It is advised that all identified fauna habitats onsite be inspected by a Department of Environment and Science (DES) approved Fauna Spotter prior to vegetation clearing and all vegetation removal activities be supervised during the

clearing process. Terrestrial load reduction activities will be conducted ahead of the clearing front where possible. Fauna captured will be relocated to adjacent habitat consistent with the life history requirements of the species requiring translocation.

- Terrestrial trapping, prior to and within a proposed daily clearing area using Elliot A traps and cage traps, will occur. Located fauna will be retained in cotton capture bags prior to release.

- There will be specific ground searches for terrestrial fauna prior to clearing and observation of the clearing process and if located temporary shelter areas to be allocated to minimise stress and provide dispersal options will occur.

- There will be observation of the clearing process for dispersing Kangaroos and Wallabies potentially on site and where required temporary shelter areas to be allocated to minimise stress will occur.

- Where possible, hollow branches containing sugar glider colonies will be removed intact, to be placed in retained trees outside and adjacent to the proposed clearing zone.

- Hollow-bearing trees and trees where fauna dispersal has been noted will be excluded from processing for a period of 24 hrs to allow natural dispersal of fauna and minimise potential fauna impacts.
- Where required, WHS limitations notwithstanding, the usage of an elevated working platform will occur to access Hollow-bearing trees with significant species or numbers of breeding birds prior to clearing and further processing.

- Where possible, hollow branches containing squirrel glider colonies will be removed intact, to be placed in retained trees outside and adjacent to the proposed clearing zone.

2.5 Threatened Species (Specific Provisions)

The potential presence of significant fauna; that is fauna scheduled as Endangered, Vulnerable, Near threatened (EVNT) in the *Queensland Nature Conservation Act 1992* or listed as threatened species under the *Commonwealth Environmental Protection & Biodiversity Act 1999* not listed in this report will be considered by the wildlife spotter-catcher during clearing processes. If and where an EVNT species is located onsite an immediate cessation of clearing process and an exclusion zone defined by high visibility tape will occur. Relevant authorities, the designated environmental management consultants and DES Wildlife Officer will be notified to confirm issues and where required arrange a site inspection prior to commencement of clearing process.

2.5.1 Koala

Due the high component of Koala feed species present, in accordance with the *Nature Conservation (Koala)) Conservation Plan 2017*, the below actions will be directed to allow Koala dispersal without human intervention.

- A Koala spotter will be required to conduct pre-clearing inspection of trees and scat-checks of cleared understory areas to confirm the location of koalas prior to felling. The Koala spotter will confirm the position located Koalas and perform designated health checks and as part of daily duties.

- It is intended that the direction of the clearing process will occur in accordance with the approved Saunders Havill *Vegetation Management Plan, Proposed School Development, prepared by Saunders Havill Group, (September 2019)*
- . It is the intention of the FSC to direct the clearing process from the edge of the existing pasture / treeline vegetation systems to the nearest edge of suitable retained habitat to encourage Koala dispersal out of clearing zones and avoid land-locking of Koalas within the clearing zone.

- Within areas of forest structure, it is intended that a maximum clearing rate of three hectares per day will occur.

- During the clearing process, there will a differentiation between *complete cover trees* and *See-through trees* where *Complete cover trees* will be retained until the spotter-catcher responsible is certain of absence of Koalas prior to the tree being felled.
  A *Complete cover tree* is defined as a tree with luxuriant foliage that does not allow confirmation of absence of Koalas without a full 360 degree viewing and if required extended viewing during peripheral clearing operations to detect movement.
  A *See-through tree* is defined as sparsely foliated tree where a 360 degree viewing confirms the absence of Koalas.

- Where located, Koalas in trees will be clearly identified by high visibility tape or paint and site foreman and clearing crew will be informed to confirm presence of animal in clearing area.
- The Environmental Coordinator will be informed via phone call and email within 1 hour of the following:
    - Sighting of a Koala within the Clearing Area
    - Sighting of a koala which appears sick or injured
    - Incidences resulting in a koala being in imminent danger
    - Incidences resulting in koala injury *or fatality*
    - *The lawful capture of a koala*

- When located, Clearing Exclusion and Dispersal zones around the active Koala tree will be set out where no activity can occur for the day's duration to confirm animal safety and allow dispersal.

- Exclusion zones from current clearing processes will be set at two tree heights distance including proximal under-story vegetation from the located Koala. All felling of trees will directed 180 degrees away from the located Koala to minimise noise disturbance in the peripheral area.

- Dispersal zones in addition to Exclusion zones will be set where late observation location of koalas may isolate them from the retained habitat zone. A sequence of trees 10m to 20m apart will be retained for an interim period to provide voluntary dispersal options. Where preliminary clearing of under-story vegetation has occurred and causes potential terrestrial impediment to dispersal, raking processes to assist egress under FSC supervision will occur

- Koala response to peripheral human activity will be monitored by Koala spotter-catcher to confirm acceptable disturbance and if required, cessation of clearing process. A four point monitoring protocol utilized for Koalas within the clearing zone is as follows.

  0 - Koala sleeping in perch; normal behaviour
  1 - Koala awake, alert, resting position in perch – acceptable disturbance
  2 - Koala awake, alert to shifting position in same perch – acceptable disturbance
  3 - Koala moving perch position within tree - unacceptable disturbance, increased exclusion zone
  4 – Koala exhibiting panicked behaviour, vocalizations - unacceptable disturbance, immediate cessation of clearing process within general area of Koala.

Where observations of Koala by senior FSC / permit holder indicates poor health or injury the designated environmental authority and the Environmental Coordinator will be notified to confirm issues and where required seek approval to capture/relocate the Koala to suitable veterinary care designated below.

2.5.2 Grey Headed Flying Fox

There is a potential that Grey headed flying fox may utilize the site feed values as part of it movements including temporary roosting.

- Specific searches for flying fox colonies that may have moved into the area will occur on a daily basis within the designated clearing zone.

- When located, Clearing Exclusion and Dispersal zones around the active flying fox roost tree will be set out where no activity can occur for the day's duration to confirm animal safety and allow dispersal.

3. Wildlife Capture and Removal plan

Relocation of native fauna is a strategy that may be required during the course of developmental works to up-hold the project's required nature conservation, animal

welfare and human safety objectives. In all circumstance where native fauna are required to be relocated it must be done so, or under the direct supervision of, a suitably licensed fauna spotter/catcher.

Suitable release sites for fauna take into account a number of considerations, depending on the ecology of the animal. These considerations include:

- Adequate food supply and presence of prey species;
- Adequate housing and nesting habitat such as tree hollows, dense vegetation, suitable areas to burrow;
- Similar vegetation type, eg. Similar tree species, density, and location to water;
- Appropriate social group, eg. Releasing all gliders from one family group into the same area;
- Releasing territorial animals as close as practical to their home range (within 1km or less), but far enough away that they won't re-disperse to the clearing zone;
- Habitat corridors that are of suitable size, and connect to other suitable habitat for further dispersal to avoid overpopulation of the release site., and;
- Time of day: Nocturnal release for nocturnally active animals .Additionally, if aquatic animals are required to be captured in the event of a dewatering, potential release locations will consider the following factors:
- Recent rainfall and observed flow velocity of waterways or river;
- Composition of riparian vegetation (with preference for presence of native flora species and dense/overhanging vegetation);
- Diversity of habitats available (i.e. riffles/pools);
- Presence of invasive species (i.e. Carp or Gambusia);
- Potential availability of food resources (i.e. for Turtles); and
- Evidence of overpopulation of relevant species.

4. Wildlife Contingency Plan

In the event sick, injured or orphaned protected animals are encountered during the course of the project they shall be administered to in accordance with the *Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland* under the *Nature Conservation Act 1992*. The stages in which injuries or illness are described under the code are as follows:

- **Critical:** Injuries or illnesses that are life-threatening; for example, an animal that has been struck by a car and has serious head injuries.
- **Serious:** Injuries or illnesses that might reasonably be expected to cause moderate pain (but are not immediately life-threatening), and the animal is not showing obvious signs of distress or pain, or significantly reduced mental activity; for example an animal with a closed fracture but no other apparent injuries and that is alert and responsive.
- **Mild:** The injuries or illness of an animal appear to cause little discomfort, pain or function loss and are not life-threatening (even without immediate vet

treatment); for example superficial cuts, superficial bruising or orphaned animals suffering from mild dehydration.

Designated veterinarian care will be

- The Blooming Vet, 15 Pub Lane, Greenbank QLD 4124 Ph: 0732976666
- RSPCA Wildlife Hospital, Wacol Ph 1300264625

5. Wildlife Housing and Care Plan

For wildlife requiring storage, temporary housing and transportation to release sites and/or to a wildlife carer or veterinarian, guidelines set out in the Code and TWC's Animal Ethics Permit will be followed. Dependent on the species of animal and condition of the animal, temporary storage and housing of animals will be as follows:

- **Calico bags**: Calico bags will be used to temporarily house fauna such as snakes, lizards and small mammals (including microbats), Bags will range in size from 200mm x 200mm to 600mm x 1800mm. Bag selection will vary according to the size of animals to be placed in them. In the case of snakes a "hoop bag" may be used to facilitate capture. The hoop is approximately 500mm in diameter attached to a handle. The bag is placed around the hoop ensuring a greater area in which to pass the snake through into the bag
- **Plastic holding tubs/containers/animal crate**: Plastic holding tubs/containers/crates will be used to temporarily house fauna such as snakes, lizards, frogs, small mammals and birds (Plastic holding tubs/containers/crates will range in size from 150mm x 150mm x 120mm to 500mmx 400mm x 400mm. Plastic holding tubs/containers/crates selection will vary according to the size and number of animals to be placed in them. In addition to this, material is used to line the tub/crate to ensure the animals won't lose its footing. This may include folded towels on the bottom of the crate or a fitted pad. These items are washed between each use to reduce the spread of disease/parasites.

Section 9 of the Code relates to how transportation of wildlife should be undertaken. The following will be adhered to when transporting wildlife to the vet and/or carer:

- Additional pain or distress of the animal is to be avoided;
- Wildlife should only be transported when necessary;
- Transport containers must be appropriate for the species (size, strength and behaviour of species being moved;
- Transport containers must be designed and maintained in a way as to:
    - Prevent injury;
    - Prevent escape;
    - Prevent rolling/tipping during transit;
    - Prevent damage to plumage (feathers);
    - Be hygienic;
    - Minimise stress and

  - Be suitably ventilated.
- Non-compatible species must not be transported in a manner which allows for visual or physical contact;
- Containers must be secured to prevent movement and provide protection from direct sunlight, wind and rain;
- Venomous, dangerous or potentially disease transmitting animals must be clearly marked with warning labels (i.e. Caution –'venomous snake' or 'live bat') and be locked and secured.

6. Willdlife Release and disposal plan

All vertebrate fauna species encountered (relocated, moved, injured or killed) during the preclearing, construction and operational works will be recorded and a summary of events will be presented to the client within the post clearing report.

The fauna spotter catcher will collect information pertaining to each capture, sighting and release
of all animals interacted with onsite including:

a. species;
b. identification name or number;
c. sex (M, F, or unknown);
d. approximate age or age class (neonate, juvenile, sub-adult, adult);
e. time and date of capture;
f. method of capture;
g. exact point of capture (GPS point);
h. state of health;
i. incidents associated with capture likely to affect the animal;
j. veterinary intervention or treatments;
k. time held in captivity;
l. disposal (euthanasia, re-release, translocation etc);
m. date and time of disposal;
n. details of disposal (if released, exact point of release GPS);
o. for released animals: distance in metres from point of capture to point of release.

7. Post Works Impact Minimisation

Where fauna is found on site during the absence of the fauna spotter (i.e., on days or in areas where no fauna spotter catcher is required), the following will occur:

- Cease works at the location of the animal;

- Report the animal immediately to the site foreman and environmental officer
- Contact the fauna spotter catcher
- Do not attempt to touch or catch an animal as it may be dangerous;
- Maintain site and known area of animal;
- If required, set up an exclusion zone around the animal;
- Once the TWC fauna spotter catcher arrives, take them to the animal.
- The fauna spotter catcher will follow the procedures outlined above.

8. Recommendations

Where fauna is found on site during the absence of the fauna spotter (i.e., on days or in areas where no fauna spotter catcher is required), the following will occur:

- Cease works at the location of the animal;
- Report the animal immediately to the site foreman and environmental officer
- Contact the fauna spotter catcher
- Do not attempt to touch or catch an animal as it may be dangerous;
- Maintain site and known area of animal;
- If required, set up an exclusion zone around the animal;
- Once the TWC fauna spotter catcher arrives, take them to the animal.
- The fauna spotter catcher will follow the procedures outlined above.

EROSION RISK RATING

BASED ON AVERAGE MONTHLY RAINFALL (SOURCE TABLE 4.4.2 IECA 2008)

MONTHLY DATA	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.
MEAN RAINFALL	101.00	79.50	130.90	535.50	33.50	67.80	19.80	24.50	23.40	35.80	109.10	75.500
EROSION RISK	HIGH	MODERATE	HIGH	MODERATE	LOW	MODERATE	VERY LOW	VERY LOW	VERY LOW	LOW	HIGH	MODERATE

	VERY LOW RISK: 0 TO 30mm
	LOW RISK: 30+ TO 45mm
	MODERATE RISK: 45+ TO 100mm
	HIGH RISK: 100+ TO 225mm
	EXTREME RISK: >225mm

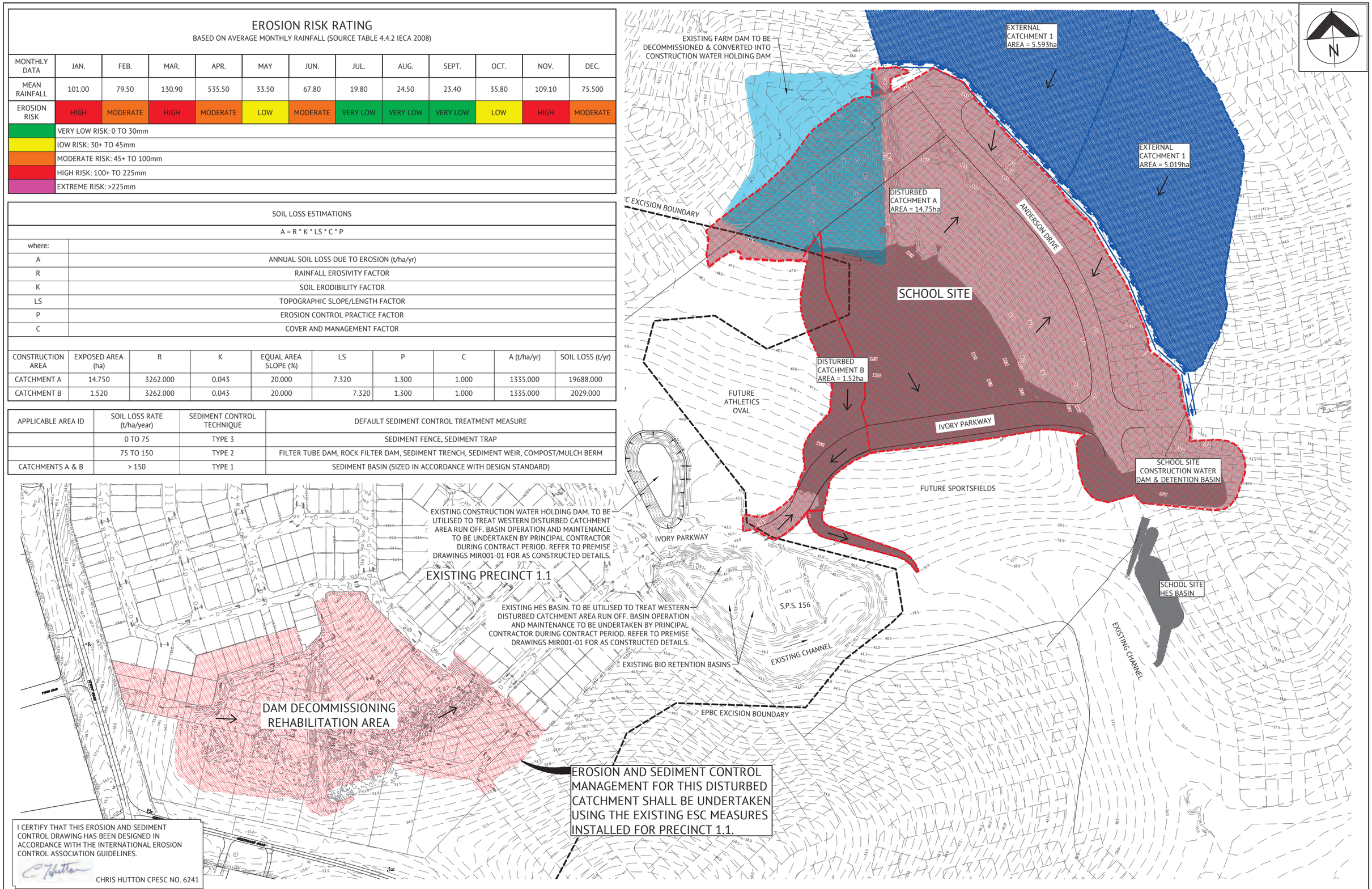
SOIL LOSS ESTIMATIONS

A = R * K * LS * C * P

where:	
A	ANNUAL SOIL LOSS DUE TO EROSION (t/ha/yr)
R	RAINFALL EROSIVITY FACTOR
K	SOIL ERODIBILITY FACTOR
LS	TOPOGRAPHIC SLOPE/LENGTH FACTOR
P	EROSION CONTROL PRACTICE FACTOR
C	COVER AND MANAGEMENT FACTOR

CONSTRUCTION AREA	EXPOSED AREA (ha)	R	K	EQUAL AREA SLOPE (%)	LS	P	C	A (t/ha/yr)	SOIL LOSS (t/yr)
CATCHMENT A	14.750	3262.000	0.043	20.000	7.320	1.300	1.000	1335.000	19688.000
CATCHMENT B	1.520	3262.000	0.043	20.000	7.320	1.300	1.000	1335.000	2029.000

APPLICABLE AREA ID	SOIL LOSS RATE (t/ha/year)	SEDIMENT CONTROL TECHNIQUE	DEFAULT SEDIMENT CONTROL TREATMENT MEASURE
	0 TO 75	TYPE 3	SEDIMENT FENCE, SEDIMENT TRAP
	75 TO 150	TYPE 2	FILTER TUBE DAM, ROCK FILTER DAM, SEDIMENT TRENCH, SEDIMENT WEIR, COMPOST/MULCH BERM
CATCHMENTS A & B	> 150	TYPE 1	SEDIMENT BASIN (SIZED IN ACCORDANCE WITH DESIGN STANDARD)



I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

FOR CONSTRUCTION

DATE	REV	DESCRIPTION	RPEQ
18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	

REVISIONS

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CHECKED JOSHUA STONE
PROJECT COORDINATOR CLINT THORP
PROJECT CERTIFIER DATE
JOSHUA STONE

RPEQ JOSHUA STONE RPEQ 15187

SCALE 0 40 80 120m
SCALE 1:2000 (A1)

CLIENT MIRVAC
PROJECT EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION TEVIOT ROAD, GREENBANK
SHEET TITLE OVERALL EROSION & SEDIMENT CONTROL KEY PLAN

JOB CODE MIR016
SHEET NUMBER C400
REV A

LEGEND - PROPOSED

- DISTURBED AREA
- CLEAN WATER DIVERSION BUND
- DIRTY WATER DIVERSION DRAIN *
- MULCH BUND
- FLOW DIRECTION ARROW

LEGEND - EXISTING

- 12.0 MAJOR CONTOURS (1.00m)
- MINOR CONTOURS (0.50m)
- CLEAN WATER DIVERSION DRAIN
- DIRTY WATER DIVERSION DRAIN

***** DIRTY WATER DIVERSION DRAIN NOTE:

LOCATION SHOWN ON THIS DRAWING IS INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE CONTRACTOR FOR SUITABILITY. FINAL LOCATION TO BE APPROVED BY THE SUPERINTENDENT.

N

FUTURE PRECINCT

EXISTING DAM TO BE DECOMMISSIONED

EPBC EXCISION BOUNDARY

4; INSTALL MULCH BUND AT DOWNSTREAM OF EDGE OF EXISTING DAM

SCHOOL SITE

INSTALL CLEAN WATER DIVERSION PRIOR TO CLEAR AND GRUB PHASE

DWD - 1

CWD - 1

CWD - 2

START POINT OF CLEAN WATER DIVERSION DRAIN 2 (CWD - 2)

FUTURE PRECINCT

I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

JOINS DRAWING C402

FOR CONSTRUCTION

DATE	REV	DESCRIPTION	RPEQ
18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	

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PROJECT CERTIFIER	DATE
RPEQ	JOSHUA STONE RPEQ 15187
SCALE	0 30 60 90m
	SCALE 1:1500 (A1)

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL - CLEAR AND GRUB PHASE - SHEET 1

JOB CODE	
MIR016	
SHEET NUMBER	REV
C401	A

JOINS DRAWING C401

N

FUTURE ATHLETICS OVAL

SCHOOL SITE

DWD - 1

DWD - 2

CWD - 2

FUTURE PRECINCT

FUTURE SPORTS FIELDS

CONSTRUCTION WATER HOLDING DAM / DETENTION BASIN

INSTALL MULCH BUND AT DOWNSTREAM OF CLEAR AND GRUB AREA

INSTALL CLEAN WATER DIVERSION BUND UPSTREAM OF WORKS AREA

EPBC EXCISION BOUNDARY

FORM 'U' SHAPED BUND AT DOWNSTREAM END OF CLEARING WORKS.

HIGH FLOW BYPASS CHANNEL FROM DETENTION BASIN SPILLWAY

OUTLET TO HES BASIN

EXISTING CHANNEL

HES BASIN
FOR DETAILS, REFER TO DWGS C408-C411

FUTURE PRECINCT

FUTURE PRECINCT

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JOSHUA STONE

RPEQ

JOSHUA STONE RPEQ 15187

SCALE

0 30 60 90m

SCALE 1:1500 (A1)

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL - CLEAR AND GRUB PHASE - SHEET 2

JOB CODE	
MIR016	
SHEET NUMBER	REV
C402	A

LEGEND - PROPOSED

- FLOW DIRECTION OR RUNOFF
- CLEAN WATER DIVERSION BUND
- DIRTY WATER DIVERSION DRAIN
- MULCH BUND
- EXTENT OF CUT
- EXTENT OF FILL
- 12.0 — FINISHED MAJOR CONTOURS (0.50m)
- FINISHED MINOR CONTOURS (0.25m)

LEGEND - EXISTING

- 12.0 — MAJOR CONTOURS (1.00m)
- MINOR CONTOURS (0.50m)
- CLEAN WATER DIVERSION DRAIN
- DIRTY WATER DIVERSION DRAIN

N

INSTALL MULCH BUND AT TOE OF BATTER

FUTURE PRECINCT

EPBC EXCISION BOUNDARY

SCHOOL SITE

ANDERSON DRIVE

RUNOFF TO FLOW DOWN ROAD BOX TO CONSTRUCTION WATER DAM DURING BULK EARTHWORKS PHASE

CONSTRUCT 0.5m HIGH GEOFABRIC LINED BUND ALONG SCHOOL FRONTAGE TO DIRECT SCHOOL SITE FLOWS TO CONSTRUCTED STORMWATER PIT

ONCE FINAL LEVELS ARE ACHIEVED, SPRAY CHANNEL WITH HEAVY DUTY POLYMER SPRAY AND INSTALL ROCK CHECKS AT 20m CRS

I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

JOINS DRAWING C404

FOR CONSTRUCTION

DATE	REV	DESCRIPTION	
17/10/19	B	AMENDED CONTOURS	JCS
18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	JCS

REVISIONS

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PROJECT CERTIFIER	DATE 17/10/19

JOSHUA STONE

RPEQ JOSHUA STONE RPEQ 15187

SCALE 0 15 30 45m

SCALE 1:750(A1)

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL - BULK EARTHWORKS PHASE - SHEET 1

JOB CODE	
MIR016	
SHEET NUMBER	REV
C403	B

JOINS DRAWING C403

N

FUTURE ATHLETICS OVAL

SCHOOL SITE

ONCE FINAL LEVELS ARE ACHIEVED, SPRAY CHANNEL WITH HEAVY DUTY POLYMER SPRAY AND INSTALL ROCK CHECKS AT 20m CRS

CONSTRUCT 0.5m HIGH GEOFABRIC LINED BUND ALONG SCHOOL FRONTAGE TO DIRECT SCHOOL SITE FLOWS TO CONSTRUCTED STORMWATER PIT

STORMWATER INLET FOR FLOWS CAPTURED FROM THE SCHOOL SITE

CONSTRUCT CONTAINMENT BUND AT DOWNSTREAM END OF CHANNEL BUND LEVEL RL 43.2

IVORY PARKWAY

RUNOFF TO FLOW DOWN ROAD BOX TO CONSTRUCTION WATER DAM DURING BULK EARTHWORKS PHASE

FUTURE SPORTS FIELDS

ANDERSON DRIVE

ROAD 81

FUTURE PRECINCT

INSTALL MULCH BUND AT TOE OF BATTER

EXTEND CLEAN WATER DIVERSION AROUND CONSTRUCTION WATER DAM

CONSTRUCTION WATER HOLDING DAM / DETENTION BASIN

ONCE FINAL LEVELS ARE ACHIEVED, SPRAY CHANNEL WITH HEAVY DUTY POLYMER SPRAY AND INSTALL ROCK CHECKS AT 20m CRS

EPBC EXCISION BOUNDARY

EXISTING CHANNEL

HIGH FLOW BYPASS CHANNEL FROM DETENTION BASIN SPILLWAY

OUTLET TO HES BASIN

HES BASIN
FOR DETAILS, REFER TO DWGS C408-C411

FUTURE PRECINCT

FUTURE PRECINCT

I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

FOR CONSTRUCTION

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17/10/19	B	AMENDED CONTOURS	JCS
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PROJECT CERTIFIER	JOSHUA STONE	DATE 17/10/19

RPEQ JOSHUA STONE RPEQ 15187

SCALE 0 15 30 45m

SCALE 1:750(A1)

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL - BULK EARTHWORKS PHASE - SHEET 2

JOB CODE	
MIR016	
SHEET NUMBER	REV
C404	B

VEGETATION TO BE RETAINED

EPBC EXCISION BOUNDARY

NOMINATED BORROW AREA

SCHOOL SITE

ANDERSON DRIVE

VEGETATION TO BE RETAINED

VEGETATION TO BE RETAINED

EPBC EXCISION BOUNDARY

EXISTING CONSTRUCTION WATER HOLDING DAM

IVORY PARKWAY

ROAD 81

REFER ENGENY DRAWINGS FOR FINAL STABILISATION DETAILS FOR OUTLET CHANNEL AND DETENTION BASIN / CONSTRUCTION WATER HOLDING DAM.

