



REHABILITATION MONITORING REPORT (2018)

Lot 2 DP 777905
Altona Road, Cudgen

A Report Prepared for
Hanson Tweed Sand Plant

SEPTEMBER 2018

NEW SOUTH WALES

8/48 Tamar Street (PO Box 1465) Ballina NSW 2478
p 02 6686 3858 • f 02 6681 1659 • e ballina@jwaec.com.au

QUEENSLAND

Suite C, Building 21 Garden City Office Park, 2404 Logan Road, Eight Mile Plains QLD 4113
p 07 3219 9436 • f 07 3423 2076 • e brisbane@jwaec.com.au

www.jwaec.com.au

DOCUMENT CONTROL

Document

| | |
|-------------------------|--|
| Title | Rehabilitation Monitoring Report (2018) |
| Job Number | N03074 |
| File Reference | \\SERVER\data\2013 CLIENTS\N03074\Reports\Monitoring |
| Version and Date | RW2 28/09/18 |
| Client | Hanson Tweed Sand |

Revision History (office use only)

| Issue | Version | Draft/Final | Date Sent | Distributed To | No. Copies | Media | Delivery Method |
|-------|---------|-------------|-----------|----------------|------------|-------|-----------------|
| 1 | Rw1 | DRAFT | 27/09/18 | G&S / Hanson | 1 | .pdf | Email |
| 2 | Rw2 | FINAL | 28/09/18 | G&S / Hanson | 1 | .pdf | Email |
| | | | | | | | |
| | | | | | | | |

Client Issue

| Version | Date | Author | | Approved by | |
|---------|----------|-----------------------------------|----------|---------------|----------|
| | | Name | Initials | Name | Initials |
| Rw1 | 27/09/18 | Phoebe Chapman / Nicole Davies | PC/ND | Adam McArthur | AM |
| Rw2 | 28/09/18 | Phoebe Chapman / Nicole Davies | PC/ND | Adam McArthur | AM |
| | | | | | |
| | | | | | |

TABLE OF CONTENTS

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION | 4 |
| 2 | METHODS..... | 5 |
| 3 | RESULTS..... | 6 |
| 3.1 | Water Quality | 6 |
| 3.2 | Aquatic Weeds | 6 |
| 3.3 | Growth Rates | 6 |
| 3.4 | Typha Invasion | 7 |
| 3.5 | Habitat Diversity..... | 7 |
| 3.6 | Assessment of Performance Measures..... | 7 |
| 4 | DISCUSSION..... | 11 |
| 4.1 | Introduction | 11 |
| 4.2 | Progress of Rehabilitation Areas | 11 |
| 4.3 | Significant Problems Encountered | 11 |
| 4.4 | Measures to be Taken to Rectify New Problems..... | 11 |
| 4.4.1 | <i>Revegetation.....</i> | <i>11</i> |
| 4.4.2 | <i>Maintenance.....</i> | <i>11</i> |
| 4.4.3 | <i>Weed Control</i> | <i>12</i> |
| 4.4.4 | <i>Monitoring.....</i> | <i>12</i> |
| 4.5 | Success or Failure of Measures Implemented | 12 |
| 5 | SUMMARY AND CONCLUSIONS..... | 13 |
| | REFERENCES | 14 |
| | APPENDIX 1 - RELEVANT FIGURES FROM THE RLMP | 15 |
| | APPENDIX 2 - PHOTO POINT DATA | 19 |

1 INTRODUCTION

JWA Pty Ltd have been engaged by Hanson Tweed Sand to undertake monitoring of the rehabilitation works occurring at their Tweed Sand Plant located at Lot 2 DP 777905 (the Subject site) Altona Road, Cudgen.

The rehabilitation works on site are the subject of a Revised Rehabilitation and Landscape Management Plan (RLMP) prepared by JWA (2016) to comply with the relevant conditional requirements of Development Application approval DA 152-6-2005. The RLMP includes monitoring requirements for the short term (5 year), medium term (6-15 years) and long term (16+ years) rehabilitation of the site involving annual monitoring visits. The preparation of annual monitoring reports is required by the RLMP.

The Development Consent for the site (DA 152-6-2005) was issued in 2006 and extraction works have been ongoing in accordance with the Consent since this time. In accordance with the RLMP, rehabilitation works on site are now within the 'medium term rehabilitation period' which occurs between the 6th and 15th years of extraction or 2012 to 2021.

The short term, medium term and long-term rehabilitation requirements of the project are shown in **APPENDIX 1**. The short term rehabilitation period required rehabilitation works within areas 1, 2 and 3 however rehabilitation within area 2 has not been completed to date as this area may be subject to future sand extraction. The medium rehabilitation period requires works within areas 4 and 5, however rehabilitation within area 4 has not been completed to date as this area may also be subject to future sand extraction.

This report comprises the 2018 annual monitoring report for rehabilitation areas 1, 3 and 5.

