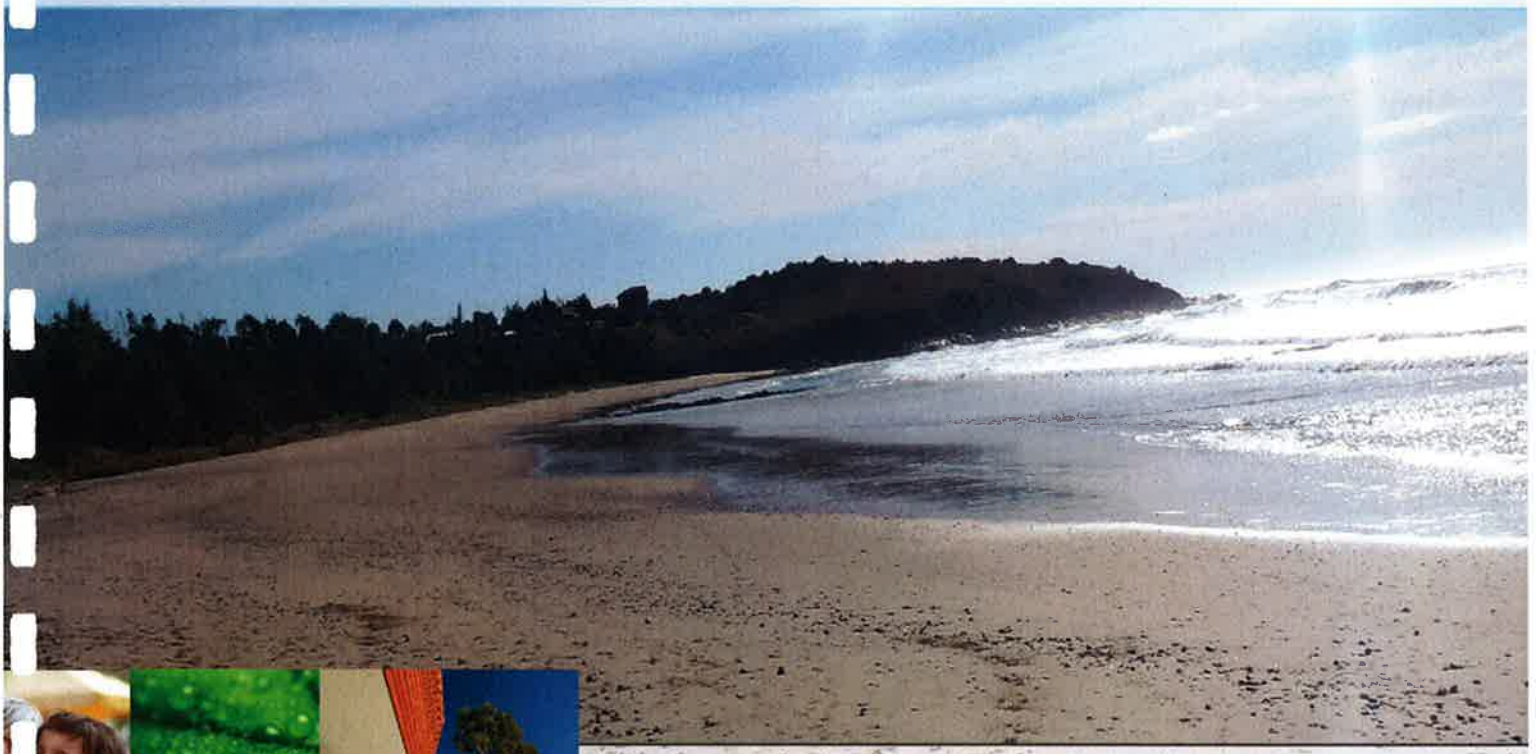
SOLITARY ISLANDS RETREAT



Volume 2 - Appendices

Statement of Environmental Effects

Seniors Living Development , Darkum Road, Mullaway

Lot 1 DP 1128964

Prepared by GHD Pty Ltd

Prepared for John Hannaford

jackie ames landscape architect

ncfadyenarchitects pty limited

August 2011

Appendices

A Site Compatibility Certificate
B Development Plans
C Landscape Plans
D Aborist Report
E Biobanking Assessment
F Ryan Bus Services Letter
G Ryan Bus Service Timetable
H Bushfire Hazard Assessment
I Traffic Impact Assessment

Appendix A

Site Compatibility Certificate

NSW GOVERNMENT
Department of Planning

Office of the Director General

COPY

Mr David Smith
Kanning Services Pty Ltd
327 Forest Road,
BEXLEY NSW 2207

Our ref:G09/00057
Your ref:

Dear Mr Smith

Subject: Determination of application for a site compatibility certificate, State Environmental Planning Policy (Housing for Seniors or People with a Disability)

I refer to your application of 29 July 2009 for a Site Compatibility Certificate under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 ('the SEPP') in relation to the proposed seniors housing development at **Lot 1 DP 1128964 Mullaway Drive, Mullaway.**

I have made the determination to issue the Site Compatibility Certificate under clause 25(4)(a) of the SEPP on the basis that the site of the proposed development is suitable for more intensive development and that development for the purposes of seniors housing of the kind proposed in the application is compatible with the surrounding environment, having had regard to the criteria specified in clause 25(5)(b).

Yours sincerely

SHaddad

Sam Haddad
Director General
17/9/2009

Bridge St Office 23-33 Bridge St Sydney NSW 2000 GPO Box 39 Sydney NSW 2001 DX 22 Sydney
Telephone: (02) 9228 6111 Facsimile: (02) 9228 6191 Website planning.nsw.gov.au

Seniors Housing
Determination of Certificate of Site Compatibility

Part 1A of *State Environmental Planning Policy* (Housing for Seniors or People with a Disability) 2004

I, the Director-General of the Department of Planning, pursuant to clause 25(4)(a) of the *State Environmental Planning Policy* (Housing for Seniors or People with a Disability) 2004, determine the application made by David Smith on 29/07/2009 by issuing this certificate.

I certify that in my opinion :

- the site described in Schedule 1 is suitable for more intensive development; and

- the development described in Schedule 2 is compatible with the surrounding environment, having had regard to the criteria specified in clause 25(5)(b).

Insert only if requirements are imposed on the determination:
[Under clause 25(7), this certificate is only valid in relation to development that satisfies the requirements specified in Schedule 2 of this certificate.]

S Haddad

Sam Haddad
Director-General
Department of Planning

Date certificate issued: 17 September 2009.
Please note: This certificate will remain current for 24 months from the date of issue.

SCHEDULE 1

Site description: LGA Coffs Harbour
Lot 1 DP 1128964 Mullaway Drive, Mullaway

SCHEDULE 2

Application made by: David Smith

Project description: Solitary Islands Retreat Retirement Village
Thirty eight (38) serviced self-care dwellings, on site accommodation for a manager, and a Village Clubhouse

Appendix B

Development Plans

figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

lifestyle alternatives environment health sustainability



DARKUM ROAD **MULLAWAY**
Proposed aged care retreat @
Darkum Road MULLAWAY NSW

Development Application JULY 2011

DRAWING SCHEDULE

Issue	Description	Date
A	Development Application Issue	27.07.11
Pg	Advanced Copy Issue	27.06.11
Pf	Advanced Copy Issue	16.06.11

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

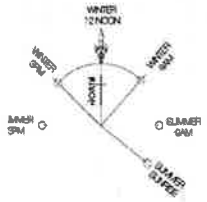
Drawing Title: Cover Page

Scale	Date	Drawn	Checked
NTS	18.05.11	BD	DAL

Drawing No: 598DA_A_000

Issue: A

figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.



A	Development Application issue	27.07.11
PC	Advanced Copy issue	27.09.11
Pt	Advanced Copy issue	18.05.11
No.	Amendment	Date

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title: Site Analysis Plan

Scale:	Date:	Drawn:	Checked:
NTS	18.05.11	BD	PMc

Drawing No: 598DA_A_001

Issue: A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

0 20 40 80m

MULLAWAY DRIVE

DARKUM ROAD

Survey Plan

Scale 1: 1000

A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	17.06.11
P1	Advanced Copy Issue	10.06.11
Rev	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Survey Plan

Scale	Date	Drawn	Checked
1:1000	18.05.11	BD	PMc

Drawing No:
598DA_A_002

Issue:
A

Site Development Plan

Scale 1: 1000

NOTES

Pedestrian pathways proposed leading from each dwelling to bus stop and letterboxes. All pathways to comply with SEPP (Housing for Seniors or People with a Disability) 2004

A	Development Application Issue	27.09.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	10.06.11
Issue	Amendment	Date

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title: Site Development Plan

Scale:	Date:	Drawn:	Reviewed:
1:1000	18.05.11	BD	PM.

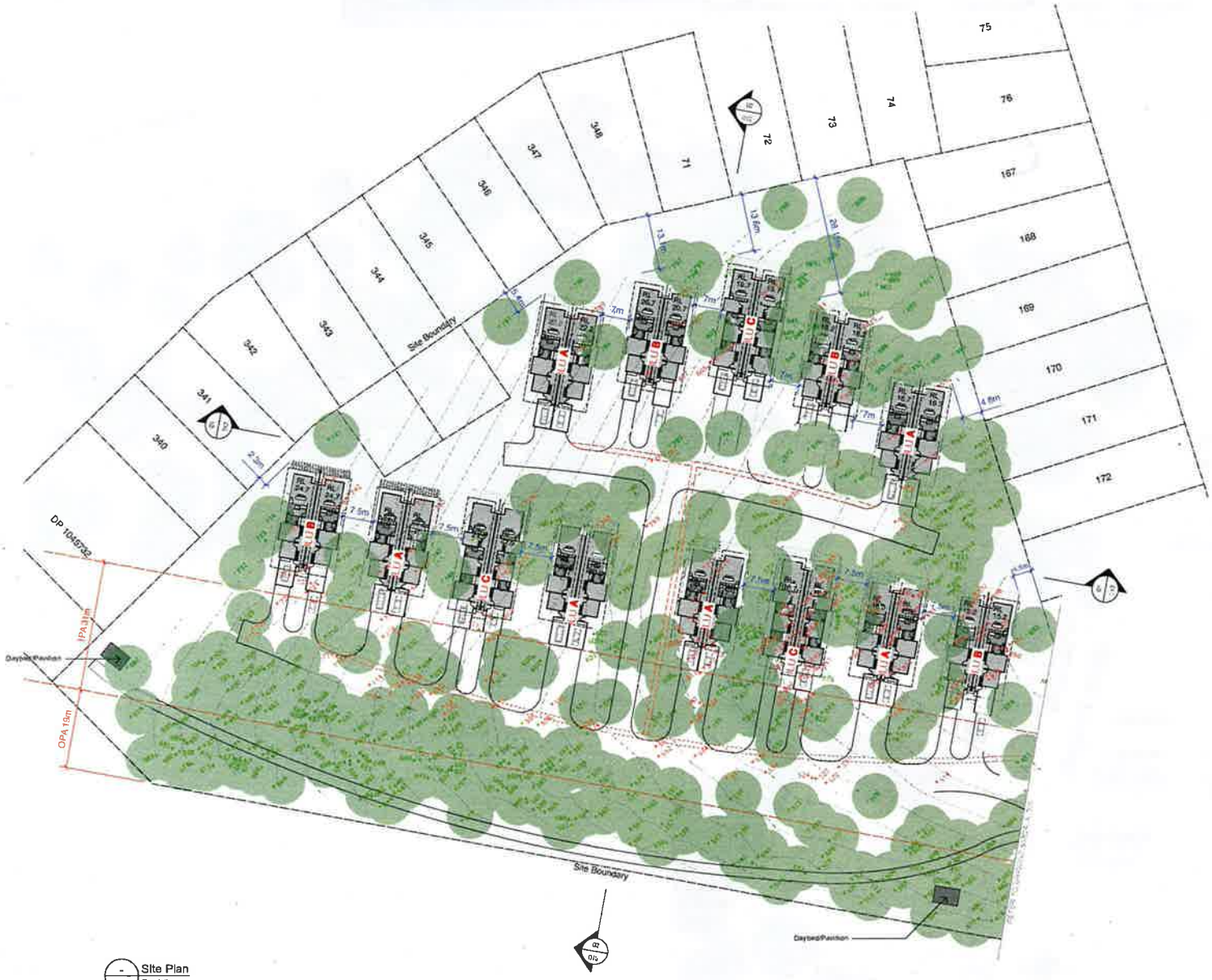
Drawing No: 598DA_A_003

Issue: A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

0 10 20 40m

KEY PLAN



Site Plan
Part 1
Scale 1 : 500

A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	13.06.11

Issue Amendment Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Site Plan
Part 1

Scale	Date	Drawn	Checked
1:500	02.06.11	BD	PMc

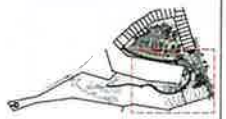
Drawing No.
598DA_A_004

Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

0 10 20 40m

KEY PLAN



175

Site Boundary

LU A

LU B

LU C

Clubroom

STAY POLE

TELSTRA

STOP VALVE

POWER POLE

STOP VALVE

TELSTRA

TELSTRA

HYDRANT

DARKUM ROAD

Site Boundary

TELSTRA

HYDRANT

SRM MARKER

POWER POLE

Site Boundary

Site Boundary

Daylight Pavilion

Daylight Pavilion

Site Plan
Part 2
Scale 1 : 500

A	Development Application Issue		27.07.11
P3	Advanced Copy Issue		22.07.11
P2	Advanced Copy Issue		27.06.11
P1	Advanced Copy Issue		13.06.11
Issue	Amendment		Date

Architect
mcfadyenarchitects pty limited

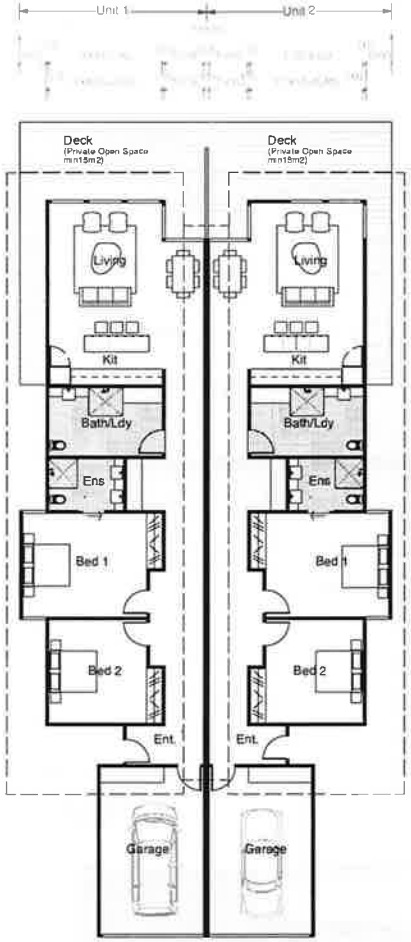
Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Site Plan
Part 2

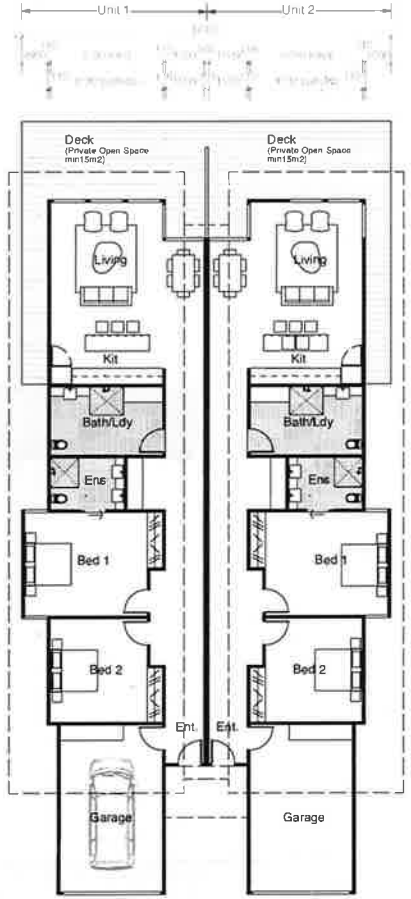
Scale	Date	Drawn	Checked
1:500	02.06.11	BD	PMc