VEGETATION TO BE RETAINED

CLEARED HAUL ROAD BACK EXTENDS TO EXISTING EPBC EXCISION BAOUNDARY

N

STABILISATION LEGEND

- 50mm THICK TOPSOIL AND GRASS SEEDING
- 100mm THICK TOPSOIL AND GRASS SEEDING AND STICK RAKING (TO FUT. ALLOTMENTS)
- 100mm THICK TOPSOIL AND GRASS SEEDING AND STICK RAKING (TO BATTERS)
- 100mm THICK TOPSOIL AND TURF
- NO TOPSOIL AND POLYMER SPRAY
- GEOFABRIC LINING (TO BATTERS)
- CLEARING AREA STABILISATION. CONTRACTOR TO ENSURE AREA IS ADEQUATELY STABILISED FOLLOWING DISTURBANCE INCLUDING FILLING OF ROOT BALL DEPRESSIONS TO ELIMINATE WATER PONDING.
- D — PROPOSED STORMWATER
- 12.0 — FINISHED CONTOURS (0.50m)

LEGEND - EXISTING

- 12.0 — CONTOURS (0.5m INTERVAL)

NOTES:

1. CONTRACTOR TO ENSURE THAT GRASS SEEDING AREAS TO ACHIEVE SUFFICIENT STRIKE AND COVERAGE IN ACCORDANCE WITH LOGAN CITY COUNCIL STANDARDS.

SOUTHERN DAM REHABILITATION AREA

INSET A

SCALE: 1:2500

0 50 100 150m

SCALE 1:2500 (A1)

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CHRIS HUTTON CPESC NO. 6241

FOR CONSTRUCTION

DATE	REV	DESCRIPTION	RPEQ
17/10/19	D	CLEARING AREA EXTENT INCREASED	JCS
20/08/19	C	BORROW AREA EXTENT INCREASED	JCS
05/08/19	B	AMENDED HATCH AREA	JCS
18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	JCS

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CHECKED	JOSHUA STONE
PROJECT COORDINATOR	CLINT THORP
PROJECT CERTIFIER	JOSHUA STONE
DATE	17/10/19

RPEQ JOSHUA STONE RPEQ 15187

SCALE 0 30 60 90m

SCALE 1:1500 (A1)

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL - STABILISATION PHASE

JOB CODE	
MIR016	
SHEET NUMBER	REV
C405	D

EROSION & SEDIMENT CONTROL NOTES

1. LOCATION & LEVELS OF ALL EXISTING SERVICES TO BE CONFIRMED ON SITE BY CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
2. REFER EARTHWORKS DRAWINGS FOR ADDITIONAL NOTES.
3. ALL TRENCHES, FOOTPATH EXCAVATIONS & STOCKPILES TO BE PROTECTED BY TEMPORARY SEDIMENT FENCES UNTIL 80% GRASS COVERAGE IS ACHIEVED TO DISTURBED AREAS.
4. EVERY PRECAUTION IS TO BE TAKEN TO PREVENT THE TRANSPORT OF SILT INTO THE NEWLY LAID STORMWATER PIPES THAT ARE CONNECTED TO THE DOWNSTREAM PIPE SYSTEMS, AND ANY EXISTING OPEN CHANNELS.
5. THESE NOTES SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
6. THE EROSION AND SEDIMENT CONTROL WORKS SHALL COMPLY WITH THE REQUIREMENTS OF THE LOCAL AUTHORITIES EROSION AND SEDIMENT CONTROL STANDARDS.
7. THE CONTRACTOR SHALL TAKE ALL REASONABLE AND PRACTICABLE MEASURES TO:

- ALLOW STORMWATER TO PASS THROUGH THE SITE IN A CONTROLLED MANNER AND AT NON EROSIVE FLOW VELOCITIES;
- MINIMISE SOIL EROSION FROM WATER AND WIND;
- MINIMISE ADVERSE EFFECTS OF SEDIMENT RUN-OFF;
- MINIMISE OR PREVENT ENVIRONMENTAL HARM ASSOCIATED WITH DISCHARGES FROM THE SITE (E.G. THE EFFECTS OF SEDIMENTATION ON THE ENVIRONMENTAL VALUES OF RECEIVING WATERS); AND
- ENSURE THAT THE VALUE AND USE OF RESIDENTIAL PROPERTIES ADJACENT TO THE DEVELOPMENT (SUCH AS DRAINAGE AND ROADS) ARE NOT DIMINISHED AS A RESULT OF THE MIGRATION OF SEDIMENT FROM THE DEVELOPMENT.

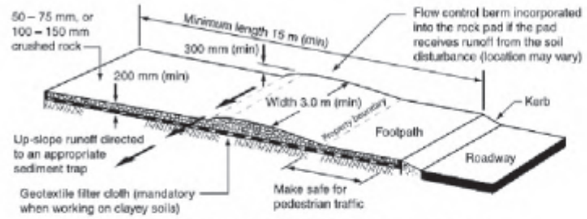
4. THE CONTRACTOR SHALL APPOINT AN APPROPRIATELY EXPERIENCED PERSON TO BE MADE RESPONSIBLE FOR IMPLEMENTATION OF THE ESC.
5. ALL ESC MEASURES SHALL BE INSPECTED:

- AT LEAST DAILY (WHEN WORK IS OCCURRING ON SITE).
- AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON SITE).
- WITHIN 24 HOURS OF EXPECTED RAINFALL.
- WITHIN 18 HOURS OF RAINFALL OCCURRING.

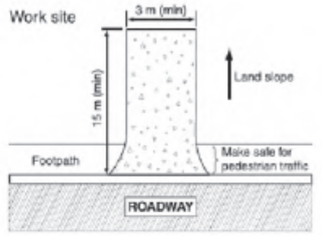
6. MAINTENANCE OF ESC MEASURES SHALL OCCUR TO ENSURE THEY ARE OPERATING EFFICIENTLY AND IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

ESC MEASURES	MAINTENANCE TRIGGER	TIME FRAME FOR UNDERTAKING MAINTENANCE
SEDIMENT BASINS	WHEN SETTLED SEDIMENT VOLUME EXCEEDS THE VOLUME OF THE SEDIMENT SETTLEMENT ZONE	WITHIN 4 DAYS OF INSPECTION
OTHER ESC MEASURES	WHEN SETTLED SEDIMENT VOLUME EXCEEDS 25% OF THE CAPACITY OF THE ESC MEASURE	BY THE END OF THE DAY

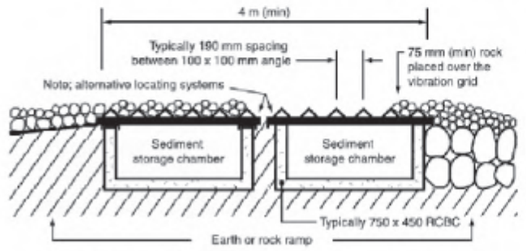
7. INSTALL DIVERSION CATCH DRAINS UPSTREAM OF, AND SILT FENCE DOWNSTREAM OF, STOCKPILES.
8. STOCKPILES ARE TO BE LOCATED AWAY FROM EROSION HAZARD AREAS SUCH AS DRAINAGE LINES AND STEEP SLOPES.
9. STOCKPILES ARE TO BE PROTECTED FROM EROSION BY THE WIND.
10. ADEQUATE SUPPLIES OF EMERGENCY MAINTENANCE MATERIALS, INCLUDING (BUT NOT LIMITED TO) TIE WIRE, STAKES, FILTER CLOTH, WIRE MESH AND CLEAN GRAVEL SHOULD BE AVAILABLE ON-SITE.
11. ESC MAINTENANCE ACTIVITIES ARE TO BE RECORDED IN AN ON-SITE REGISTER. THE REGISTER IS TO BE MAINTAINED FOR THE DURATION OF THE WORKS AND IS TO BE MADE AVAILABLE TO THE SUPERINTENDENT.
12. DISTURBED AREA ARE TO BE STABILISED AS SOON AS POSSIBLE ON COMPLETION OF BULK EARTHWORKS. LOTS TO BE STABILISED FOLLOWING RESPREADING OF TOPSOIL.
13. SUPPLEMENTARY ESC MEASURES SHALL BE DIRECTED BY THE SUPERINTENDENT.



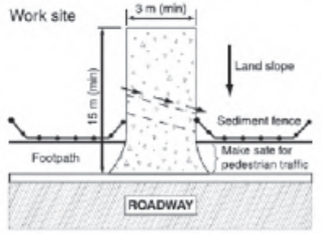
(a) Rock entry/exit pad for construction sites (refer to Standard Drawing Exit-03 for building sites)



(b) Rock pad sloping away from road



(c) Alternative low maintenance arrangement (still under development)



(d) Rock pad sloping towards the road

CONSTRUCTION ENTRANCE DETAIL

MATERIALS

COMPOSTS MUST COMPLY WITH THE REQUIREMENTS OF AS4454.

(i) WELL-DECOMPOSED 100% ORGANIC MATTER PRODUCED BY CONTROLLED AEROBIC (BIOLOGICAL) DECOMPOSITION.

(ii) MAXIMUM OF 1% OF INERT MATERIAL.

(iii) MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m, AND pH RANGE OF 5.0 TO 8.5.

(iv) MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND EXTENT. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, MATERIAL TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. WHEN SELECTING THE LOCATION OF A COMPOST FILTER BERM, TO THE MAXIMUM DEGREE PRACTICABLE, ENSURE THE BERM IS LOCATED:

(i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;

(ii) ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL);

(iii) AT LEAST 1m, IDEALLY 3m, FROM THE TOE OF A FILL EMBANKMENT;

(iv) AWAY FROM AREAS OF CONCENTRATED FLOW.

3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE BERM.

4. ENSURE THE BERM HAS BEEN PLACED ALONG THE CONTOUR SUCH THAT WATER WILL POND EVENLY ALONG THE LENGTH OF THE BERM.

5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOPE TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.

6. ENSURE 100% CONTACT WITH THE SOIL SURFACE.

7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT THE BERM AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR OR REPLACE ANY DAMAGED SECTIONS.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 100mm OR 1/3 THE HEIGHT OF THE BERM.

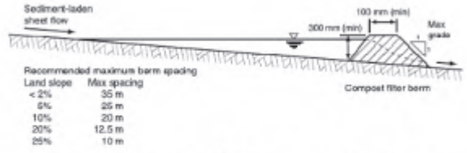
5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL (IF REQUIRED)

1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAYBE REMOVED.

2. REMOVE ANY COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.



Recommended maximum berm spacing

Land slope	Max spacing
< 2%	35 m
5%	25 m
10%	20 m
20%	12.5 m
25%	10 m

Figure 1 - Typical profile of a compost filter berm

CATCH DRAIN DETAILS

Drain ID	Drain Type	Slope	Lining	Base Width (m)	Top Width (m)	Depth Incl. freeboard (m)
CWD-1	Type B	1.0%	Geofabric	3	4.2	0.3
CWD-2	Type C	1.0%	Coir TMC7	3	5	0.5
DWD-1	Type C	1.0%	Coir TMC7	3	5	0.5
DWD-2	Type B	1.0%	Geofabric	2	3.2	0.3

NOTE:

COIR LOG CHECK DAMS TO BE INSTALLED AT 20m CRS

MULCH BUND DETAIL

I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

FOR CONSTRUCTION

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18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	JCS

REVISIONS

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CHECKED	JOSHUA STONE	JOSHUA STONE	RPEQ 15187
PROJECT COORDINATOR	CLINT THORP	SCALE	
PROJECT CERTIFIER	JOSHUA STONE	DATE	18/07/19

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL NOTES AND DETAILS - SHEET 1 OF 2

JOB CODE	
MIR016	
SHEET NUMBER	REV
C406	A

ROLES AND RESPONSIBILITIES

ROLE	RESPONSIBILITY
PROJECT MANAGER	• OVERALL RESPONSIBILITY OF ESC IMPLEMENTATION • NOTIFY THE ENVIRONMENTAL MANAGER IMMEDIATELY OF ANY NON-COMPLIANCE WITH ESCP • ENSURE THE PROMPT IMPLEMENTATION OF MEASURES TO MITIGATE EROSION AND SEDIMENT GENERATION
SITE SUPERVISOR / FOREMEN	• MONITOR DAILY RAINFALL • NOTIFY ENVIRONMENTAL ADVISOR/CONSULTANT WHEN RUNOFF GENERATING RAINFALL OCCURS IN THE PREVIOUS 24 HOURS • MAINTAIN CURRENT RECORDS OF RAINFALL, STORAGE VOLUMES, WATER QUALITY, TREATMENT PRACTICES, DISCHARGE VOLUMES (AS APPROPRIATE) • INSTALLATION AND MAINTENANCE OF ESC
ENVIRONMENTAL MANAGER	• PROVIDE DESIGN INFORMATION AS REQUIRED • CONDUCT IN-SITU MONITORING (AS REQUIRED) • COLLECT AND SUBMIT SAMPLES TO LABORATORY (AS REQUIRED) • COLLATE RESULTS AND PREPARE REPORTS (AS REQUIRED) • CONDUCT SITE INSPECTIONS AN AUDITS (AS REQUIRED) • INSPECT ESC INSTALLATION AND MAINTENANCE • INSPECT OFFSITE IMPACTS AND MANAGEMENT • PROVIDE ADVICE REGARDING ESC SITE IMPROVEMENT (AS REQUIRED)
ALL PERSONNEL	• REPORT ANY DAMAGE TO ESC DEVICES AND ANY POTENTIAL OR ACTUAL ENVIRONMENTAL HARM IN LINE WITH DUTY TO NOTIFY UNDER THE REQUIREMENTS OF THE ENVIRONMENTAL PROTECTION ACT 1994

CORRECTIVE AND PREVENTATIVE ACTION

AN ENVIRONMENTAL INCIDENT WITH RESPECT TO THE ESCP IS DEFINED AS ANY OCCURRENCE WHERE SEDIMENT IS RELEASED FROM THE SITE, WHETHER CONTROLLED OR UNCONTROLLED, OR WHERE STORM WATER IS RELEASED (CONTROLLED) FROM SITE WHICH DOES NOT MEET THE WATER QUALITY REQUIREMENTS.

ALL INCIDENTS AND NON-CONFORMANCES ARE TO BE REPORTED, INVESTIGATED AND CORRECTED IN ACCORDANCE WITH THE ESCP TO ENSURE EFFECTIVE SOIL AND WATER QUALITY MANAGEMENT PRACTICES AT ALL TIMES.

BEST PRACTICE SITE MANAGEMENT REQUIRES ALL ESC MEASURES TO BE INSPECTED BY THE CONTRACTORS NOMINATED REPRESENTATIVE AT LEAST DAILY WHEN RAIN IS OCCURRING, WITHIN 24 HOURS PRIOR TO EXPECTED RAINFALL, AND WITHIN 18 HOURS OF A RAINFALL EVENT OF SUFFICIENT INTENSITY AND DURATION TO CAUSE ONSITE RUNOFF (IECA, 2008). SUCH INSPECTIONS MUST CHECK:

- DAILY SITE INSPECTIONS (DURING PERIODS OF RUNOFF PRODUCING RAINFALL)
  - ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES
  - OCCURRENCES OF EXCESSIVE SEDIMENT DEPOSITION (WHETHER ON-SITE OR OFF-SITE)
  - ALL SITE DISCHARGE POINTS (INCLUDING DEWATERING ACTIVITIES AS APPROPRIATE)
- WEEKLY SITE INSPECTIONS (EVEN IF WORK IS NOT OCCURRING ON-SITE)
  - ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES
  - OCCURRENCES OF EXCESSIVE SEDIMENT DEPOSITION (WHETHER ON-SITE OR OFF-SITE)
  - OCCURRENCES OF CONSTRUCTION MATERIALS, LITTER OR SEDIMENT PLACED, DEPOSITED, WASHED OR BLOWN FROM THE SITE, INCLUDING DEPOSITION BY VEHICULAR MOVEMENTS.
  - LITTER AND WASTE RECEPTORS
  - OIL, FUEL AND CHEMICALS STORAGE FACILITIES
- PRIOR TO ANTICIPATED RUNOFF PRODUCING RAINFALL
  - ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES
  - ALL TEMPORARY FLOW DIVERSION AND DRAINAGE WORKS
- FOLLOWING RUNOFF PRODUCING RAINFALL
  - ALL DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES
  - OCCURRENCES OF EXCESSIVE SEDIMENT DEPOSITION (WHETHER ON-SITE OR OFF-SITE)
  - OCCURRENCES OF CONSTRUCTION MATERIALS, LITTER OR SEDIMENT PLACED, DEPOSITED, WASHED OR BLOWN FORM THE SITE, INCLUDING DEPOSITION BY VEHICULAR MOVEMENTS.

I CERTIFY THAT THIS EROSION AND SEDIMENT CONTROL DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH THE INTERNATIONAL EROSION CONTROL ASSOCIATION GUIDELINES.

CHRIS HUTTON CPESC NO. 6241

FOR CONSTRUCTION

DATE	REV	DESCRIPTION	RPEQ
18/07/19	A	SELF-CERTIFIED DRAWING ISSUE	JCS

REVISIONS

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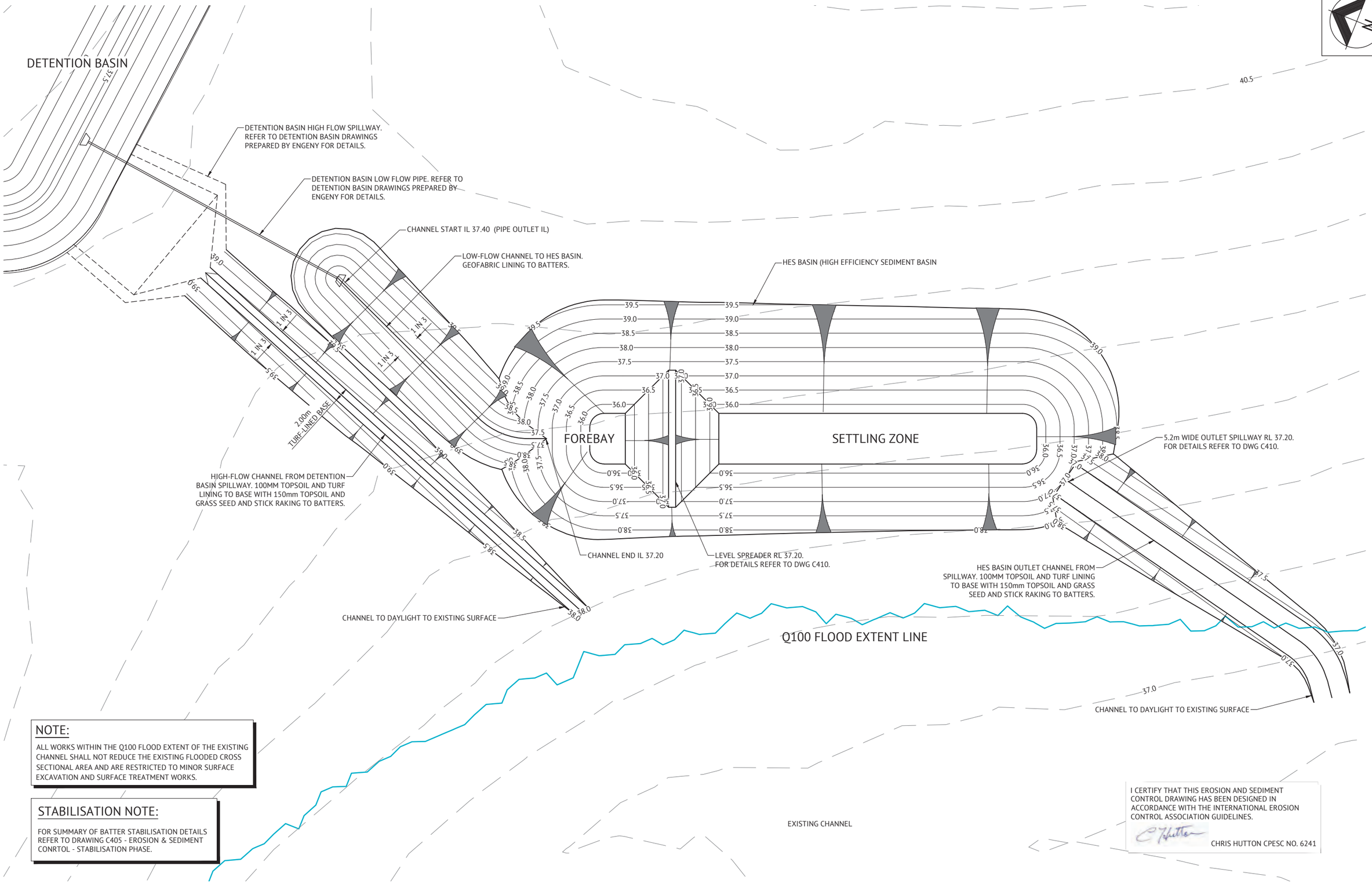
CHECKED	JOSHUA STONE	JOSHUA STONE	RPEQ 15187
PROJECT COORDINATOR	CLINT THORP	SCALE	
PROJECT CERTIFIER	DATE 18/07/19		
JOSHUA STONE			

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	EROSION & SEDIMENT CONTROL NOTES AND DETAILS - SHEET 2 OF 2

JOB CODE	
MIR016	
SHEET NUMBER	REV
C407	A



NOTE:

ALL WORKS WITHIN THE Q100 FLOOD EXTENT OF THE EXISTING CHANNEL SHALL NOT REDUCE THE EXISTING FLOODED CROSS SECTIONAL AREA AND ARE RESTRICTED TO MINOR SURFACE EXCAVATION AND SURFACE TREATMENT WORKS.

STABILISATION NOTE:

FOR SUMMARY OF BATTER STABILISATION DETAILS REFER TO DRAWING C405 - EROSION & SEDIMENT CONRTOL - STABILISATION PHASE.

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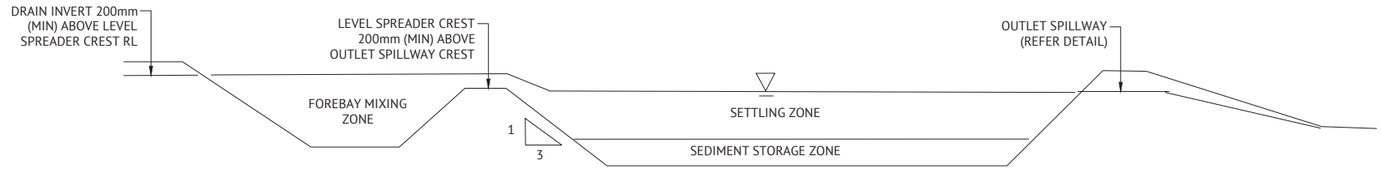
PROJECT CERTIFIER	JOSHUA STONE
DATE	18/07/19
RPEQ	JOSHUA STONE RPEQ 15187
SCALE	0 5 10 15m
	SCALE 1:250 (A1)

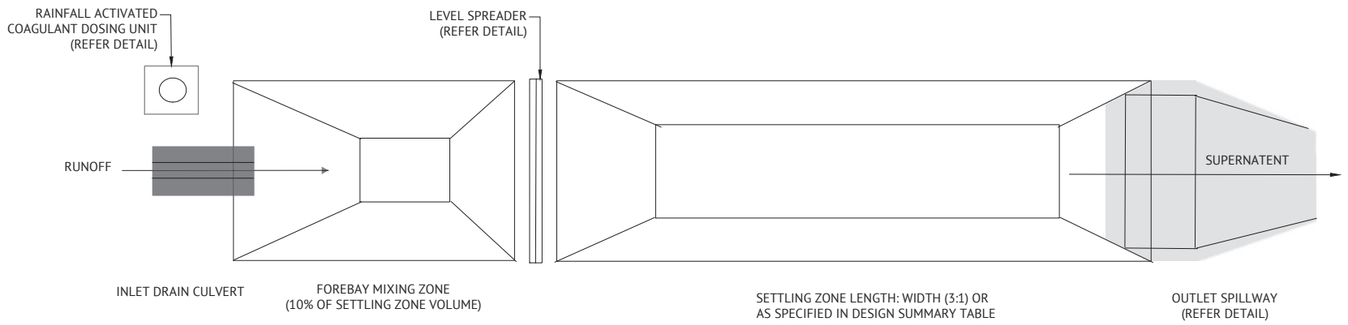
CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	HES BASIN LAYOUT PLAN

JOB CODE	
MIR016	
SHEET NUMBER	REV
C408	A



TYPE B SEDIMENT BASIN LONG SECTION

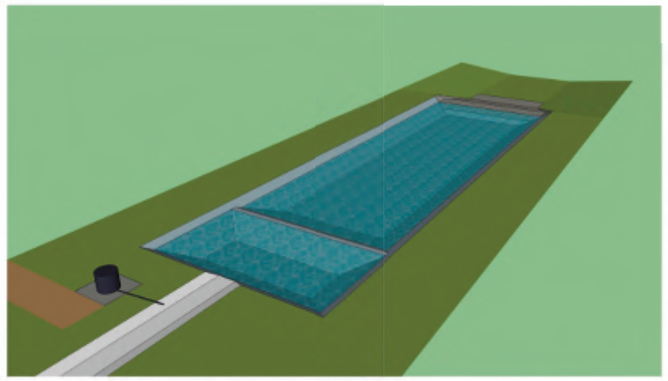
N.T.S.