2 METHODS

The following survey methodologies were employed by two (2) JWA Ecologists on the 7th February 2018 and one (1) JWA Ecologist on the 25th September 2018. The methodology has been developed to monitor specific biological indicators within the wetland rehabilitation areas as discussed in Section 3.4.6 of the RLMP (JWA 2016). This methodology states that in any site visit the qualified ecologist is to monitor and ensure:

- Water quality is in line with acceptable parameters;
- No aquatic weeds have colonised the wetland (particular attention should be given to the noxious weed *Salvinia* (*Salvinia molesta*);
- Adequate growth rates of aquatic vegetation using photo plates. Four (4) photos (north, east, south, west) are to be taken from the monitoring points (shown in APPENDIX 1). These are to be permanently marked by star pickets;
- The planting zones (Wetland Nos 1 and 2) are free from any *Typha* invasion; and
- The vegetation growth is appropriate for a diverse habitat (no monoculture).

In accordance with the requirements of the RLMP the performance of the monitoring program will be assessed using biological indicators, including:

- Growth rate of wetland plants; and
- Abundance of fish, birds, and macroinvertebrates.

The growth rate of wetland plants and the abundance of fauna observed during the site visit will be used to determine the base rate for future comparisons of the biological diversity (assessment).

3 RESULTS

3.1 Water Quality

A broad range of physiochemical indicators are routinely monitored at the site including those stipulated in the RLMP (nutrients, dissolved and suspended solids, turbidity, dissolved oxygen, pH and salinity). These works are undertaken in accordance with the approved Cyanobacterial Management Plan (Gilbert & Sutherland, 2014) and Soil and Water Management Plan (Gilbert & Sutherland, 2015) with results reported in the Annual Environmental Management Report.

3.2 Aquatic Weeds

No significant aquatic weed infestations were observed during the 2018 monitoring program. Some terrestrial weed species were observed within rehabilitation areas 1 and 3 and included Coastal morning glory (*Ipomea cairica*), Castor oil plant (*Ricinus communis*) and Asparagus vine (*Asparagus plumosus*).

3.3 Growth Rates

Existing vegetation within rehabilitation areas 1, 3 and 5 is generally in good condition and has shown substantial growth over time (based on visual assessment).

Natural regeneration of Swamp she-oaks (*Casuarina glauca*) is continuing to occur within area 1 and mature individuals are now well established. Macrophytes such as Common reed (*Phragmites australis*) and Broad-leaved cumbungi (*Typha orientalis*) are present in the land/water interface. However, some areas of bare soil with limited evidence of natural recruitment were observed between the sand pit and the access track.

Rehabilitation area 3 continues to naturally regenerate. There is a high diversity of tree, shrub, groundcover and macrophyte species present. Vegetation is extremely dense along the edge of the sand pit. However, some areas containing pasture grasses and exotic species with limited evidence of natural recruitment were observed between the sand pit and the access track.

Planting of approximately 5,000 trees and shrubs occurred within rehabilitation area 5 prior to 2012 and included Swamp she-oaks, *Callistemon* sp., Lilly pillilly (*Acmena smithii*) and Silky oak (*Grevillia robusta*). Macrophyte planting along the edge of the sand pit also occurred and included rushes, sedges, grasses and Water lilly. Survival rates of plantings of approximately 90% were achieved. There were obvious signs of continued maintenance in this area during the most recent monitoring event, including mowed grass, tagged plants for identification, weed control and tea tree mulching.

3.4 Typha Invasion

Whilst Broad-leaved cumbungi (*Typha orientalis*) has been observed within rehabilitation areas 1, 3 and 5, it is not currently occurring at densities whereby active management is considered necessary.

It is also noted that, whilst the “invasion” of rehabilitation areas by *Typha* was proposed as a monitoring requirement of the RLMP, this eventuality (if it occurred) would no longer be considered a trigger for corrective actions/active management. Broad-leaved cumbungi is a robust, emergent monoecious aquatic perennial to 4 m high. Eradication is difficult due to prolific seed production and extensive rhizomatous roots. Furthermore, management of Broad-leaved cumbungi may impact on waterbird roosting sites and habitat.

The RLMP is currently undergoing further revision as a result of the recent DA modification approval. As part of the revised RLMP it is proposed to remove the requirement to actively manage any *Typha* “invasion”.

3.5 Habitat Diversity

Whilst moderate habitat diversity is considered to currently occur within rehabilitation areas 1 and 3, it is proposed to increase habitat diversity in these areas through additional revegetation. A suitably qualified rehabilitation team (Bushland Restoration Services) has been contracted and plants have been ordered (on 10th September 2018) and site preparation (i.e. weed control works) has recently been completed (on 18th September 2018) as shown by the photo monitoring (APPENDIX 2). Bushland Restoration Services have also provided the following timeline of upcoming works:

- Secondary weed control - to be completed on 4th October 2018;
- Follow-up weed control - to be completed on 1st December 2018;
- Installation of plants as stock becomes available and subject to weather conditions - between December 2018 and March 2019;
- Follow-up weed control - January to April 2019;
- Maintenance of plantings and further weed control (as necessary) i.e. Year 1 maintenance (4 treatments) - 1st May 2019 - 1st April 2020; and
- Maintenance of plantings and further weed control (as necessary) i.e. Year 2 maintenance (4 treatments) - 1st May 2020 - 1st April 2021

3.6 Assessment of Performance Measures

As discussed in Section 3.4 of the RLMP the performance of the monitoring program will be assessed using biological indicators, including:

- Growth rate of wetland plants; and
- Abundance of fish, birds, and macroinvertebrates.