Drawing No
598DA_A_005

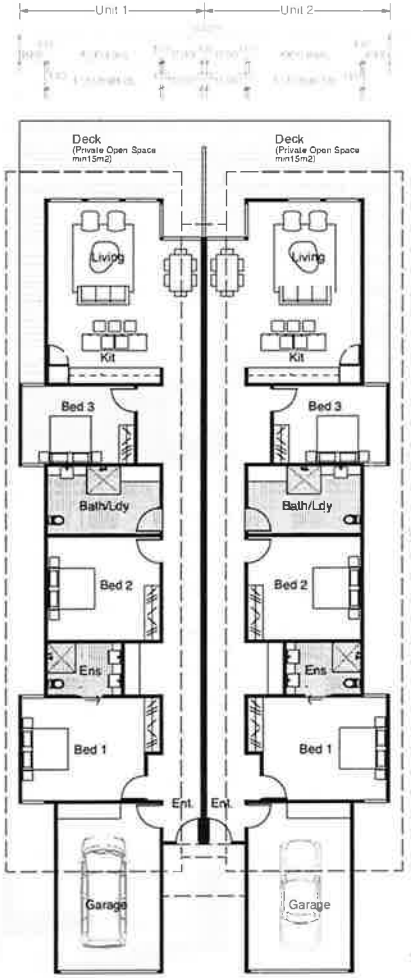
Issue
A



01 Floor Plan - 2 bed
Type A (265sqm)



02 Floor Plan - 2 bed
Type B (265sqm)



03 Floor Plan - 3 bed
Type C (305sqm)

A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	18.06.11

Issue Amendment Date

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title: Floor Plans
Independent Living Units

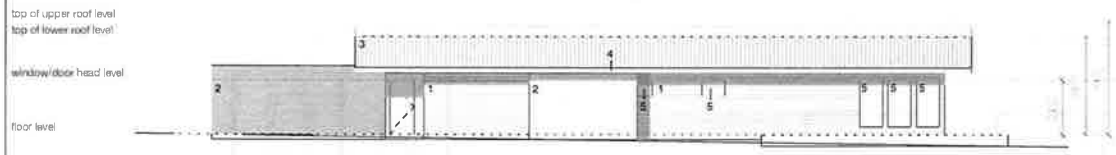
Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PAL

Drawing No. 598DA_A_006

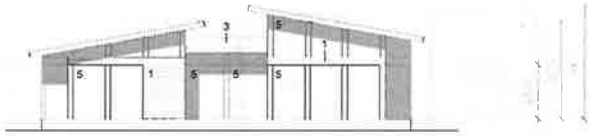
Issue A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

0 1 2 4 6m



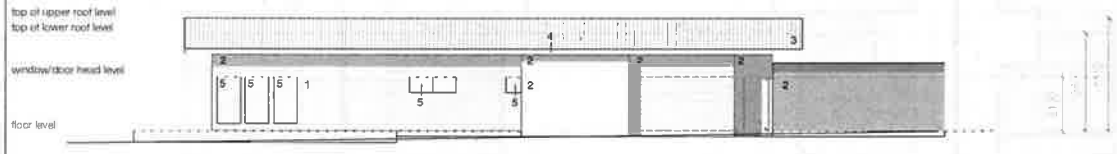
01 Side Elevation
Type A



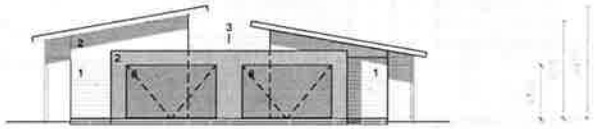
02 Rear Elevation
Type A

MATERIALS LEGEND

1 Fibre Cement Recess Panel
2 Pre-primed Recess Panel - Painted
3 Colorbond Corrugated Roof Sheeting
4 Colorbond Gutter
5 Powder Coated Aluminium Window/Door Frames
6 Panel Lift Garage Door



03 Side Elevation
Type A



04 Front Elevation
Type A

A	Development Application Issue	27.07.11
P3	Authorities Copy Issue	22.07.11
P2	Authorities Copy Issue	27.06.11
P1	Authorities Copy Issue	10.06.11

Issue	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
ILU Elevations
Type A

Scale:	Date:	Drawn:	Checked:
1:100	31.05.11	BD	PMc

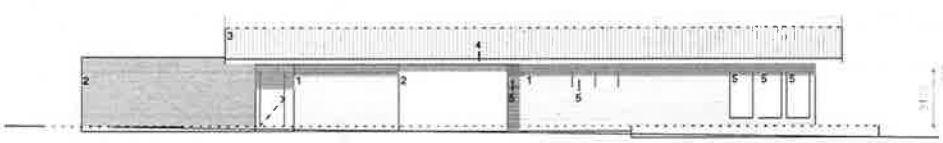
Drawing No:
598DA_A_007

Issue:
A

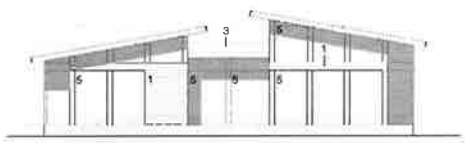
Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

0 1 2 4 6m

top of upper roof level
top of lower roof level
window/door head level
floor level



01 Side Elevation
Type B
Scale 1 : 100

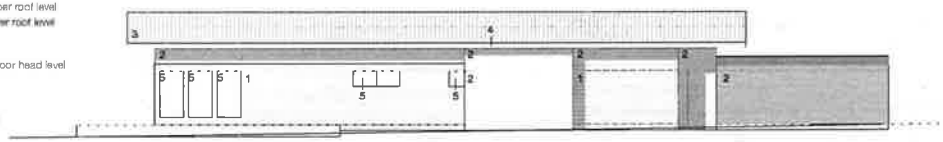


02 Rear Elevation
Type B
Scale 1 : 100

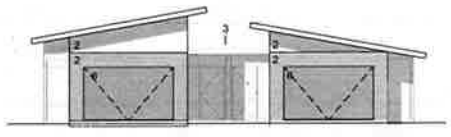
MATERIALS LEGEND:

1. Fibre Cement Render Panel
2. Prefinished Render Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

top of upper roof level
top of lower roof level
window/door head level
floor level



03 Side Elevation
Type B
Scale 1 : 100



04 Front Elevation
Type B
Scale 1 : 100

A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	15.06.11
Issue	Amendment	Date

Architect:
mcfadyenarchitects pty limited

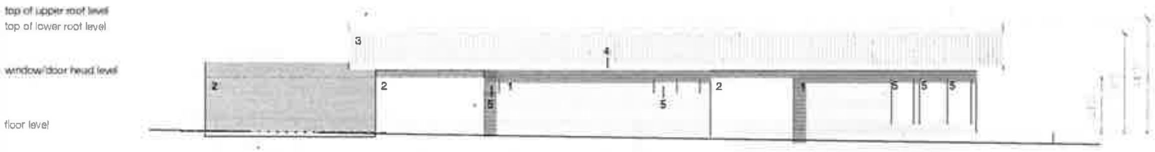
Project:
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title:
ILU Elevations
Type B

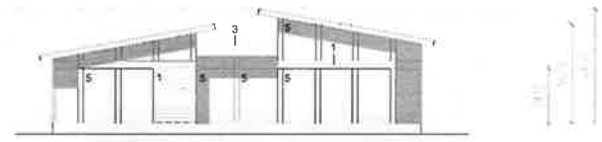
Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PAC

Drawing No: 598DA_A_008

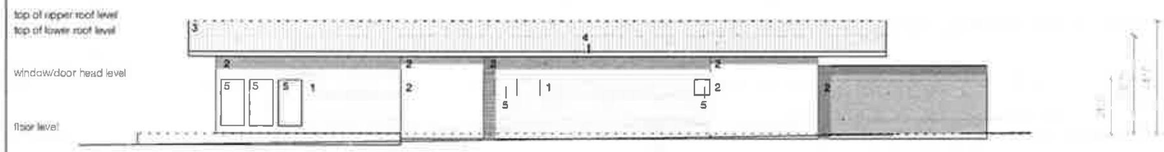
Issue: A



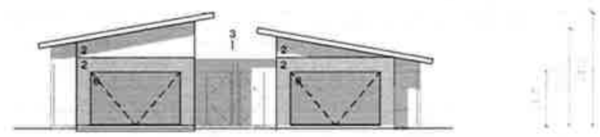
01 Side Elevation
Type C



02 Rear Elevation
Type C



03 Side Elevation
Type C



04 Front Elevation
Type C

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

0 1 2 4 8m

MATERIALS LEGEND:

1. Fibre Cement Facade Panel
2. Prefinished Facade Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

Issue	Amendment	Date
A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	22.07.11
P1	Advanced Copy Issue	10.06.11

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**

proposed aged care retreat at darkham road, mullaway NSW

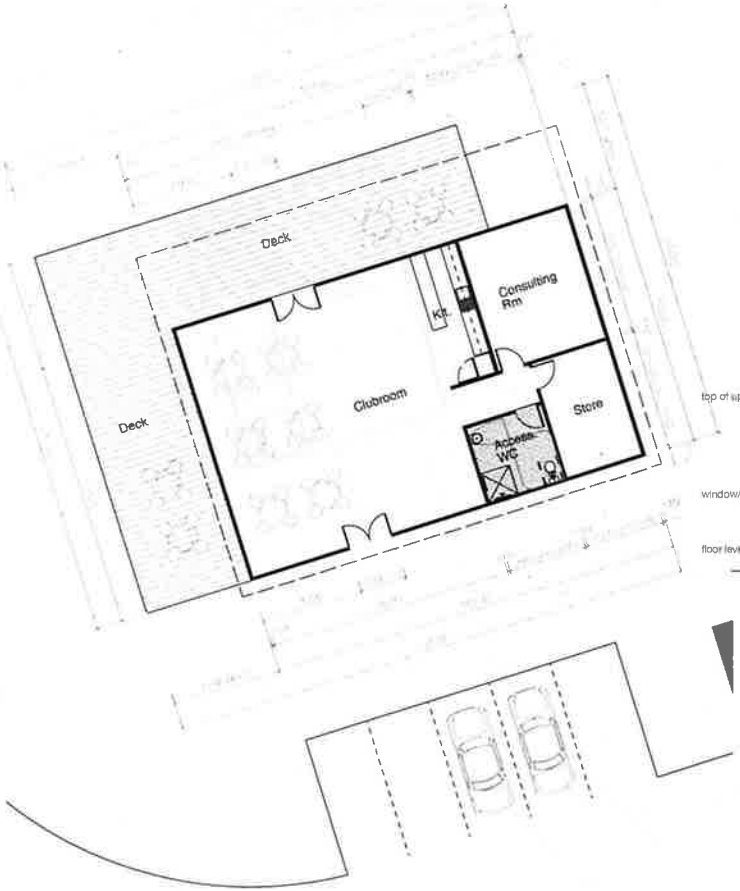
Drawing Title: ILU Elevations
Type C

Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

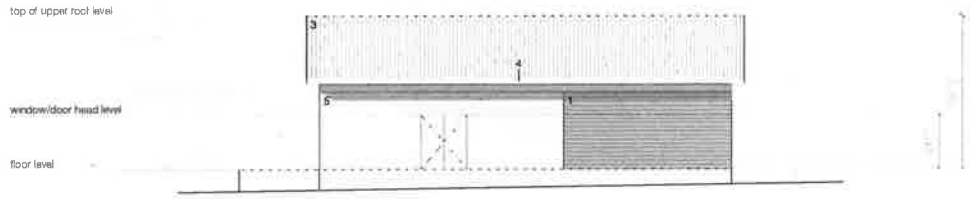
Drawing No: 598DA_A_009
Issue: A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

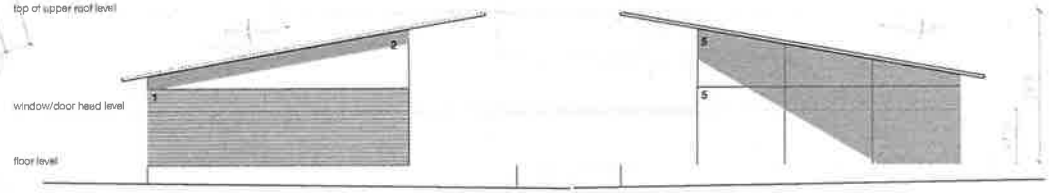
0 1 2 4 8m



01 Floor Plan
Clubroom
Scale 1 100

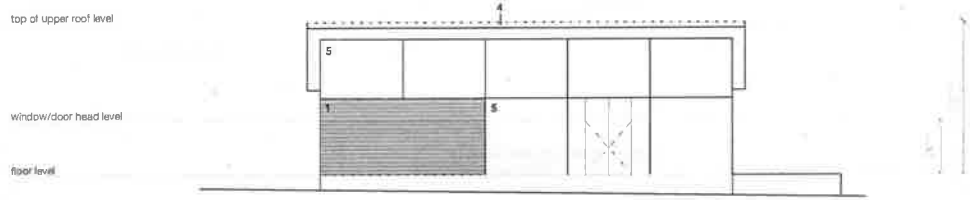


02 South Elevation
Clubroom
Scale 1 100



03 East Elevation
Clubroom
Scale 1 100

04 West Elevation
Clubroom
Scale 1 100



05 North Elevation
Clubroom
Scale 1 100

MATERIALS LEGEND:

1. Fibre Cement Render Panel
2. Pre-primed Render Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

A	Development Application Issue	27.07.11
Pg	Advanced Copy Issue	27.06.11
Pn	Advanced Copy Issue	18.06.11
Issue	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Plans/Elevations/Section
Clubroom

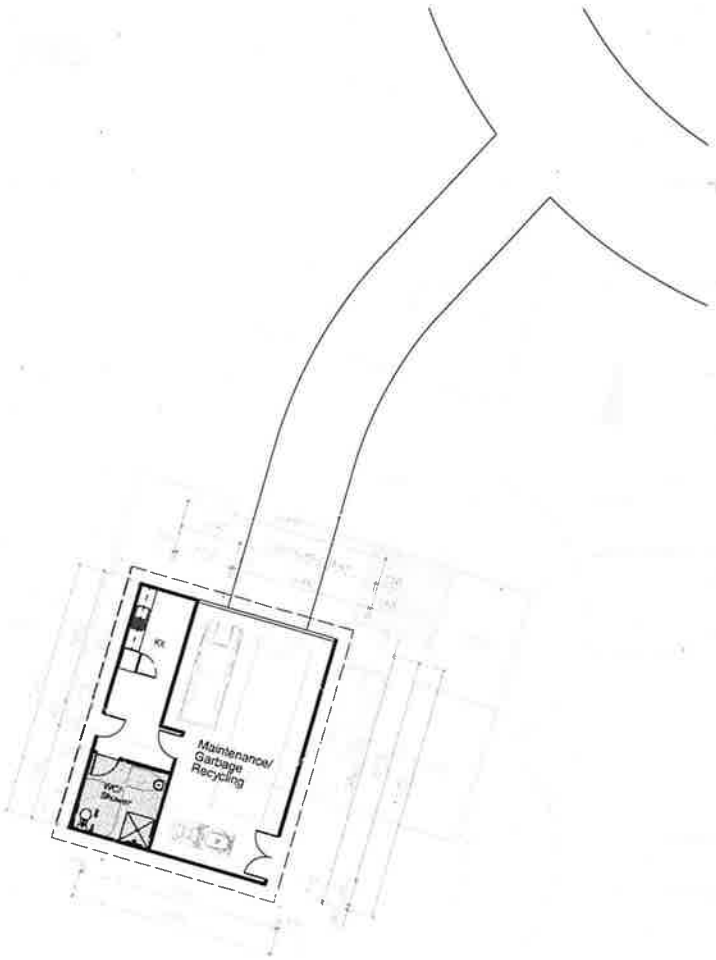
Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PAL

Drawing No.
598DA_A_010

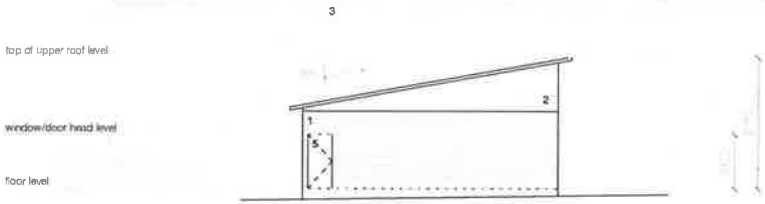
Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any quantities to be verified on site.