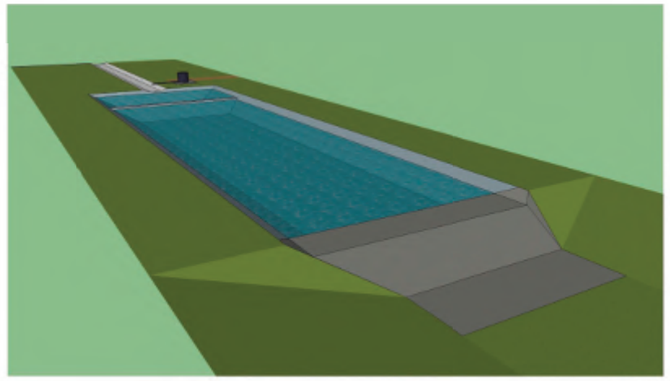
TYPE B SEDIMENT BASIN PLAN VIEW

N.T.S.

iFOD RAIN DOSING UNIT (CUSTOM BUILT)



BASIN PERSPECTIVE (LOOKING DOWNSTREAM)



BASIN PERSPECTIVE (LOOKING UPSTREAM)

HES BASIN DETAILS

BASIN ID	SETTLING ZONE (INCLUDING SEDIMENT STORAGE)				FOREBAY				HYDRAULIC CONTROLS			
	VOLUME	LENGTH	WIDTH	DEPTH	VOLUME	LENGTH	WIDTH	DEPTH	SPILLWAY CREST LENGTH	SPILLWAY CREST	EMBANKMENT	LEVEL SPREADER CREST
	(m^3)	(m)	(m)	(m)	(m^3)	(m)	(m)	(m)	(m)	RL	RL	RL
A	985.000	41.400	16.600	1.720	117.990	4.100	16.600	1.720	5.200	37.000	37.750	37.200

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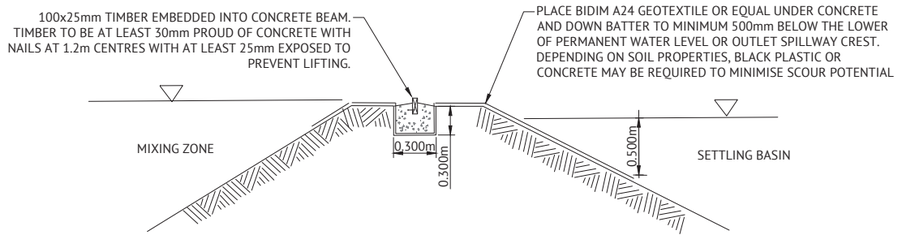
PROJECT COORDINATOR	CLINT THORP	SCALE	
PROJECT CERTIFIER	JOSHUA STONE	DATE	18/07/19

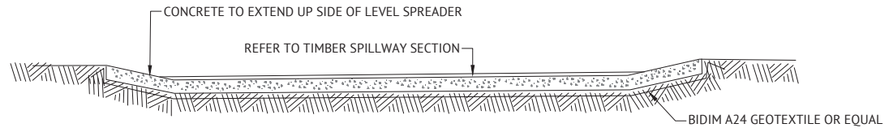
CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	HES BASIN NOTES AND DETAILS - SHEET 1 OF 3

JOB CODE	
MIR016	
SHEET NUMBER	REV
C409	A



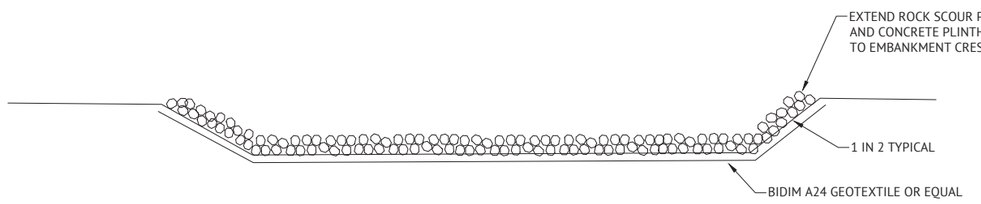
LEVEL SPREADER DETAILS - TYPICAL CROSS SECTION

N.T.S.



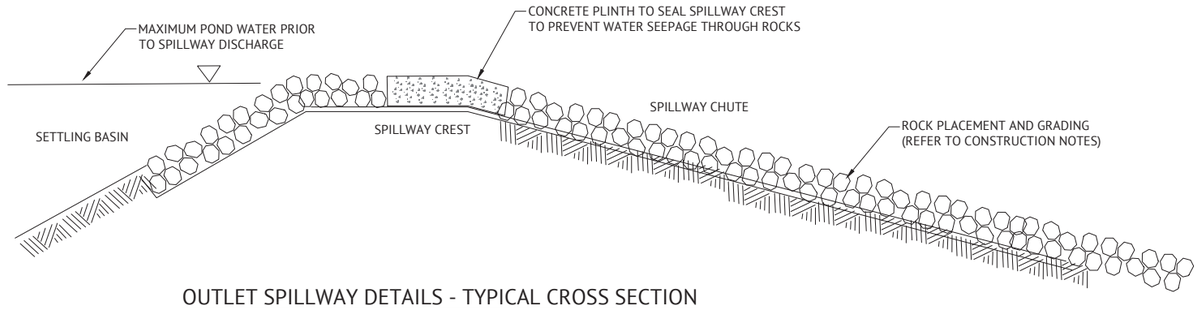
LEVEL SPREADER DETAILS - TYPICAL LONG SECTION

N.T.S.



OUTLET SPILLWAY DETAILS - TYPICAL LONG SECTION

N.T.S.



OUTLET SPILLWAY DETAILS - TYPICAL CROSS SECTION

N.T.S

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PROJECT CERTIFIER	DATE 18/07/19

JOSHUA STONE

RPEQ JOSHUA STONE RPEQ 15187

SCALE

CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	HES BASIN NOTES AND DETAILS - SHEET 2 OF 3

JOB CODE	
MIR016	
SHEET NUMBER	REV
C410	A

NOTES

AUTO DOSER

1. PROVIDED AS EITHER FLOC BOX OR iFOD-RAIN TO MANUFACTURES SPECIFICATION.
2. DOSER AND SUPPLY OF FLOCCULANT TO BE PROVIDED ON LEVEL PAD 4m x 4m WITHIN 10m OF DOSING POINT.
3. ALL-WEATHER ACCESS TRACK TO BE PROVIDED TO DOSER.
4. FLOCCULANT PROVIDED AS TURBICLEAR (ahc). IF ALTERNATIVE FLOCCULANT USED THEN THE BASIN SIZE IS TO BE INCREASED ACCORDING TO JAR SETTLEMENT TEST (REFER TO TABLE BELOW).

JAR SETTLEMENT AFTER 15 MINUTES	MULTIPLICATION FACTOR TO SETTLING ZONE
(mm)	VOLUME
50	x3
75	x2
100	x1.5
150	x1

BASIN CONSTRUCTION

MATERIALS

1. EARTH FILL: CLEAN SOIL WITH EMERSON CLASS 2(1), 3, 4 OR 5 AND FREE OF ROOTS, WOODY VEGETATION, ROCKS AND OTHER UNSUITABLE MATERIAL. SOIL WITH EMERSION CLASS 4 AND 5 MAY NOT BE SUITABLE DEPENDING ON PARTICLE SIZE DISTRIBUTION AND DEGREE OF DISPERSION.
   1.1. CLASS 2(1) SHOULD ONLY BE USED UPON RECOMMENDATION FROM GEOTECHNICAL SPECIALIST.
2. SPILLWAY ROCK: HARD, ANGULAR, DURABLE WEATHER RESISTANT AND EVENLY GRADED ROCK WITH 50% BY WEIGHT LARGER THAN THE SPECIFIED NOMINAL (d50) ROCK SIZE. LARGE ROCK SHOULD DOMINATE, WITH SUFFICIENT SMALL ROCK TO FILL THE VOIDS BETWEEN LARGER ROCK. THE DIAMETER OF THE LARGEST ROCK SHOULD BE NO LARGER THAN 1.5 TIMES THE NOMINAL ROCK SIZE. THE SPECIFIED GRAVITY SHOULD BE AT LEAST 2.5.
3. GEOTEXTILE FABRIC: HEAVY DUTY, NEEDLE-PUNCHED, NON-WOVEN CLOTH, MINIMUM 'BIDIM' A24 OR EQUIVALENT.

CONSTRUCTION

1. NOTWITHSTANDING ANY DESCRIPTION CONTAINED WITH APPROVED PLANS OR SPECIFICATIONS,, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SATISFYING THEMSELVES AS TO THE NATURE AND EXTENT OF THE SPECIFIED WORKS AND THE PHYSICAL AND LEGAL CONDITIONS UNDER WHICH THE WORKS WILL BE CARRIED OUT. THIS SHALL INCLUDE MEANS OF ACCESS, EXTENT OF CLEARING, NATURE OF THE MATERIALS TO BE EXCAVATED, TYPE AND SIZE OF MECHANICAL PLANT REQUIRED, LOCATION AND SUITABILITY OF WATER SUPPLY FOR CONSTRUCTION AND TESTING PURPOSES, AND ANY OTHER LIKELY MATTERS AFFECTING THE CONSTRUCTION OF THE WORKS.
2. REFER TO APPROVED PLANS FOR LOCATION, DIMENSIONS, AND CONSTRUCTION DETAILS. IF THERE ARE ANY QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
3. BEFORE STARTING ANY CLEARING OR CONSTRUCTION, ENSURE ALL THE NEXESSARY MATERIALS AND COMPONENTS ARE ON THE SITE TO AVOID DELAYS IN COMPLETING THE SEDIMENT BASIN ONCE WORKS BEGIN.
4. INSTALL REQUIRES SHORT TERM SEDIMENT RUNOFF DURING CONSTRUCTION OF THE BASIN.
5. THE AREA TO BE COVERED BY THE EMBANKMENT, BORROW PITS AND INCIDENTAL WORKS, TOGETHER WITH AN AREA EXTENDING BEYOND THE LIMITS OF EACH FOR A DISTANCE NOT EXCEEDING 5m ALL AROUND MUST BE CLEARED OF ALL TREES, SCRUB, STUMPS, ROOTS, DEAD TIMBER AND RUBBISH AND DISPOSED OF IN A SUITABLE MANNER. DELAY CLEARING THE MAIN BASIN AREA UNTIL THE EMBANKMENT IS COMPLETE.
6. ENSURE ALL HOLES MADE BY GRUBBING WITHIN THE EMBANKMENT FOOTPRINT ARE FILLED WITH SOUND MATERIAL, ADEQUATELY COMPACTED, AND FINISHED FLUSH WITH THE NATURAL SURFACE.

EMBANKMENT

1. SCARIFY AREAS ON WHICH FILL IS TO BE PLACED BEFORE PLACING THE FILL.
2. ENSURE ALL FILL MATERIAL USED TO FORM THE EMBANKMENT MEETS THE SPECIFICATIONS CERTIFIED BY A SOIL SCIENTIST OF GEOTECHNICAL SPECIALIST.
3. THE FILL MATERIAL MUST CONTAIN SUFFICIENT MOISTURE SO IT CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN 150mm TO 200mm CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL AREA AND THEN COMPACT BEFORE PLACEMENT OF FURTHER FILL.
4. UNLESS SPECIFIED ON THE APPROVED PLANS, COMPACT THE SOIL AT ABOUT % TO 2% WET OPTIMUM AND TO 95% MODIFIED OR 100% STANDARD COMPACTION. EMBANKMENT TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLING.
5. WHERE BOTH DISPERSIVE AND NON-DISPERSIVE CLASSIFIED EARTH-FILL MATERIALS ARE AVAILABLE, NON-DISPERSIVE EARTH-FILL MUST BE USED IN THE CORE ZONE. THE REMAINING CLASSIFIED EARTH-FILL MATERIALS MUST ONLY BE USED AS DIRECTED BY THE SITE SUPERINTENDENT.
6. WHERE SPECIFIED, CONSTRUCT THE EMBANKMENT TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLING; OTHERWISE FINISHED DIMENSION OF THE EMBANKMENT AFTER SPREADING OF TOPSOIL MUST CONFORM TO THE DRAWING WITH A TOLERANCE OF 75mm FROM SPECIFIED DIMENSIONS.
7. ENSURE DEBRIS AND OTHER UNSUITABLE BUILDING WASTE IS NOT PLACED WITHIN THE EARTH EMBANKMENT.
8. AFTER COMPLETION OF THE EMBANKMENT, ALL LOOSE UNCOMPACTED EARTH-FILLMATERIAL ON THE UPSTREAM AND DOWNSTREAM BATTER MUST BE REMOVED PRIOR TO SPREADING TOPSOIL.
9. TOPSOIL AND RE-VEGETATE/STABILISE ALL EXPOSED EARTH AS DIRECTED WITHIN THE APPROVED PLANS.

CUT-OFF TRENCH

1. BEFORE CONSTRUCTION OF THE CUT-OFF TRENCH OR ANY ANCILLARY WORKS WITHIN THE EMBANKMENT FOOTPRINT, ALL GRASS GROWTH AND TOPSOIL MUST BE REMOVED FROM THE AREA TO BE OCCUPIED BY THE EMBANKMENT AND MUST BE DEPOSITED CLEAR OF THIS AREA AND RESERVED FOR TOPDRESSING THE COMPLETED EMBANKMENT.
2. EXCAVATED A CUT-OFF TRENCH ALONG THE CENTRE LINE OF THE EARTH FILL EMBANKMENT. CUT THE TRENCH TO STABLE SOIL MATERIAL, BUT IN NO CASE MAKE IT LESS THAN 600mm DEEP. THE CUT-OFF TRENCH MUST EXTEND INTO BOTH ABUTMENTS TO AT LEAST THE ELEVATION OF THE OUTLET SPILLWAY CREST. MAKE THE MINIMUM BOTTOM WIDTH WIDE ENOUGH TO PERMIT OPERATION OF THE EXCAVATION AND COMPACTION EQUIPMENT, BUT IN NO CASE LESS THAN 600mm. MAKE THE SIDE SLOPES OF THE TRENCH NO STEEPER THAN 1:1 (H:V).
3. ENSURE ALL WATER, LOOSE SOIL, AND ROCK ARE REMOVED FROM THE TRENCH BEFORE BACKFILLING COMMENCES. THE CUT-OFF TRENCH MUST BE BACKFILLED WITH SELECT EARTH-FILL OF THE TYPE SPECIFIED FOR THE EMBANKMENT, AND THIS SOUL MUST HAVE A MOISTURE CONTENT AND DEGREE OF COMPACTION THE SAME AS SPECIFIED FOR THE CORE ZONE.
4. MATERIAL EXCAVATED FROM THE CUT-OFF TRENCH MAY BE USED IN THE CONSTRUCTION OF THE EMBANKMENT PROVIDED IT IS SUITABLE AND IT IS PLACED IN THE CORRECT ZONE ACCORDING TO ITS CLASSIFICATION.

SPILLWAY CONSTRUCTION

1. THE SPILLWAY MUST BE EXCAVATED AS SHOWN ON THE PLANS, AND THE EXCAVATED MATERIAL IF CLASSIFIED AS SUITABLE, MUST BE USED IN THE EMBANKMENT, AND IF NOT SUITABLE IT MUST BE DISPOSED OF INTO SPOIL HEAPS.
2. ENSURE EXCAVATED DIMENSIONS ALLOW ADEQUATE BOXING-OUT SUCH THAT THE SPECIFIED ELEVATIONS, GRADES, CHUTE WIDTH, AND ENTRANCE AND EXIT SLOPES FOR THE EMERGENCY SPILLWAY WILL BE ACHIEVED AFTER PLACEMENT OF THE ROCK OR OTHER SCOUR PROTECTION MEASURES AS SPECIFIED IN THE PLANS.
3. PLACE SPECIFIED SCOUR PROTECTION MEASURES ON THE EMERGENCY SPILLWAY. ENSURE THE FINISHED GRADE BLENDS WITH THE SURROUNDING AREA TO ALLOW A SMOOTH FLOW TRANSITION FROM SPILLWAY TO DOWNSTREAM CHANNEL.
4. IF A SYNTHETIC FILTER FABRIC UNDERLAY IS SPECIFIED, PLACE THE FABRIC DIRECTLY ON THE PREPARED FOUNDATION. IF MORE THAN 1 SHEET OF FILTER FABRIC IS REQUIRED, OVERLAP THE EDGES BY AT LEAST 300mm AND PLACE ANCHOR PINS AT MINIMUM 1m SPACING ALONG THE OVERLAP. BURY THE UPSTREAM END OF THE FILTER FABRIC A MINIMUM 300mm BELOW GROUND AND WHERE NECESSARY, BURY THE LOWER END OF THE FABRIC OR OVERLAP A MINIMUM 300mm OVER THE NEXT DOWNSTREAM SECTION AS REQUIRED. ENSURE THE FILTER FABRIC EXTENDS AT LEAST 1m UPSTREAM OF THE SPILLWAY CREST.
5. TAKE CARE NOT TO DAMAGE THE FABRIC DURING OR AFTER PLACEMENT. IF DAMAGE OCCURS, REMOVE THE ROCK AND REPAIR THE SHEET BY ADDING ANOTHER LATER OF FABRIC WITH A MINIMUM OVERLAP OF 300mm AROUND THE DAMAGED AREA. IF EXTENSIVE DAMAGE IS SUSPECTED, REMOVE AND REPLACE THE ENTIRE SHEET.
6. WHERE LARGE ROCK IS USED, OR MACHINE PLACEMENT IS DIFFICULT, A MINIMUM 100mm LATER OF FINE GRAVEL, AGGREGATE, OR SAND MAY BE NEEDED TO PROTECT THE FABRIC.
7. PLACEMENT OF ROCK SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER FABRIC. PLACE ROCK SO THAT IT FORMS A DENSE, WELL GRADED MASS O ROCK WITH A MINIMUM OF VOIDS. THE DESIRED DISTRIBUTION OF ROCK THROUGHOUT THE MASS MAYBE OBTAINED BY SELECTIVE LOADING AT THE QUARRY AND CONTROLLED DUMPING DURING FINAL PLACEMENT.
8. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS. HAND PLACING MAY BE NECESSARY TO ACHIEVE THE PROPER DISTRIBUTION OF ROCK SIZES TO PRODUCE A RELATIVELY SMOOTH, UNIFORM SURFACE. THE FINISHED GRADE OF THE ROCK SHOULD BLEND WITH THE SURROUNDING AREA. NO OVERFALL OF PROTRUSION OF ROCK SHOULD BE APPARENT.
9. ENSURE THAT THE FINAL ARRANGEMENT OF THE SPILLWAY CREST WILL NOT PROMOTE EXCESSIVE FLOW THROUGH THE ROCK SUCH THAT THE WATER CAN BE RETAINED WITHIN THE SETTLING BASIN AT THE ELEVATION NO LESS THAN 50mm ABOVE OR BELOW THE NOMINATED SPILLWAY CREST ELEVATION.

ESTABLISHING THE SETTLING POND

1. THE AREA TO BE COVERED BY THE STORED WATER OUTSIDE OF THE LIMITS OF THE BORROW PITS MUST BE CLEARED RUBBISH. TREES MUST BE CUT DOWN STUMP HIGH AND REMOVED FROM THE IMMEDIATE VICINITY OF THE WORK.
2. ESTABLISH ALL REQUIRED INFLOW CHUTES AND INLET BAFFLES, IF SPECIFIED, TO ENABLE WATER TO DISCHARGE INTO THE BASIN IN A MANNER THAT WILL NOT CAUSE SOIL EROSION OR THE RE-SUSPENSION OF SETTLED SEDIMENT.
3. INSTALL A SEDIMENT STORAGE LEVEL MARKER POST WITH A CROSS MEMBER SET JUST BELOW THE TOP OF THE SEDIMENT STORAGE ZONE (AS SPECIFIED ON THE APPROVED PLANS). USE AT LEAST A 75mm WIDE POST FIRMLY SET INTO THE BASIN FLOOR.
4. IF SPECIFIED, INSTALL INTERNAL SETTLING POND BAFFLES. ENSURE THE CREST OF THESE BAFFLES IS SET LEVEL WITH, OR JUST BELOW, THE ELEVATION OF THE EMERGENCY SPILLWAY.
5. INSTALL ALL APPROPRIATE MEASURES TO MINIMISE SAFETY RISK TO ON-SITE PERSONNEL AND THE PUBLIC CAUSED BY THE PRESENCE OF THE SETTLING POND. AVOID STEEP, SMOOTH INTERNAL SLOPES. APPROPRIATELY FENCE THE SETTLING POND AND POST WARNING SIGNS IF UNSUPERVISED PUBLIC ACCESS IS LIKELY OR THERE IS CONSIDERED TO BE AN UNACCEPTABLE RISK TO THE PUBLIC.

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CLIENT	MIRVAC
PROJECT	EVERLEIGH SCHOOL SITE PACKAGE 1 - BULK EARTHWORKS
LOCATION	TEVIOT ROAD, GREENBANK
SHEET TITLE	HES BASIN NOTES AND DETAILS - SHEET 3 OF 3

JOB CODE	
MIR016	
SHEET NUMBER	REV
C411	A

URBAN SPECIFIC SITE DETAILS

Project Name	Everleigh		Project Scope	Bulk earthworks, Clearing, Civils	
Title	**Name**	**Contact**	**Title**	**Name**	**Contact**
Project Manager	Cam Mcclure	0437 930 319	**Supervisor**	Stan Reid	0417 734 258
SHET Advisor	Josh Jurgens	0427 029 582	**Engineer**	Derek Hennessy	0427 573 703
Location	**440 Greenbank Rd**		**Co-ordinates**	Lat -27.74328, Long 152.99071	

General Project Specific Information

- Site boundaries
- Muster points
- Key Infrastructure
- First aid facility & kits locations
- Crib Huts, Toilets & LV park up areas
- Live service permit zones & any other restricted areas

Emergency Response Details

EMERGENCY RESPONSE TEAM / FIRST AIDERS

EMERGENCY RESPONSE PROCEDURE

Call up on UHF on Designated channel and state: **Emergency, Emergency, Emergency**

Your Name, location and the emergency situation;

- Continue to state Emergency until you receive a confirmation. If no response, dial 000 directly;
- Remain in location & assist the Emergency Response Team/Emergency Services as directed;
- Be prepared to assist to secure the incident site and:
  - Prevent unauthorised access to incident site;
  - Act as an escort as required/directed for emergency services or external officials;
  - Comply with radio silence (no chatter over dedicated emergency channel);

Don't take photos or speak with external parties including any media or co-workers from other sites

Site Specific Hazards and Issues

- **Federally protected fauna corridors, Absolutely no clearing of any trees without direct instruction and verification of limits from Golding Supervisor.**
- **20km speed limit on access roads between areas of works**
- **Access to site will be shared with other contractors as further works commence**

URBAN SPECIFIC SITE DETAILS

Bushfire Hazard Assessment and Fire Management Plan

(State Primary School Site)

Ivory Parkway, Greenbank

Prepared for

Mirvac Qld

By

Rob Friend & Associates Pty ltd

February 2019

Document Management

Quality Assurance Statement				
Revision No.	Author	Status	Approved for Issue	
			Name	Date
01	Rob Friend	Draft	Rob Friend, Director, RF&A Pty. Ltd.	27 February 2019
02	Rob Friend	FINAL	Rob Friend, Director, RF&A Pty. Ltd.	28 February 2019

Photograph cover page – Photograph of a typical Acacia regrowth area covering much of the property.

Table of Contents

Introduction

This Bushfire Hazard Assessment and Fire Management Plan has been prepared for Mirvac Qld with respect to the development application for the State Primary School Site and the immediate vicinity as identified in Figure 1 (see Appendix A). The footprint of the State Primary School Site is located within Mirvac's Greenbank land holding as identified below:

- 96-102 Brightwell Street, Greenbank described as Lot 205 on RP845844 (15.9284 ha.),
- 138-168 Teviot Road, Greenbank, described as Lot 434 on RP845844 (400.8 ha), and
- 456-520 Greenbank Road, Greenbank, described as Lot 9 on S312355 (64.75 ha).

This fire management plan seeks to provide a number of bushfire management actions with regard to the school site and surrounds.

Site description

General location

The property is located to the east of Teviot Road, and north of Greenbank Road, Greenbank. To the east is a Council managed bushland park, Wearing Park, along with rural residential allotments primarily accessible from Greenhill Road, Greenbank. To the north are rural and rural residential allotments around Brightwell Street and Campbell Road. Rural properties also abut the site along its southern boundary and to the west is Teviot Road.

The property has had a history of cattle use prior to the settlement and transfer of land to Mirvac Qld. It is noted that balance areas of the property awaiting future development will continue to be managed for rural residential/agricultural purposes including the grazing of cattle.

The school site is located in the centre of the site abutting Teviot Road and Greenbank Road.

Access to the development will be via Everleigh DRive and Ivory Parkway from the existing Teviot Road / Pub Lane,

Greenbank intersection.

Topography

The landform within this area generally slopes from west to east.

Existing Vegetation

The school site is located within a portion of the site that has generally poor vegetation and also contains and existing water holding dam. Such land is defined as the area to the south and west of the EPBC excision boundary as shown on Figure 2 of Appendix A.