As discussed above, existing vegetation within the rehabilitation areas 1, 3 and 5 has shown substantial growth over time (based on visual assessment). As significant additional planting is now proposed within rehabilitation areas 1 and 3, future monitoring will utilise a more intensive monitoring methodology to allow a more thorough assessment of growth rates. The proposed methodology (in addition to visual assessments) will include:

1. Transects

- permanent 50m transects will be placed within the revegetation areas;
- specific measurable features will be recorded along the length of the transect; and
- Specific features measured will include:
 - Areas of vegetation cover;
 - Areas of weed cover;
 - Areas of deceased plants/bare ground/mud.

2. Quadrats

- Three (3) Quadrats (5m x 5m) will be permanently marked at least 10m apart along each of the transects (discussed above);
- For each quadrat the following specific measurable features will be measured:
 - Areas of vegetation cover;
 - Areas of weed cover;
 - Areas of deceased plants/bare ground/mud.

In relation to the abundance of fish, birds and macroinvertebrates it is noted that JWA have not been engaged to monitor either fish or macroinvertebrate species. In relation to birds, the following species (TABLE 1) were observed (both visually and aurally) during a 30 minute period during the most recent monitoring event (25th September 2018) and will form the basis for comparison during future monitoring events. In total forty-two (42) species of birds were observed.

TABLE 1
BIRDS RECORDED DURING THE SURVEY

| Scientific name | Common name |
|--------------------------------|------------------------|
| <i>Acridotheres tristis</i> | Indian mynah* |
| <i>Acrocephalus stentoreus</i> | Clamorous reed warbler |
| <i>Anas gracilis</i> | Grey teal |
| <i>Anas superciliosa</i> | Pacific black duck |
| <i>Anhinga melanogaster</i> | Darter |
| <i>Anthus novaeseelandiae</i> | Richard's pipit |
| <i>Ardea alba</i> | Great egret |
| <i>Ardea ibis</i> | Cattle egret |
| <i>Ardea novaehollandiae</i> | White-faced heron |
| <i>Chenonetta jubata</i> | Australian wood duck |

| Scientific name | Common name |
|--|---------------------------|
| <i>Cisticola exilis</i> | Golden headed cisticola |
| <i>Coracina novaehollandiae</i> | Black-faced cuckoo shrike |
| <i>Cracticus nigrogularis</i> | Pied butcher bird |
| <i>Dicaeum hirundinaceum</i> | Mistletoe bird |
| <i>Fulica atra</i> | Eurasian coot |
| <i>Gallinula tenebrosa</i> | Dusky moorhen |
| <i>Geopelia humeralis</i> | Bar-shouldered dove |
| <i>Geopelia placida</i> | Peaceful dove |
| <i>Grallina cyanoleuca</i> | Magpie lark |
| <i>Gymnorhina tibicen</i> | Magpie |
| <i>Haliastur sphenurus</i> | Whistling kite |
| <i>Hirundo ariel</i> | Fairy martin |
| <i>Hirundo neoxena</i> | Welcome swallow |
| <i>Macropygia amboinensis</i> | Brown cuckoo-dove |
| <i>Malurus melanocephalus</i> | Red-backed fairy wren |
| <i>Meliphaga lewinii</i> | Lewin's honeyeater |
| <i>Merops ornatus</i> | Rainbow bee-eater |
| <i>Neochmia temporalis</i> | Red-browed finch |
| <i>Nycticorax caledonicus</i> | Nankeen night heron |
| <i>Ocyphaps lophotes</i> | Crested pigeon |
| <i>Pachycephala rufiventris</i> | Rufous whistler |
| <i>Pelecanus conspicillatus</i> | Pelican |
| <i>Phalacrocorax melanoleucos</i> | Little pied cormorant |
| <i>Phalacrocorax sulcirostris</i> | Little black cormorant |
| <i>Porphyrio porphyrio</i> | Purple swamphen |
| <i>Rhipidura fuliginosa</i> | Grey fantail |
| <i>Rhipidura leucophrys</i> | Willie wagtail |
| <i>Specothes viridis</i> | Figbird |
| <i>Streptopelia chinensis</i> | Spotted turtle-dove* |
| <i>Threskiornis spinicollis</i> | Straw-necked ibis |
| <i>Trichoglossus haematodus</i> | Rainbow lorikeet |
| <i>Vanellus miles</i> | Masked lapwing |
| <p>Notes: * Introduced species</p> | |

Future monitoring reports will assess the growth rate of wetland plants and the abundance of fauna observed using the site against the result in **SECTIONS 3.2 - 3.5** above for comparisons of biological diversity values, and also provide a comparison against the performance measures discussed in this section.