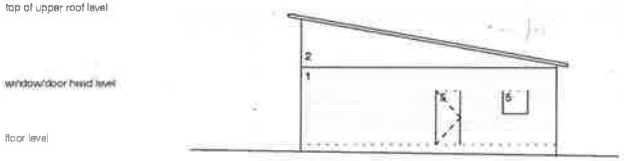
0 1 2 4 8m



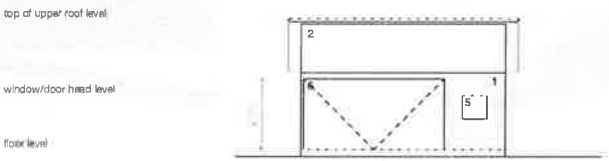
01 Floor Plan
Maintenance/Garbage Recycl Store
Scale 1 100



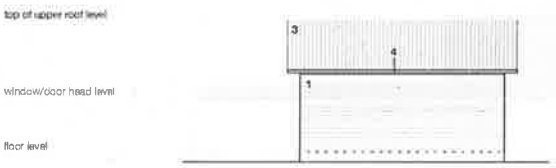
02 East Elevation
Maintenance/Garbage Recycl Store
Scale 1 100



03 West Elevation
Maintenance/Garbage Recycl Store
Scale 1 100



04 North Elevation
Maintenance/Garbage Recycl Store
Scale 1 100



05 South Elevation
Maintenance/Garbage Recycl Store
Scale 1 100

MATERIALS LEGEND:

1. Fibre Cement Recipe Panel
2. Pre-painted Recipe Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	18.06.11

Issue Amendment Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Plan/Elevations
Maintenance/Recycling/Garbage Store

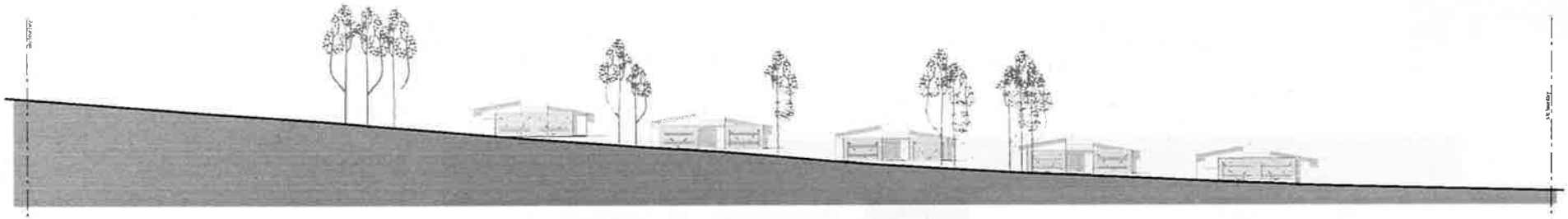
Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PAL

Drawing No.
598DA_A_011

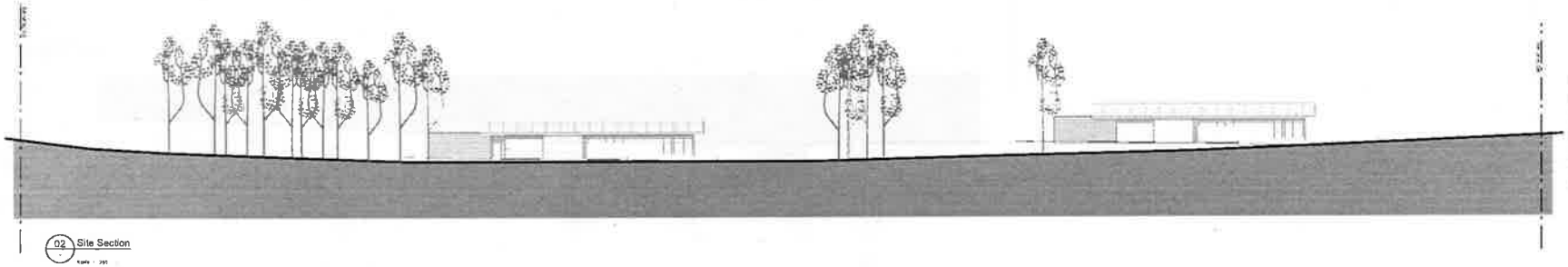
Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

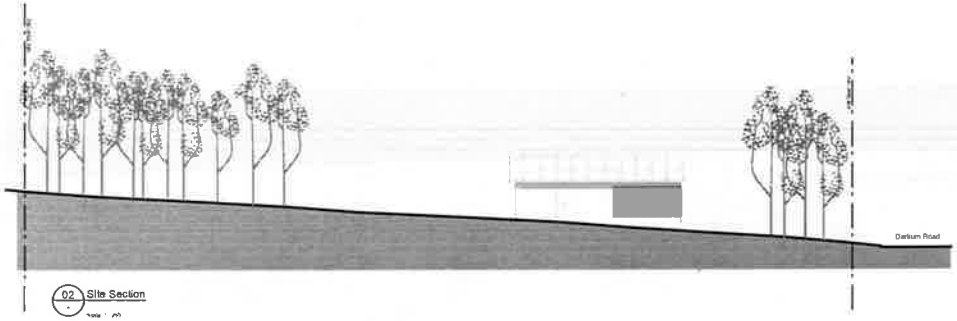
0 5 10 20m



01 Site Section



02 Site Section



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A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	15.06.11
no.	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title:
Site Sections

Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

Drawing No
598DA_A_012

Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

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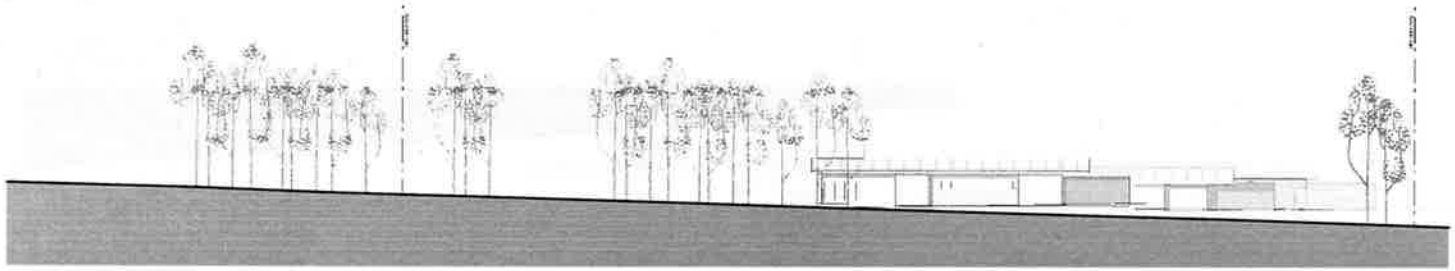

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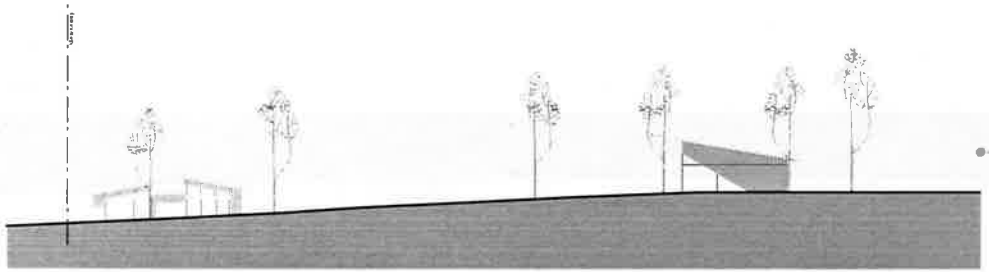

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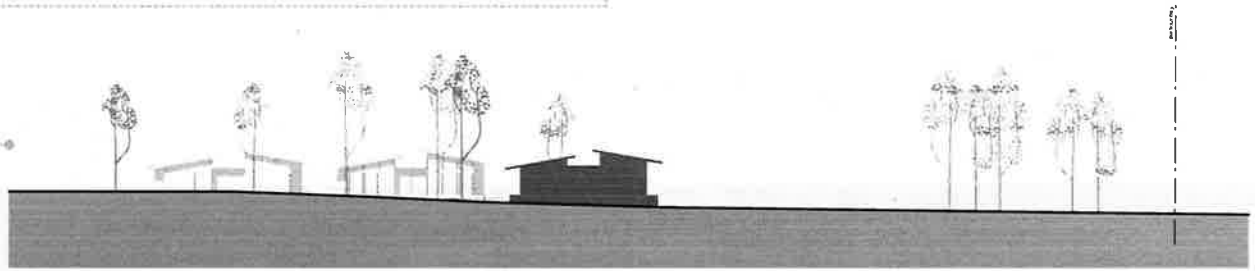

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P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	10.06.11

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Site Sections

Scale 1:100 | Date 31.05.11 | Drawn BD | Checked PM

Drawing No. 598DA_A_013

Issue A

Appendix C

Landscape Plans

LANDSCAPE DESIGN INTENT

The landscape design to the Solitary Island Retreat seeks to:

retain, where possible, indigenous site vegetation and provide for its long term protection

The project site is Lot 1 DP 1128964, Darkum Road, Mullaway. The site slopes down to Darkum Road with the southeast corner of the site, being the wettest area. This area of the site includes *Melaleuca quinquenervia* (Broad leaf Paperbarks) and *Lophostemon suaveolens* (Swamp Turpentine). The higher areas of the site have Open Forest with the predominant species being *Eucalyptus pilularis* (Blackbutt), *Eucalyptus siderophloia* (Northern Grey Ironbark), *Eucalyptus resinifera* (Red Mahogany), *Corymbia intermedia* (Pink Bloodwood), *Allocasuarina torulosa* (Forest Oak), *Eucalyptus teriticornis* (Forest Red Gum) and *Alphitonia excelsa* (Red Ash).

Nigel Smith of Arboreal Solutions prepared an arboricultural audit on the health and condition of the existing trees that may be impacted upon by the proposed development. In that report, each tree was allocated a 'Condition Rating' with 1 being a dead tree and 5 being a tree most suitable for retention. The landscape design seeks to implement practices described in the arborist report including retaining some trees with a lower Condition Rating as groups and retaining trees with a condition rating of 3, 4 and 5. In addition to these strategies the landscape design also seeks to retain trees identified as containing hollows and old growth trees.

Individual trees have been tagged and numbered and the Arboreal Solutions audit lists all tagged trees. In order to provide an Asset Protection Zone for proposed dwellings the following trees have been indicated for removal:

Trees:
1 to 8, 12, 27 to 31, 37, 40 to 41, 43 to 60, 66 to 67, 82 to 87, 93, 98 to 100, 105, 117, 128 to 129, 132 to 134, 137, 145, 152 to 155, 158 to 159, 164 to 177, 177 to 179, 182, 185 to 186, 208 to 212, 216 to 224, 226, 253, 286 to 288, 298, 464 to 465, 475 to 478, 481 to 483, 485 to 486, 488 to 495, 498 to 500, 502 to 504, 506 to 507, 510 to 524, 527 to 532, 534 to 537, 540 to 542, 544 to 548, 551 to 552, 556 to 560, 563 to 568, 576 to 588, 592 to 594, 597 to 599, 601 to 616, 622 to 632, 635 to 637, 639 to 644, 647, 650, 653 to 654, 656, 659 to 660, 662, 665, 667 to 668, 671 to 674, 706 to 709, 711 to 719, 721 to 731, 733 to 735, 737 to 761, 762 to 766, 768 to 770, 771 to 778, 781 to 790, 793 to 795, 797, 799, 801 to 802, 804 to 816, 819 to 827, 832 to 833, 835, 838 to 859, 863 to 878, 880to 882, 884 to 901, 903 to 906, 909, 916 to 919, 924, 927 to 937, 939, 941 to 956, 959 to 969, 973 to 974, 976 to 981, 983 to 990.

The existing understorey to the remnant trees includes a range of indigenous grasses and groundcovers. It is intended, where trees are retained, the understorey is also retained and incorporated into a mulched garden area. Groups of retained trees to the Asset Protection Zone and to the communal parkland would be mulched so that mowing could occur between gardens without risk of damage to tree roots.

fulfil the requirements of the Asset Protection Zone, Inner Protection Area and Outer Protection Area

The tree canopy within the Inner Protection Zone should cover less than 15% and should be located greater than 2 m from the building. Garden beds of flammable shrubs should be no closer than 10 m from an exposed window or door. Trees should have lower limbs removed up to a height of 2 m above the ground. The tree canopy in the Outer Protection Area should be less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September).

The landscape design indicates trees to be retained and removed and this assessment has been based on site investigations combined with a review of the arborist report. Retained trees are mulched, as a group where possible, to allow for mowing being tree groups. Tree removal has also sought to achieve the requirements of the Asset Protection Zone.

The site is within easy walking distance, along The Boulevard, to Mullaway Beach. The undulating topography, the remnant trees and the proximity to the beach contribute to the site's appealing character. The landscape design seeks to reflect these positive site attributes through the use of indigenous vegetation, informat setout to planting and integration of retained trees. Materials incorporated within the site will reflect the 'natural' character of the site. In particular, the site will incorporate bluestone basalt landscape walls, bluestone rock to the dam outfall, timber to park structures and gravels for access around villas. Gardens areas will incorporate site mulch created from the removed trees.

The existing vegetation provides a home and feeding ground to a range of birdlife. New planting to the site will seek to encourage visitation by native fauna and birds.

add visual amenity and provide opportunities for outdoor recreation

The landscape design to the Solitary Island Retreat will integrate the built forms with the retained site vegetation, create an attractive Darkum Road frontage, create an entrance to the facility and provide opportunities for residents to enjoy the outdoor setting. Pathways will provide extensive opportunities for walking within the natural setting. Shelters with seating will provide opportunities for comtemplation along walking routes. The communal open space outside the proposed club room will provide for BBQs, picnics and group gatherings.

Garden areas featuring flowering native shrubs will be located to provide some privacy to decks whilst still allowing views out to the broader setting.

The landscape design will incorporate informal layout to gardens with layered planting of trees for shade, flowering shrubs to add colour and to attract birds and an understorey of groundcovers to add a soft contrast to built elements. Planting will be used to define key spaces, to add comfort to communal areas and to provide privacy to private open spaces.

incorporate indigenous species with low water requirements

The landscape will retain many trees and these will be incorporated into simple, large mulch areas to allow for easy mowing between. Indigenous groundcovers will be retained within these mulched areas. Streetscape planting and gardens will feature indigenous species with low maintenance and water requirements. Planting will seek to add interest through foliage texture, flower colour and variety of plant form.