Development proposal

The proposal is to undertake the development of an area identified on the proposal plans as the 'School Site'. The School Site is located in the centre of 138-168 Teviot Road, Greenbank (Lot 434 on RP845844 covering an area of 400.8 hectares) (see Figure 1 of Appendix A).

It is noted that the proposal will also see the establishment of a minimum 100-metre-wide maintained buffer around the perimeter of the School Site footprint and associated infrastructure, and as such no habitable/occupied structure will be within 100 metres of any area of mapped potential bushfire hazard area.

All hazardous vegetation within the EPBC excision boundary will be cleared on commencement of site works on the School Site.

Bushfire Hazard Assessment

Existing

The Natural Hazards Risks and Resilience - Bushfire hazard area mapping provided by the State Planning Policy of April 2016, maps areas of Medium potential bushfire intensity over the area which the School Site will be developed (see Figure 2).

Post Clearing

The post clearing area within the EPBC excision boundary can be classified as grassland. Therefore, this area is considered to be an area of low bushfire risk.

However, areas of medium and high potential bushfire intensity remain outside the EPBC excision area after the EPBC excision area has been cleared. A 100m potential hazard buffer is required from such medium and high potential bushfire intensity areas. The post clearing medium and high potential bushfire intensity areas and buffers are shown on Figure 3 of Appendix A.

Figure 3 shows that the School Site is outside the potential hazard buffer and are therefore classified as having a low bushfire risk, or not in a bushfire prone area.

Bushfire Management Plan

No areas of the School Site are in a bushfire prone area in the post clearing scenario. Therefore, no structures within the school site will be required to be assessed against the Australian Standard Building in a Bushfire Prone Area, AS3959-2009 once such clearing works are complete.

The following land management specifications have been made to ensure the management of the area within the EPBC excision boundary is such that this area remains as an area of low bushfire hazard.

1. The 100-metre-wide buffer is to be maintained by slashing at regular intervals such that the vegetation within the buffer is maintained at all times, less than 200 mm in height.
2. A 6-metre-wide fire trail is to be established along the outer edge of the 100-metre-wide buffer and setback from that edge by a maximum of 10 metres. This space allows for effective zone within which to conduct any bushfire suppression operations by Emergency Services if and when required.
3. The fire trail is to have access for Emergency Service and maintenance contractors from: -
    a. Teviot Road via a locked gate
    b. Greenbank Road via a locked gate
    c. At least four points from the internal road network including from the end of the main boulevard road. This point is to ensure access is directly available to the north and east of this dead end of the boulevard roadway.
4. In the event of a bushfire commencing within the properties owned by Mirvac Qld, the Property Caretaker is to ensure the locked gates which provide access from Teviot and Greenbank Roads are unlocked. However, a key is to be provided to the Greenbank Rural Fire Brigade for their purpose and to enable access at all times for any purpose involving the management of bushfire within the whole property.

Appendix A – Figures

Figure 1 – Overall Land use plan including Area 1 and State Primary School Site

Legend

- SITE BOUNDARY
- CADASTRE BOUNDARIES
- AREA 1 BOUNDARY
- GREATER FLAGSTONE UDA BOUNDARY
- EXISTING EASEMENTS
- RAIL CORRIDOR
- POTENTIAL TRAIN STATION [1]
- TRUNK CONNECTOR ROAD NETWORK
- NEIGHBOURHOOD CONNECTOR ROAD NETWORK
- RESIDENTIAL ACCESS STREETS

Land Uses

- RESIDENTIAL - STANDARD LOTS
- RESIDENTIAL - INTERFACE LOTS - NORTH
- RESIDENTIAL - INTERFACE LOTS - SOUTH
- NEIGHBOURHOOD CENTRE
- DISTRICT CENTRE (EXTERNAL) [1]
- COMBINED REGIONAL RECREATION AND REGIONAL SPORTS PARK
- INDICATIVE LOCATIONS OF MAJOR LINEAR PARKS
- CONSERVATION PARKLAND
- POTENTIAL ECO LOT PRECINCT (SUBJECT TO FURTHER ASSESSMENT)
- INDICATIVE LOCATIONS OF NEIGHBOURHOOD PARKS
- INDICATIVE LOCATION OF STATE PRIMARY SCHOOL
- COMMUNITY FACILITY

1 Location as nominated in the Greater Flagstone PDA Development Scheme. These items are outside the area controlled by the applicant and are subject to approval and delivery by others.

Note: Locations of Context Plan features are indicative and subject to detailed design.

URBIS

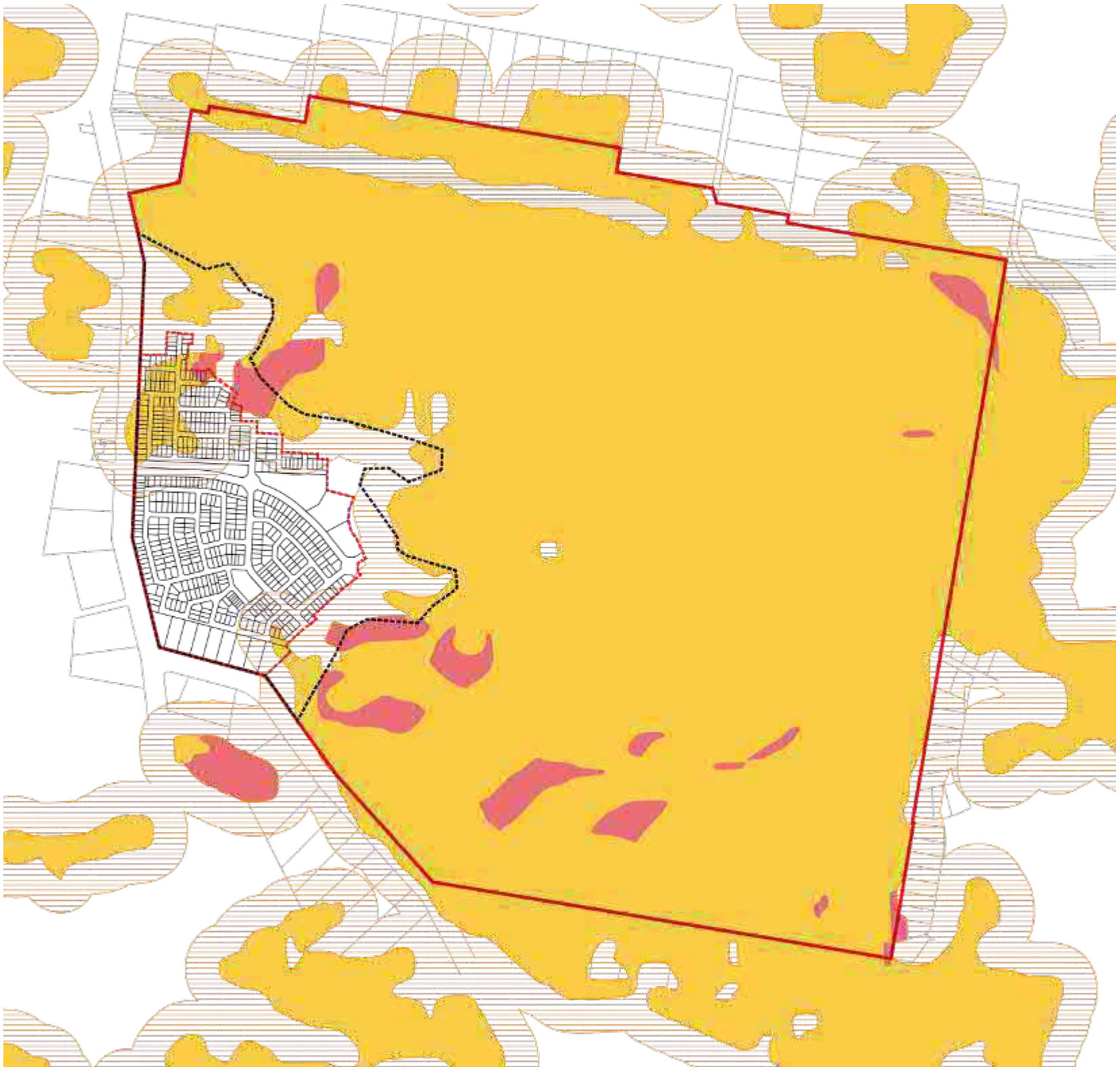
GREENBANK
LAND USE PLAN WITH AREA 1 & STATE PRIMARY SCHOOL SITE

1:15,000 @ A3

0 200 400 600 800

DATE: 02.11.2016
JOB NO: ND1309
DWG NO: LU:02
REV: 5

Figure 2 – Bushfire hazard plan – Primary School Site
– Pre-clearing



Legend

- SITE BOUNDARY
- CADASTRE BOUNDARIES
- AREA 1 BOUNDARY
- EPBC EXCISION BOUNDARY
- HIGH POTENTIAL BUSHFIRE INTENSITY
- MEDIUM POTENTIAL BUSHFIRE INTENSITY
- POTENTIAL IMPACT BUFFER (100M)

URBIS

GREENBANK

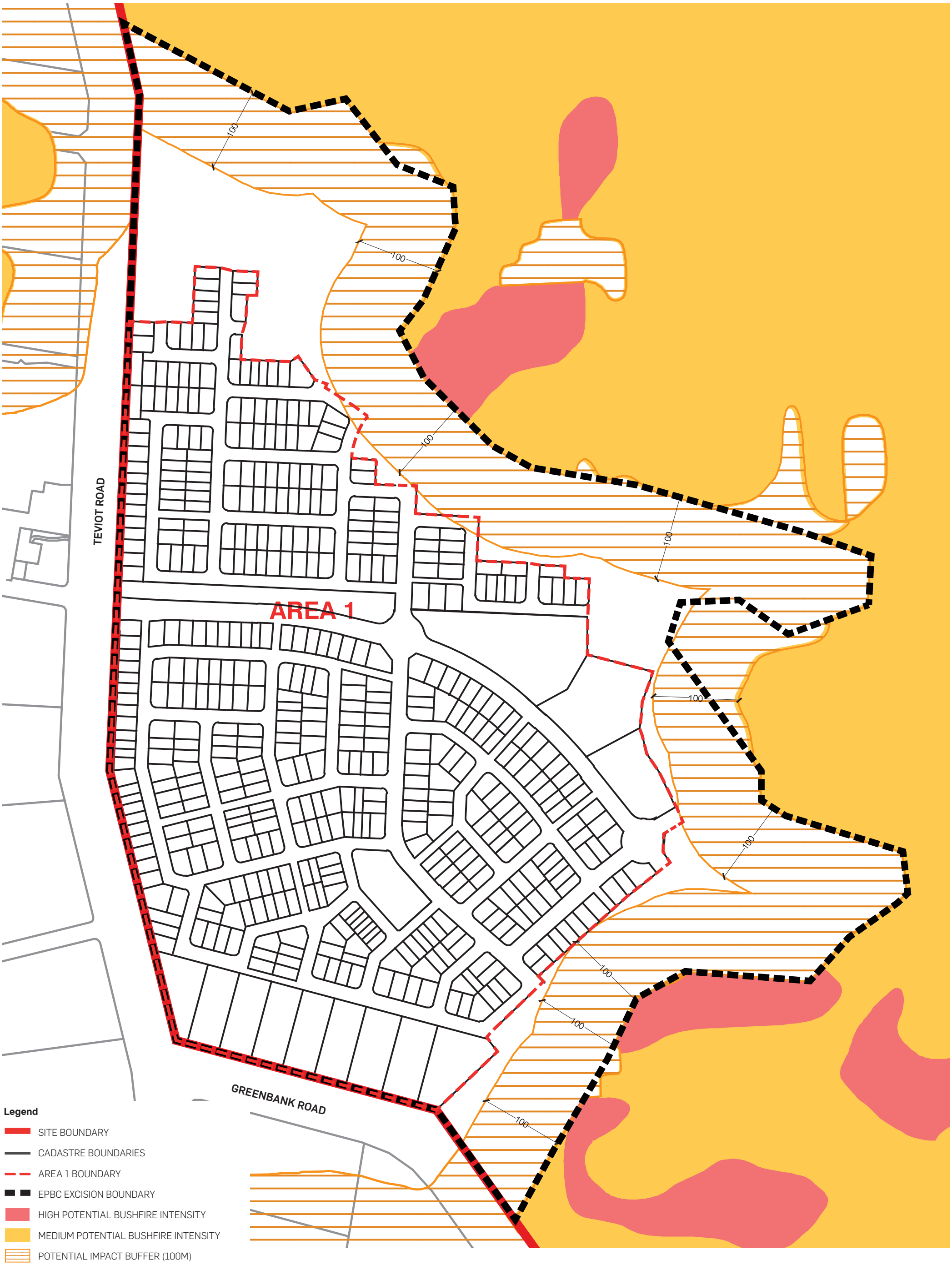
BUSHFIRE HAZARD PLAN - PRIMARY SCHOOL SITE - EXISTING

1:15,000 @ A3

0 200 400 600 800

DATE: 03.11.2016
JOB NO: ND1309
DWG NO: BF:01
REV: -

Figure 3 - Bushfire hazard plan – Primary School Site – Post-clearing land within the EPBC excision boundary



URBIS

GREENBANK

BUSHFIRE HAZARD PLAN - AREA 1 & PRIMARY SCHOOL SITE - POST CLEARING

1:4,000 @ A3

0 50 100 150 200

DATE: 03.11.2016
JOB NO: ND1309
DWG NO: BF:03
REV: 1

Appendix D

Melaleuca irbyana Impact Management Plan (July 2020)

Impact Management Plan
Melaleuca irbyana
Renewal for Permit No. WA0009354

432-520 Greenbank Road, Greenbank
Prepared for Mirvac Queensland Pty Ltd
10 July 2020

Job No. 7598

Document Control

Document: Impact Management Plan for 432-520 Greenbank Road, prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd.

Document Issue

Issue	Date	Prepared By	Checked By
A	07.07.2020	KG	AD
B	10.07.2020	KG	AD

Prepared by

ABN 24 144 972 949
www.saundershavill.com

Reports and plans by others may be included in this document.

Table of Contents

Tables

Plans

Abbreviations and Acronyms

DAM	Declared Area Map
DES	Department of Environment and Science (Qld)
DNRME	Department of Natural Resources, Mines and Energy (Qld)
EDQ	Economic Development Queensland (Qld)
EVNT	Endangered, Vulnerable or Near Threatened (as defined by the NCA)
NCA	*Nature Conservation Act 1992* (Qld)
NCWR	Nature Conservation (Wildlife) Regulation 2006
PDA	Priority Development Area (herein referencing the Greater Flagstone Priority Development Area)
PMAV	Property Map of Assessable Vegetation
SHG	Sunders Havill Group

1. Introduction

Saunders Havill Group (SHG) was engaged by Mirvac Queensland Pty Ltd (Mirvac) to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* (Swamp Tee Tree) specimens located within the Greenbank project area located at 432-520 Greenbank Road, Greenbank.

As required under the *Protected Plants Assessment Guidelines* (the Guidelines) this IMP has been prepared to support the renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) for the clearing of *Melaleuca irbyana* specimens within the 277 hectare (ha) development area located at 432-520 Greenbank Road, Greenbank (Lot 1/SP297192). A copy the Protected Plants Clearing Permit is included at **Appendix A**.

1.1. Background

Protected Plants Flora Surveys undertaken over the site in 2018 recorded four isolated patches of *Melaleuca irbyana*; three of which are located within the Clearing Area (refer **Plan 1**). The species is listed as Endangered under the *Nature Conservation Act 1992*.

Subsequently, an Impact Management Plan *'Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018'* (IMP) was prepared to support a Protected Plants Clearing Permit application to the Department of Environment and Science (DES) in accordance with Section 3.2 of the *Nature Conservation (Wildlife Management) Regulation 2006 – Protected Plants Assessment Guidelines*. A copy of the IMP is included at **Appendix B**.

A Protected Plants Clearing Permit (Permit No. WA0009354) was issued by the DES on 24 August 2018 which allows for clearing of all *M. irbyana* over the entire Clearing Impact Area (i.e. 277 ha site). Conditions of the Permit (PPCM01) require all activities relating to the impact of EVNT plant species under the permit to be carried out in accordance with the procedures and actions in the IMP. This included rehabilitation planting of *M. irbyana* within future Conservation land in the eastern portion of the site to ensure no significant residual impact on the species occurs as a result of the development.

In March 2019, rehabilitation planting by land care consultant Evolve commenced at the rehabilitation area in accordance with the IMP. This included weed treatment and tube-stock planting of *M. irbyana* within a 5,000 m^2 area within the eastern Conservation land.

As the Conservation land (and *M. irbyana* rehabilitation area) will be ultimately handed over to Logan City Council, the proposed *M. irbyana* rehabilitation area was requested to be legally secured as a Declared Area (Category A) under the *Vegetation Management Act 1999* (VMA) to counterbalance the clearing of *M. irbyana*. on site and to ensure objectives of the exchange area are fully achieved. The Voluntary Declaration Management Plan was approved by DNRME and the Declared Area was secured on title on 3 March 2020 and is shown as Category A (PMAV 2019/002658). A copy of the Declared Area Map is included at **Appendix C**.

The Protected Plants Clearing Permit (Permit No. WA0009354) expires on 23 August 2020. While clearing within the Permit area has been undertaken, clearing at the locations of the *M. irbyana* patches has not yet occurred. Importantly, rehabilitation works have commenced and subject to legal rehabilitation success, monitoring and reporting benchmarks under the Voluntary Declaration Management Plan. The purpose of this report is to support renewal of the Protected Plants Clearing Permit.

1.2. Site Details

Contextually, the site is located 30 kilometres (km) south of Brisbane and 10 km west of Logan Village, within the western suburb of Greenbank. The site is bound by Greenbank and Teviot Roads to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 500 metres east of the Brisbane – Sydney Railway Line. An infrastructure easement traverses the site parallel to the northern boundary. The site remains one of the last large rural properties in the immediate landscape predominately comprised of rural residential development.

The proposed clearing works will be undertaken over 277 ha of the 412 ha site to facilitate a master planned development and will be subject to future operational works approvals from Economic Development Queensland (EDQ) (DEV 2016/768).

Key site details are provided in **Table 1** below.

Table 1: Property Summary

Address	423-520 Greenbank Road, Greenbank
RPD	Lot 1 on SP297192
Local Government Area	Logan City
Administering Authority	Economic Development Queensland
Priority Development Area	Greater Flagstone PDA
Planning Scheme	Greater Flagstone PDA Development Scheme
Area Classification / Zone	Urban Living
Existing Land Use	Rural

1.3. Protected Plants Flora Survey

In accordance with the regulatory requirements, Protected Plant Flora surveys were conducted where clearing is proposed, including within areas mapped as 'High risk' under the Protect Plants Flora Survey Trigger Map High Risk and as per the Guidelines. The 2020 surveys were undertaken in accordance with the Guidelines (i.e. High Risk Areas), but also included survey at the four previously known locations of *M. irbyana* on site recorded by 2018 surveys.

Protected Plants Flora Surveys undertaken in June 2020 confirmed *M. irbyana* in the four previously recorded locations and well as one new location (location 5). Refer **Plan 1** for *M. irbyana* located during 2018 surveys and **Plan 2** for the location for *M. irbyana* located during 2020 surveys and **Table 2** for a summary. It is noted growth categories have changed since 2018 with the classification of "semi-mature" introduced. Growth categories are defined in **Section 2.2**.

A copy of the 2020 Protected Plans Flora Survey Report is provided under a separate cover.

Table 2: *M. irbyana* Locations

Location	2018 Survey Results	2020 Survey Results
1	3 x mature + 100 juveniles	3 x mature + 1 x semi mature + 100 juvenile
2	3 x mature + 20 x juveniles	3 x mature + 11 x semi mature + 10 juvenile
3a	4 x mature + 10 x juveniles	3 x mature
3b		1 x mature + 9 x juvenile
3c		2 x mature + 9 x semi mature + 3 x juvenile
3d		2 x semi mature + 2 x juvenile
4	5 x mature + 100 juveniles	5 x mature + 107 x semi mature + 8 x juvenile
5		x mature + 3 x semi mature + 24 x juvenile

1.4. IMP Intent

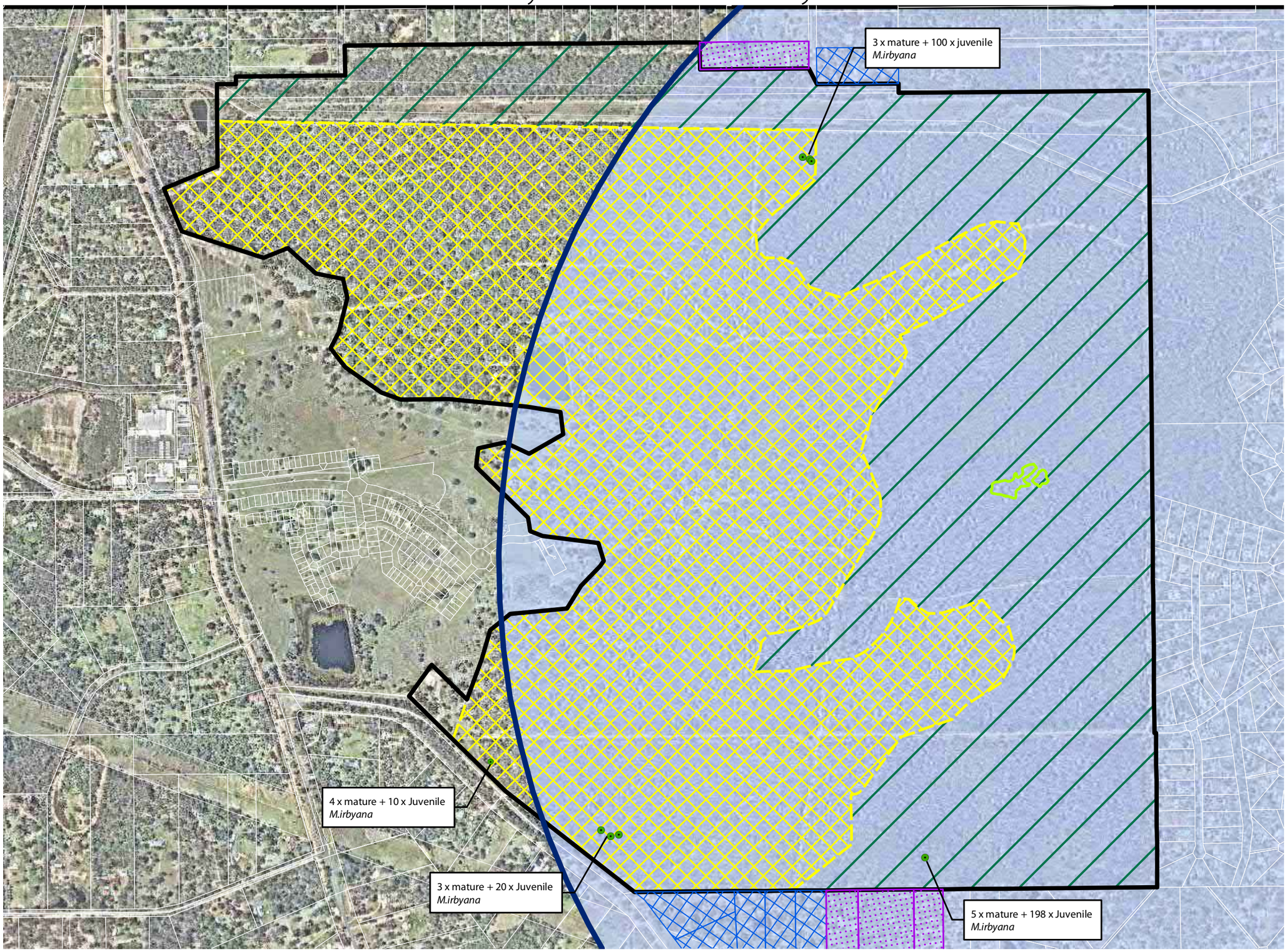
The IMP has been prepared in accordance with Section 3.2.1, as follows:

3.2.1 Impact management plan

An impact management plan must include the following sections:

- attempts to avoid and minimise impact
- nature of impact
- management of impact
- justification of impact management
- survival of plant in the wild

1. 2018 Protected Plants Survey - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

LEGEND

- Project DCDB
- Qld DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- No Access under NCA Exemption (AP0007102)
- Surveyed under NCA Exemption (AP0007102)
- Mature *Melaleuca irbyana* specimen
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	13/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @A3

0 50 100 200 300 400 m

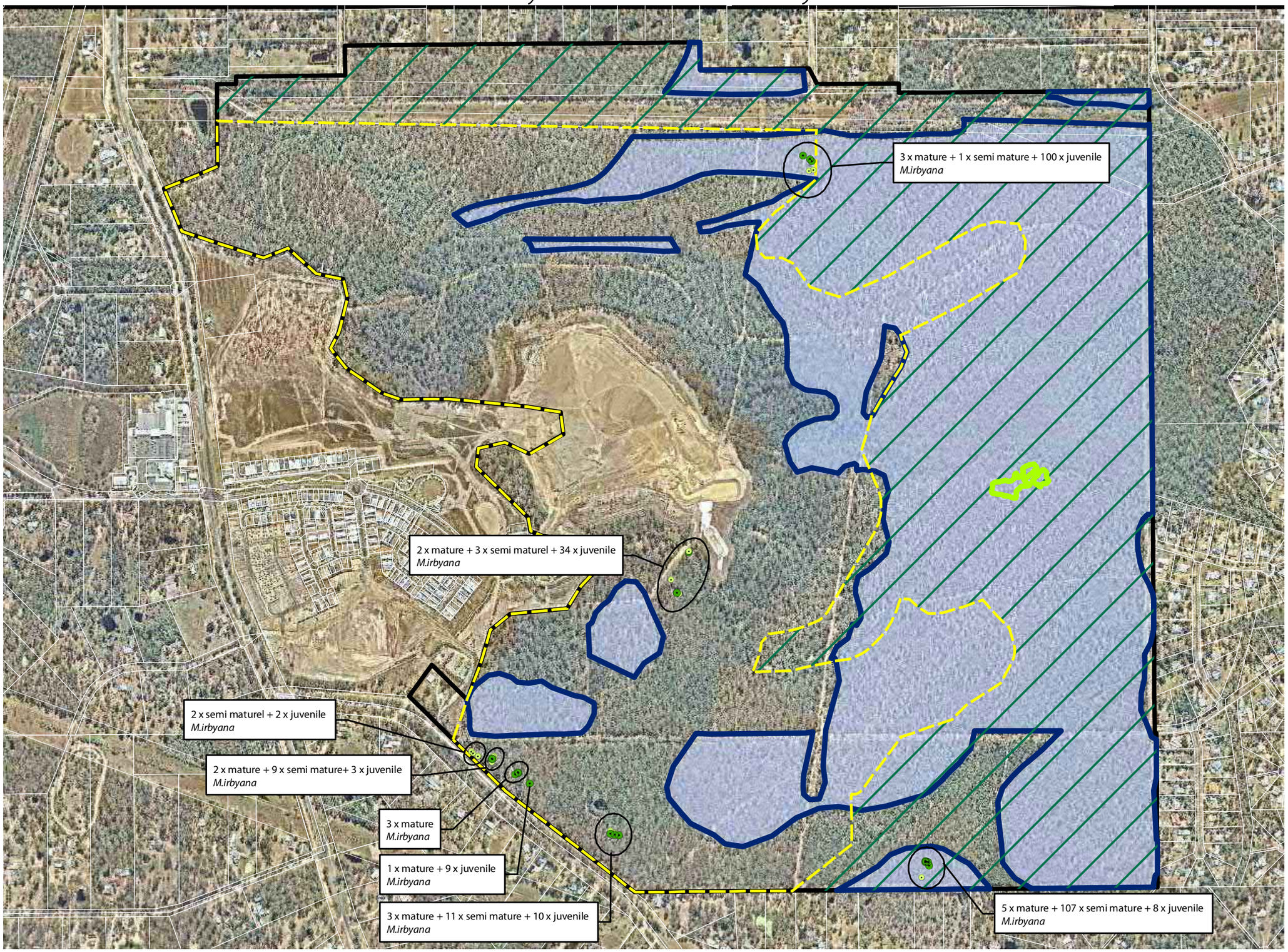
saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 13/07/2020 7598 E 01 NCA 2018 A

2. 2020 Protected Plants Survey - *Melaleuca irbyana*



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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- QLD DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- Mature *Melaleuca irbyana* specimen
- Semi-mature or juvenile *Melaleuca irbyana* specimen
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	14/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @A3

0 50 100 200 300 400 m

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 14/07/2020 7598 E 02 NCA 2020 A

1.5. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2006 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited.