4 DISCUSSION

4.1 Introduction

The following sections discuss the progress of rehabilitation areas 1 and 3, and significant problems encountered, measures to be taken to rectify new problems and the success or failure of measures implemented.

4.2 Progress of Rehabilitation Areas

In light of the recent site observations rehabilitation area 1, 3 and 5 are considered to be well on track to achieving the medium term (i.e. 6 - 15 year) aims of the Rehabilitation plan. Additional plantings have been identified as being required within rehabilitation areas 1 and 3 to achieve an increased species diversity.

4.3 Significant Problems Encountered

Apart from the intensive rehabilitation works that were completed prior to 2012 by external professional rehabilitation contractors, sand plant staff are implementing the rehabilitation plan. Whilst plant staff should be commended for their weed control actions to date, this generally occurs on an ad hoc basis, and is limited by time and personnel constraints as well limited ecological knowledge.

4.4 Measures to be Taken to Rectify New Problems

4.4.1 *Revegetation*

Natural regeneration assumes that a fertile seed source exists on or near the site. If the system is too geomorphically modified or the soil seed bank is depleted, or sterile, natural regeneration may not be successful. Some areas of bare soil with limited evidence of natural recruitment were observed within rehabilitation area 1, and some areas containing pasture grasses and exotic species with limited evidence of natural recruitment were observed in rehabilitation area 3. These areas either remain unvegetated or cycle through stages of being vegetated by weeds and then sprayed and bare. Structurally complex vegetation should be established in these areas to reduce the erosion potential and the burden of constant weed control.

Bushland Restoration Services have now been contracted to complete additional revegetation works (including a minimum of 2 years maintenance) within rehabilitation areas 1 and 3.

4.4.2 *Maintenance*

Ongoing maintenance of the sites is critical to the success of revegetation efforts. Planting may only be a small part of the work required, as watering, fencing and weed control are key post-planting tasks. Watering is essential during planting to minimise air pockets and improve contact between the soil and the roots. It is especially important for free draining soils such as the sands that occur at the Subject site. The use of water

crystals to prevent drying out after planting is highly effective. These are usually applied at the bottom of the planting hole, at the time of planting. Mulching or the use of mulching blankets can also reduce the watering requirement and weed control efforts of revegetation areas. Care should be taken to ensure high levels of nutrients in the form of mobile mulch, are not entering the ponds. Stakes or high visibility flagging may be required to provide support and to protect seedlings from herbicide spray and weed control. Support stakes should be removed once a seedling is well established to encourage strong limbs and deep root growth.

Bushland Restoration Services have now been contracted to complete the above works within rehabilitation areas 1 and 3.

4.4.3 Weed Control

Existing weed growth has been identified as potentially limiting the ability of natural regeneration in some locations within rehabilitation areas 1 and 3. The Weed and Pest Management Plan (APPENDIX 4 of the RLMP) provides weed identification and control techniques. The timing of weed control methods should be considered as many weed species have lengthy seed viability. A good technique is to control weed species at the time of flowering for easy identification, before seed is set.

Bushland Restoration Services have now been contracted to complete weed control works within rehabilitation areas 1 and 3.

4.4.4 Monitoring

As significant additional planting is now proposed within rehabilitation areas 1 and 3, future monitoring will utilise a more intensive monitoring methodology (in addition to visual assessments) as discussed in SECTION 3.6 to allow a more thorough assessment of growth rates.

4.5 Success or Failure of Measures Implemented

The success or failure of the measures discussed above to increase plant species diversity within rehabilitation areas 1 and 3 will be discussed in the next annual monitoring report (due 30th September 2019).

5 SUMMARY AND CONCLUSIONS

This report details the methodology and results of the annual monitoring completed in 2018 in accordance with the medium term (i.e. 6-15 year) rehabilitation plan which commenced in 2012 and will continue until 2021.

No significant aquatic weed infestations were observed during the 2018 monitoring program. Existing vegetation within rehabilitation areas 1, 3 and 5 is generally in good condition and has shown substantial growth over time (based on visual assessment). Natural regeneration of both terrestrial and aquatic species is now well established however some areas of bare soil with limited evidence of natural recruitment were observed within rehabilitation area 1, and some areas containing pasture grasses and exotic species with limited evidence of natural recruitment were observed in rehabilitation area 3.

Apart from the intensive rehabilitation works that were completed prior to 2012 by external professional rehabilitation contractors, sand plant staff are implementing the rehabilitation plan. Whilst plant staff should be commended for their weed control actions to date, this generally occurs on an ad hoc basis, and is limited by time and personnel constraints as well limited ecological knowledge.