Solitary Islands Retreat
Mullaway

1160-01 LANDSCAPE INTENT
issue C

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LEGEND

site boundary

land parcel subject of current DA

independent living villas

pathway link to bus stop

2.5m pathway

1.2m pathway

retained trees

street tree planting

gardens

seating pavillion/shelter

mown grass

buffer planting

mulch to retained trees

retained grassland

Solitary Islands Retreat
Mullaway

scale 1:2000 @ A3

1160-02 SITE PLAN
issue C

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Solitary Islands Retreat
Mullaway

scale 1:1000 @ A3

1160-03 SITE PLAN DETAIL
issue C

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Solitary Islands Retreat
Mullaway

scale 1:1000 @ A3

1160-04 SITE PLAN DETAIL
issue C

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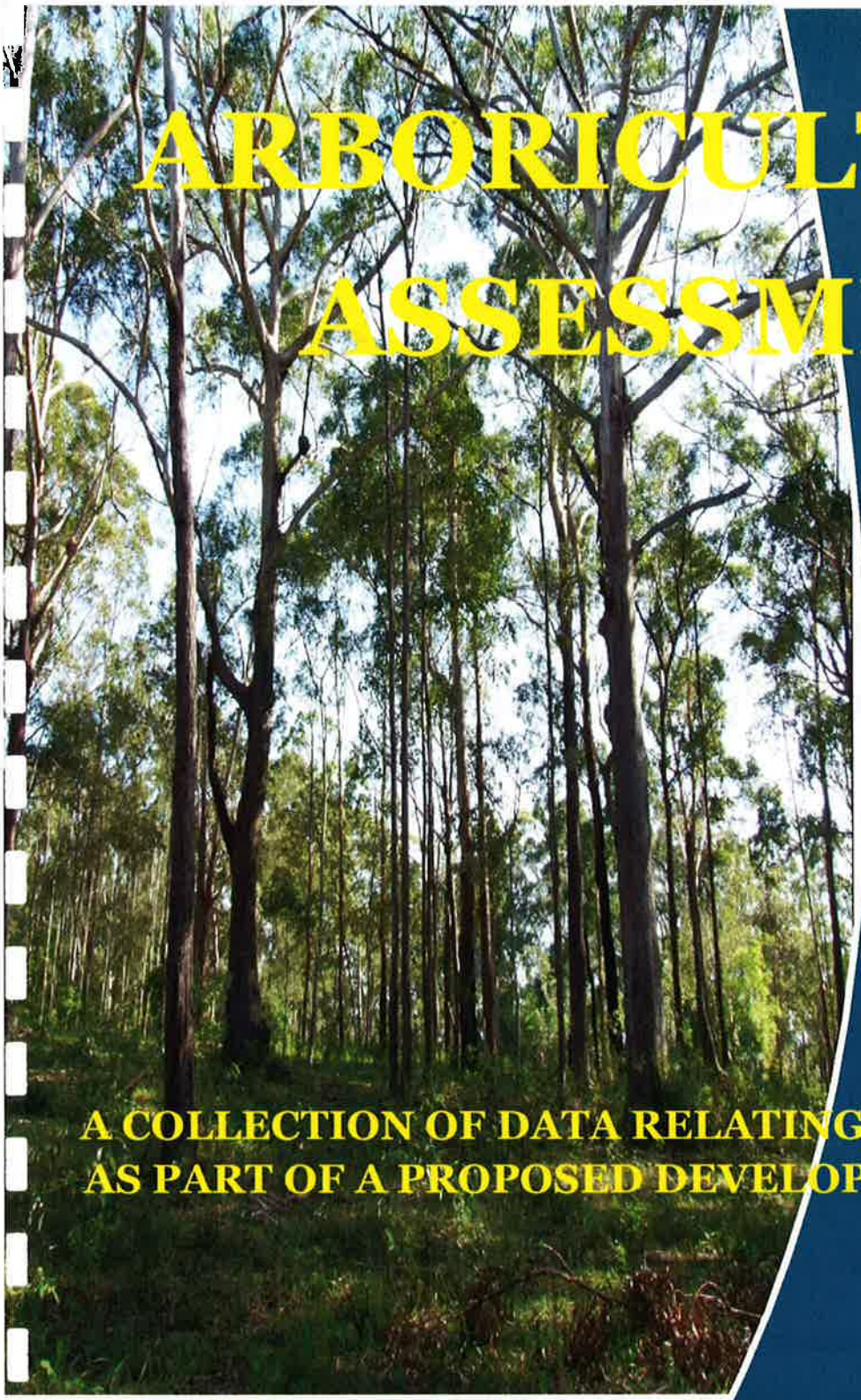
Appendix D

Aborist Report



ARBORICULTURAL ASSESSMENT

LOT 1 DP 1128964

DARKUM ROAD

MULLAWAY

A COLLECTION OF DATA RELATING TO EXISTING TREES AS PART OF A PROPOSED DEVELOPMENT APPLICATION

Arboreal Solutions
ARBORICULTURAL CONSULTANTS

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NOVEMBER 2009

Contents

EXECUTIVE SUMMARY

The environment in which these trees are growing on this site has been impacted by the grazing of stock, logging operations and minor clearing. Consequently many of the trees are in varying degrees of health. Many also display a forest habit. These factors have been considered when allocating the Condition Rating in the Tree Assessment Schedule.

Of the 473 trees assessed:

- 13 are old growth trees, some containing hollows.
- 8 mature trees were assessed as having hollows.
- 11 are dead, some containing hollows.
- 289 have a Condition Rating of 2.
- 26 trees have a Condition Rating of 4 and 5 being most suitable for retention as individual specimens.
- 158 trees had a Condition Rating of 3, these may also be considered for retention.

The following practises will promote long term survival of the existing trees selected for retention if the site is developed.

1. Consider retaining some trees with lower a Condition Rating as groups.
2. Consider the retention of trees with a condition rating of 3, 4 and 5.
3. Allow the minimum RPZ's for trees to be retained, adhering to guidelines in both the British Standard BS 5837:1991 Methods of Assessing Trees and the Draft Australian Standard AS 4970 Protection of Trees on Development Sites.
4. Any old growth trees to be retained will have a better chance of long term survival if an area greater than the recommended RPZ is allocated for each tree.
5. Some trees to be retained may require a suitably qualified arborist to reassess them in relation to the final building proposal.

1.0 INTRODUCTION

On 7 October 2009 the author, Nigel Smith from Arboreal Solutions was contacted by Mr Rob Harrison from GHD, Coffs Harbour, on behalf of the owner/s of Lot 1 DP 1128964, Darkum Road, Mullaway.

He requested an arboricultural audit on the health and condition of existing trees on the above property that maybe impacted by a proposed retirement village development.

The trees discussed in this report are located within and adjacent to a proposed building envelope on the subject land. The subject Land is Zoned 1A Rural Agriculture.

There are constraints on tree removal under the Coffs Harbour City Council (CHCC) Tree Preservation Order (TPO), amended December 2004. It states that the TPO applies to lots east of the Pacific Highway, greater than 1 hectare with this zoning. A Development Application is required for tree removal.

There are trees on site containing hollows. These are protected under the Threatened Species Conservation act 1995.

Old growth trees have also been identified. These are protected under the Native Vegetation Act 2003.

There are also constraints under the Koala Plan of Management, 1999. (KPoM). The subject trees are part of an area designated as secondary Koala habitat.

Figure 1 Location of subject property taken from the Coffs Harbour Local Environment Plan (LEP) amended 2008

2.0 SCOPE OF REPORT

The purpose of this report is to provide information on the health, condition and size of existing trees on this property that maybe impacted by a future development proposed for the site.

The subject trees are defined as a tree in the Coffs Harbour City Council (CHCC) Tree Preservation Order (TPO) as trees. They are woody plants > 3m tall or a DBH > 150mm.

This report identifies the species present and the root area that needs to be protected to maintain the trees vigour and stability during the development process and into the long term.

It also designates a Condition Rating for each tree. This rating provides a retention value of each tree.

The information in this report reflects the condition of the subject trees at the time of the inspection. Information in the report as far as I am aware is from reliable sources. However I cannot guarantee or be responsible for information from others.

Industry best practice methods will be used in obtaining data and providing recommendations in this report.

3.0 DISCLOSURE STATEMENT

Trees are living organisms and therefore possess natural viability. This cannot be controlled, however trees can be managed. An Arborist cannot guarantee that a tree will be safe under all circumstances nor predict a time when a tree will fail. To live and work near a tree involves some degree of risk and this evaluation does not preclude all the possibilities.

4.0 METHODOLOGY

Nigel Smith (the author) visited the site on various days during November 2009 and carried out a Visual Tree Assessment (VTA) from the ground on 473 trees as surveyed by Blair Lansky Surveyors, Coffs Harbour.

The subject trees have been tagged at breast height with aluminium tags attached by aluminium nails. They have been numbered.

They were identified to species level. Their age and Diameter at Breast Height (DBH) were recorded. Vigour, condition, crown class and spread were also recorded. Any relevant comments were noted along with their required Root Protection Zone (RPZ). This information has been tabulated in the attached Tree Assessment Schedule. Trees with observed hollows were noted. A condition rating was given to each tree.

DBH was measured with a 330mm straight edge and randomly checked for accuracy with a diameter tape.

The heights of the trees were recorded using visual estimation.

A digital camera was used to obtain the photos used in this report. Binoculars were used to observe features within the crown.

The Draft Australian Standard AS 4970 has been used for the calculation of the Root Protection Zones quoted in this report.

Visual Tree Assessment defined as:

"The thorough and optical check on the condition and health of the tree **made from the ground,** this includes external factors that may impact on the health of the tree" (Mattheck & Breloer 1994)
Explanation:
"The tree shows through its configuration what is wrong with it. This understanding is the basis for the Visual Tree Assessment system known at VTA" (Mattheck & Breloer 1994).

VTA is based on the *Axiom of Uniform Stress,* which states that trees grow with such configuration that all stress on their surfaces are distributed evenly. If this state is disturbed the trees repair themselves by forming locally thicker rings. These reparative structures are symptoms of defects". (Mattheck &Breloer)

5.0 SITE DESCRIPTION AND HISTORY

The site has an easterly aspect with a gentle slope down to Darkum Road. The southern portion of the footprint is the wettest area. There is evidence where surface water has drained.

A large proportion of the Paperbarks and Swamp Turpentines assessed were located in this portion. For the purposes of this report this area has been called Area B.

The better drained areas A and C contain species common in Open Forest communities.

Undergrowth consists mainly of native and introduced grasses with seedling trees present.

Horses presently utilise the land. A previous owner informed me that the site had been logged periodically over the years.

Some trees in Area C have suffered various degrees of crown failure due to this timber harvesting practise.

Red Ash trees and seedlings are scattered among others trees in area A and extending into area B.

It is bounded to the east by Darkum Road, to the south by unmanaged vegetation with a 5m wide slashed area through the wire fence. To the north near Darkum road are urban lots. To the west is more unmanaged vegetation and rural properties.

Figure 2 Existing trees as viewed from Darkum Road

6.0 EXPLANATION OF TERMS IN THE TREE ASSESSMENT SCHEDULE

Common Botanical name

Botanical name given to *Genus* and *species* level only .Common name refers to non professional's ID of tree, e.g. Paperbark.

Tree No.: Relates to tree ID as found on attached Blair Lansky survey and aluminium tags attached to the subject trees.

Age

Young: Tree aged less than 20% of life expectancy.
Mature: Tree aged 20- 80% of life expectancy.
Over- mature: tree aged greater than 80% of life expectancy, with or without reduced vigour and declining gradually or rapidly but will ultimately end in the trees death.

DBH: Diameter at breast height measured at 1.4m off the ground

TREE HEALTH
Vigour
Overall health; capacity to grow and resist physiological stress.

Normal: A tree that can maintain and sustain its life processes. This is evident by the growth of leaves, branches, roots and trunk.
Low: Reduced ability to maintain and sustain life processes. Evident with the decline of leaf growth, branches, roots and trunk.
Abnormal: Accelerated growth due to artificial changes to its environment. E.g., water from a leaking pipe or nutrients from animal waste. Crown damage often results in this growth. May result in premature ageing.

Condition
A tree's crown form and growth habit.

Good: At the time of the inspection the tree was free from pests and diseases and appeared stable and of good form. It has space for future growth. Has a medium to long-term useful life expectancy of 15 to 40 plus years, assuming the site around it is not greatly altered.

Fair: At the time of the inspection, observations were similar as above though the tree could be misshapen and impacted by pests and diseases or site modifications. Tree may recover with remedial works or may recover and adapt to changes in its new environment. Having a medium useful life expectancy of 15 to 40 years.

Poor: At the time of inspection the tree had poor form and was suppressed. It has also declined through pests and diseases and site alterations. It may have sustained weather event damage. Remedial works will not restore health. Requiring immediate removal or within five years.

Crown Class
Dominant: crown extending above the general stand canopy and not restricted by adjacent trees.
Co Dominant: Crown forming the bulk of the upper canopy layer but is crowded by adjacent trees.
Intermediate: Crown extends into the level of the dominants and co dominants but is quite crowded on all sides.
Suppressed: Trees which have been over topped and with crown development restricted from above.

Crown Spread: Spread of the crown and the compass direction where the crown is bias. No compass direction noted indicates some symmetry in the crown.

Lean: Corrected lean indicates tree has produced reaction wood to compensate for the lean. The apex of the tree has returned to vertical. Reaction wood formed on the lower or upper sides of a stem to counteract the stem. In broadleaves this forms on the upper side, tension wood and in conifers on the lower side, compression wood.
Slight lean: 0-15 degrees off vertical.
Moderate Lean: 15-30 degrees off vertical.
Severe Lean: 30-45 degrees off vertical.
Critical lean: >45 degrees off vertical.

Codominant Stems: Trunks or stems equal in size. Also associated with 1st and 2nd order limbs in the crown.

Root Protection Zone (RPZ)

The calculation of the ideal Root Protection Zone (RPZ) has been taken from DR AS 4970 Draft for Public Comment Australian Standard. Protection of Trees on Development Sites. The calculated distance is similar to setbacks referred to in British Standard BS 5837:2005 Trees in Relation to Construction – Recommendations.

Calculation of the minimum RPZ

(From DR AS 4970 Protection of trees on development sites)

Tree Age	Tree Vigour	RPZ radius (m)
Young trees (age <20% of life expectancy in situ)	Good vigour	6 x DBH
	Poor vigour	9 X DBH
Mature trees (age between 20% and 80% of life expectancy in situ)	Good vigour	9 X DBH
	Poor vigour	12 x DBH[1]
Over mature trees (age >80% of life expectancy in situ)	Good vigour	12 x DBH
	Poor vigour	15 X DBH

RPZ for multi stemmed trees has been calculated combining the stem DBH and using this formula:

Total DBH = $\sqrt{(DBH1)^2 + (DBH2)^2 + (DBH3)^2}$

[1] RPZ radius most suited to subject trees

Condition Rating

1: Dead trees. (Red rows in TAS)

2: Trees that are misshapen or have dieback, physical wounds or severe crown damage and are unable to adapt to changes and may decline further regardless of remedial works. May include trees with excessive forest growth habit and old growth trees.

Short Life Expectancy, 5 -15 years. In most cases not suitable for retention.

3: Trees that are not restricted for space or light and may recover with remedial works. These trees may require further assessment.