The Queensland Government has adopted a regulatory framework that captures activities that pose a high risk to plant biodiversity. Under the framework, when a non-exempt clearing activity is proposed within a 'High Risk' area, the proponent of that activity is required to complete a flora survey prior to commencement of clearing. The Protected Plants Flora Survey Trigger Map shows 'High Risk' areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location.

A search of the Protected Plants Flora Survey Trigger Mapping indicated proposed clearing areas within the subject site are overlayed as 'High Risk' and so are subject to flora survey requirements (refer **Plan 2**).

Prior to flora surveys, the schedules of the NCWR were considered in this report using a Wildlife Online Database Search with a 10 km radius from the site. Three (3) flora species listed under the NCWR were identified as having the potential to occur on site and are presented in **Table 3**. Refer to **Appendix D** for full search results.

Table 3: Wildlife Online Search Results–Flora

Scientific Name	Common Name	NCA Status
Marsdenia coronata	Slender Milkvine	Vulnerable
Coleus habrophyllus	-	Endangered
Melaleuca irbyana	Swamp Tea Tree	Endangered

2. Nature of the Impact

2.1. Background

The only EVNT species located within the Greenbank project area was *Melaleuca irbyana* (Swamp Tea Tree). This species was the only EVNT species recorded by 2018 surveys. Four (4) patches of *M. irbyana* preciously located in 2018 were confirmed on site during contemporary surveys in June 2020 to support renewal of the Protected Plants Clearing Permit (refer **Plan 1**). One additional patch of *M. irbyana* was recorded within the Clearing Area (location 5, refer **Plan 2**).

The existing Permit considered impacts for the entire Clearing Area (i.e. 277 ha). This IMP has been prepared for the same Clearing Area. It is anticipated the clearing of *M. irbyana* will occur within the next 2 years.

The profile of the species is detailed below in **Section 2.2**.

2.2. Protected Plant Profile

Melaleuca irbyana, a member of the Myrtaceae family, is listed as a threatened species under Schedule 2 of the *Nature Conservation (Wildlife) Regulation 2006* (NCWR) and is classified as "endangered". *Melaleuca irbyana* is also included as part of Endangered Regional Ecosystems (RE) 12.3.18, 12.3.19, 12.9-10.11 and 12.9-10.27 under the *Vegetation Management Act 1999* (VMA). This vegetation community is also listed as a Critically Endangered when present as a Threatened Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

M. irbyana forms communities that occur in two (2) structural forms: the more common form consists of a dominant eucalypt canopy with an understorey containing *M. irbyana* thickets 8-12 metres in height; the less common form is an open forest or thicket of *M. irbyana* with emergent eucalypt trees. The understorey is sparse and can comprise of grasses, sedges, and herbs with a few shrubs, vines and possibly orchids present. There are fairly clear descriptions of *M. irbyana* communities, however, there are no clear indications of the point at which an individual tree or small number of trees are considered to be part of a community. An individual tree may still contribute reproductively to a community, or may have the potential to regenerate and in time create a community.

Growth categories for this assessment are definied as juvenile specimens less than two (2) meters in height, semi-mature specimens greater than two (2) meters in height but with a trunk less than 100mm DBH, and mature specimens retaining a trunk diameter of at least 100mm.

Logan City Council defines an *M. irbyana* community as, "*where Melaleuca irbyana occur in a patch size of 0.25 hectares or greater, or where a patch of Melaleuca irbyana less than 0.25 hectares adjoins a second patch and the sum of the patches is greater than 0.25 hectares*". This definition has been determined using methodology from the *Melaleuca irbyana* (Swamp Tea-tree) Community 1:25,000 Scale Mapping Project (Ryan, 2010).

2.3. *Melaleuca irbyana* On-site

The site was traversed as part of previous and contemporary NCA searches. *Melaleuca irbyana* were recorded the species in four (4) separate locations during both 2018 and confirmed again in 2020, with an additional patch also recorded (location 5). Refer to **Plan 1-2** for *Melaleuca irbyana* onsite locations. Four of these locations (locations 1, 2, 3, and 5) occur within the Clearing Area. One patch (location 4) is located outside the Clearing Area and will be retained by the development in Conservation. Refer **Table 4** for a description of the Regional Ecosystems.

2.3.1 Location 1

Location 1 is situated in the northern aspect of the site, adjacent to the power easement. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consists of three (3) established specimens, one (1) semi-mature specimen and one-hundred (100) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy, representing the Least Concern RE12.9-10.2.

Photo Plate 1: Location 1

2.3.2 Location 2

Location 2 is situated towards the south-western property boundary, adjacent to Greenbank Road. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This *Melaleuca irbyana* (Swamp Tea-tree) patch consists of three (3) established (mature) specimens, eleven (11) semi-mature specimens and ten (10) juvenile specimens. This patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Allocasuarina littoralis* (Black She-oak) and *Acacia spp.* regrowth.

Photo Plate 2: Location 2

2.3.3 Location 3

Location 3 is situated towards the south-western property boundary, adjacent to Greenbank Road and approximately 380 m west of Location 2. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consists of six (6) mature specimens, eleven (11) semi-mature specimens and fourteen (14) juvenile specimens. The overall patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Acacia leiocalyx* (Early Flowering Black Wattle), *Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth. The patch is separated into four separate patches.

Photo Plate 3: Location 3

2.3.4 Location 4

Location 4 is situated towards the southern property boundary, approximately 800 m east of Location 3. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch consists of five (5) mature specimens, one hundred and seven (107) semi-mature specimens and eight (8) juvenile specimens with a height less than two (2) meters. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy, typically representing the Least Concern RE12.9-10.2.

Photo Plate 4: Location 4

2.3.5 Location 5

Location 5 is situated towards the central portion of the development footprint. This patch is located within mapped non-remnant vegetation or Category X as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch consists of two (2) mature specimens retaining a trunk DBH greater than 100mm, three (3) semi-mature specimens with a trunk less than 100mm and a height greater than two (2) meters, and thirty-four (34) juvenile specimens with a height less than two (2) meters. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Allocasuarina littoralis* (Black She-oak) with scattered *Acacia leiocalyx* (Early Flowering Black Wattle), *Eucalyptus crebra* (Narrow Leaf Ironbark) and *Eucalyptus tereticornis* (Forest Red Gum). These species are typical of the Of Concern Regional Ecosystem community 12.9-10.7.

Photo Plate 5: Location 5

Table 4: Regional Ecosystems Descriptions

Status	Code	Description
Endangered	12.9-10.12	Corymbia intermedia, Angophora leiocarpa, Eucalyptus seeana +/- E. siderophloia, E. tereticornis, E. racemosa subsp. racemosa, C. citriodora subsp. variegata woodland to open forest. Lophostemon suaveolens is often present as a sub-canopy or understorey tree. Occasional Melaleuca quinquenervia on lower slopes. Does not include areas dominated by Eucalyptus racemosa subsp. racemosa. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 9g).
Of Concern	12.9-10.7:	Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora leiocarpa, E. melanophloia woodland. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 13c).
Of Concern	12.3.11	Eucalyptus tereticornis +/- E. siderophloia and Corymbia intermedia open forest to woodland. Corymbia tessellaris, Lophostemon suaveolens and Melaleuca quinquenervia frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include Angophora leiocarpa, E. exserta, E. grandis, C. trachyphloia, C. citriodora subsp. variegata, E. latisinensis, E. tindaliae, E. racemosa and Melaleuca sieberi. E. seeana may be present south of Landsborough and Livistona decora may occur in scattered patches or low densities in the Glenbar SF and Wongi SF areas. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y. (BVG1M: 16c)
Least Concern	12.3.6:	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest to woodland with a grassy ground layer dominated by species such as Imperata cylindrica. Eucalyptus tereticornis may be present as an emergent layer. Occurs on Quaternary floodplains and fringing drainage lines in coastal areas. (BVG1M: 22a)
Least Concern	12.9-10.2:	Corymbia citriodora subsp. variegata open forest or woodland usually with Eucalyptus crebra. Other species such as Eucalyptus tereticornis, E. moluccana, E. acmenoides and E. siderophloia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of Lophostemon confertus (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 10b).

Based on the information provided in **Section 2.2**, the specimens located on site are not consistent with a *Melaleuca irbyana* community due to the patches predominately containing juvenile individuals with relatively few fully mature specimens. Importantly, these patches are not associated with Endangered Regional Ecosystems. Locations 1 and 4 were confirmed via a certified PMAV to be located within composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 while locations 2, 3 and 5 were located within non-remnant areas.

While Location 1 contains a substantial amount of juvenile species, overall, the significance of these patches is considered less than if they formed part of a broader existing community. The habitat value they currently provide is considered relatively limited, with no obvious noteworthy habitat for flora or fauna observed at the time of survey.

3. Management of the Impact

The proposed earthworks to facilitate the development footprint will require the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens over the next two years as development progresses. A significant residual impact (SRI) assessment was undertaken in accordance with the *Queensland environmental Offsets Policy - Significant Residual Impact Guideline (DES 2014)* as part of the approved IMP (refer **Appendix B**). Prior to the SRI, an assessment survival in the wild and avoidance and mitigation was considered.

3.1. Avoidance and Minimisation of Impact

An assessment for the survival of the plant in the wild was previously made as part of the IMP (refer **Appendix B**) and has been updated as part of this assessment.

The proposed works are for the development of Greenbank master planned development in the Greater Flagstone PDA. Preliminary approval for the context plan and master plan has been issued by EDQ. These plans were informed by detailed analysis of the site by specialist consultants, including a detailed ecological analysis by SHG. Subsequently, areas for development shown are concentrated to areas of least constraint. Areas of highest ecological value have been identified for retention as conservation.

The proposed works will include the creation of residential allotments, a proposed school site, new roads, park and conservation areas and corridors. Minimisation of overall clearing impacts are evident through location of the proposed development, located outside Endangered remnant vegetation and waterway corridors. Rehabilitation of conservation areas and waterways is proposed as part of the development.

The proposed earthworks to facilitate the development footprint will require the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens over the next two years, and ongoing property boundary maintenance within 100 m of the retained patch (Location 4). These specimens are located within Of Concern and non-remnant regrowth areas (refer **Plan 2**).

As per the EDQ endorsed Natural Environment Site Strategy, extensive conservation of greater than 89 hectares of proposed Conservation Parkland adjoining Norris Creek and Wearing Park is proposed as part of the development. In accordance with best practice management, restoration and rehabilitation works will seek to stabilise and reverse the negative effects of ongoing habitat fragmentation. The intent is for managed areas of rehabilitation and restoration to rectify canopy gaps and restore bare or denuded areas to provide additional habitat and refugia within the lower strata to maintain connectivity with external approval corridors and improve terrestrial corridor viability. Rehabilitation works within the conservation area and waterway corridors will include weed management and replanting with native species consistent with mapped Regional Ecosystems to augment ecological values and enhance connectivity.

Melaleuca irbyana grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. The species prefers poorly draining, heavy clay soils (Byrnes 1984; Barlow 1987). The approved conservation land rehabilitation works include an established *Melaleuca irbyana* thicket within remnant woodland forest to the north of the central waterway (Plans **2 & 3**). This land is relatively low lying and adjoins an ephemeral waterway that contains permanent billabongs. The approved *Melaleuca irbyana* planting site is therefore considered ideal for the species, which is dependent on specific groundwater and / or surface water hydrology. Impacts to *Melaleuca irbyana* have been minimised to the greatest practical extent and include establishing the *Melaleuca irbyana*

community, on the project site, within future conservation land and managing potential impacts from ongoing works that will occur within 100 m of a retained patch.

3.2. Survival of the Plant in the Wild

An assessment for the survival of the plant in the wild was previously made as part of the IMP (refer **Appendix B**) and has been updated as part of this assessment.

Based on the current disturbed nature of the site and the locations of the *Melaleuca irbyana* specimens mostly along property boundaries, it is not anticipated that the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens will significantly hinder the future success of the species in the area. Importantly, the patch in location 4 is to be preserved within the conservation area and approved and established rehabilitation works provide a *Melaleuca irbyana* community on the site allowing the community to be protected in perpetuity.

3.3. Significant Residual Impact (Justification of the Impact)

A SRI assessment (refer Section 3 of the IMP at **Appendix B**) was made to support the Protected Plants Clearing Permit (Permit No. WA0009354) for the clearing of *Melaleuca irbyana* specimens within the 277 hectare clearing area. The SRI assessment concluded the clearing of three small patches of M. irbyana for the development would not result in a SRI due to extensive rehabilitation works proposed within the onsite Conservation land, including the establishment of a 5,000 m^2 *Melaleuca irbyana* thicket resulting in a net gain in *Melaleuca irbyana* across the site.

While rehabilitation for the 5,000 m^2 *Melaleuca irbyana* thicket has been undertaken, the permit for clearing within the 277 ha area is about to expire.

Renewal of the Protected Plant Clearing Permit for the same impact (i.e. clearing 277 ha) is requested. While an additional patch of *M. irbyana* has been identified, this falls within the same 277 ha impact area as previously assessed under the Permit No. WA0009354. The below SRI assessment for the clearing of the four patches of mostly juvenile *M. irbyana* proposed under this permit renewal concludes, with the established rehabilitation works, the impact would not result in a SRI.

To demonstrate this mitigation of impact, a response to the four (4) points of consideration within Section 1.2 of the *Significant Residual Impact Guideline* was provided below for ease of reference

- **The extent and duration of impact on the matter and its sensitivity to disturbance.**

  The impact on the matter is the removal of four (4) relatively small patches (locations 1, 2, 3 and 5) of predominately juvenile *Melaleuca irbyana* specimens from former paddock areas that have already been subject to high disturbance from cattle grazing and historical clearing. A patch (at location 4) will be retained with ongoing adjoining works within 100 m limited to the maintenance of the nearby property boundary. The sites are described in detail in **Section 2.3**, shown in **Plan 2** and summarised below:

  - Location 1: 3 x mature s + 1 x semi mature + 100 juvenile specimens, located within the north-east along a drainage feature
  - Location 2: 3 x mature + 11 x semi mature + 10 juvenile specimens, located along the southern boundary
  - Location 3: 5 mature + 20 semi mature + 14 juvenile specimens, located along the southern boundary
  - Location 4: 5 mature + 107 x semi mature + 8 x juvenile specimens, located along the southern boundary in the south-west

- Location 5: 2 x mature + 3 x semi mature + 34 x juvenile specimens, located within the central portion of the site

- **Timeframe for rehabilitation relative to the impact occurring and the ability of the matter to maintain its viability during this timeframe.**

  As required under Permit No. WA0009354 rehabilitation planting of six hundred and twenty-five (625) advanced tube stock specimens of *M. irbyana* occurred within a 5,000m^2 area within the central waterway corridor of the conservation zone (refer **Plan 2**). Although it is expected that these plantings will take approximately four (4) years to reach maturity they have been planted in a thicket to replicate as close to natural conditions for a *M. irbyana* ecological community as possible and will be maintained as part of the extensive rehabilitation works for the conservation zone. The area of planting of this thicket adjoins the central waterway corridor and is not within 100 m of future development areas. This location has been chosen to avoid human disturbance and as far away as possible from conflicting uses. Importantly, the rehabilitation area has been legally secured on title as a declared area (Category A) under the *Vegetation Management Act 1999* (refer **Appendix C**) and will be handed over to Logan City Council, along the with the waterway corridor, following the on-maintenance period. Further, the patch of *M. irbyana* at location 4 will be retained within the Conservation area and will be subject to regular compatible weed suppression and monitored for persistence as part of site maintenance before being handed over to Council.

- **Likely success of rehabilitation works to return the impacted matter to its original condition, and;**

  It is important to note that the Regional Ecosystems within and adjoining the creek corridor reflect those where the *M. irbyana* patches are currently located on-site. The rehabilitation area was chosen after detailed ecological survey of site attributes, including the prevailing low-lying topography, proximity to the creek, and canopy gaps with limited existing understorey. Thus, the planting of *M. irbyana* in the creek corridor has a high likelihood of success given the suitable landscape and habitat.

  Planting was undertaken by land care experts Evolve Environmental. Given that the impact is the removal predominately juvenile *M. irbyana*, the planting of six hundred and twenty-five (625) specimens of *M. irbyana* as a thicket within the conservation zone will result in rehabilitation outcomes and a consolidated *M. irbyana* thicket which will far exceed the impacted matter.

- **The time-lag effect—between impact and rehabilitation successfully delivering the original condition for the matter—on the matter's viability.**

  As mentioned previously, the removal of four relatively small patches of *M. irbyana* is not considered to significantly impact upon the viability of local populations nor remove significant habitat values. Although there will be a time-lag between the removal of the predominantly juvenile *M. irbyana* specimens and the maturity of the tube stock of *M. irbyana*, planting has already occurred to reduce the potential time lag-effect to the greatest practical extent. Overall, the rehabilitation proposed is considered a far superior ecological outcome for viability of local populations.

  The extent and number of *M. irbyana* planted is intended to establish a self-sustaining thicket of *M. irbyana* in a safe and secluded buffer environment that is capable of mitigating the proposed impacts. It is acknowledged that any future unavoidable loss of *M. irbyana* from the development area will be assessed by DES on a case by case basis, however, it is requested that DES consider the approval of Permit No. WA0009354 for the clearing of 277ha on the site consistent with the clearing being proposed.

3.4. Voluntary Declaration

As the Conservation land (and *M. irbyana* rehabilitation area) will be ultimately handed over to Logan City Council, the proposed *M. irbyana* rehabilitation area was requested to be legally secured as a Declared Area (Category A) under the *Vegetation Management Act 1999* (VMA) to counterbalance the clearing of *M. irbyana*. on site and to ensure objectives of the exchange area are fully achieved.

The "*Voluntary Declaration Management Plan (Melaleuca irbyana Declared Area), 432-520 Greenbank Road, Greenbank, prepared by Saunders Havill Group for Mirvac (Queensland) Pty Ltd, dated March 2019*" was submitted to the Department of Natural Resources, Mines and Energy (DNRME) as part of the Voluntary Declaration and included the following attachments:

- Appendix A – Protected Plants Clearing Permit (Permit No. WA0009354)
- Appendix B - *Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018'*
- Appendix C – Declared Area Plan (proposed)
- Appendix D - *Melaleuca irbyana* Declared Area Rehabilitation Plan, prepared for Mirvac QLD Pty Ltd, by SHG dated March 2019.

Importantly, the Rehabilitation Plan in Appendix D of the Voluntary Declaration application, provides detailed rehabilitation, monitoring and reporting procedures in format suitable for tender and expands on the single page plan in Section 3 of the IMP (previously assessed and approved by DES in 2018 (Permit No. WA0009354).

The Voluntary Declaration Management Plan was approved by DNRME and the Declared Area was secured on title on 3 March 2020 and is shown as Category A (PMAV 2019/002658).

A copy of the Rehabilitation Plan has been extracted and included hereafter for ease of reference.

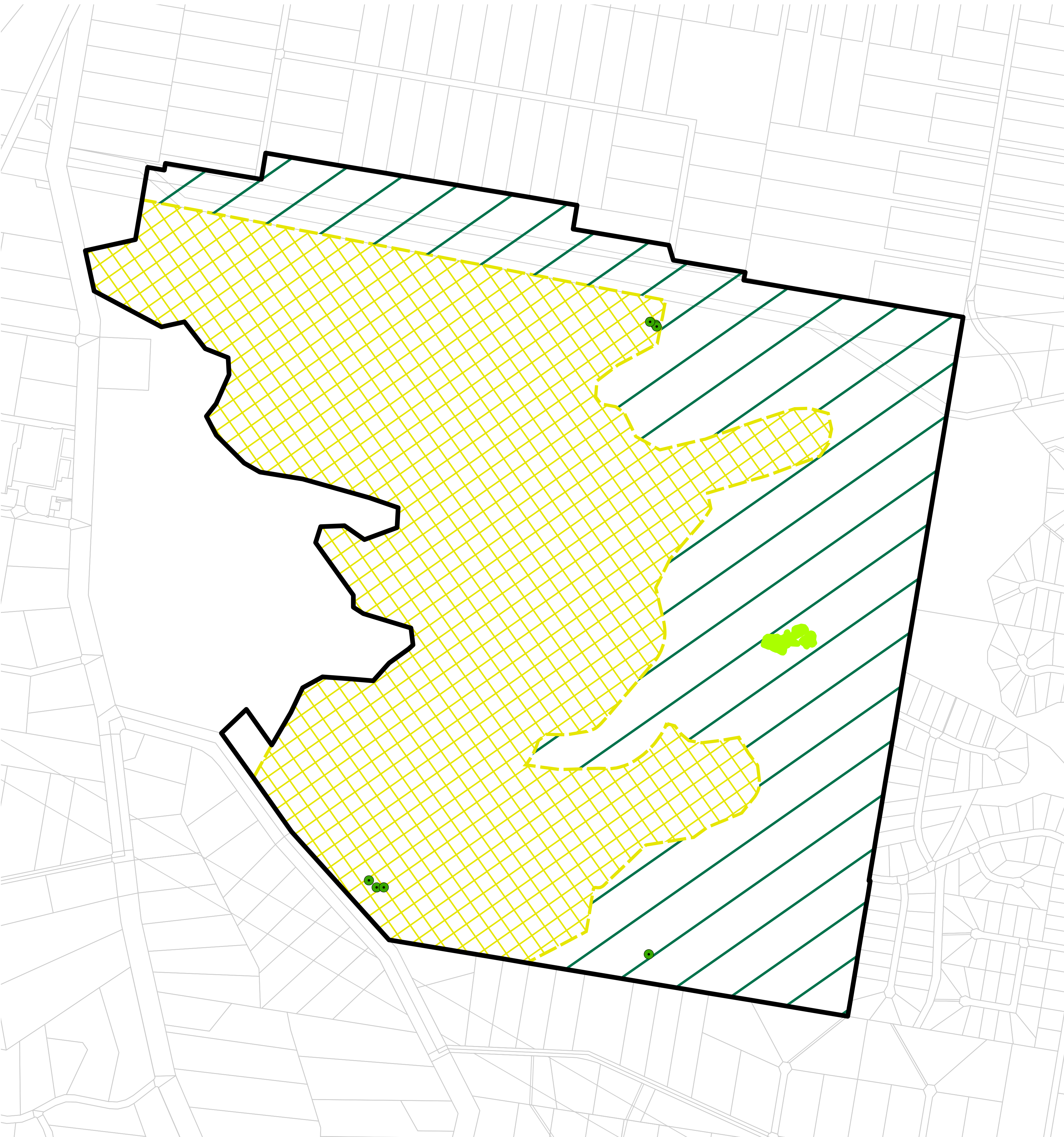
3.5. Rehabilitation

Land care Consultants Evolve were engaged by Mirvac to undertake installation and establishment of the *M. irbyana* rehabilitation area. Rehabilitation works area ongoing in accordance with the Rehabilitation Plan (refer Photos below). It is understood that the *M. irbyana* offset area planting was completed in January 2020 and Evolve are continuing maintenance practices as specified in the approved Rehabilitation Plan. Refer to **Plan 3** for a plan of the rehabilitation area extracted from the VDec.