A suitably qualified rehabilitation team (Bushland Restoration Services) has been therefore contracted and plants have been ordered (on 10th September 2018) and site preparation (i.e. weed control works) has recently been completed (on 18th September 2018). Bushland Restoration Services have also provided a timeline of works which include a minimum 2-year maintenance period. These works will be completed within rehabilitation areas 1 and 3 with the aim of better managing weed species and increasing habitat diversity in these areas.

As significant additional planting is now proposed within rehabilitation areas 1 and 3, future monitoring will utilise a more intensive monitoring methodology (in addition to visual assessments) as discussed in SECTION 3.6 to allow a more thorough assessment of growth rates.

The success or failure of measures recommended in this monitoring report will be discussed in the next annual monitoring report (due 30th September 2019).

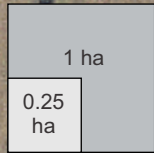
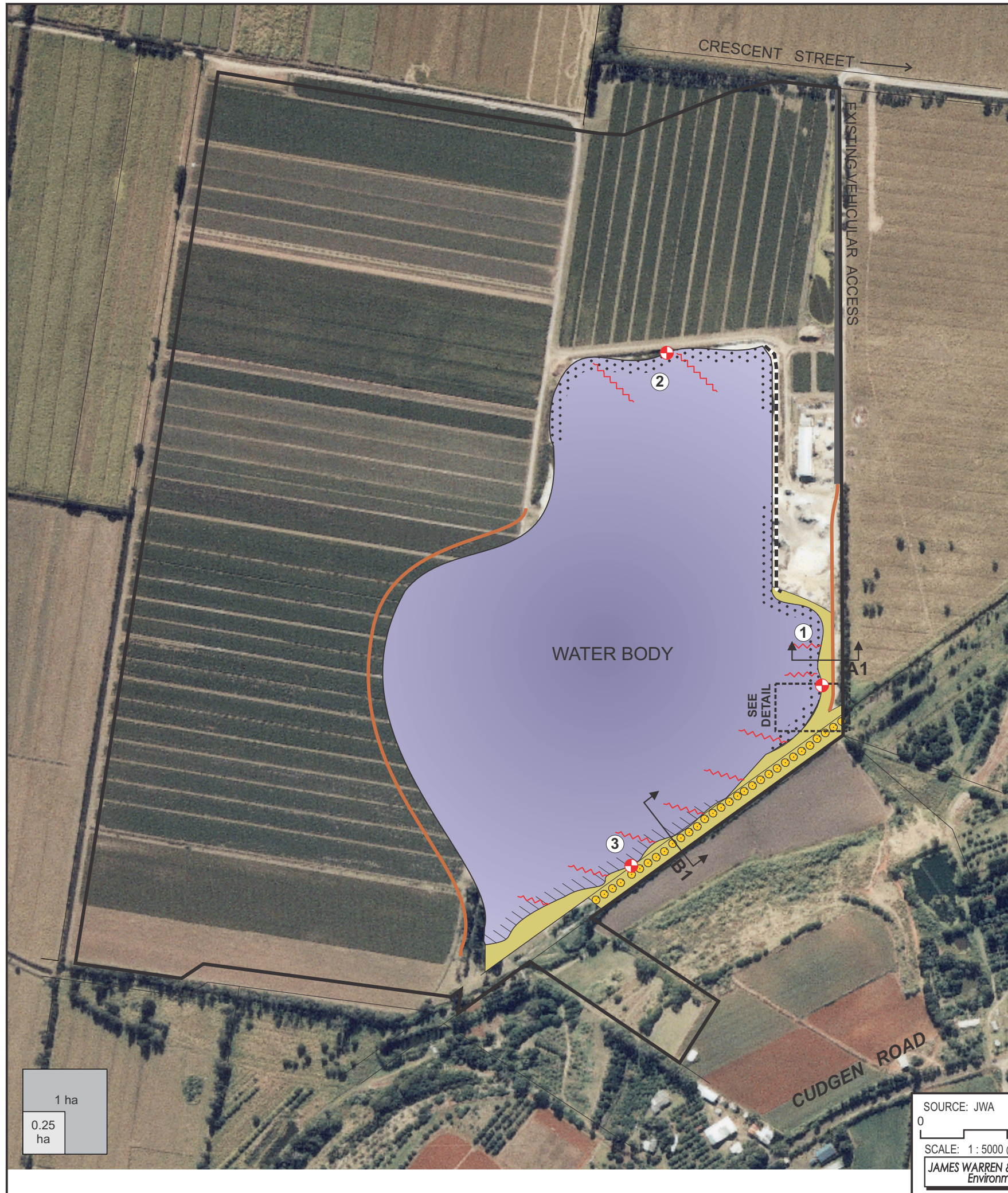
REFERENCES

Gilbert & Sutherland (2014). Revised Cyanobacterial Management Plan, Tweed Sand Quarry, Cudgen Queensland.