Medium Life Expectancy, 15- 40 years. Suitable for retention.

4: Trees of good form and structure that require minimal maintenance at the time of the inspection. May require remedial works. May include groups of trees.

Long Life Expectancy, 40+ years. More suitable for retention.

5: Trees of good form and structure that require no maintenance at the time of the inspection.

Long Life Expectancy, 40 + years. Most suitable for retention.

7.0 TREE ASSESSMENT SCHEDULE

Client: GHD **Assessed by:** Nigel Smith **Site:** Lot 1 DP1128964, Darkum Rd, Mullaway

Assessment date: .November 2009 **Trees tagged:** Yes **Weather:** Fine

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
1	**Swamp Sheoak** ***Casuarina glauca***	Mature	280 200	10	Normal	Poor	Co dominant 4	co dominant stems@ GL	2.5	**2**
2	**Black Sheoak** ***Allocasuarina littoralis***	Mature	100 160 150	6	Low	Poor	Co dominant 5	Multi stemmed	1.9	**2**
3	**Black Sheoak** ***Allocasuarina littoralis***	Mature	150 150 160	6	Low	Poor	Co dominant 4	Multi stemmed, Gadaghi at base	1.8	**2**
4	**Black Sheoak** ***Allocasuarina littoralis***	Mature	170	6	Normal	Good	Co dominant 2		1.5	**4**
5	**Black Sheoak** ***Allocasuarina littoralis***	Mature	150	6	Low	Poor	Suppressed 5	Upper crown failure HOLLOWS 1 FOSB remains	1.8	**2**
6	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	540	5	Low	Fair	Co dominant 7	Moderate lean	6.5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
7	**Red Ash** ***Alphitonia excelsa***	Mature	210	9	Low	Fair	Suppressed 4		2.5	**4**
8	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	750	16	Low	Fair	Dominant 8	Moderate lean west	9	**3**
9	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	300	8	Low	Fair	Co dominant 6e		3.6	**3**
10	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	10	Low	Fair	Suppressed 6W	suppressed by adjacent tree	2.4	**3**
11	**Pink Bloodwood** ***Corymbia intermedia***	Mature	360	14	Low	Fair	Co dominant 8N	New growth dieback	4.3	**3**
12	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	200 160	9	Low	Poor	Co dominant 4	Co dominant stems at GL	3	**3**
13	**Red Ash** ***Alphitonia excelsa***	Mature	260 160	12	Normal	Fair	Co dominant 3	Co dominant stems at GL	2.2	**3**
14	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	150	8	Low	Poor	Co dominant 2		2	**2**
15	**Black Sheoak** ***Allocasuarina littoralis***	Mature	200	5	Low	Poor	Intermediate 7N	Moderate lean	2.6	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
16	**Pink Bloodwood** ***Corymbia intermedia***	Mature	220	10	Low	Fair	Co dominant 4N		2.6	**3**
17	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	300	10	Normal	Fair	Co dominant 4E		2.6	**3**
18	**Red Bloodwood** ***Corymbia gummifera***	Mature	290	12	Normal	Fair	Co dominant 4NW	Occluded crack at co dominant FOSB junction	2.7	**2**
19	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	9	Normal	Poor	Co dominant 6E	Moderate lean	2	**2**
20	**Black Sheoak** ***Allocasuarina littoralis***	Mature	200	7	Low	Poor	Intermediate 4NW	Fosb failure	2.4	**2**
21	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	360	15	Low	Poor	Co dominant 8NE		4.3	**3**
22	**Black Sheoak** ***Allocasuarina littoralis***	Young	140	4	Low	Poor	Suppressed 2E	Basal wounds	2	**2**
23	**Black Sheoak** ***Allocasuarina littoralis***	Mature	200	5	Low	Poor	Co dominant 6E	Moderate lean	2.4	**2**
24	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	300	9	Low	Poor	Co dominant 4	FOSB failure	3.6	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
25	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	280	5	Low	Poor	Suppressed 10E	Severe lean, basal cavity	3.4	**2**
26	**Black Sheoak** ***Allocasuarina littoralis***	Mature	750	19	Normal	Fair	Co dominant 15W	Med vol. DW. Moderate lean, Wound on trunk HOLLOW	6.8	**3**
27	**Pink Bloodwood** ***Corymbia intermedia***	Mature	310	12	Low	Poor	Co dominant 6S	Wound on trunk N side GL to 5m	3.7	**2**
28	**Black Sheoak** ***Allocasuarina littoralis***	Mature	210	8	Low	Poor	Co dominant 2W	50% crown failure	2.5	**2**
29	**Black Sheoak** ***Allocasuarina littoralis***	Mature	180	8	Low	Poor	Co dominant 2		2	**2**
30	**Red Bloodwood** ***Corymbia gummifera***	Mature	200	8	Normal	Poor	Co dominant 2	Wound basal area co dominant FOSB	2	**2**
31	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	180 160	5	Low	Poor	Co dominant 5E	Co dominant GL stems	2.4	**2**
32	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	230	10	Normal	Fair	Co dominant 3NE		2	**3**
33	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	180	8	Normal	Fair	Co dominant 3		2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
34	**Red Bloodwood** ***Corymbia gummifera***	Mature	200 230	12	Low	Poor	Co dominant 8	Co dominant GL stem	3.6	**2**
35	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	170	8	Low	Fair	Co dominant 3	Severe new growth dieback	2	**2**
36	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	10	Normal	Fair	Co dominant 5E		2.2	**2**
37	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	8	Normal	Fair	Co dominant 4E		2.4	**2**
38	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	180	8	Normal	Fair	Co dominant 2		2	**3**
39	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	DEAD	230	5						**1**
40	**Pink Bloodwood** ***Corymbia intermedia***	Young	200 220	15	Low	Fair	Co dominant 5N	Co dominant GL stem	3.6	**2**
41	**Pink Bloodwood** ***Corymbia intermedia***	Young	160 130 180 180	13	Normal	Poor	Co dominant 4	Multi stemmed at GL	2.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
42	**Pink Bloodwood** ***Corymbia intermedia***	Young	210	10	Normal	Fair	Co dominant 4E	Basal wound	1.2	**3**
43	**Black Sheoak** ***Allocasuarina littoralis***	Young	120	4	Low	Poor	Suppressed 3E	Moderate lean	2	**2**
44	**Pink Bloodwood** ***Corymbia intermedia***	Young	150	9	Low	Poor	Co dominant 2S		2	**2**
45	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	250	12	Low	Good	Co dominant 3W	Mechanical wound 2.2m	3	**4**
46	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	250 200	10	Abnormal	Poor	Co dominant 3	Co dominant stems@ 500mm FOSB failure	3.6	**2**
47	**Pink Bloodwood** ***Corymbia intermedia***	Mature	250	10	Low	Fair	Co dominant 4	Basal wound	3	**3**
48	**Black Sheoak** ***Allocasuarina littoralis***	Mature	160	6	Low	Poor	Co dominant 6N	Moderate lean	2	**2**
49	**Blackbutt** ***Eucalyptus pilularis***	Mature	300	16	Normal	Fair	Emergent 4NE	Forest habit	3.8	**2**
50	**Blackbutt** ***Eucalyptus pilularis***	Young	200	15	Normal	Poor	Suppressed 6NE	Suppressed by adjacent tree	2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
51	**Pink Bloodwood** ***Corymbia intermedia***	Mature	420	8	Abnormal	Poor	Co dominant 5	Mid to upper crown failure	5	**2**
52	**Blackbutt** ***Eucalyptus pilularis***	Mature	330	16	Normal	Fair	Co dominant 8		3	**3**
53	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	470	10	Low	Fair	Co dominant 8W		5.5	**3**
54	**Blackbutt** ***Eucalyptus pilularis***	Mature	250	16	Normal	Fair	Co dominant 2	Forest habit	2.3	**2**
55	**Blackbutt** ***Eucalyptus pilularis***	Mature	250	16	Normal	Fair	Co dominant 3	Forest habit	2.3	**2**
56	**Pink Bloodwood** ***Corymbia intermedia***	Mature	275	15	Low	Poor	Co dominant 4N		3.3	**2**
57	**Black Sheoak** ***Allocasuarina littoralis***	Mature	260	15	Low	Poor	Co dominant 1E	Forest habit	3.1	**2**
58	**Blackbutt** ***Eucalyptus pilularis***	Mature	570	16	Normal	Fair	Co dominant 7NE	Basal wound	5.2	**3**
59	**Pink Bloodwood** ***Corymbia intermedia***	Mature	420	12	Low	Fair	Co dominant 10N		5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
60	**Red Bloodwood** ***Corymbia gummifera***	Mature	560	13	Low	Poor	Co dominant 10W	Severe new growth dieback	6.6	**2**
61	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	12	Low	Poor	Suppressed 3S		3	**2**
62	**Red Bloodwood** ***Corymbia gummifera***	Mature	640	16	Abnormal	Poor	Co dominant 12	Severe new growth dieback	7.7	**2**
63	**Pink Bloodwood** ***Corymbia intermedia***	Mature	520	16	Low	Fair	Co dominant 10E	Severe new growth dieback	6.2	**3**
64	**Pink Bloodwood** ***Corymbia intermedia***	Mature	530	15	Low	Poor	Co dominant 8W	Severe new growth dieback	6.3	**2**
65	**Blackbutt** ***Eucalyptus pilularis***	Mature	340	16	Normal	Fair	Co dominant 4	Forest habit	3.1	**3**
66	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1210	22	Low	Poor	Dominant 20	Upper crown failure HOLLOWS	18	**2**
67	**Blackbutt** ***Eucalyptus pilularis***	Mature	640 300	16	Abnormal	Poor	Co dominant 10W	Upper crown failure	8.4	**2**
68	**Blackbutt** ***Eucalyptus pilularis***	Mature	320	20	Normal	Poor	Co dominant 2N	Forest habit	2.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
69	**Blackbutt** ***Eucalyptus pilularis***	DEAD	250	12	Normal					**1**
70	**Blackbutt** ***Eucalyptus pilularis***	Mature	310	27	Normal	Poor	Co dominant 2N	Forest habit	2.8	**2**
71	**Pink Bloodwood** ***Corymbia intermedia***	Mature	250	7	Normal	Poor	Intermediate 4W		2.3	**2**
72	**Blackbutt** ***Eucalyptus pilularis***	Mature	840	30	Normal	Poor	Co dominant 8W	Co dominant stems @2m included bark	7.6	**2**
73	**Blackbutt** ***Eucalyptus pilularis***	Mature	300 320	25	Normal	Poor	Co dominant 4	Forest habit Co dominant stems @600mm Included bark	3.2	**2**
74	**Blackbutt** ***Eucalyptus pilularis***	Mature	640	16	Low	Poor	Co dominant 8W	Fosb failure lower crown regrowth from stump	7.7	**2**
75	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	960	20	Low	Poor	Co dominant 6S	70% crown failure, basal area burnt and decayed 50%	14.4	**2**
76	**Blackbutt** ***Eucalyptus pilularis***	Mature	960	32	Normal	Fair	Co dominant 12	FOSB failures HOLLOWS	5.3	**2**
77	**Pink Bloodwood** ***Corymbia intermedia***	Mature	440	5	Abnormal	Poor	Co dominant 1	Upper crown failure during weather event	8.6	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
78	**Pink Bloodwood** ***Corymbia intermedia***	Young	150 100	6	Normal	Fair	Intermediate 2N		2.9	**3**
79	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	320	28	Normal	Fair	Co dominant 5	Forest habit	2	**3**
80	**Red Bloodwood** ***Corymbia gummifera***	Mature	650	16	Normal	Poor	Co dominant 8E	Basal wound GL-3m	5.9	**2**
81	**Pink Bloodwood** ***Corymbia intermedia***	Young	150	9	Normal	Fair	Intermediate 2E		2	**3**
82	**Blackbutt** ***Eucalyptus pilularis***	Mature	940	20	Normal	Fair	Co dominant 18NE	Failure in upper crown	8.5	**3**
83	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	650	15	Normal	Fair	Co dominant 5	Bracket fungi middle crown	5.9	**4**
84	**Swamp Sheoak** ***Casuarina glauca***	Mature	200	8	Low	Poor	Co dominant 7E	Moderate lean	2.4	**2**
85	**Pink Bloodwood** ***Corymbia intermedia***	Mature	520	16	Low	Poor	Co dominant 10E	Severe new growth dieback	6.2	**2**
86	**Pink Bloodwood** ***Corymbia intermedia***	Mature	520	16	Normal	Poor	Co dominant 12W	HOLLOWS Moderate lean	4.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
87	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	950	20	Low	Fair	Co dominant 12NW	Basal cavity Medium volume deadwood	11.4	**3**
88	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	330	12	Normal	Poor	Co dominant 10N	Moderate lean	3	**2**
89	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Young	200	8	Normal	Fair	Suppressed4 NW		2	**3**
90	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	570	19	Normal	Poor	Co dominant 10	Apical dominance made up of first order branches	5.2	**2**
91	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Young	200	9	Normal	Poor	Suppressed 2E		2	**2**
92	**Blackbutt** ***Eucalyptus pilularis***	Mature	520 640	24	Normal	Poor	Co dominant 6E	Co dominant GL stems	5.8	**2**
93	**Blackbutt** ***Eucalyptus pilularis***	Mature	1280	28	Low	Poor	Co dominant 16SE	Basal decay Ample reaction wood present	15.4	**2**
94	**Pink Bloodwood** ***Corymbia intermedia***	Mature	250	12	Normal	Fair	Intermediate 4	Forest habit	2.3	**3**
95	**Blackbutt** ***Eucalyptus pilularis***	Mature	430	25	Normal	Good	Co dominant 4N	Forest habit	2.5	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
96	**Blackbutt** ***Eucalyptus pilularis***	Mature	470	25	Normal	Good	Co dominant 4	Forest habit	4.2	**3**
97	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	270	9	Normal	Fair	Suppressed 2E		2.	**2**
98	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	250	8	Normal	Fair	Suppressed 3	Suppressed by adjacent tree	2.3	**2**
99	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	620	19	Normal	Poor	Suppressed1 0E	Suppressed by adjacent tree	5.6	**2**
100	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	340	10	Normal	Poor	Co dominant 10E	Moderate lean	3.1	**2**
101	**Pink Bloodwood** ***Corymbia intermedia***	Mature	890	18	Normal	Poor	Co dominant 15S	HOLLOWS 50% crown failure	8.1	**2**
102	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	470	16	Normal	Poor	Co dominant 10E	Suppressed by adjacent tree FOSB lower crown	4.2	**2**
103	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	570	16	Low	Poor	Co dominant 6W	Trunk wound 3m	6.8	**3**
104	**Blackbutt** ***Eucalyptus pilularis***	Mature	570	20	Normal	Good	Co dominant 7		4.7	**4**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
105	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	320	16	Normal	Fair	Suppressed 7N	Suppressed by adjacent Blackbutt	2.9	**2**
106	**18 x Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	6	Low	Poor	Co dominant 2E	Best retained as part of a group	2.4	**5**
107	**Black Sheoak** ***Allocasuarina littoralis***	Mature	170 210	5	Low	Poor	Co dominant 5E		3.2	**2**
108	**Slash Pine** ***Pinus elliottii***	Mature	330	16	Normal	Good	Co dominant 3	Undesirable species	3	**4**
109	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	10	Normal	Fair	Co dominant 3		2.3	**4**
110	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	6	Normal	Fair	Co dominant 3E		2	**3**
111	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	6	Normal	Fair	Co dominant 3E		2	**2**
112	**Black Sheoak** ***Allocasuarina littoralis***	Mature	220	9	Low	Poor	Co dominant 3NE	Wound @500mm	2.4	**2**
113	**Black Sheoak** ***Allocasuarina littoralis***	Mature	200	8	Low	Fair	Co dominant 3		2.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
114	**Black Sheoak** ***Allocasuarina littoralis***	Mature	200	10	Normal	Fair	Co dominant 3		2	**2**
115	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	150	6	Normal	Fair	Co dominant 1	Wound on stem @500mm root damage	2	**2**
116	**Blackwood** ***Acacia melanoxylon***	Mature	200	8	Normal	Fair	Co dominant 4NW	Best retained as part of a group	2	**3**
117	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	600	22	Low	Fair	Co dominant 14N	Branch welded with adjacent Bloodwood	7.2	**2**
118	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	470	12	Low	Poor	Co dominant 6E	HOLLOW 90% crown dead	5.5	**2**
119	**Blackbutt** ***Eucalyptus pilularis***	Mature	300	12	Normal	Fair	Co dominant 4N		3.6	**2**
120	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	6	Low	Poor	Co dominant 5E	50% crown dead	3.8	**2**
121	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	180	8	Normal	Fair	Co dominant 2	*Parsonsia spp.* in crown	2	**2**
122	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	6	Low	Poor	Co dominant 6N	*Parsonsia spp.* in crown	3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
123	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	7	Low	Poor	Co dominant 5NE		2.4	**2**
124	**Red Bloodwood** ***Corymbia gummifera***	Mature	700	17	Normal	Fair	Co dominant 20	High volume deadwood possible HOLLOWS	6.3	**4**
125	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	350	12	Normal	Fair	Co dominant 6W		3.2	**3**
126	**Pink Bloodwood** ***Corymbia intermedia***	Mature	330	14	Normal	Fair	Co dominant 7W	Medium volume deadwood	3	**3**
127	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	200 210	10	Normal	Fair	Co dominant 3W		2	**3**
128	**Red Ash** ***Alphitonia excelsa***	Mature	260	10	Low	Fair	Co dominant 4	Co dominant stems minimal bark included	3.1	**2**
129	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	300	8	Normal	Fair	Co dominant 3	Wound on stem @4m	2.7	**3**
130	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	320	12	Low	Good	Co dominant 4	Forest habit	3.8	**3**
131	**Pink Bloodwood** ***Corymbia intermedia***	Mature	280	12	Normal	Fair	Co dominant 4N		2.6	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
132	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	230	10	Normal	Good	Co dominant 3W		2.1	**4**
133	**Forest Red Gum** ***Eucalyptus teriticornis***	Young	160	9	Normal	Fair	Co dominant 1	Forest habit	2	**2**
134	**Pink Bloodwood** ***Corymbia intermedia***	Mature	200	8	Normal	Fair	Co dominant 2		2	**3**
135	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	640	9	Low	Poor	Co dominant 5N	HOLLOWS	7.7	**2**
136	**Pink Bloodwood** ***Corymbia intermedia***	Young	150	9	Normal	Fair	Co dominant 2	Forest habit	2	**2**
137	**10 x Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	<200	9	Normal	Fair	Co dominant 1	Best retained as part of a group	2	**3**
138	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	520	10	Normal	Poor	Co dominant 4SW	40% crown failure	4.7	**2**
139	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	320	12	Normal	Poor	Co dominant 12N	Moderate lean	2.9	**2**
140	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	12	Normal	Poor	Co dominant 12NE	Moderate lean Basal decay	2.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
141	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	10	Normal	Fair	Co dominant 2	*Parsonsia spp.* in crown	2	**3**
142	**Blackbutt** ***Eucalyptus pilularis***	Mature	520	14	Normal	Poor	Co dominant 6	Co dominant stems @6m included bark	4.7	**2**
143	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	DEAD	520	8						**1**
144	**Pink Bloodwood** ***Corymbia intermedia***	Young	150	6	Normal	Fair	Co dominant 2		2	**3**
145	**Slash Pine** ***Pinus elliottii***	Mature	400	10	Normal	Fair	Co dominant 4	Undesirable species	3.6	**3**
146	**Red Ash** ***Alphitonia excelsa***	Mature	220	6	Normal	Fair	Co dominant 4N	Basal wound	2	**2**
147	**Blackbutt** ***Eucalyptus pilularis***	Mature	570	16	Normal	Fair	Co dominant 8		5.2	**3**
148	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	260	7	Low	Fair	Co dominant 5		3.1	**2**
149	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	360	10	Normal	Fair	Co dominant 4N	30% crown failure	3.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
150	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	10	Normal	Poor	Co dominant 6S		3.3	**2**
151	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	300 220	11	Low	Poor	Co dominant 10N	Co dominant GL stems	3.4	**2**
152	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	520	12	Low	Poor	Co dominant 2	90% crown dead HOLLOWS	6.2	**2**
153	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	10	Low	Poor	Co dominant 4NE	Moderate lean	3	**2**
154	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	270	10	Low	Poor	Co dominant 4N		3.2	**2**
155	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	160	6	Low	Poor	Co dominant 4N		2	**2**
156	**Swamp Turpentine** ***Lophostemon sauveolens***	Young	150	8	Low	Fair	Co dominant 2S		2	**3**
157	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	170	6	Normal	Fair	Co dominant 2		2	**4**
158	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	160 200	7	Normal	Poor	Co dominant 2	Co dominant stems wound @2m	2.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
159	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	350	10	Normal	Fair	Co dominant 3		3.2	**2**
160	**Pink Bloodwood** ***Corymbia intermedia***	Young	200	9	Normal	Fair	Co dominant 3		2	**2**
161	**Swamp Turpentine** ***Lophostemon sauveolens***	Young	150	9	Normal	Good	Co dominant 3		2	**5**
162	**Pink Bloodwood** ***Corymbia intermedia***	Mature	310	5	Normal	Good	Co dominant 3	Forest habit	2.8	**3**
163	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	250	12	Normal	Good	Co dominant 4		2.3	**4**
164	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	210	7	Normal	Good	Co dominant 3		2	**4**
165	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	160	6	Normal	Fair	Co dominant EN		2	**3**
166	**Pink Bloodwood** ***Corymbia intermedia***	Over Mature	1120	15	Normal	Poor	Co dominant 15SW	HOLLOWS Medium volume deadwood	16.8	**2**
167	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	DEAD	640	9				HOLLOWS		**1**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
168	**Blackbutt** ***Eucalyptus pilularis***	Mature	570	16	Normal	Fair	Co dominant 6	FOSB failure mid crown	5.2	**3**
169	**Swamp Turpentine** ***Lophostemon suaveolens***	Mature	270	7	Low	Poor	Co dominant 3S		3.2	**2**
170	**Red Bloodwood** ***Corymbia gummifera***	Mature	320	8	Low	Poor	Co dominant 3W	Wound length of stem N side Medium volume deadwood	3.8	**2**
171	**Pink Bloodwood** ***Corymbia intermedia***	Mature	200 570	12	Low	Poor	Co dominant 10N	Medium volume deadwood	7.2	**2**
172	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	360	16	Normal	Fair	Co dominant 5E		3.3	**2**
173	**Pink Bloodwood** ***Corymbia intermedia***	Mature	470	15	Low	Poor	Co dominant 7NW	60% crown dead	5.5	**2**
174	**Blackbutt** ***Eucalyptus pilularis***	Mature	300	16	Normal	Poor	Co dominant 7N	Medium volume deadwood Forest habit	2.7	**2**
175	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	550	12	Low	Fair	Co dominant 6NW		6.5	**2**
176	**Red Ash** ***Alphitonia excelsa***	Mature	4x<200	6	Normal	Fair	Co dominant 5	Best retained as part of a group	2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
177	**Red Bloodwood** ***Corymbia gummifera***	Mature	360	7	Low	Poor	Co dominant 5N	70% crown failure	4.3	**2**
178	**Pink Bloodwood** ***Corymbia intermedia***	Mature	320 400	12	Low	Poor	Co dominant 12N	Medium volume deadwood	4.6	**2**
179	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	700	10	Normal	Poor	Co dominant 8	Medium volume deadwood FOSB removed outside guidelines of AS 4373	8.4	**3**
180	**Red Ash** ***Alphitonia excelsa***	Mature	180 160	10	Normal	Fair	Co dominant 3	Co dominant GL stems	2.9	**2**
181	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	350	10	Normal	Fair	Co dominant 4W	Basal cavity FOSB failure mid crown	4.2	**2**
182	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	860	15	Normal	Poor	Co dominant 1	1 FOSB attached to stump	10.3	**2**
183	**Blackbutt** ***Eucalyptus pilularis***	Mature	470	16	Normal	Fair	Co dominant 6N		4.2	**3**
184	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	300	9	Low	Poor	Co dominant 2E	80% crown dead	3.6	**2**
185	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	310	15	Low	Poor	Co dominant 3NE	70% crown dead	3.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
186	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	490	10	Normal	Poor	Co dominant 6NW		4.4	**2**
187	**Blackbutt *Eucalyptus pilularis***	Mature	520	15	Normal	Fair	Co dominant 6	Raised and damaged First order roots	4.7	**3**
188	**Blackbutt *Eucalyptus pilularis***	Mature	320	16	Normal	Poor	Co dominant 12SW	Moderate lean	2.9	**2**
189	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	160	5	Normal	Fair	Co dominant 2		2	**3**
190	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	150	6	Normal	Fair	Co dominant 2	Best retained as part of a group	2	**3**
191	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	150	7	Normal	Fair	Co dominant 2	Best retained as part of a group	2	**2**
192	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	160	7	Normal	Fair	Co dominant 2	Best retained as part of a group	2	**2**
193	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	200	7	Normal	Fair	Co dominant 2	Best retained as part of a group	2	**2**
194	**Broadleaved Paperbark *Melaleuca***	Young	160	5	Normal	Fair	Co dominant 2N	Best retained as part of a group	2	**4**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
	quinquenervia									
195	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	150	5	Normal	Good	Co dominant 2	Best retained as part of a group	2	**5**
196	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	270	15	Normal	Fair	Co dominant 2	Best retained as part of a group	2.5	**3**
197	**Broadleaved Paperbark *Melaleuca quinquenervia***	DEAD	200	5						**1**
198	**Cheese tree *Glochidian ferdinandii***	Young	150 50	5	Normal	Fair	Co dominant 3		2	**3**
199	**Swamp Turpentine *Lophostemon sauveolens***	Mature	250	8	Normal	Fair	Co dominant 4		2.3	**3**
200	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	320	10	Normal	Fair	Co dominant 2	Medium volume deadwood	2.9	**3**
201	**Swamp Turpentine *Lophostemon sauveolens***	Mature	170	16	Normal	Fair	Co dominant 2		2	**3**
202	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	190	6	Normal	Poor	Co dominant 3E	Moderate lean	2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
203	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	240	8	Normal	Poor	Co dominant 10E	Severe lean	2.2	2
204	Swamp Turpentine *Lophostemon sauveolens*	Mature	500	8	Normal	Fair	Co dominant 8N		4.5	3
205	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	250	15	Normal	Poor	Co dominant 7N	Wound 1.5m Leaning into adjacent tree	2	2
206	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	350	15	Normal	Fair	Co dominant 5E	Moderate lean	3.2	2
207	Broadleaved Paperbark *Melaleuca quinquenervia*	DEAD	250	6						1
208	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	570	12	Low	Fair	Co dominant 5SE	Moderate lean	6.8	2
209	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	200	12	Low	Poor	Co dominant 1NE		2.4	2
210	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	180	6	Low	Poor	Co dominant 3W		2.1	2