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

PLAN SET				
SHEET NO.	TITLE	DESCRIPTION	ISSUE	DATE
1	7598 E 01 VDEC RMP B	Cover sheet	B	23/05/2019
2	7598 E 02 VDEC RMP A	Details sheet	A	15/04/2019
3	7598 E 03 VDEC RMP B	Introduction / Weed management	B	23/05/2019
4	7598 E 04 VDEC RMP A	Planting, fauna, responsibilities	A	15/04/2019
5	7598 E 05 VDEC RMP B	Maintenance and monitoring	B	23/05/2019
6	7598 E 06 VDEC RMP A	Monitoring photo plan - Pre-works/Maintenance	A	15/04/2019
7-9	7598 E A01-A03 V-DEC RMP A	Appendix A - Weed treatment & Removal	A	15/04/2019



Legend

- *Melaleuca irbyana* patch
- Declared Area
- Conservation area
- Urban Area
- Project site
- QLD DCDB

saunders havill group

Saunders Havill Group Pty Ltd ABN 24 144 972 949

Brisbane ■ Emerald ■ Rockhampton

■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT:

mirvac Everleigh

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AMENDMENTS:

Issue	Date	Description	Checked
B	24/05/2019	Client Amendments	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

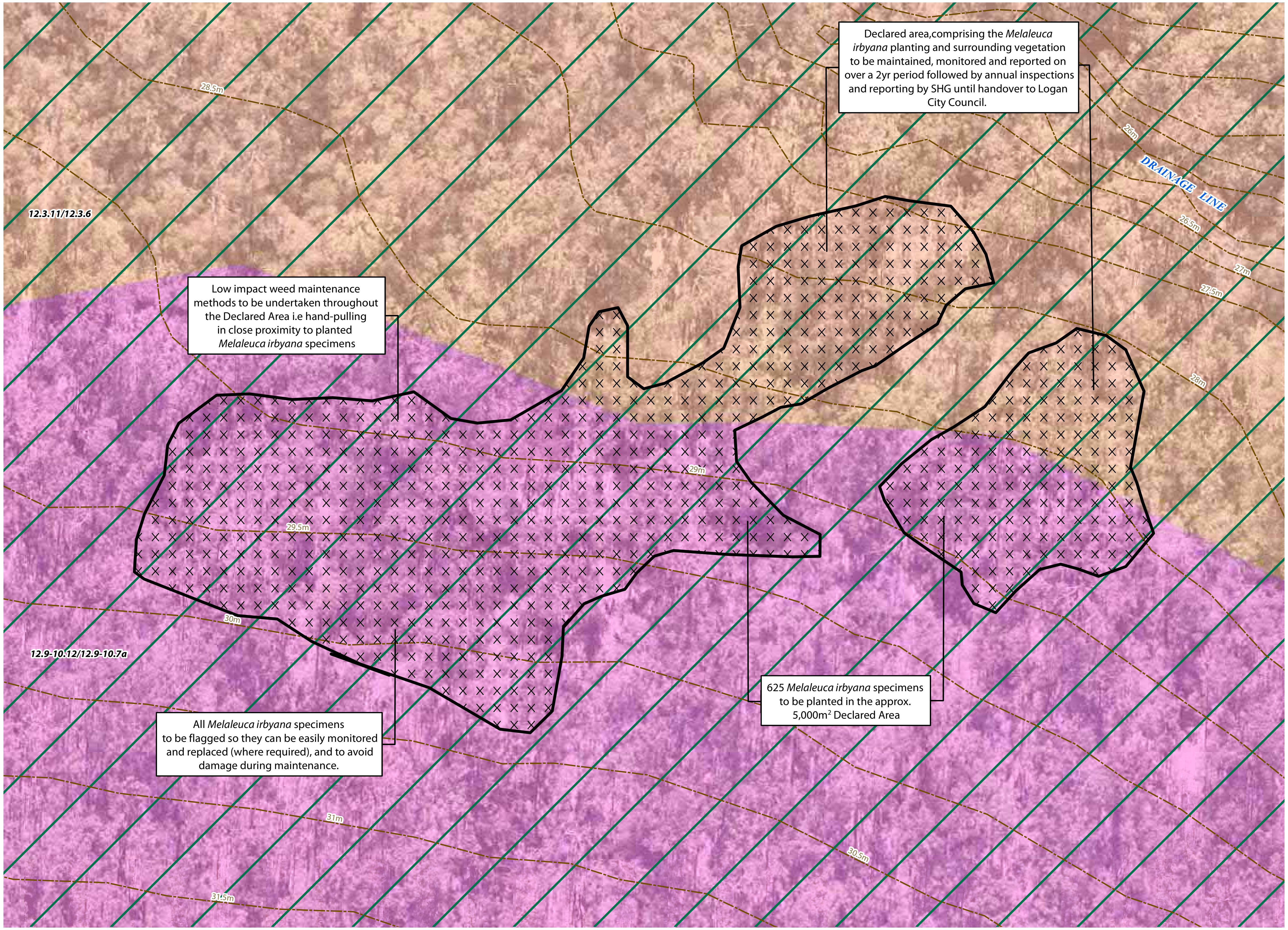
environmental management

PLAN OF: Rehabilitation Plan Cover Sheet

DATE:	24/05/2019	CHECKED:	AD
CLIENT REF.:	JOB NO.	DRAWN:	MC
DRAWING No.:	7598 E 01 VDEC RMP B		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - DETAIL SHEET



LEGEND

- Management Zone 1: Melaleuca Irbyana planting and rehabilitation site (Approx. 5,000m²)
- Conservation area
- Contours (0.5m)

VM regional ecosystem map - v11

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems

saunders havill group

Saunders Havill Group Pty Ltd ABN 24 144 972 949

Brisbane ■ Emerald ■ Rockhampton

■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT: mirvac Everleigh

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REFERENCES:

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AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Detail Sheet

DATE:	15/04/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 02 VDEC RMP A		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

INTRODUCTION

Saunders Havill Group (SHG) was engaged by MIRVAC to prepare a Voluntary Declaration Rehabilitation Plan (VDRP) for the clearing of 140 *Melaleuca irbyana* (Swamp Tree Tree) specimens. The replacement plants will be located in a Declared Area within the approved conservation area of the Everleigh project. The clearing works, current and future will facilitate the creation of residential lots, a school, and internal roads for the site's ultimate development layout.

The rehabilitation proposal for the clearing of 140 *Melaleuca Irbyana* is the planting of more than four (4) advanced tube stock specimens of *Melaleuca Irbyana* per tree cleared. A total of 625 (560+65 additional) *Melaleuca Irbyana* will be planted as a result. The Declared planting area is proposed within the site's conservation zone (refer Plan 2) and will cover 5,000 m². The specific location of the planting area was determined onsite by Ecologists from SHG. The percentage of existing canopy cover and the land zone features were taken into consideration when determining the optimal location for planting. Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *Melaleuca Irbyana* ecological community as possible and maintained as part of the rehabilitation works for the conservation zones. The area of planting of this thicket is centralised within the conservation zone and adjacent the waterway corridor, as stipulated by the EDQ approved NESS, and not within 100m of future development areas.

This Rehabilitation Plan is drafted to identify and manage the site disturbances for the planting of the 625 *Melaleuca Irbyana* specimens within a 5,000m². The planting will involve low impact weed removal and the retention of any existing native vegetation in the immediate area. The planting will be succeeded by a two (2) year period of maintenance, monitoring and reporting, then annual inspections and reporting by SHG until handover to Logan City Council.

REHABILITATION - APPROACHES

Ecologists from SHG have assessed the site's vegetation. Broadly, it was determined that a hybrid of infill planting and minor reconstruction approaches will be used on site. This approach is described below:

ECOLOGICAL RESTORATION APPROACH	
INFILL PLANTING / MINOR RECONSTRUCTION	
Applies:	To natural areas where the native plant community is largely healthy and functioning. Where area retains canopy trees, few T2 layer trees but with largely bare shrub and ground cover layers. 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 the main management issue is weed infestation and/or historical land use practices is causing ground and shrub layers to be absent from the area.
Role of planting:	Infill planting is to assist the existing natural area reach the intended composition through planting specific species.
Goal vegetation community:	The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation.

Note: Table adapted from Gold Coast City Council's 'Guideline for the preparation of a Rehabilitation Plan'

WEED MANAGEMENT

Rehabilitation treatment is to generally include the following points:

- A number of weeds are recorded for removal within shrub & ground layer
- Weed removal and management will utilise low impact methods to minimise impacts on planted *Melaleuca Irbyana* specimens

Weed management typically comprises a major part of rehabilitation site works. Weed management provides the basis of aiding natural regeneration and assisted natural regeneration. It also forms part of the preliminary work required for reconstruction and fabrication scopes. Weed Management to be undertaken in accordance with SEQERF Primary, Follow-up and Maintenance works notes (adjacent).

Critical skills for Weed Management include:

- Knowledge of relevant legislation
- Plant Identification skills
- Knowledge of different weed management techniques

Knowledge of Relevant Legislation:

It is expected contractors have a depth of knowledge of relevant legislation to complete site rehabilitation works.

This may include occupational Health and Safety laws as well as environmental and heritage protection legislation. Bush regenerators must comply with the requirements of the Workplace Health and Safety Act 2011 or, when working on Commonwealth lands, the Commonwealth's Occupational Health and Safety (Commonwealth Employment) Act 1991. Contractors should also obtain all relevant permits required under State and Commonwealth legislation (e.g.Nature Conservation Act 1992, Fisheries Act 1994, Vegetation Management Act 1999, Biosecurity Act 2014). Contractors must also be aware of and adhere to cultural heritage protection obligations under the Aboriginal Cultural Heritage Act 2003 and where chemicals are in use, the Agricultural Chemicals Distribution Control Act 1966.

In addition to the above, contractors should also be familiar with local government body requirements (e.g. Pest Management Plans, Local Codes, Policies and Guidelines) and Classifications of weeds. Refer to adjacent schedules for classification of weeds under the Biosecurity Act 2014).

RESTRICTED MATTERS (*BIOSECURITY ACT 2014*)	
Category	Description
1	must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. Includes red imported fire ants, electric ants, Asian honey bees, and certain animal diseases, aquatic diseases and pathogens.
2	must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. includes certain noxious fish, weeds and pest animals
3	You must not distribute this restricted matter. It must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised in a regulation or under a permit. Deliberate human distribution or disposal contrary to the legislation is a key source of spread into other areas. includes weeds, pest animals and noxious fish
4	You must not move this restricted matter to ensure that it does not spread into other areas of the state. includes specific weeds, pest animals and noxious fish
5	You must not possess or keep this restricted matter under your control. These pests have a high risk of negatively impacting on the environment. You may only keep this restricted matter under a permit of the *Biosecurity Act 2014* or another Act. includes weeds, pest animals and noxious fish
6	You must not feed this category of restricted matter. Feeding this restricted matter may cause their numbers to increase and negatively impact the economy or the environment. Feeding for the purpose of preparing for or undertaking a control program is exempted. Includes invasive animals such as feral deer, foxes, rabbits and wild dogs and noxious fish such as carp, gambusia and tilapia.
7	If you have these noxious fish in your possession you must kill the restricted matter and dispose of the carcass by burying the whole carcass in the ground above the high tide water mark or placing it in a waste disposal receptacle. Includes noxious fish such as carp, weather loach, climbing perch and gambusia

Plant Identification Skills:

Both native and weed species should be identified prior to primary weed removal works and ongoing throughout the follow-up and maintenance periods. This is to maximise natural regeneration and reducing likelihood of accidental weed spraying to native vegetation. Regenerating species to be treated and maintained in a similar manner to newly planted revegetation tubestock. If contractor is unsure of species, advise should be sought by botanist, specialist contractor or confirmed with Queensland Herbarium. Refer to indicative Weed Treatment schedules derived from Queensland Herbarium for an indication of weed species and treatments.

Knowledge of Different Weed Management Techniques:

A range of weed management techniques are available to combat varying weed species and scenarios. Refer to adjacent schedules and Appendix A for an indication of weed management techniques.

WEED MANAGEMENT TECHNIQUES	
METHOD	DESCRIPTION
Herbicide	The herbicide weed control techniques described below provide a range of proven methods that can be used on a restoration site.
Cut - Scrape- Paint	Cut the stem of the plant close to the ground (approximately 1-2cm) ensuring that soil does not come in contact with the cut surface. The cut can be made at a slight angle in order to increase the surface area that is exposed to the chemical. Apply herbicide immediately to the cut stump using poison pot and brush or dripper bottle. Using a knife, scrape the sides of the stump thoroughly to expose the green tissue. Apply herbicide to the scraped stump. The chemical must be applied within 10 seconds of the cut or scrape being made in order for it to be fully effective.
Cut - Paint	Cut the stem of the plant close to ground level. Apply herbicide to the cut stump using poison pot and brush or dripper bottle. This method is best suited to easy-to-treat weeds such as small-leaved privet (Ligustrum sinense), provided that the diameter of the stem at ground level is less than approximately three centimetres. If a glyphosate-/ metsulfuron methyl herbicide mix is being used in the poison pot, a greater range of weeds can be controlled using this method e.g. Easter cassia.
Scrape - Paint	Scrape as much of the stem as possible (one side of the stem) using a knife and apply herbicide to the scrape. Leave a small section of the vine unscraped, and then twist the vine so that the next scrape is made on the opposite side of the stem to the preceding scrape. Continue along the length of the vine, scraping and painting as much of the stem as possible, with scraping to be concentrated along the thicker stems close to the root of the plant. This is the best method to use for madeira vine, as it allows the chemical to translocate to the underground storage organs and aerial tubers which may be hanging in large clusters above head height. This avoids the potential problem of tubers from cut stems left hanging in the trees from dropping to the ground and sprouting. When scraping madeira vine stems a deep scrape is advisable – scrape right through to the fibrous, stringy section of the stem, taking care not to sever the vine. This method is also suitable for treatment of ochna.
Over- spraying	Over-spraying involves the use of knapsacks or power sprayers to treat large expanses of weed such as lantana thickets. The foliage must be covered with herbicide but not to the point of running off the plant. The dead plants remain in place and can be cut down at a later stage. Prior to over-spraying, any weeds that are growing closely around established native plants must be hand removed or treated by cut-scrape-paint.
oll-hang	Vines such as mile-a-minute (*Ipomoea cairica*) which produce long stolons extending many metres along the surface of the ground, are suited to the roll-hang method. Locate the base of the plant and carefully pull up the runners and roll them up. The resulting roll of vine is then hung in the fork of a tree to dry out as if it is left on the ground it is likely to re-shoot. Where runners are climbing up into a tree they are cut off at head height prior to the runner being rolled up – there is no need to pull cut vines down from trees as this action is likely to damage the tree. The base of the vine is treated using the cutscrape-paint method.
Gouge- paint	This method applies to plant species that have a fleshy underground storage organ, such as the large tuber that is often found at the base of madeira vine. It is also particularly appropriate for the treatment of climbing asparagus (*Protasparagus plumosus*). If using this technique on climbing asparagus, first cut the stems that are growing into the canopy at head height and also at the base. The fleshy rhizome can then be gouged, or alternatively in the case of climbing asparagus, it may be struck several times firmly with the head of a pair of loppers, allowing the brown outer covering of the crown to peel away exposing the white fleshy inner section of the rhizome for application of herbicide. Gouge out sections of the fleshy base with a knife and apply herbicide using a paint pot and brush or dripper bottle within 10 seconds.

WEED MANAGEMENT TECHNIQUES	
METHOD	DESCRIPTION
Basal Barking	This method involves mixing an oil-soluble herbicide in diesel/kerosene and painting or spraying the full circumference of the trunk or stem of the plant from ground level to a height of approximately 45cm. Basal bark application is suitable for thin-barked woody weeds including saplings, regrowth and multi-stemmed shrubs. The method will usually result in the mortality of difficult-to-control woody weeds at any time of the year, provided the bark is not wet or too thick to enable the herbicide to penetrate. The method should not be used in wet weather, adjacent to waterways or in areas where native trees and shrubs are located. The use should be restricted to situations where a weed is particularly difficult to control e.g. cherry guava and where other methods have been unsuccessful.
Splatter Gun	This small gas-powered injector kit is fitted into a knapsack for easy carrying and delivers large droplets in a stream over the weed. The gun is used to deliver a concentrated herbicide (glyphosate or metsulfuron methyl) across large dense expanses of weed. The method is used for species such as lantana (ratio of 1:9 of glyphosate:water). Splatter gun involves spraying strips at one to two metre intervals over the thicket. The herbicide is then translocated throughout the entire plant. The method does not require the whole plant to be covered as in over-spray.
Spot- spraying	A knapsack filled with an appropriate herbicide mix is used by the operator to selectively control environmental weeds. A keen eye and an ability to distinguish between the native and weed species likely to be present, especially at seedling stage, is essential. Marker dye is added to the chemical mix to allow the operator to see what has already been sprayed, thus covering the ground weeds comprehensively and thoroughly Glyphosate and metsulfuron methyl are the main herbicides used for spot-spraying in ecological restoration, together with the addition of a penetrant and/or surfactant and marker dye.
Stem Injection	Large woody weeds such as camphor laurel, coral trees (Erythrina spp, Privet Ligustrum spp) and umbrella trees are generally treated by stem-injection. Holes are drilled at regular intervals around the base of the tree and exposed roots using a drill. A tree injection syringe attached to a small capacity knapsack is used to fill the holes with the herbicide. Stem-injection of trees can also be undertaken using a hatchet to create cuts in a 'brickwork pattern' in trunks of trees for the application of herbicide (known as tree frilling). Frilling is more labour intensive than drilling. The greatest benefit of steminjection is that the trees can be left standing in situ as they die, provided there is no risk to humans or infrastructure from falling limbs. This creates convenient roosts for birds and other animals, and prevents the formation of large amounts of debris on the ground and damage to understorey plants which would result if the trees were to be cut down using a chainsaw.
Wick Wiping	Wick wipers can be manually used with a sponge or wick applicator, attached to a container filled with herbicide or as an attachment towed by a tractor. The manual method can be used to selectively apply herbicide to the leaves of weeds growing in sensitive situations. The hand-held container can leak and generally spot spraying would be recommended. The use of a tractor drawn wick wiper is used to control taller growing species such as introduced grasses and to encourage the growth of lower growing species. This method could be used in preparation for planting.
Mechanical	Mechanical weed control involves the use of powered and non-powered equipment such as brushcutters, chainsaws, slashers, shovels, pruners, saws, etc. These methods are best used in situations where there is a large, uninterrupted stand of weeds.
Dig and Bag	Dig and remove tuberous/ rhizomatous root systems. Remove roots or whole plant in hard/ compacted soils. Place in suitable container and remove from site, dispose of by deep burial, burn or burial at a land fill, must not place declared weed species in recycling (mulch).
Hand-Pull	Remove totally from ground by hand (human). Perform when soil is moist. Applicable to small infestations or areas of environmental sensitivity (including sensitive watercourses, when frogs are breeding, or presence of threatened species).
General Mechanical	May involve use of machinery (e.g. brushcutter, chainsaw, slasher, dozer, excavator). Suitable for large infestations and weed trees. Initially cost-effective, but requires immediate revegetation of site or matting/ mulch application and extensive maintenance periods. Generates excessive soil and vegetation disturbance.

Note: Table adapted from a table in SEQERF

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surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT: mirvac Everleigh

REFERENCES:

South East Queensland Ecological Restoration Framework (2012)

Guideline for the preparation of a Rehabilitation Plan (GCC)

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD
B	24/05/2019	Client Amendments	AD

PROJECT: 423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Rehabilitation Plan Notes

DATE: 24/05/2019	CHECKED: AD
CLIENT REF.: 7598	DRAWN: MC
DRAWING No.: 7598 E 03 VDEC RMP B	

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

PLANTING

Prior to undertaking planting installation, the following general items should be considered:

- Sourcing plant material
- Timing of planting
- Site preparation
- Planting density
- Planting installation

Sourcing Plant Material:

There are a number of options for sourcing plant material for revegetation purposes. Propagation from site seed is a good outcome however is often limited by required timing of works. Sourcing planting from local nurseries is the commonly chosen option and has the following benefits:

- Awareness of genetic considerations when collecting seed.
- Experience with breaking dormancy mechanisms in hard to germinate seeds.
- Highly successful propagation techniques.
- Ability to provide high quality stock to order
- Draw on industry resources.

For threatened species, it is recommended to source seed from stock of local provenance, as close to the receiving site as possible—to maintain the genetic signature of the local population. Furthermore, seed should be sourced randomly from as many individuals as possible across the population—to ensure a representative range of genetic material is collected and to minimise potential for inbreeding.

Timing of Planting:

The timing of planting should ideally be aligned with the wet season in SEQ (summer and autumn). This minimises the need for intensive watering to establishment planting. Planting between February to May is the most beneficial as it also seeks to avoid intense heat periods of summer. Despite this, it is understood planting may occur at various times within the rehabilitation areas due to development timing needs.

Site Preparation:

Site or planting preparation includes:

- Fencing to exclude grazing animals and people (if required)
- Pre-spraying of exotic grasses and other weeds to planting areas
- Consideration of source of water for new planting (access tracks, temporary irrigation)
- Arranging delivery of mulch, jute netting and treeguards (if required)
- Treatment of heavily compacted soils by ripping and or application of gypsum
- Soil amelioration as required

Planting Density:

The planting will provide a net benefit of greater than 4 to 1 in an area protected under the NESS. Planting of the 625 specimens will be planted at approximately 1 per 8m2 to form a *Melaleuca Irbyana* thicket.

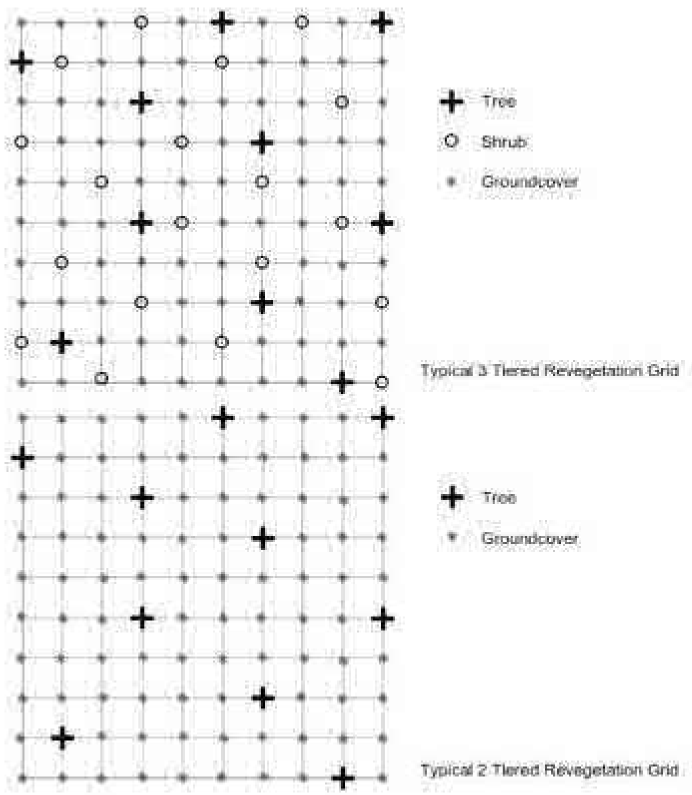
PLANTING INSTALLATION

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimise plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced and qualified bush regenerator. All works shall be in accordance with the provisions of this sheet, local government policies and Australian Standards. Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged.
- Plants are to be planted immediately after delivery to the planting site. If not possible, they should be stored in the shade and watered sufficiently during the day.
- Planting is to be undertaken in accordance with the planting grid contained within this drawing sheet.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient depauperate, hydrophobic etc.) and above areas of potential frequent inundation and water flow, topsoil may be used or the ground mechanically ripped where access is feasible.
- Pre-water plant hole, if soil is dry, to decrease root stress upon planting and assess the infiltration of water through the soil
- Incorporate into the planting substrate the appropriate quantity of prepared water crystals or other suitable hydrating product such as Hortex 'Rainsaver' or 'Moisturaid'.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10mm or any more than 20mm of planting medium
- Plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as required during the construction phase of the development depending on climatic conditions. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, slow release fertiliser is recommended, and is to be administered appropriately during planting. Top dressing with slow release fertiliser is preferred to avoid toxic levels of fertiliser accumulating in the plant hole around the plant roots.
- To ensure successful establishment, all planting surfaces must be covered in:
  - 100mm layer of high-quality weed-free composted chip mulch (site mulch) - Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 200mm
  - suitable individual anchored natural fibre weed mat; or
  - As presented within other section, where available mulch material will be sourced from cleared vegetation material if adequately seasoned.
- A long-term slow release fertiliser, such as Nutricote or similar product should be used for all plantings after initial plant establishment.
- Seedlings and saplings are to be encouraged and maintained throughout the establishment period.

PLANTING SET OUT

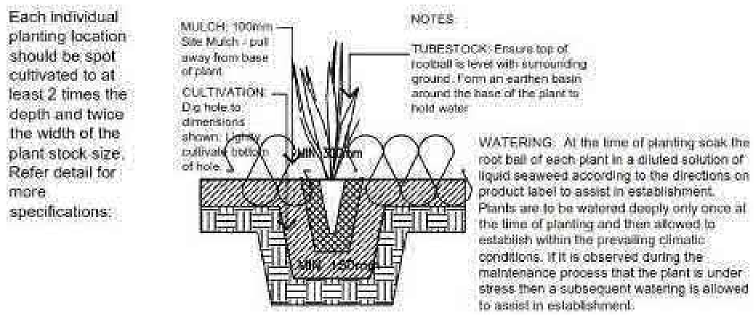
Revegetation planting locations shall be generally set out in accordance with a typical random grid pattern as shown below.