Gilbert & Sutherland (2015). Amended Soil and Water Management Plan for the Expansion of Extractive Industry (Phases 3 and 4) and Operation of a Recreational Fishing Facility, Lot 2 DP777905 Cudgen, New South Wales.

JWA (2016) Revised Rehabilitation and Landscape Management Plan. JWA Pty Ltd, Ballina, NSW.

APPENDIX 1 - RELEVANT FIGURES FROM THE RLMP



SOURCE: JWA
 SCALE: 1 : 5000 @ A3
JAMES WARREN & ASSOCIATES PTY LIMITED
 Environmental Consultants

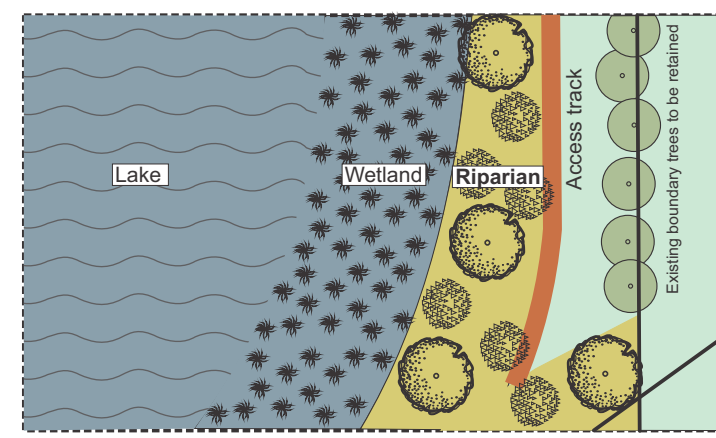
CLIENT
 P. Guinane Pty Ltd
 PROJECT
 Vegetation Management Plan
 Proposed Extension of Guinane Quarry
 Crescent St, Cudgen, NSW
 Shire of Tweed

FIGURE 7
 PREPARED: VJA/BW
 DATE: 03 November 2016
 FILE: 03074_VMP_short.cdr

TITLE
**SHORT-TERM
 CONCEPT PLAN
 (0-5 YEARS)**

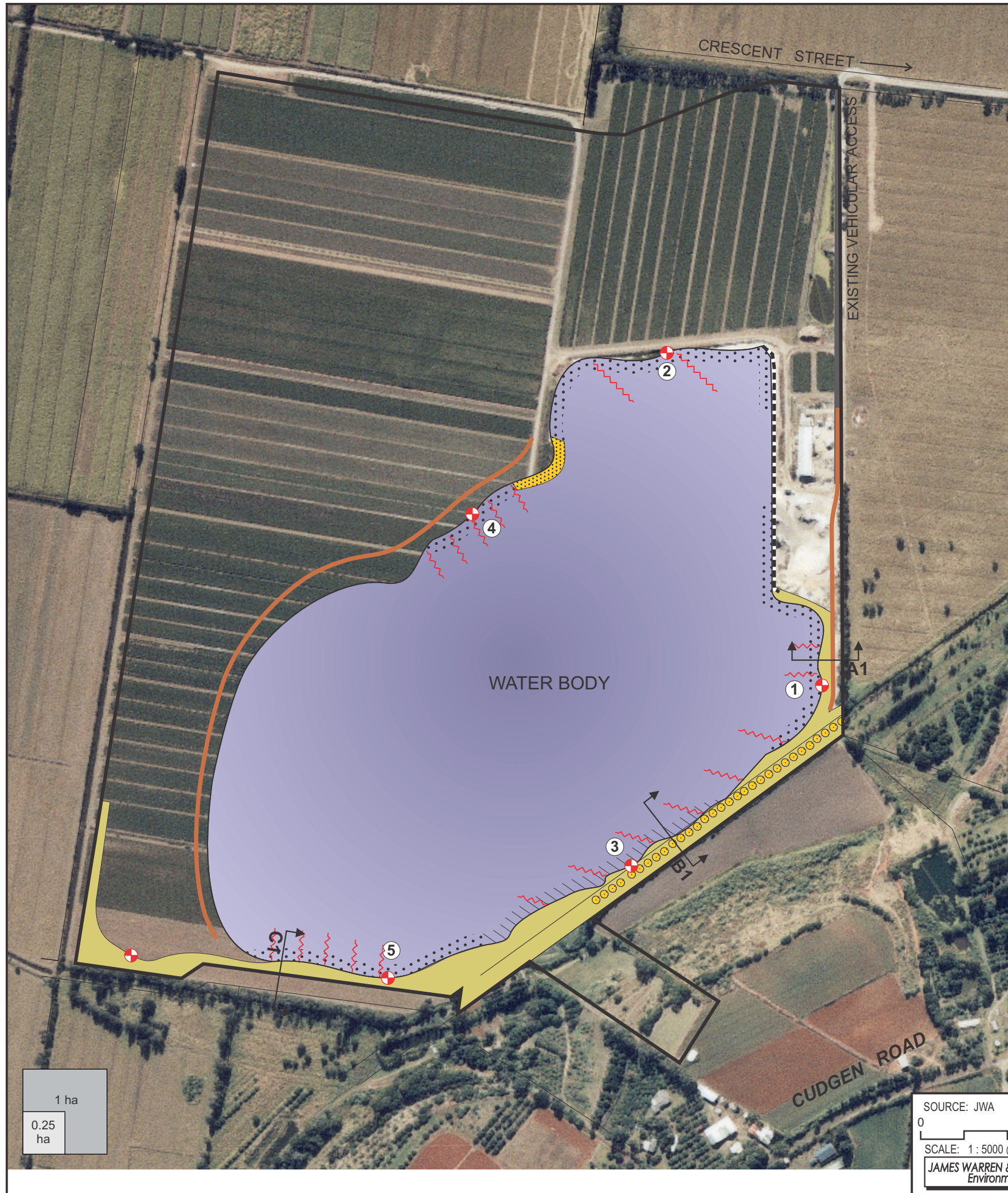
- LEGEND**
- Wetland rehabilitation area (variable width) (no. denotes construction sequence)
 - Natural wetland regeneration (variable width)
 - Riparian rehabilitation area (variable width)
 - Large tree rehabilitation
 - Floating silt curtain *
 - Geofabric bags and/or socks (where appropriate)
 - Vehicular access track
 - Cross-section A1 (see Figure 10)
 - Cross-section B1 (see Figure 11)
 - Photo monitoring point