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
211	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	200	6	Normal	Fair	Co dominant 3W		2	**2**
212	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	210	12	Normal	Fair	Co dominant 6		2	**2**
213	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	620	20	Normal	Fair	Co dominant 10W	Medium volume deadwood	7.4	**3**
214	**Swamp Turpentine** ***Lophostemon sauveolens***	Young	150	5	Normal	Good	Co dominant 2		2	**4**
215	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	540	15	Low	Poor	Co dominant 20W	Moderate lean	6.4	**2**
216	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	15	Normal	Fair	Co dominant 2		2.9	**2**
217	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	520	15	Low	Poor	Co dominant 12	Severe lean	6.2	**2**
218	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	470	12	Low	Poor	Co dominant 8	Severe lean FOSB failure @ 2m with decay present	5.5	**2**
219	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	13	Low	Poor	Co dominant 8	Moderate lean	3.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
220	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	6	Low	Fair	Co dominant 5	Moderate lean	2.4	**2**
221	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	520	20	Normal	Fair	Co dominant 12		4.7	**4**
222	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1600 220	25	Low	Poor	Dominant 25W	HOLLOWS High volume deadwood Basal decay	24	**3**
223	**Pink Bloodwood** ***Corymbia intermedia***	Mature	630	18	Normal	Fair	Co dominant 10NE	Medium volume deadwood	5.7	**3**
224	**Red Ash** ***Alphitonia excelsa***	Mature	200	15	Normal	Fair	Co dominant 2	Forest habit	2	**2**
225	**Blackbutt** ***Eucalyptus pilularis***	Mature	360	18	Normal	Fair	Co dominant 4	Forest habit Mechanical wound @ base	3.3	**3**
226	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1160	25	Low	Poor	Co dominant 15	Lightening strike length of stem	17.4	**2**
227	**Pink Bloodwood** ***Corymbia intermedia***	Mature	470	15	Normal	Fair	Suppressed 4N	Suppressed by 226	4.2	**2**
228	**Red Bloodwood** ***Corymbia gummifera***	Mature	510	16	Normal	Fair	Co dominant 7N	Moderate lean	4.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
229	**Blackbutt** ***Eucalyptus pilularis***	Mature	640	25	Normal	Fair	Co dominant 10E	Forest habit	5.8	**3**
230	**Blackbutt** ***Eucalyptus pilularis***	Mature	320	15	Normal	Fair	Co dominant 3	Forest habit	2.9	**2**
231	**Blackbutt** ***Eucalyptus pilularis***	Mature	540	20	Normal	Fair	Co dominant 4	Forest habit	4.9	**2**
232	**Pink Bloodwood** ***Corymbia intermedia***	Mature	640	15	Normal	Poor	Co dominant 7w	HOLLOWS FOSB failure mid crown Severely crooked stem	5.6	**2**
233	**Blackbutt** ***Eucalyptus pilularis***	Mature	350	24	Normal	Fair	Co dominant 5	Forest habit	3.1	**2**
234	**Red Bloodwood** ***Corymbia gummifera***	Mature	640	17	Normal	Fair	Co dominant 8W	Medium volume deadwood	5.8	**3**
235	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	650	17	Normal	Fair	Co dominant 8W		5.8	**4**
236	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	580	13	Low	Poor	Co dominant 10E	Moderate lean	6.2	**2**
237	**Red Bloodwood** ***Corymbia gummifera***	Over Mature	1300	16	Normal	Fair	Co dominant 16W	Surface root damage High volume deadwood HOLLOWS	15.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
238	**Broadleaved Paperbark *Melaleuca quinquenervia***	Young	170	10	Low	Fair	Co dominant 2	Forest habit	2	**2**
239	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	320	15	Normal	Fair	Co dominant 3	Forest habit Self corrected lean	2.9	**2**
240	**Swamp Turpentine *Lophostemon sauveolens***	Mature	520	16	Low	Fair	Co dominant 5N		6.2	**4**
241	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	180	8	Normal	Fair	Co dominant 2		2	**2**
242	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	200	6	Normal	Fair	Co dominant 2		2	**3**
243	**Swamp Turpentine *Lophostemon sauveolens***	Mature	200	15	Normal	Fair	Co dominant 2		2	**3**
244	**Swamp Turpentine *Lophostemon sauveolens***	Mature	200	15	Normal	Fair	Co dominant 2		2	**3**
245	**Swamp Turpentine *Lophostemon sauveolens***	Young	150	8	Normal	Fair	Co dominant 2W		2	**3**
246	**Swamp Turpentine *Lophostemon sauveolens***	Mature	220	8	Normal	Fair	Co dominant 3		2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
247	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	190	8	Normal	Fair	Co dominant 2		2	3
248	Swamp Turpentine *Lophostemon sauveolens*	Mature	480	16	Low	Fair	Co dominant 3	Basal flare damage	5.8	3
249	Swamp Turpentine *Lophostemon sauveolens*	Mature	290	12	Normal	Fair	Co dominant 3E		2.6	3
250	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	420	16	Normal	Fair	Co dominant 5N	Slight lean	3.8	2
251	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	215	16	Normal	Fair	Co dominant 2	Forest habit	2	2
252	Red Ash *Alphitonia excelsa*	Mature	70 190	14	Normal	Fair	Co dominant 2N	Forest habit	2.4	2
253	Pink Bloodwood *Corymbia intermedia*	DEAD	300							1
254	Pink Bloodwood *Corymbia intermedia*	Mature	170 270	15	Normal	Poor	Co dominant 12W		2.8	2
255	Swamp Turpentine *Lophostemon sauveolens*	Mature	330	17	Low	Fair	Co dominant 8		4	2