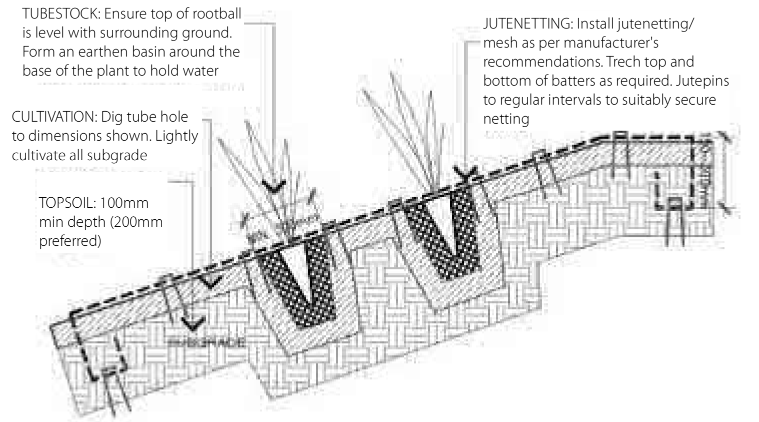
MULCH / JUTE MATTING

Areas to be blanket mulched to a minimum depth of 100mm leaving a 50mm gap surrounding the trunk of planted stock. Areas which are too steep or where overland flows may occur, a combination of mulch and Jute mat and or suitably anchored natural fibre weed mat installed to manufactures specifications have been specified.

Typical planting details as below for standard medium mulch installation and jute netting. Refer to manufacturer's recommendations for detailed jute netting installation including pinning, etc.



Where evidence of plant damage is occurring i.e. Kangaroo or wallaby grazing, tree guards grow tubes to be installed as required.



Jute netting mesh to be installed as per manufacturer's recommendations. Indicative detail shown only.

FAUNA CONSIDERATIONS

Consideration for fauna habitat and values should be given during rehabilitation site works and should seek to enhance and restore the existing native vegetation areas and promote safe fauna movement throughout the site and into the larger greenspace corridors where possible. It is assumed properties adjacent to the rehabilitation scope of works will undertake individual site analysis, fauna investigations, and implement future measures as required. As part of these rehabilitation works, basic fauna works will be undertaken. These treatments will primarily involve:

- Fauna Habitat Value and Protection
- Increased fauna habitat value within the rehabilitation areas.

Rehabilitation Areas to include reuse of site fallen hollow logs and site rock to create fauna safe havens and cover from predators for small fauna. This approach coupled with additional revegetation works allows greater fauna security and movement within the rehabilitation areas. Consideration for bushfire requirements should be reviewed to confirm no conflict in both the fauna and rehabilitation approaches. Refer indicative images below.

RESPONSIBILITIES

It is also critical for all parties to understand their responsibilities as part of the overall rehabilitation 'team'.

REHABILITATION TEAM RESPONSIBILITIES	
PARTY	DESCRIPTION
Proponent	Ensure all consultants, contractors, sub-contractors or others utilizing the area are aware of the Rehabilitation Plan. Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by the Assessment Manager. Provide security via an uncompleted works bond and maintenance bond for the cost of works if required. Cover the costs of all necessary resources to ensure works are completed as per the approved documents.
Consultants	Brief proponent on their requirements in implementing and maintaining works as per the Rehabilitation Plan. Attend pre-start and compliance (on and off maintenance) inspections. Undertake monitoring and reporting to the Assessment Manager as set up by this document. Be available to respond to technical queries to the approved documentation when on-site conditions require changes. Liaise with the Assessment Manager throughout all stages of approval, initial works and maintenance of works.
Assessment Manager	Provide technical expertise via commentary on the approval of documentation. Attend pre-start and compliance (on and off maintenance) inspections. Reduce and release securities held against works at the completion of successful milestone inspections. Be available to respond to technical queries to the approved documentation when on-site conditions require changes. Accept and review maintenance reports as dictated (if required) in this document.
Contractor	Complete works in strict accordance with the documentation. Attend pre-start and compliance (on and off maintenance) inspections. Hold relevant licenses in applicable weed management/ revegetation/ fauna management, any required insurances for scope of works and an understanding of required Laws, Act, Policies and Guidelines. Recommend changes to the documentation when specific experience or on-site conditions require so.

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CLIENT: mirvac Everleigh

REFERENCES:
South East Queensland Ecological Restoration Framework (2012)

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Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:
423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:
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DRAWING No.:	7598 E 04 VDEC RMP A		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

MAINTENANCE

The planting will be followed up by a two (2) year period of maintenance, monitoring and reporting to ensure benchmarks for plant survival and weed management are obtained. Further annual inspections and reporting will be undertaken by SHG until handover to Logan City Council.

Maintenance, as with all ecological restoration work, is fundamental in ensuring project success. Maintenance of the planting includes tasks such as:

- Herbicide spraying to control competing weeds.
- Watering while plants are establishing. This is often highly variable and depends on the suite of species planted, weather conditions and time of year when planted. A watering schedule may consist of watering every day for week 1, twice per week for weeks 2-6 and then weekly from weeks 6-12.
- Repair of tree guards if they become damaged.
- Replenishment of mulch.
- Maintaining exclusion fencing; and
- Additional planting may be required to replace plants that do not survive (e.g.to meet survival rate requirements, or to fill gaps).

Maintenance is required following installation of the plants, although if maintenance is regular and thorough during the first year, maintenance requirements are likely to taper off significantly in the following years. The utilisation of benchmark criteria helps to determine rehabilitation success during the maintenance period and assists in prompting when additional maintenance activities are required. Typically accepted benchmarks or performance indicators for dedicated or open space rehabilitation works include:

- Compliance 'On Maintenance' requirements:
  - All required planting completed.
  - 98% plant survival.
  - 98% kill rate of declared environmental weeds.
- Ongoing 'Off Maintenance' requirements:
  - 98% plant survival.
  - Tree guards, stakes and general rubbish removed.
  - No remaining eroded or degraded areas.
  - 98% kill rate of declared environmental weeds.

The desired end-product is a fully-functioning system that can support itself in perpetuity, with minimal maintenance and input required.

MONITORING

Informal monitoring will occur through ongoing site inspections, note taking and photo-monitoring for the duration of the maintenance / monitoring period (2 years) (Refer to tables below for frequency).

Informal monitoring notes and photos (to address accepted benchmarks above) are to be submitted to SHG and DNRME under the Voluntary Declaration. Notes should also be distributed to the rehabilitation team and rectification works completed against notes.

Monitoring of rehabilitation works is a method of determining ecological restoration success in conjunction with the adjacent benchmarks. Monitoring of the weed management and revegetation works allows for:

- Review of the pre-established performance indicators for measuring the success of the weed removal and control.
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated
- Review the rate of spread or contraction of weed infestation within the control program.
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed.
- Identification of new weed threats or other factors that may be effecting areas designated for rehabilitation.

Monitoring timeframes may involve a series of key milestones:

- Prestart Inspection - On site meeting prior to the initial commencement of work. Typically involves Consultant, Contractor and Assessment Manager to work through rehabilitation areas and clarify any adjustments to scope against approved works.
- Compliance Inspections - At the completion of the Primary Site Works, a compliance inspection meeting will be held with the Consultant, Contractor and Assessment Manager to inspect the works on-site in relation to the approved plans and previously agreed benchmarks performance indicators. Should the rehabilitation be a dedicated asset (open space) to the assessment manager, this inspection is commonly referred to as 'on maintenance'. For dedicated assets, a secondary compliance inspection will be required (off maintenance).
- Ongoing Monitoring Inspections- Monitoring to occur on a regular basis as highlighted above. These inspections will generally occur throughout the process, specifically before, during and after relevant compliance inspections.

Photo-monitoring is required for submission over the duration of the monitoring period. Approximate photo-monitoring locations were determined by SHG during the preliminary approval process (refer *Sheet 6*) and are to be utilised for the remainder of the monitoring period.

A permanent photo point can be set up using a star picket marked with fluorescent yellow safety cap or painted timber stakes, so that a photograph may be taken of the site at regular intervals as it is being restored. A time series of photographs from a degraded state prior to the commencement of restoration, through the transition stages and into the maintenance stage will assist in assessing the success of the ecological restoration process. Collected site data and photos should be compiled in a 'master' monitoring report for proper record keeping.

INDICATIVE SCHEDULE OF WORK ITEMS AND MAINTENANCE SEQUENCING FOR THE TWO (2) YEAR MAINTENANCE PERIOD

TIMING	SPRING			MILESTONE: COMPLIANCE / "ON MAINTENANCE"	SUMMER			AUTUMN		
	PRIMARY WORKS				FOLLOW-UP WORKS			FOLLOW-UP / MAINTENANCE WORKS		
	Month 1	Month 2	Month 3		Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
WEEK 1	Pre-start meeting Council, Contractor and Superintendent	Weed management - "knockdown spray"	Mulch spreading and Jute-mat installation		Watering and Monitoring and reporting (throughout establishment)	Watering and Monitoring and reporting (throughout establishment)	Watering and Monitoring and reporting (throughout establishment)	Monitoring and reporting (watering to replacement plants only)	Monitoring and reporting	Monitoring and reporting
WEEK 2	Initial weed management works - wood weed removal /"knockdown" spray	Soil Preparation and cultivation	Natural regeneration plants staking for identification		Weed management - "knockdown spray" in mulched areas	Weed management - "knockdown spray" re-apply woody weeds	Weed management - "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas
WEEK 3	Weed management works - removal by hand	Soil Preparation and modification	Planting and Watering		Natural regeneration plants - weed management	Replacement of Failed Plants	Replacement of Failed Plants	Natural regeneration plants - weed management	Natural regeneration plants - weed management	Replacement of Failed Plants
WEEK 4	Weed Management - slashing of maintenance access paths	Mulch - stockpiled on site	Planting and Watering		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths

TIMING	WINTER			SPRING			SUMMER		
	MAINTENANCE WORKS			MAINTENANCE WORKS			MAINTENANCE WORKS		
	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
WEEK 1	Monitoring (watering to replacement plants only). Photomonitoring as required		Informal monitoring and reporting	Informal monitoring and reporting. Photomonitoring as required.		Informal monitoring and reporting	Monitoring (watering to replacement plants only). Photomonitoring as required		Informal monitoring and reporting
WEEK 2	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas
WEEK 3	Natural regeneration plants - weed management		Trees formative pruning			Replacement of Failed Plants			
WEEK 4	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths

TIMING	AUTUMN			WINTER			SPRING			MILESTONE: COMPLIANCE / "OFF MAINTENANCE"
	MAINTENANCE WORKS			MAINTENANCE WORKS			MAINTENANCE WORKS			
	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	
WEEK 1	Informal monitoring and reporting. Photomonitoring as required.		Monitoring and reporting	Informal monitoring and reporting. Photomonitoring as required.		Informal monitoring and reporting	Mulch - top up depths to 100mm and replace / repair Jutematting as required	Informal monitoring and reporting. Photomonitoring as required.	Monitoring (watering to replacement plants only)	
WEEK 2	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Natural regeneration plants - weed management	Weed management - "knockdown spray" re-apply woody weeds	Weed management - "knockdown spray" in mulched areas	
WEEK 3	Natural regeneration plants - weed management		Trees formative pruning				Trees formative pruning	Replacement of Failed Plants	Natural regeneration plants - weed management	
WEEK 4	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Replacement of Failed Plants	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	

INDICATIVE SCHEDULE OF MAINTENANCE AND MONITORING SEQUENCING UNTIL HANDOVER TO COUNCIL

ACTIVITY	INDICATIVE OCCURANCE - YEAR 0-2	INDICATIVE OCCURANCE - YEAR 2 UNTIL HANDOVER TO COUNCIL
Cleaning Operations		
Litter Collection (general landscape)	"As above"	Annually*
Horticultural Environment		
Planting of shrubs and trees (infill planting post initial works)	"As above"	Annually*
Care of existing trees and shrubs (inc. formative pruning)	"As above"	Annually*
Native bushland maintenance (inc. maintaining access paths, mulch, matting, etc.)	"As above"	Annually*
Pest control	"As above"	Annually*
Weed treatment	"As above"	Annually*
Watering	"As above"	Monitor*
Monitoring / Photo location	Quarterly	Annually
* Reactionary maintenance as required		

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CLIENT: mirvac Everleigh

REFERENCES:

South East Queensland Ecological Restoration Framework (2012)

AMENDMENTS:

Issue	Date	Description	Checked
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PROJECT: 423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Maintenance & Monitoring

DATE: 24/05/2019 CHECKED: AD

CLIENT REF.: 7598 DRAWN: MC

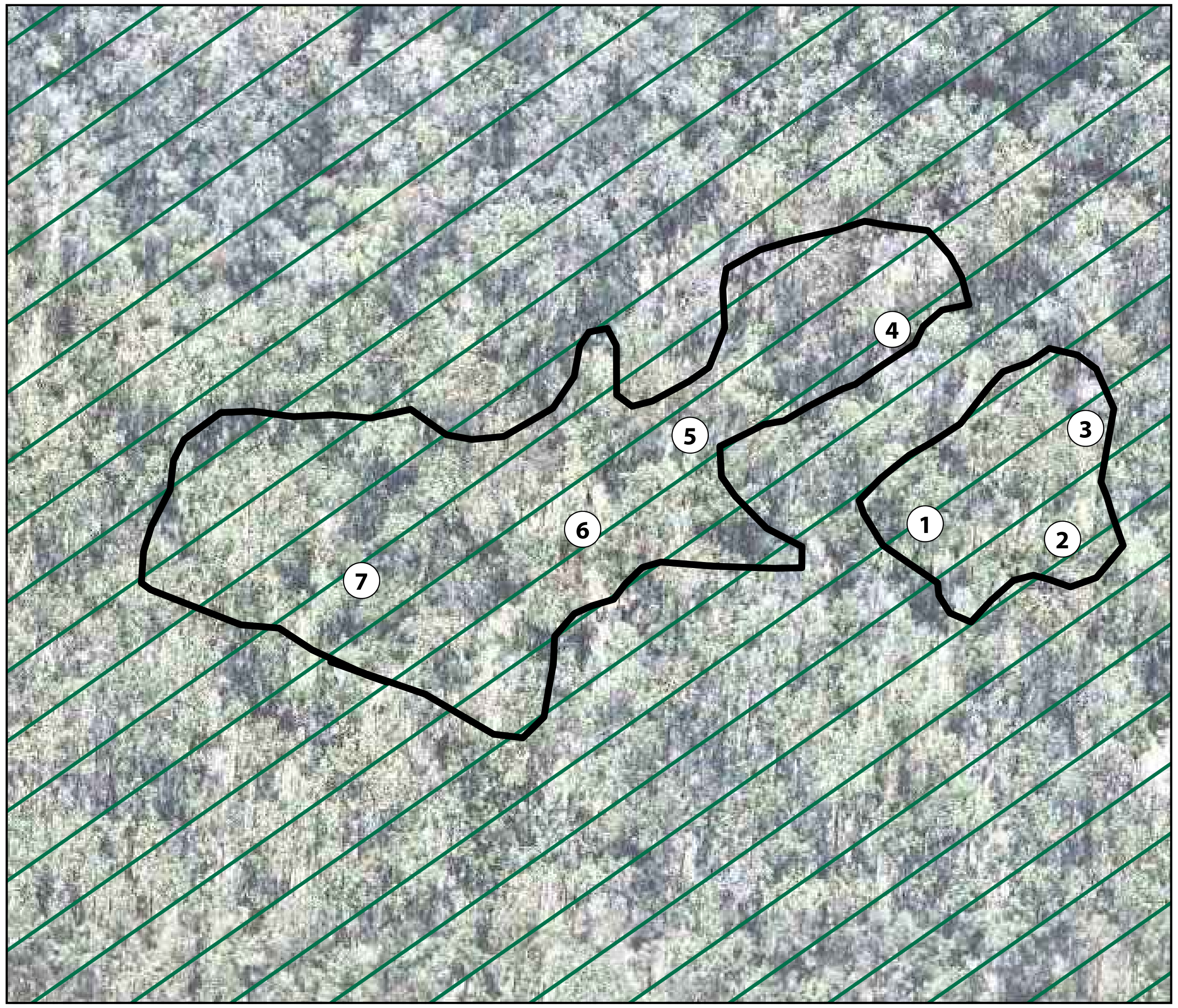
DRAWING No.: 7598 E 05 VDEC RMP B

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - APPROXIMATE PHOTO MONITORING LOCATIONS

LEGEND

- Photo monitoring location (approximate)
- Conservation area
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)



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CONFIRM ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION AND DO NOT SCALE FROM THE DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETRES. ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH SAUNDERS HAVILL GROUP PRIOR TO THE COMMENCEMENT OF WORK.

PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDER-GROUND SERVICES AND DETAILD LOCATIONS OF ALL SERVICES.

REFERENCES:

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AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:

Photo monitoring locations

DATE:	15/04/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 06 VDEC RMP A		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (1)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
1	Verbenaceae	Lantana camara var. camara (lantana)	10	455	5	S/O	Seedlings: Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
2	Asteraceae	Baccharis halimifolia (groundsel bush)	10	168	5	S/O	Seedlings: Hand pull	
3	Crassulaceae	Bryophyllum delagoense (mother of millions)	8	38	5	H/O	Hand pull and dispose	
4	Bignoniaceae	Macfadyena unguis-cati (cat's claw creeper)	5	36	5	V/O	Tubers: crown or dig up, bag and remove.	
	Basellaceae	Anredera cordifolia (madeira vine)	8	16	5	V/O	Small Vines & Tubers: Hand pull. Bag and dispose.	
6	Asparagaceae	Asparagus africanus (ornamental asparagus, asparagus fern)	7	26	5	V/O	dig out roots and dispose of at local council landfill site. remove entire crown and underground stem to prevent regrowth	
7	Ulmaceae	Celtis sinensis (Chinese celtis)	8	19	5	T/O	remove when small .hand pull or dig out small seedlings. combine dozing, burning and controlled grazing for large infestations	
8	Lauraceae	Cinnamomum camphora (camphor laurel)	7	25	5	T/O	Seedlings: Hand pull	
9	Anacardiaceae	Schinus terebinthifolius (broad-leaf pepper tree)	6	49	5	T/O	Seedlings: Hand pull	
	Salviniaceae	Salvinia molesta (salvinia)	8	57	5	Ha/F	Mechanical removal of small infestations; Salvinia weevil (Biological control)	
11	Cabombaceae	Cabomba caroliniana (cabomba, fanwort)	4	12	5	Ha/F	Mechanical removal of small infestations	
12	Asteraceae	Chrysanthemoides monilifera subsp. rotundata (bitou bush)	3	23	5	S/OA	N/A	
13	Pontederiaceae	Eichhornia crassipes (water hyacinth)	4	8	5	Ha/OF	Mechanical removal of small infestations	
14	Acanthaceae	Hygrophila costata (Glush weed)	3	7	5	Ha/F	Hand pull smal infestations. Can be controlled by planting competitive native species.	
	Oleaceae	Ligustrum lucidum (tree privet)	5	9	5	T/O	Seedlings: Hand pull	
16	Asteraceae	Sphagneticola trilobata (Singapore daisy)	6	34	5	H/O	Hand pull	
17	Asteraceae	Ageratina adenophora (crofton weed)	6	38	5	H/O	Hand pull and hang to dry.	
18	Verbenaceae	Lantana montevidensis (creeping lantana)	8	62	5	S/O	Fire and/or mechanical control	
19	Fabaceae	Neonotonia wightii (glycine)	5	16	5	H/A	N/A	
	Poaceae	Panicum maximum (green panic and guinea grass)	8	78	5	H/A	Hand or mechanical removal of small infestations	
21	Oleaceae	Ligustrum sinense (Chinese privet)	4	11	5	T/O	Seedlings: Hand pull	
22	Ochnaceae	Ochna serrulata (ochna)	7	33	5	S/O	N/A	
23	Asparagaceae	Asparagus aethiopicus cv. Sprengeri (asparagus ground fern)	5	35	5	H/O	dig out unwanted plants and dispose of at the appropriate council landfill. remove the entire crown of underground stem of plant to prevent regrowth	
24	Poaceae	Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses)	8	72	5	H/U?	Hand or mechanical removal of small infestations	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
25	Asteraceae	Ageratina riparia (mistflower)	5	38	5	H/O	Hand pull and hang to dry.	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
26	Asclepiadaceae	Araujia sericifera (mothvine)	9	38	4	V/O	Seedlings & Vines: Hand pull. Bag and remove fruit.	
27	Crassulaceae	Bryophyllum daigremontianum x B. delagoense (hybrid mother-of millions)	6	15	5	H/O	Hand pull and dispose	
28	Convolvulaceae	Ipomoea cairica (mile-a-minute)	7	56	4	V/O	Vines & Runners: hand pull, roll up and hand up to dry.	
29	Sapindaceae	Cardiospermum grandiflorum (balloon vine)	7	31	4	V/O	Seedlings & Small Vines: Hand Pull	
30	Asclepiadaceae	Cryptostegia grandiflora (rubber vine)	6	19	4	V/O	Scatteredered or medium-density infestations: Where possible, repeated slashing close to ground level is recommended.	
31	Phytolaccaceae	Rivina humilis (baby pepper)	8	61	4	H/O	Hand pull and hang to dry.	
32	Poaceae	Sporobolus africanus (Parramatta grass)	8	48	5	H/U	Hand or mechanical removal of small infestations	
33	Poaceae	Sporobolus fertilis (giant Parramatta grass)	9	27	5	H/U	Hand or mechanical removal of small infestations	
34	Poaceae	Eragrostis curvula (African lovegrass)	7	29	4	H/U	Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first.	
35	Asteraceae	Gymnocoronis spilanthoides (Senegal tea)	3	4	5	Ha/F	place plant material in a sealed plastic bag, leave in sunlight to rot then burn or dispose of at a council-approved land fill tip	
36	Amaranthaceae	Alternanthera philoxeroides (alligator weed)	1?	3	5	Ha/U	physical removal of plant should not be attempted	
37	Passifloraceae	Passiflora suberosa (cork passionflower)	8	166	4	V/O	N/A	
38	Poaceae	Melinis minutiflora (molasses grass)	5	17	5	H/A	Grazing or mowing	
39	Aristolochiaceae	Aristolochia elegans (Dutchman's pipe)	8	30	4	V/O	Stems: Hand pull; Fruit: Bag and remove.	
40	Convolvulaceae	Ipomoea indica (blue morning glory)	5	24	4	V/O	Vines and Runners: hand pull, roll up and hang to dry.	
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4	ST/A	Small plants: Hand pull or mechanical removal	
42	Poaceae	Brachiaria mutica (para grass)	6	18	4	Ha/A	Grazing	
43	Hydrocharitacea e	Egeria densa (egeria waterweed)	2	7	4	Ha/F	hand pulling, cutting and digging with machines effective	
44	Pinaceae	Pinus elliottii (slash pine)	4	22	4	T/A	Seedlings: Hand pull; Saplings and Trees: cut close to ground or ring-bark	
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4	ST/A	Small plants: Hand pull or mechanical removal	
42	Poaceae	Brachiaria mutica (para grass)	6	18	4	Ha/A	Grazing	
43	Hydrocharitacea e	Egeria densa (egeria waterweed)	2	7	4	Ha/F	hand pulling, cutting and digging with machines effective	
44	Pinaceae	Pinus elliottii (slash pine)	4	22	4	T/A	Seedlings: Hand pull; Saplings and Trees: cut close to ground or ring-bark	
45	Caesalpiniaceae	Senna pendula var. glabrata (Easter cassia)	7	33	4	ST/O	Seedlings: Hand pull	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
46	Poaceae	Chloris gayana (Rhodes grass)	9	55	4	H/A	Hand pulling and removal and digging of larger clumps	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
47	Crassulaceae	Bryophyllum pinnatum (resurrection plant)	6	17	4	H/O	Hand pull and dispose	
48	Asteraceae	Parthenium hysterophorus (parthenium weed)	6	14	4	H/U	hand pulling of small areas is not recommended	
49	Caprifoliaceae	Lonicera japonica (Japanese honeysuckle)	3	6	4	V/O	Vines and Runners: hand pull, roll up and hang to dry.	
50	Acanthaceae	Thunbergia alata (black eyed susan)	5	22	4	H/O	N/A	
51	Fabaceae	Macroptilium atropurpureum (siratro)	8	39	4	V/A	N/A	
52	Rosaceae	Rubus ellipticus (yellowberry)	4	26	4	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	
53	Colchicaceae	Gloriosa superba (glory lily)	3	26	4	V/O	N/A	
54	Verbenaceae	Phyla canescens (lippia, Condamine couch)	3	4	4	Ha/O	a combined approach of different control methods including chemical and mechanical with land management practices is most effective	
55	Solanaceae	Solanum seaforthianum (Brazilian nightshade)	8	78	4	V/O	Hand pull	
56	Araceae	Pistia stratiotes (water lettuce)	3	8	4	Ha/OF	Mechanical removal of small infestations	
57	Asparagaceae	Asparagus plumosus (asparagus fern)	4	8	4	V/O	Rhizomes: crown and hang to dry.	
58	Commelinaceae	Tradescantia fluminensis (Qld use T. albiflora) (wandering jew)	5	9	4	H/O	N/A	
59	Solanaceae	Cestrum parqui (green cestrum)	6	36	4	S/O	Seedlings: Hand pull	
60	Caesalpiniaceae	Senna septemtrionalis (arsenic bush, was S. floribunda)	6	25	4	S/O	Seedlings: Hand pull	
61	Solanaceae	Solanum mauritianum (wild tobacco tree)	8	30	4	S/O	Seedlings: Hand pull	
62	Apocynaceae	Catharanthus roseus (pink periwinkle)	5	22	4	S/O	Hand pull	
63	Passifloraceae	Passiflora subpeltata (white passion flower)	10	60	4	V/O	Stems: Hand pull	
64	Fabaceae	Desmodium uncinatum (silverleaf desmodium)	5	14	4	H/A	Hand pull or crown and dispose	
65	Poaceae	Melinis repens (red Natal grass)	10	134	4	H/A	Grazing or mowing	
66	Nymphaeaceae	Nymphaea caerulea subsp. zanzibarensis (blue lotus)	4	17	4	Ha/OF	Hand pull small infestations.	
67	Onagraceae	Oenothera drummondii subsp. drummondii (beach evening primrose)	3	17	4	H/O	Hand pull	
68	Tiliaceae	Triumfetta rhomboidea (Chinese burr)	7	44	4	H/U	Hand pull	
69	Haloragaceae	Myriophyllum aquaticum (parrot's feather)	3	15	4	Ha/F	N/A	
70	Passifloraceae	Passiflora foetida (stinking passion flower)	7	50	4	V/O	Hand Pull	
71	Asteraceae	Verbesina encelioides (crownbeard)	7	34	4	H/U	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
72	Poaceae	Paspalum mandiocanum (broad leaf paspalum)	3	6	4	H/A	N/A	
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	4	H/A	Hand pull or dig up	