* Floating silt curtain (or a similar suitable measure) to be employed if necessary based on visual assessments of bank stabilisation. Alternative temporary stabilisation measures designed in consultation with the Environmental Consultant and/or the Coastal Engineer may also be used.















DETAIL
 0 25m
 1 : 1000 @ A4

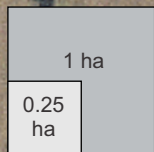




LEGEND

-  Wetland rehabilitation area (variable width)
(no. denotes construction sequence)
-  Natural wetland regeneration (variable width)
-  Riparian rehabilitation (variable width)
-  Large tree rehabilitation
-  Beach
-  Vehicle access track 2 metres wide (unsealed)
-  Floating silt curtain *
-  Geofabric bags and/or socks (where appropriate)
-  **A1** Cross-section A1
(see Figure 10)
-  **B1** Cross-section B1
(see Figure 11)
-  **C1** Cross-section C1
(see Figure 12)
-  Photo monitoring point

* Floating silt curtain (or a similar suitable measure) to be employed if necessary based on visual assessments of bank stabilisation. Alternative temporary stabilisation measures designed in consultation with the Environmental Consultant and/or the Coastal Engineer may also be used.



SOURCE: JWA
0 150m

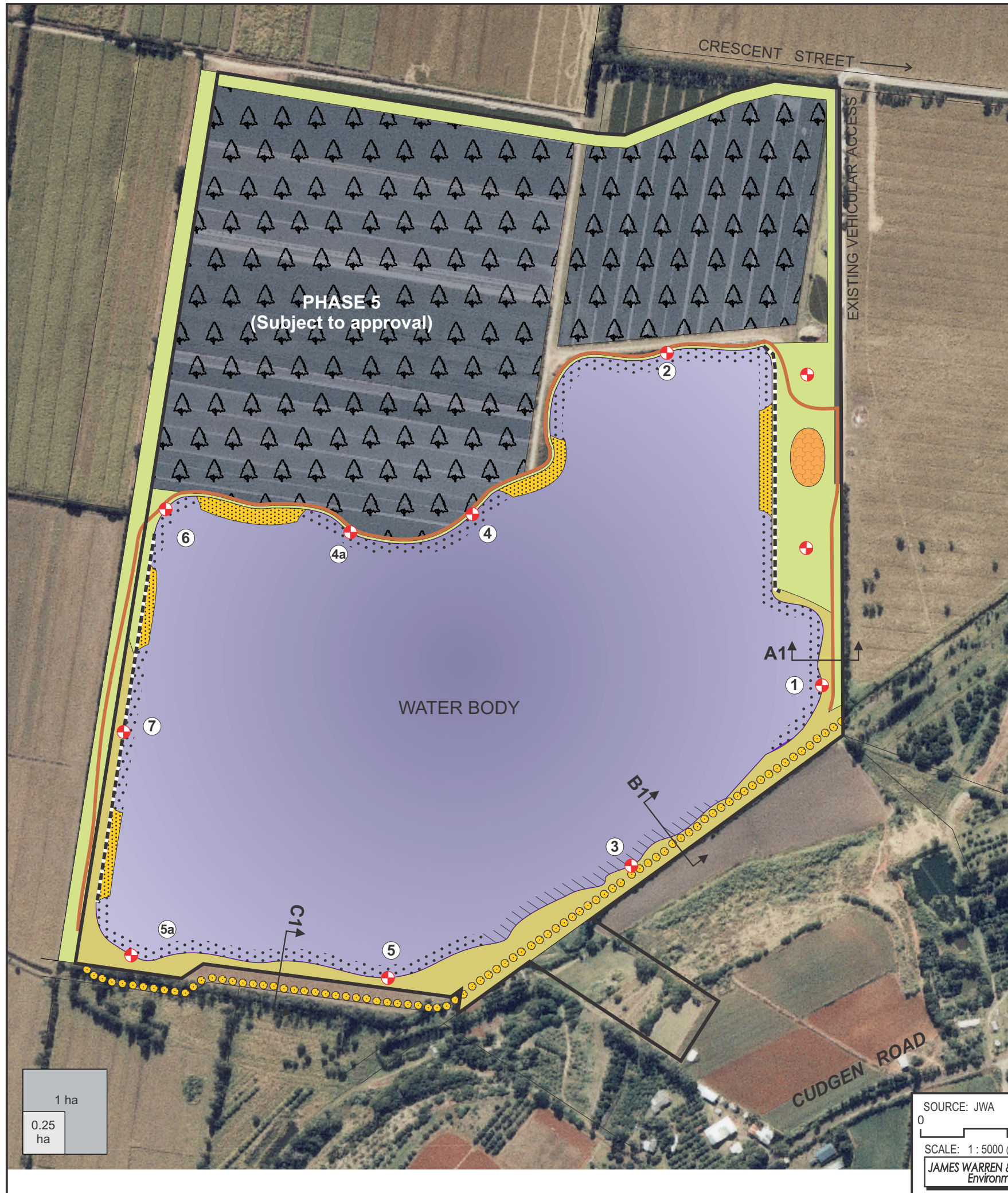
SCALE: 1 : 5000 @ A3
JAMES WARREN & ASSOCIATES PTY LIMITED
Environmental Consultants