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
256	**Pink Bloodwood** ***Corymbia intermedia***	Mature	220	16	Low	Fair	Co dominant 4N		2.6	**2**
257	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	290	9	Low	Poor	Co dominant 3E	Upper crown failure	3.5	**2**
258	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	190	15	Low	Poor	Co dominant 2S		2.3	**2**
259	**Pink Bloodwood** ***Corymbia intermedia***	DEAD	620	16						**1**
260	**Cheese tree** ***Glochidian ferdinandii***	Mature	160	8	Normal	Poor	Co dominant 4SW	Wound @1.5m	2	**2**
261	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	160	8	Low	Fair	Co dominant 2E	Forest habit	2	**3**
262	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	200	12	Low	Poor	Co dominant 3	Moderate lean Self corrected	2.4	**2**
263	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	960	24	Low	Poor	Co dominant 4W	FOSB failure throughout crown Basal wound	11.5	**2**
264	**White Mahogany** ***Eucalyptus acmenoides***	Mature	630	24	Normal	Fair	Co dominant 10W		5.7	**4**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
265	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	200	12	Normal	Fair	Co dominant 4W	Impacted by 264	2	**2**
266	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	330	17	Normal	Fair	Co dominant 4	Forest habit	3	**3**
267	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	470	15	Low	Poor	Co dominant 10E	Forest habit	5.5	**2**
268	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	320	15	Normal	Poor	Co dominant 5E		2.9	**2**
269	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250	12	Low	Poor	Co dominant 2E	80% crown dead	3	**2**
270	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	DEAD	260260	8						**1**
271	**Blackbutt** ***Eucalyptus pilularis***	Mature	630	25	Normal	Fair	Co dominant 6	Forest habit	5.7	**3**
272	**Blackbutt** ***Eucalyptus pilularis***	Mature	420	20	Normal	Fair	Co dominant 4	Forest habit	3.8	**3**
273	**Blackbutt** ***Eucalyptus pilularis***	Young	150	12	Normal	Poor	Co dominant 2		2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
274	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	320	12	Low	Poor	Co dominant 4SE	80% crown dead	3.8	**2**
275	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	640	15	Normal	Poor	Co dominant 14SE	Moderate lean	5.8	**2**
276	Swamp Turpentine *Lophostemon sauveolens*	Mature	360	15	Normal	Fair	Co dominant 5		3.3	**4**
277	Cheese tree *Glochidian ferdinandii*	Young	140 140	7	Normal	Fair	Suppressed 4N		2	**2**
278	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	200	9	Low	Fair	Co dominant 3	Forest habit	2.4	**2**
279	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	210	9	Normal	Fair	Co dominant 2W		2	**2**
280	Swamp Turpentine *Lophostemon sauveolens*	Mature	200	15	Normal	Fair	Co dominant 2	Forest habit	2	**2**
281	Swamp Turpentine *Lophostemon sauveolens*	Mature	210	12	Low	Fair	Co dominant 2		2	**4**
282	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	250	12	Normal	Fair	Co dominant 3	Forest habit	2.3	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
283	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	10	Normal	Fair	Co dominant 3	Slight lean	2	**2**
284	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	200	9	Normal	Fair	Co dominant 3W		2	**1**
285	**Blackbutt** ***Eucalyptus pilularis***	Mature	525	22	Low	Poor	Co dominant 6	Branch tear lower crown	6.2	**2**
286	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1300	25	Normal	Poor	Co dominant 15	50% failure @ GL	15.6	**2**
287	**Blackbutt** ***Eucalyptus pilularis***	Mature	340	25	Normal	Poor	Co dominant 5W	Slight lean	3.1	**2**
288	**Blackbutt** ***Eucalyptus pilularis***	Mature	640	25	Normal	Fair	Co dominant 4W	Slight lean	5.8	**2**
289	**Blackbutt** ***Eucalyptus pilularis***	Mature	320	20	Normal	Fair	Co dominant 2	Forest habit	2.9	**2**
290	**Blackbutt** ***Eucalyptus pilularis***	Mature	280	20	Normal	Fair	Co dominant 2	Forest habit	2.6	**2**
291	**Blackbutt** ***Eucalyptus pilularis***	Mature	270	18	Normal	Fair	Co dominant 2	Forest habit	2.6	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
292	**Red Bloodwood** ***Corymbia gummifera***	Mature	250 330	9	Low	Poor	Co dominant 3S		4.9	**2**
293	**Blackbutt** ***Eucalyptus pilularis***	Mature	430	20	Normal	Fair	Co dominant 3	Forest habit	3.8	**2**
294	**Blackbutt** ***Eucalyptus pilularis***	Mature	430	18	Normal	Fair	Co dominant 4E	Forest habit	3.8	**2**
295	**Blackbutt** ***Eucalyptus pilularis***	Mature	960	20	Low	Poor	Co dominant 15	Basal regrowth Crown dead	14.5	**1**
296	**Blackbutt** ***Eucalyptus pilularis***	Mature	320	16	Normal	Poor	Co dominant 10S		2.9	**2**
297	**Blackbutt** ***Eucalyptus pilularis***	Mature	620	23	Normal	Fair	Co dominant 5SW		5.4	**2**
298	**Blackbutt** ***Eucalyptus pilularis***	Mature	1200	22	Normal	Fair	Co dominant 20	Medium volume deadwood	9.8	**3**
299	**Pink Bloodwood** ***Corymbia intermedia***	Mature	240	12	Normal	Fair	Co dominant 5W	Moderate lean	2.2	**2**
300	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Over Mature	790	9	Low	Poor	Co dominant 4SE	50% crown failure Bracket fungi mid crown	9.5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
301	**Blackbutt** ***Eucalyptus pilularis***	Young	220	15	Normal	Fair	Co dominant 3	Forest habit	2	**2**
302	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	100 200	8	Normal	Poor	Co dominant 5S	Co dominant GL stems	2	**2**
303	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	430	12	Normal	Poor	Co dominant 5E		3.9	**2**
304	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	600	25	Normal	Fair	Co dominant 10	Medium volume deadwood	5.4	**3**
305	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	160	10	Normal	Fair	Co dominant 1	Forest habit	2	**2**
306	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	8	Normal	Fair	Co dominant 2		2	**2**
307	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	150	8	Normal	Fair	Co dominant 2	Forest habit	2	**2**
308	**Red Bloodwood** ***Corymbia gummifera***	Mature	290	10	Low	Poor	Co dominant 5W	Moderate lean Wound 1.5m	3.4	**2**
309	**Blackbutt** ***Eucalyptus pilularis***	Mature	620	20	Normal	Fair	Co dominant 15SE	Moderate lean	5.5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
310	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	580	8	Low	Poor	Co dominant 10	Failure in upper crown	6.8	**2**
311	**Red Bloodwood** ***Corymbia gummifera***	Mature	850	16	Normal	Poor	Co dominant 15N	Failure in upper crown	7.4	**3**
312	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	160	10	Normal	Fair	Co dominant 2		2	**3**
313	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	160	10	Normal	Fair	Co dominant 2		2	**3**
314	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1960	23	Normal	Poor	Co dominant 15	Failure in upper crown High volume deadwood HOLLOWS Basal cavity 80%	22.8	**2**
315	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1020	23	Normal	Poor	Co dominant 15	HOLLOWS High volume deadwood	12	**2**
316	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1200	23	Normal	Poor	Co dominant 15	HOLLOWS Cavity GL to 4m **BEES NEST**	14.4	**2**
317	**Red Bloodwood** ***Corymbia gummifera***	Mature	320	8	Normal	Poor	Co dominant 6N	Wound on stem @1.5m	2.9	**2**
318	**Blackbutt** ***Eucalyptus pilularis***	Mature	570	18	Normal	Poor	Co dominant 11N	Slight lean	5.2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
319	**Tallowood** ***Eucalyptus microcorys***	Mature	320	16	Normal	Fair	Co dominant 4		2.9	**2**
320	**Blackbutt** ***Eucalyptus pilularis***	Mature	720	20	Normal	Fair	Co dominant 6S	Basal wound	6.5	**3**
321	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	250	15	Normal	Poor	Suppressed 3N	Forest habit	2.3	**2**
322	**Blackbutt** ***Eucalyptus pilularis***	Mature	530	16	Normal	Poor	Co dominant 4N		4.7	**2**
323	**Blackbutt** ***Eucalyptus pilularis***	Young	480	16	Normal	Poor	Co dominant 3	Forest habit	4.2	**2**
324	**Brush Box** ***Lophostemon confertus***	Mature	220	10	Normal	Fair	Co dominant 3		2	**3**
325	**Blackbutt** ***Eucalyptus pilularis***	Mature	310	20	Normal	Fair	Co dominant 4	Forest habit	2.7	**2**
326	**Red Bloodwood** ***Corymbia gummifera***	Mature	360	16	Normal	Poor	Co dominant 3S	Slight lean	3.1	**2**
327	**White Mahogany** ***Eucalyptus acmenoides***	Mature	160	9	Normal	Poor	Co dominant 2W	Forest habit	2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
328	**Blackbutt** ***Eucalyptus pilularis***	Young	420	20	Normal	Fair	Co dominant 6SE	Forest habit	3.8	**2**
329	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	200	14	Normal	Fair	Co dominant 1	Forest habit	2	**2**
330	**White Mahogany** ***Eucalyptus acmenoides***	Mature	530 210	20	Normal	Poor	Co dominant 4N	Basal wound	5	**2**
331	**Blackbutt** ***Eucalyptus pilularis***	Over Mature	1100	25	Normal	Poor	Co dominant 6SW	Moderate lean	3.2	**2**
332	**Tallowood** ***Eucalyptus microcorys***	Young	210	8	Normal	Fair	Co dominant 3N		2	**4**
333	**Tallowood** ***Eucalyptus microcorys***	Young	250	12	Normal	Fair	Co dominant 3S		2	**4**
334	**Blackbutt** ***Eucalyptus pilularis***	Mature	960	25	Normal	Fair	Co dominant 8S		8.6	**3**
335	**Blackbutt** ***Eucalyptus pilularis***	Mature	350 100	16	Normal	Fair	Co dominant 4		3.3	**3**
336	**Red Ash** ***Alphitonia excelsa***	Mature	240	7	Normal	Fair	Co dominant 3		2.2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
337	**Pink Bloodwood** ***Corymbia intermedia***	Mature	250	14	Normal	Fair	Co dominant 3	Forest habit	2.3	**3**
338	**Blackbutt** ***Eucalyptus pilularis***	Young	160	8	Normal	Poor	Co dominant 2		2	**2**
339	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	200	8	Normal	Poor	Co dominant 2		2	**2**
340	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	440	20	Normal	Fair	Co dominant 5NW	Forest habit	4	**2**
341	**Blackbutt** ***Eucalyptus pilularis***	Mature	320	16	Normal	Good	Co dominant 3	Forest habit	2.9	**3**
342	**Tallowood** ***Eucalyptus microcorys***	Young	150	8	Normal	Poor	Co dominant 2E		2	**2**
343	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	340	16	Low	Poor	Co dominant 4		4.1	**2**
344	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	240	11	Normal	Fair	Co dominant 3S		2.2	**3**
345	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	240 80	12	Normal	Fair	Co dominant 3S		2.2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
346	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	270	16	Normal	Poor	Co dominant 3N	Moderate lean	2.5	**2**
347	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	7	Normal	Fair	Co dominant 2		2	**4**
348	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	560	20	Low	Fair	Co dominant 10		6.6	**2**
349	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	8	Normal	Fair	Suppressed 3S		2	**2**
350	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	320	16	Low	Fair	Co dominant 6E	Forest habit	3.8	**2**
351	**Forest Red Gum** ***Eucalyptus teriticornis***	Young	150	9	Low	Poor	Co dominant 2	Failure in upper crown Root wounds	2	**2**
352	**Red Bloodwood** ***Corymbia gummifera***	Mature	840	16	Normal	Poor	Co dominant 15N		7.6	**2**
353	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	470 150	9	Normal	Poor	Co dominant 3		4.9	**2**
354	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Young	250	8	Normal	Fair	Co dominant 3		2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
355	Broadleaved Paperbark *Melaleuca quinquenervia*	Young	200	9	Normal	Fair	Co dominant 2		2	**2**
356	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	200	9	Low	Fair	Co dominant 35	Slight lean	2.4	**3**
357	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	300	10	Normal	Good	Co dominant 4		2.7	**5**
358	Pink Bloodwood *Corymbia intermedia*	DEAD	620	20						**1**
359	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	300	9	Normal	Fair	Co dominant 3E	50% crown failure	2.7	**2**
360	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	250	12	Normal	Fair	Co dominant 3		2.3	**4**
361	Broadleaved Paperbark *Melaleuca quinquenervia*	Mature	300	12	Normal	Fair	Co dominant 4		2.7	**4**
362	Blackbutt *Eucalyptus pilularis*	DEAD	790	25			t	HOLLOWS		
363	Broadleaved Paperbark *Melaleuca*	Mature	470	12	Low	Fair	Co dominant 6E		5.5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
	quinquenervia									
364	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	200	16	Low	Fair	Co dominant 4S		2.4	**2**
365	**Broadleaved Paperbark *Melaleuca quinquenervia***	DEAD	520	66			0	HOLLOWS		**1**
366	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	520	16	Low	Fair	Co dominant 8N	Sparsely foliated	6.2	**2**
367	**Forest Red Gum *Eucalyptus teriticornis***	Over Mature	1140	30	Low	Fair	Co dominant 22	High volume deadwood HOLLOWS Wound GL extending to FOSB	17.1	**3**
368	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	320	16	Normal	Fair	Co dominant 6S	Basal wound	2.9	**4**
369	**Swamp Turpentine *Lophostemon sauveolens***	Mature	270	15	Low	Fair	Co dominant 5N		3.2	**3**
370	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	320	15	Normal	Fair	Co dominant 4		2.9	**3**
371	**Swamp Turpentine *Lophostemon sauveolens***	Mature	420	16	Normal	Fair	Co dominant 8N		3.8	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
372	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	680	20	Low	Poor	Co dominant 10N	Severe new growth dieback	8.2	**2**