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surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT:

mirvac Everleigh

DISCLAIMER:

[illegible]

REFERENCES:

Queensland Herbarium Invasive Naturalised Plants in South East Queensland

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:

Weed Treatment & Removal

DATE: 15/04/2019 CHECKED: AD

CLIENT REF: 7598 DRAWN: MC

DRAWING No.: 7598 E A07 VDEC RMP A

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (2)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	4	H/A	Hand pull or dig up	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
74	Ruppiaceae	Ruppia maritima (sea tassel)	2	8	4	Ha/F	Hand pull or dig up	
75	Arecaceae	Syagrus romanzoffiana (queen palm)	4?	10	4	T/O	Seedlings: Hand pull or crown; Trees: cut below growing point	
76	Poaceae	Hymenachne amplexicaulis cv. Olive (hymenachne)	1?	1	4	Ha/A	a combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective	
77	Asteraceae	Senecio tamoides (Canary creeper)	3	8	4	V/O	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
78	Poaceae	Cenchrus ciliaris (buffel grass)	4	15	4	H/A	Hand or mechanical removal of young plants	
79	Acanthaceae	Thunbergia grandiflora (thunbergia, blue thunbergia)	2	3	5?	V/O	N/A	
80	Cactaceae	Opuntia tomentosa (velvet tree pear)	8	46	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
81	Euphorbiaceae	Ricinus communis (castor oil plant)	7	20	4	S/O	Seedlings: Hand pull	
82	Asteraceae	Senecio madagascariensis (fire weed)	6	28	4	H/U	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
83	Cyperaceae	Cyperus involucratus (African sedge)	6	15	4	Ha/OF	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	
84	Asteraceae	Tithonia diversifolia (Mexican sunflower)	5	11	4	H/O	N/A	
85	Poaceae	Setaria sphacelata (South African pigeon grass)	9	41	4	H/A	Hand pull or dig up	
86	Asclepiadaceae	Gomphocarpus physocarpus (balloon cotton bush)	10	132	4	S/OU	Slash in winter and burn cuttings. Wanderer Butterfly can also be used as biological control.	
87	Poaceae	Digitaria didactyla (Queensland blue couch)	9	70	4	H/A	Hand pull or cultivation	
88	Caesalpiniaceae	Gleditsia triacanthos (honey locust)	7	12	4	T/O	For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method.	
89	Poaceae	Paspalum notatum (bahia grass)	4	10	4	H/A	Hand pull or dig up	
90	Cactaceae	Opuntia monacantha (drooping tree pear, syn. O. vulgaris)	2	3	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
91	Poaceae	Paspalum conjugatum (paspalum grass)	7	38	4	H/A	Cut below crown.	
92	Malpighiaceae	Hiptage benghalensis (hiptage)	3	5	4	S,V/O	Hand pull small infestations.	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
93	Solanaceae	Solanum torvum (devil's fig)	6	39	4	S/O	Seedlings: Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
94	Caesalpiniaceae	Caesalpinia decapetala (thorny poinciana)	4	20	4	S,V/O	Seed-heads: Bag and remove.	
95	Poaceae	Pennisetum alopecuroides (swamp foxtail)	7	29	4	H/O	Hand Pull	
96	Verbenaceae	Duranta erecta (duranta)	6	14	4	ST/O	Shrubs: CS&P (1:1.5)	
97	Brassicaceae	Nasturtium officinale (Qld use Rorippa nasturtium-aquaticum) (watercress)	7	19	4	Ha/FU	Manually grub and destroy.	
98	Polygonaceae	Acetosa sagittata (rambling dock)	4	18	4	V/U	Tubers: Dig up, bag and remove.	
99	Poaceae	Cynodon dactylon (couch, Bahama grass introduced cultivars)	10	45	4	H/OA	Hand pull small infestations, removing all roots or smother with mulch.	
100	Bignoniaceae	Tecoma stans (yellow bells)	4	16	4	ST/O	N/A	
101	Rosaceae	Rhaphiolepis indica (Indian hawthorn)	3	10	4	ST/O	Seedlings: Hand pull	
102	Mimosaceae	Mimosa pudica (common sensitive plant)	4	12	4	S/A	N/A	
103	Commelinaceae	Callisia fragrans (purple succulent)	3	9	4	H/O	N/A	
104	Scrophulariaceae	Paulownia tomentosa (paulownia)	3	5	4	T/AO	Seedlings: Hand pull	
105	Commelinaceae	Tradescantia zebrina (zebrina)	3	12	4	H/O	N/A	
106	Acanthaceae	Ruellia malacosperma (ruellia)	5	16	4	H/O	N/A	
107	Poaceae	Pennisetum clandestinum (kikuyu grass)	4	12	4	H/A	Hand Pull	
108	Liliaceae	Lilium formosanum (Taiwan lily)	5	10	4	H/O	Hand pull or crown and dispose	
109	Asteraceae	Sigesbeckia orientalis (Indian weed)	10	148	4	H/U	Hand pull or cultivation.	
110	Asteraceae	Bidens pilosa (cobbler's pegs)	10	110	4	H/U	Hand pull or cultivation.	
111	Cactaceae	Opuntia stricta (common prickly pear)	7	67	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
112	Poaceae	Eleusine indica (crowsfoot grass)	8	55	4	H/A	Pull and chip. Replant with native couch.	
113	Poaceae	Axonopus compressus (broad leaved carpet grass)	5	23	4	H/AO	Cut stems from roos.	
114	Lamiaceae	Salvia coccinea (red salvia)	9	46	4	H/O	remove small areas by hand or machine	
115	Asteraceae	Ageratum houstonianum (blue billygoat weed)	8	81	4	H/UO	N/A	
116	Myrtaceae	Psidium guajava and P. guineense (yellow guava and West Indes guava)	4	7	4	ST/AO	N/A	
117	Rosaceae	Rubus bellobatus (kittatinny blackberry)	5	22	4	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	
118	Myrtaceae	Eugenia uniflora (Brazilian cherry)	4	19	4	ST/O	N/A	
119	Oleaceae	Olea europaea (olive)	2	6	4?	T/A	Seedlings: Hand pull	
120	Poaceae	Brachiaria decumbens (signal grass)	4	14	4	H/A	Grazing	
121	Fabaceae	Stylosanthes scabra (shrubby stylo)	4	4	4.3?	H/A	N/A	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
122	Commelinaceae	Commelina benghalensis (hairy wandering jew)	4	7	4	H/O	Collect and Bag	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
123	Poaceae	Pennisetum purpureum (elephant grass)	2	9	4	H/O	Grazing or mechanical removal	
124	Zingiberaceae	Hedychium coronarium (wild ginger)	2	2	4	H/O	Small Plants: Hand pull and dispose	
125	Phytolaccaceae	Phytolacca octandra (inkweed)	10	50	3	H/O	Hand pull or crown	
126	Asclepiadaceae	Asclepias curassavica (red cotton bush)	9	43	3	S/O	Hand pull; Slash	
127	Solanaceae	Lycium ferocissimum (African boxthorn)	1?	5	4.4?	S/O	N/A	
128	Mimosaceae	Prosopis pallida (algaroba)	2	2	4	ST/O	When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface). If this is not removed, re-shooting can occur.	
129	Juncaceae	Juncus articulatus (jointed rush)	1	2	4	Ha/FO	Hand pull.	
130	Cactaceae	Opuntia aurantiaca (tiger pear)	1	2	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
131	Poaceae	Arundo donax (giant reed)	1	4	4	H/O	Physical removal of small infestations.	
132	Cactaceae	Opuntia imbricata (rope pear)	1	1	4	H/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
133	Bignoniaceae	Pyrostegia venusta (flame vine)	1	1	4	V/O	N/A	
134	Poaceae	Cortaderia selloana (pampas grass)	2	1	4	H/O	Small Plants: dig out by hand or machine	
135	Solanaceae	Solanum hispidum (giant devil's fig)	5	23	4	S/O	Hand pull	
136	Agavaceae	Furcraea foetida (Cuban hemp)	3	4	4.3?	S/OA	Dig out by hand or machine	
137	Agavaceae	Furcraea selloa (hemp)	1	2	4?	S/OA	Dig out by hand or machine	
138	Agavaceae	Agave americana (century plant)	4	9	4	S/OA	Dig out by hand or machine	
139	Rutaceae	Murraya paniculata cv. Exotica (murraya)	6	26	4	S/O	Seedlings: Hand pull	
140	Rosaceae	Rubus discolor (R. fruticosus complex, a blakberry)	4	10	4	S/OA	slashing hinders growth, giving some control if plants are slashed before they seed	
141	Brassicaceae	Cakile edentula (American sea rocket)	4	24	4	H/U	Manually grub and destroy.	
142	Balsaminaceae	Impatiens walleriana (balsam)	2	6	4	H/O	N/A	
143	Agavaceae	Agave sisalana (sisal)	2	4	4	S/OA	Dig out by hand or machine	
144	Agavaceae	Agave vivipara var. vivipara (sisal)	2	3	4	S/OA	Dig out by hand or machine	
145	Rosaceae	Prunus munsoniana (wild goose plum)	7	31	4	ST/A	Seedlings: Hand pull	
146	Poaceae	Echinochloa crus-galli (barnyard grass)	6	34	4	H/A	Hand pull or dig out small infestations.	

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CLIENT:

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REFERENCES:

Queensland Herbarium Invasive Naturalised Plants in South East Queensland

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:

Weed Treatment & Removal

DATE: 15/04/2019 CHECKED: AD

CLIENT REF.: 7598 DRAWN: MC

DRAWING No.: 7598 E A08 VDEC RMP A

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (3)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
147	Asteraceae	Solidago canadensis var. scabra (Canadian goldenrod)	7	15	4?	H/O	Hand pull and hang to dry.	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
148	Fabaceae	Pueraria lobata (kudzu)	3	4	4	V,S/O	Slash; Diminish by shading site	
149	Alismataceae	Sagittaria graminea var. platyphylla (sagittaria arrowhead)	3	7	4	Ha/FO	Physical removal of small infestations.	
150	Nymphaeaceae	Nymphaea mexicana (yellow waterlily)	2	4	4	Ha/OF	Hand pull small infestations.	
151	Poaceae	Phyllostachys aurea (fishpole bamboo)	1	2	4	S/O	N/A	
152	Euphorbiaceae	Jatropha gossypiifolia (cotton-leaf physic nut, bellyache bush)	1	1	4	S/O	Hand pull	
153	Malvaceae	Sida rhombifolia (Paddy`s lucerne)	9	69	4	S/U	Hand pull or dig out.	
154	Poaceae	Themeda quadrivalvis (grader grass)	8	25	4	H/A	Hand pull or dig out small infestations.	
155	Poaceae	Andropogon virginicus (whisky grass)	6	14	4	H/A	Hand pull or dig out small infestations.	
156	Bignoniaceae	Jacaranda mimosifolia (jacaranda)	4	12	3	T/O	Seedlings: Hand pull	
157	Acanthaceae	Justicia betonica (squirreltail)	2	4	4	S/O	Hand pull smal infestations. Can be controlled by planting competitive native species.	
158	Mimosaceae	Acacia boliviana (Bolivian wattle)	1	1	4	T/O	Mechanical or chain removal.	
159	Simaroubaceae	Ailanthus altissima (tree of heaven)	1?	3	4	T/O	Seedlings: Hand pull	
160	Poaceae	Echinochloa colona (awnless barnyard grass)	9	44	3	H/A	Hand or mechanical removal of small infestations	
161	Cyperaceae	Cyperus brevifolius (Mullumbimby couch)	8	53	3	H/O	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
162	Moraceae	Morus alba (white mulberry)	3	10	3	T/O	N/A	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
163	Arecaceae	Colocasia esculenta (taro)	3	4	3	H/AO	Hand pull.	
164	Cannaceae	Canna indica (canna lily)	3	9	3	H/O	Dig out entire plant	
165	Buddlejaceae	Buddleja madagascariensis (buddleja)	5	6	3	S,V/O	N/A	
166	Bignoniaceae	Tecoma capensis (Cape honeysuckle)	3	8	4	ST/O	N/A	
167	Cactaceae	Harrisia martinii (harrisia cactus)	2?	4	4	S/O	The use of the biological mealy-bug agent is recommended	
168	Acanthaceae	Thunbergia laurifolia (laurel clock vine)	1	1	4	V/O	N/A	
169	Fabaceae	Erythrina crista-galli (cockspur coral tree)	2?	4	4	T/O	N/A	
170	Sapindaceae	Koelreuteria elegans (Chinese rain tree)	1?	1	3.6?	T/O	Seedlings: Hand pull	
171	Zingiberaceae	Hedychium gardnerianum (ginger lily)	1?	3	4	H/O	Small Plants: Hand pull and dispose	
172	Acanthaceae	Hypoestes phyllostachya (polka-dot plant	3	5	4	H/O	Hand pull or crown and dispose	
173	Caprifoliaceae	Sambucus canadensis (American elder)	3	7	3	ST/O	Vines and Runners: hand pull, roll up and hang to dry.	
174	Asteraceae	Conyza sumatrensis (tall fleabane)	9	45	3	H/U	Hand or mechanical removal of small infestations	
175	Fabaceae	Tipuana tipu (tipuana)	2	5	3	T/O	Seedlings: Hand pull	
176	Asteraceae	Tagetes minuta (stinking roger)	8	32	3	H/U	Hand pull and hang to dry.	
177	Caesalpiniaceae	Chamaecrista rotundifolia (round-leaf cassia)	6	14	3	ST/A	Seedlings: Hand pull	
178	Poaceae	Cenchrus echinatus (Mossman river grass)	8	43	3	H/A	Hand or mechanical removal of young plants	
179	Asteraceae	Conyza canadensis (Canadian fleabane)	10	55	3	H/U	Hand or mechanical removal of small infestations	
180	Euphorbiaceae	Euphorbia cyathophora (painted spuge)	8	20	3	H/O	Hand pull	
181	Poaceae	Setaria palmifolia (palm leaf setaria)	5	13	3	H/O	Hand pull or dig up	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
182	Euphorbiaceae	Euphorbia heterophylla (milk weed)	5	12	3	H/O?	Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
183	Fabaceae	Desmodium intortum (greenleaf desmodium)	4	11	3	H/A	Hand pull or crown and dispose	
184	Poaceae	Pennisetum setaceum (fountain grass)	3	11	3	H/O	Hand Pull	
185	Asteraceae	Conyza bonariensis (flax-leaf fleabane)	7	38	3	H/U	Hand or mechanical removal of small infestations	
186	Solanaceae	Solanum erianthum (a tobacco bush)	7	19	3	S/O	Hand pull	
187	Poaceae	Stenotaphrum secundatum (buffalo grass)	3	23	3	H/AO	Hand or mechanical removal of small infestations	
188	Apocynaceae	Cascabela thevetia (syn. Thevetia peruviana) (yellow oleander)	5	9	3	ST/O	Hand pull small infesttions. Slashing can be used but should be followed up by herbicide application.	
189	Rubiaceae	Coffea arabica (coffee)	3	7	3	ST/A	Saplings: Hand pull	
190	Bignoniaceae	Spathodea campanulata (African tulip tree)	1?	1	3	T/O	N/A	
191	Fabaceae	Macrotyloma axillare (perennial horse gram)	4	12	3	V,H/A	N/A	
192	Iridaceae	Watsonia meriana var. bulbillifera (bulbil watsonia)	2	3	3	H/O	Dig up, bag and remove	
193	Passifloraceae	Passiflora edulis (passion fruit)	6	12	3	V/AO	Hand Pull	
194	Asteraceae	Zinnia peruviana (wild zinnia)	6	33	3	H/O	Seedlings: Hand pull	
195	Dracaenaceae	Sansevieria trifasciata (sansevieria)	2?	7	3	H/O	Hand pull or dig up	
196	Poaceae	Digitaria eriantha (pangola grass)	5	20	3	H/A	Hand pull or cultivation	
197	Rosaceae	Eriobotrya japonica (loquat)	3	5	3	T/O	Seedlings: Hand pull	
198	Cactaceae	Acanthocereus tetragonus (sword pear)	1	1	3	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
199	Mimosaceae	Acacia nilotica subsp. indica (prickly acacia)	3	3	4.4?	T/A	Mechanical or chain removal.	
200	Mimosaceae	Acacia farnesiana (mimosa bush)	6	15	3	T/A	Mechanical removal of small plants.	

Explanatory notes.

Sub-region (Sr): Number of the ten sub-regions of the Southeast Queensland bioregion (Young and Dillewaard 1999) within which species recorded (Queensland Herbarium data).
Rec no. (R): Total number of records for species within study area, Queensland Herbarium CORVEG and HERBRECS data.
Scores (S): Based on panel data of invasiveness, 5 (highest) to 3 (moderate). ? indicate doubtful scores.

Life forms (LFS): T-tree (woody plant >5m), ST-small tree (2-5m), S-shrub (woody <2m), H-herb (grasses & forbes), Ha-aquatic herbs.
Source: A-agriculture, O-ornamental and landscaping, F-fish aquarium, U-unintentional introduction and/or contaminant.

Abbreviations: Control Methods

CS&P = cut scrape and paint

S&P = scrape and paint

C&P = cut and paint

F/I = frill or inject stem

Abbreviations: Herbicides

G = Glyphosate, eg. Roundup Biactive, Weedmaster Duo

MM = Metsulfuron methyl, eg, Brushoff

F = Fluroxypyr, eg. Starane

Abbreviations: Herbicide Dilution Rates for High Concentration Applications

GU = Glyphosate undiluted

G1 = 1 part water to 1 part glyhphosate

G1.5 = 1.5 parts water to 1 part glyphosate

G4 = 4 parts water to 1 part glyphosate

Abbreviations: Herbicide Spray Concentrations

G100 = 100mL glyphosate per 10L of water + surfactant, eg 20mL LI 700 per 10L
G200 = 200mL glyphosate per 10L of water + surfactant, eg 50mL LI 700 per 10L

G100 + MM = 100mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water
G200 + MM = 200mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water

MM = 1.5g metsulfuron methyl per 10L water + wetting agent, eg. 2mL Agral per 10L water

F100 = 100mL fluroxypyr per 10L water

F150 = 150mL fluroxypyr per 10L water

Other Abbreviations

= Locally non-indigenous native species

Ref. 1. Big Scrub Rainforest Landcare Group (2008), 'Common Weeds of Subtropical Rainforests of Eastern Australia: A practical manual on their identification and control'

Ref. 2. Department of Primary Industries and Fisheries (QLD), 'Weeds and pest animals and ants'.

Ref. 3. Holland et al. (1996), 'Suburban Weeds', DPI QLD.

Ref 4. Port Stephens Council (NSW), 'Weed Busters'.
Ref 5. Depertment of Primary Industries (NSW), 'Noxious and Environmental Weed Handbook, 3rd Edition'.

Ref 6. Department of Environment and Conservation, 'Florabase', (DEC- WA)

Ref 7. Vitelli, J.S. and Madigan, B.A. and Van Haaren, P.E. and Setter, S. and Logan, P. (2009) Control of the invasive liana, Hiptage benghalensis. Weed Biology and Management, 9 (1). pp. 54-62.

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Brisbane ■ Emerald ■ Rockhampton
[illegible]
surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT: mirvac Everleigh

REFERENCES:

Queensland Herbarium Invasive Naturalised Plants in South East Queensland

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

@ A3

PROJECT:

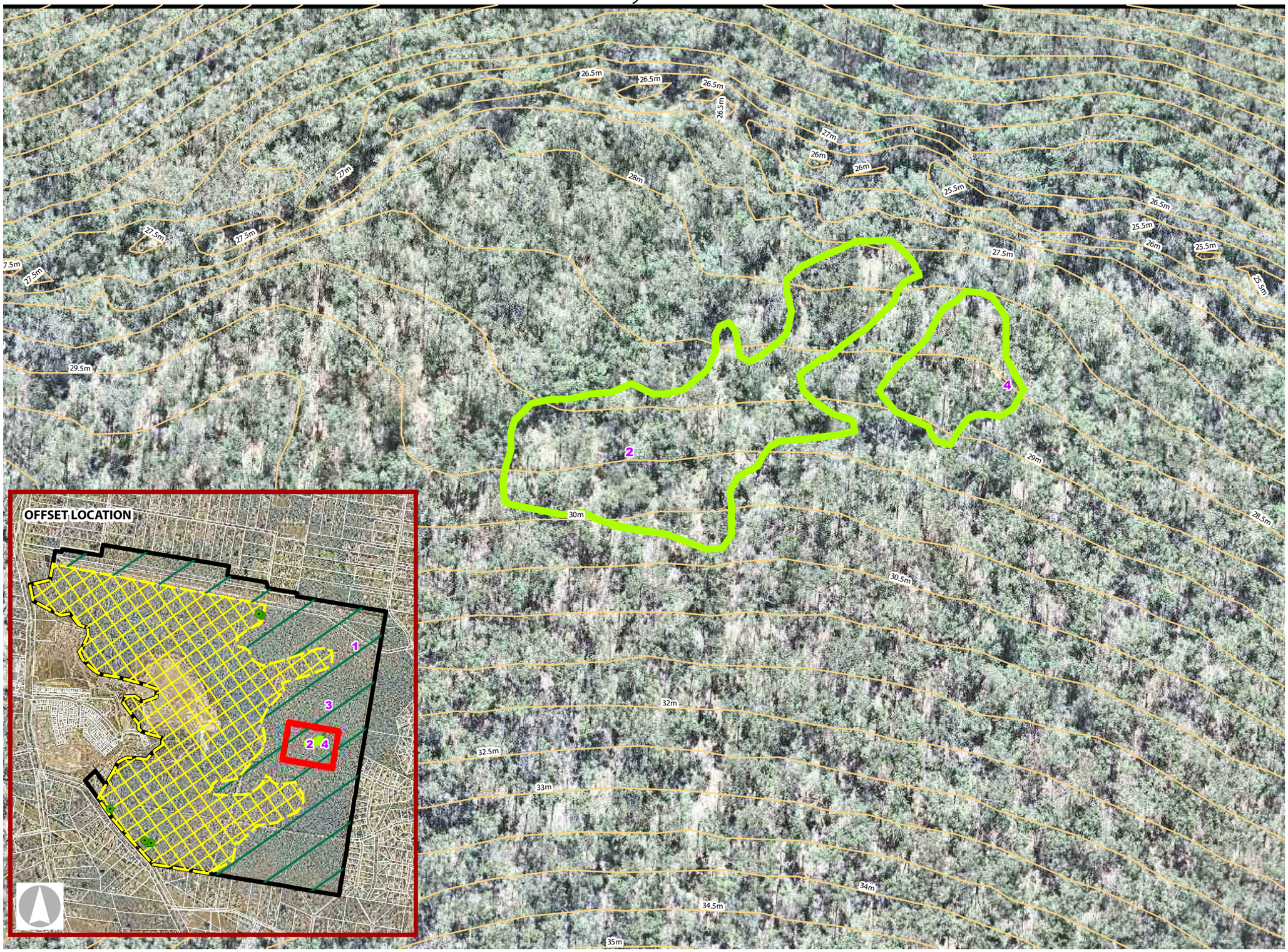
423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Weed Treatment & Removal

DATE:	15/04/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E A09 VDEC RMP A		

3. Rehabilitation Area - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- Mature *Melaleuca irbyana* specimen to be impacted by clearing works
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)
- 1 Evolve Environmental Solutions photo monitoring points

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	13/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

0 5 10 20 30 40 m

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Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 13/07/2020 7598 E 03 Rehabilitation Area A

4. Summary and Conclusion

Saunders Havill Group has been engaged by Mirvac Queensland Pty Ltd to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* located within the extent of works for the Everleigh Greenbank project. This IMP is intended to support the renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) from Department of Environment and Science (DES). The IMP has been prepared in accordance with the *Nature Conservation (Wildlife Management) Regulation 2006 - Protected Plants Assessment Guidelines*.

A Protected Plants Clearing Permit (Permit No. WA0009354) was issued by the DES on 24 August 2018 which allows for clearing of M. irbyana over the entire Clearing Impact Area (i.e. 277 ha site). Conditions of the Permit (PPCM01) require all activities relating to the impact of EVNT plant species under the permit to be carried out in accordance with the procedures and actions in the IMP. This included rehabilitation planting of M. irbyana within future Conservation land in the eastern portion of the site to ensure no significant residual impact on the species occurs as a result of the development. Rehabilitation works in accordance with the IMP, including weed removal and advanced tubestock planting commenced in March 2019. Further, a 5,000m^2 *M. irbyana* rehabilitation area was made a declared area (Category A) under the *Vegetation Management Act* 1999 and is subject to legal monitoring and reporting benchmarks set by DNRME.

While clearing within the Permit area has been undertaken, clearing at the locations of the *M. irbyana* patches has not yet occurred. Therefore, this IMP seeks to support renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) which expires on 23 August 2020 for the clearing of protected plants within the 277 ha impact area at the project site.