CLIENT
P. Guinane Pty Ltd
PROJECT
Vegetation Management Plan
Proposed Extension of Guinane Quarry
Crescent St, Cudgen, NSW
Shire of Tweed















FIGURE 8

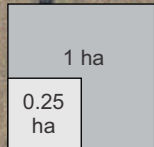
PREPARED: VJA/BW
DATE: 03 November 2016
FILE: 03074_VMP_medium.cdr

TITLE
**MEDIUM-TERM
CONCEPT PLAN
(6-15 YEARS)**



LEGEND

-  Wetland rehabilitation area (variable width)
(no. denotes construction sequence)
-  Natural wetland regeneration (variable width)
-  Open space rehabilitation
-  Riparian rehabilitation area (variable width)
-  Existing agriculture retained for potential water quality treatment (Phase 5 subject to approval)
-  Large tree rehabilitation
-  Recreation node (eg. amenities, car parking, picnic shelter, fish scaling bench)
-  Beach
-  Vehicle access track 2 metres wide (unsealed)
-  Geofabric bags and/or socks (where appropriate)
-  Cross-section A1 (see Figure 10)
-  Cross-section B1 (see Figure 11)
-  Cross-section C1 (see Figure 12)
-  Photo monitoring point



SOURCE: JWA
 0 150m
 SCALE: 1 : 5000 @ A3
JAMES WARREN & ASSOCIATES PTY LIMITED
 Environmental Consultants

CLIENT
 P. Guinane Pty Ltd
 PROJECT
 Vegetation Management Plan
 Proposed Extension of Guinane Quarry
 Crescent St, Cudgen, NSW
 Shire of Tweed

FIGURE 9
 PREPARED: VJA/BW
 DATE: 03 November 2016
 FILE: 03074_VMP_long.cdr

TITLE
**LONG-TERM
 CONCEPT PLAN
 (16+ YEARS)**

APPENDIX 2 – PHOTO POINT DATA



Photo 1.1: Rehabilitation Area 1 (facing north) February 2018



Photo 1.2 - Rehabilitation Area 1 (facing north) September 2018



Photo 2.1 - Rehabilitation Area 1 (facing east) February 2018



Photo 2.2 - Rehabilitation Area 1 (facing east) September 2018



Photo 3.1 - Rehabilitation Area 1 (facing south) February 2018



Photo 3.2 - Rehabilitation Area 1 (facing south) September 2018



Photo 4.1 - Rehabilitation Area 1 (facing west) February 2018



Photo 4.2 - Rehabilitation Area 1 (facing west) September 2018



Photo 5.1: Rehabilitation Area 3 (facing north) February 2018



Photo 5.2 - Rehabilitation Area 3 (facing north) September 2018



Photo 6.1 - Rehabilitation Area 3 (facing east) February 2018



Photo 6.2 - Rehabilitation Area 3 (facing east) September 2018



Photo 7.1 - Rehabilitation Area 3 (facing south) February 2018



Photo 7.2 - Rehabilitation Area 3 (facing south) September 2018



Photo 8.1 - Rehabilitation Area 3 (facing west) February 2018



Photo 8.2 - Rehabilitation Area 3 (facing west) September 2018