373	**Blackbutt** ***Eucalyptus pilularis***	Mature	520	27	Normal	Good	Co dominant 6W		4.7	**3**
374	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	370	15	Low	Poor	Co dominant 12E	Basal failure leaning in adjacent tree	4.4	**2**
375	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	570 890	35	Low	Fair	Emergent 22N	HOLLOWS High volume deadwood	12.6	**3**
376	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	570	15	Low	Poor	Suppressed 10NE	Moderate lean	6.8	**2**
377	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	570	12	Low	Poor	Suppressed 8NW 0		6.8	**2**
378	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	250 260	15	Normal	Fair	Co dominant 6	Co dominant stems @ 1m	3.3	**3**
379	**Red Mahogany** ***Eucalyptus resinifera***	Mature	350	28	Normal	Fair	Co dominant 6S	Forest habit	3.2	**3**
380	**Blackbutt** ***Eucalyptus pilularis***	Young	250	20	Normal	Good	Co dominant 3	Forest habit	2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
381	**Blackbutt** ***Eucalyptus pilularis***	Young	250	18	Normal	Poor	Co dominant 3SW	Forest habit Slight lean	2	**2**
382	**Blackbutt** ***Eucalyptus pilularis***	Young	18	18	Normal	Fair	Co dominant 2	Forest habit	2	**2**
383	**Brush Box** ***Lophostemon confertus***	Mature	280	15	Low	Poor	Co dominant 6N		3.4	**3**
384	**Blackbutt** ***Eucalyptus pilularis***	Mature	890	29	Abnormal	Poor	Co dominant 15	High volume deadwood Failure in upper crown	10.7	**2**
385	**Red Mahogany** ***Eucalyptus resinifera***	Mature	320	25	Normal	Poor	Co dominant 4	FOSB failure @3m resulting in 50% crown failure	2.9	**2**
386	**Red Bloodwood** ***Corymbia gummifera***	DEAD	570	1818						**1**
387	**Blackbutt** ***Eucalyptus pilularis***	Mature	640	26	Normal	Fair	Co dominant 15	Medium volume deadwood Moderate lean	5.8	**3**
388	**Blackbutt** ***Eucalyptus pilularis***	Mature	260 680	30	Normal	Fair	Co dominant 15N	Moderate lean	6.6	**2**
389	**Blackbutt** ***Eucalyptus pilularis***	Mature	680	30	Normal	Fair	Co dominant 20	High volume deadwood Basal wound	6.1	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
390	**Red Bloodwood** ***Corymbia gummifera***	Mature	320	14	Normal	Poor	Co dominant 5	Medium volume deadwood	2.9	**2**
391	**Blackbutt** ***Eucalyptus pilularis***	Mature	520	24	Normal	Fair	Co dominant 6	Wound on stem @ 1-4m	4.7	**2**
392	**Blackbutt** ***Eucalyptus pilularis***	Mature	1060	33	Normal	Fair	Co dominant 16SW	Basal wound Co dominant stems minimal bark included	9.5	**2**
393	**Blackbutt** ***Eucalyptus pilularis***	Mature	770	30	Normal	Poor	Co dominant 20NE	Medium volume deadwood Moderate lean	7	**2**
394	**Red Mahogany** ***Eucalyptus resinifera***	Mature	250	12	Normal	Fair	Suppressed 4NW		2.3	**2**
395	**Red Bloodwood** ***Corymbia gummifera***	Over Mature	720	17	Abnormal	Poor	Co dominant 6N	Medium volume deadwood Failure in upper crown	8.6	**2**
396	**Blackbutt** ***Eucalyptus pilularis***	Mature	960	30	Normal	Fair	Co dominant 12N	Moderate lean Branch rub Co dominant stems @ 1.5m	8.6	**2**
397	**Pink Bloodwood** ***Corymbia intermedia***	Mature	220	6	Normal	Fair	Intermediate 4E		2	**3**
398	**Blackbutt** ***Eucalyptus pilularis***	Mature	540	28	Normal	Poor	Co dominant 8	Apical dominance in FOSB	4.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
399	**Blackbutt** ***Eucalyptus pilularis***	Mature	490	30	Normal	Good	Co dominant 8	Forest habit Low volume deadwood	4.4	**3**
400	**Pink Bloodwood** ***Corymbia intermedia***	Mature	610	20	Normal	Fair	Co dominant 5	Co dominant stems 1.8m	4.5	**3**
401	**Blackbutt** ***Eucalyptus pilularis***	Mature	330	29	Normal	Fair	Co dominant 4W	Forest habit	3	**3**
402	**Blackbutt** ***Eucalyptus pilularis***	Mature	610	30	Normal	Fair	Co dominant 8	Forest habit Co dominant stems 2m	5.5	**2**
403	**Blackbutt** ***Eucalyptus pilularis***	Mature	540	29	Normal	Fair	Co dominant 10	Basal wound Forest habit	4.9	**3**
404	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	180	10	Normal	Fair	Intermediate 4W		2	**2**
405	**Blackbutt** ***Eucalyptus pilularis***	Mature	620	30	Normal	Fair	Co dominant 15	Basal wound	5.6	**3**
406	**Red Bloodwood** ***Corymbia gummifera***	Mature	320	10	Normal	Poor	Co dominant 4N	Low volume deadwood	2.9	**2**
407	**Blackbutt** ***Eucalyptus pilularis***	Mature	220	29	Normal	Poor	Co dominant 2	Forest habit	2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
408	**Blackbutt** ***Eucalyptus pilularis***	Mature	250	29	Normal	Poor	Co dominant 2	Forest habit	2.3	**2**
409	**Blackbutt** ***Eucalyptus pilularis***	Mature	430	29	Normal	Poor	Co dominant 5N	Forest habit	3.9	**2**
410	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Young	150	9	Normal	Poor	Intermediate 2NW	Forest habit	2	**2**
411	**Red Mahogany** ***Eucalyptus resinifera***	Mature	250	28	Normal	Poor	Co dominant 4N	Forest habit	2.3	**2**
412	**Pink Bloodwood** ***Corymbia intermedia***	Mature	250	8	Normal	Poor	Intermediate 4N 0	Basal wound	2.3	**2**
413	**Northern Grey Ironbark** ***Eucalyptus siderophloia***	Mature	430	29	Normal	Poor	Co dominant 10NW	Slight lean	3.9	**2**
414	**Blackbutt** ***Eucalyptus pilularis***	Mature	580	29	Normal	Poor	Co dominant 10SW	Low volume deadwood Wound stem 3-8m	5.2	**2**
415	**Blackbutt** ***Eucalyptus pilularis***	Mature	340	27	Normal	Poor	Co dominant 6SW	Wound on stem @1m Moderate lean	3.1	**2**
416	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	330	16	Normal	Poor	Co dominant 5N	Low volume deadwood Wound on stem GL-2m	3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
417	**Blackbutt** ***Eucalyptus pilularis***	Mature	300	6	Abnormal	Poor	Topped	Stem failure 6m due to impact	3.6	**2**
418	**Blackbutt** ***Eucalyptus pilularis***	Mature	290	26	Normal	Fair	Co dominant 4N	Forest habit	2.6	**2**
419	**Blackbutt** ***Eucalyptus pilularis***	Mature	270	29	Normal	Fair	Co dominant 3	Forest habit Basal wound	2.5	**2**
420	**Blackbutt** ***Eucalyptus pilularis***	Mature	190	19	Normal	Poor	Co dominant 3N	Forest habit	2	**2**
421	**Blackbutt** ***Eucalyptus pilularis***	Young	200	16	Normal	Poor	Co dominant 6S	Forest habit Moderate lean	2	**2**
422	**Blackbutt** ***Eucalyptus pilularis***	Mature	600	27	Normal	Poor	Co dominant 10N	Moderate lean Low volume deadwood	5.4	**2**
423	**Pink Bloodwood** ***Corymbia intermedia***	Mature	290	16	Normal	Fair	Intermediate 6		2.6	**3**
424	**Tallowood** ***Eucalyptus microcorys***	Mature	250	20	Normal	Fair	Co dominant 5	Failure in upper crown Forest habit	2.3	**3**
425	**Red Mahogany** ***Eucalyptus resinifera***	Mature	510	25	Normal	Fair	Co dominant 8W	Co dominant stems 5m	4.6	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
426	**Blackbutt** ***Eucalyptus pilularis***	Mature	330	20	Low	Poor	Co dominant 6	Corrected lean	4	**2**
427	**Blackbutt** ***Eucalyptus pilularis***	Mature	580 220	30	Normal	Fair	Co dominant 15S		5.5	**2**
428	**Pink Bloodwood** ***Corymbia intermedia***	Mature	320	15	Normal	Fair	Intermediate 6N		2.9	**2**
429	**Blackbutt** ***Eucalyptus pilularis***	Mature	760	32	Normal	Fair	Co dominant 20S	High volume deadwood Heavy horizontal branches	6.9	**3**
430	**Blackbutt** ***Eucalyptus pilularis***	Mature	200	5	Abnormal	Poor	Topped	Stem failure due to impact	2.4	**2**
431	**Blackbutt** ***Eucalyptus pilularis***	Mature	530	29	Normal	Fair	Co dominant 12	Forest habit	4.8	**3**
432	**Red Mahogany** ***Eucalyptus resinifera***	Mature	170	10	Normal	Poor	Intermediate 3	Forest habit	2	**2**
433	**Brush Box** ***Lophostemon confertus***	Mature	150 160	10	Normal	Fair	Intermediate 4	Forest habit Co dominant GL stems	2	**2**
434	**Blackbutt** ***Eucalyptus pilularis***	Mature	990	35	Normal	Fair	Co dominant 17	High volume deadwood Failure in upper crown	11.9	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
435	**Red Mahogany** ***Eucalyptus resinifera***	Mature	590	20	Normal	Poor	Co dominant 10N	Failure in upper crown	7	**2**
436	**Blackbutt** ***Eucalyptus pilularis***	Mature	200 210	28	Abnormal	Poor	Co dominant 4	Co dominant GL stems Forest habit	2.6	**2**
437	**Blackbutt** ***Eucalyptus pilularis***	Mature	580	30	Abnormal	Poor	Co dominant 5	Failure in upper crown from impact	6.9	**2**
438	**Red Mahogany** ***Eucalyptus resinifera***	Mature	240	9	Abnormal	Poor	Intermediate 5E	Failure in upper crown	2.9	**2**
439	**Blackbutt** ***Eucalyptus pilularis***	Mature	530 530	32	Normal	Poor	Co dominant 15N	Co dominant GL stems	6.8	**2**
440	**Tallowood** ***Eucalyptus microcorys***	Mature	240	10	Normal	Fair	Intermediate 3	Wound on stem @1m	2.2	**3**
441	**Blackbutt** ***Eucalyptus pilularis***	Mature	430	28	Normal	Fair	Co dominant 3NE	Forest habit	3.9	**2**
442	**Tallowood** ***Eucalyptus microcorys***	Mature	230	8	Normal	Poor	Suppressed 6N	Moderate lean	2.1	**2**
443	**Blackbutt** ***Eucalyptus pilularis***	Mature	700	28	Normal	Poor	Suppressed 18N	Moderate lean Medium volume deadwood	6.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
444	**Blackbutt** ***Eucalyptus pilularis***	Mature	1260	30	Normal	Fair	Co dominant 16N	Heavy horizontal branches Medium volume deadwood	11.3	**3**
445	**Blackbutt** ***Eucalyptus pilularis***	Mature	260	16	Normal	Poor	Suppressed 7N	Moderate lean	2.4	**2**
446	**Tallowood** ***Eucalyptus microcorys***	Mature	330	10	Low	Poor	Intermediate 6	Stag headed	4	**2**
447	**Blackbutt** ***Eucalyptus pilularis***	Mature	690	32	Normal	Fair	Co dominant 12W	FOSB failure lower crown Hanging branch	6.2	**3**
448	**Red Mahogany** ***Eucalyptus resinifera***	Mature	200	12	Low	Fair	Intermediate 3N		2.4	**2**
449	**Tallowood** ***Eucalyptus microcorys***	Mature	250	16	Normal	Poor	Intermediate 5N	Moderate lean	2.3	**2**
450	**Pink Bloodwood** ***Corymbia intermedia***	Mature	260	9	Normal	Fair	Co dominant 4S		2.4	**2**
451	**Red Ash** ***Alphitonia excelsa***	Mature	200	9	Normal	Fair	Co dominant 3		2	**3**
452	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	520	9	Normal	Fair	Co dominant 4		4.7	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
453	**Black Sheoak** ***Allocasuarina littoralis***	Mature	160	6	Low	Poor	Co dominant 3NW		2	**2**
454	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	160	8	Normal	Fair	Co dominant 2		2	**3**
455	**Pink Bloodwood** ***Corymbia intermedia***	Mature	210	8	Normal	Good	Co dominant 3		2	**5**
456	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	170	8	Normal	Fair	Co dominant 2SW		2	**3**
457	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	200	6	Normal	Good	Co dominant 3		2	**5**
458	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	210	8	Low	Poor	Co dominant 3		2.5	**3**
459	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	240	6	Low	Fair	Co dominant 2	Failure in upper crown	2.9	**2**
460	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	200	7	Low	Fair	Co dominant 2		2.4	**3**
461	**Forest Red Gum** ***Eucalyptus teriticornis***	Mature	630	8	Abnormal	Poor	Co dominant 2	Failure in upper crown	7.5	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
462	**Red Bloodwood** ***Corymbia gummifera***	Mature	860	8	Normal	Poor	Co dominant 13W	Medium volume deadwood Wound 4m north FOSB	10.3	**2**
463	**Pink Bloodwood** ***Corymbia intermedia***	Mature	210	8	Normal	Fair	Co dominant 2		2	**2**
464	**Pink Bloodwood** ***Corymbia intermedia***	Mature	200	9	Normal	Fair	Co dominant 2	Forest habit	2	**3**
465	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	240	12	Normal	Fair	Co dominant 3	Forest habit	2.2	**3**
466	**Red Bloodwood** ***Corymbia gummifera***	Mature	260	9	Normal	Fair	Co dominant 3NE		2.4	**3**
467	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	160	5	Normal	Fair	Co dominant 2		2	**3**
468	**Red Bloodwood** ***Corymbia gummifera***	Mature	160	9	Normal	Fair	Co dominant 2	Forest habit	2	**2**
469	**Swamp Turpentine** ***Lophostemon sauveolens***	Mature	160 140	8	Normal	Poor	Co dominant 4E	Co dominant GL stems	2	**2**
470	**Broadleaved Paperbark** ***Melaleuca quinquenervia***	Mature	5x<200-300	6	Normal	Fair	Co dominant 6		2.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	Tree Health		Crown Class/ Spread (m)	Comment	RPZ (m)	Condition Rating 5,4,3,2,1
					Vigour L, N, Ab	Condition G,F,P				
471	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	240	12	Normal	Fair	Co dominant 6S	Moderate lean Stem wound @ 1m	2.2	**4**
472	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	190	10	Normal	Poor	Co dominant 4SW	Moderate lean	2	**2**
473	**Broadleaved Paperbark *Melaleuca quinquenervia***	Mature	200	20	Normal	Poor	Co dominant 3S	Slight lean	2	**2**

8.0 DISCUSSION

The environment in which these trees are growing on this site has been impacted by the grazing of stock, logging operations and minor clearing. Consequently many of the trees are in varying degrees of health. This has been considered when allocating the condition rating in the TAS.

The existing trees on this site have established themselves in a forest situation and consequently many have attained a forest habit competing for light and space.

Most trees assessed are of mature age class with the canopy ranging from 5 metres to 35 metres while the average canopy height is between 10 and 20 metres in height.

A large number of these trees may only have a short life expectancy if their present environment is greatly altered. In most cases these trees would be better retained in groups if any development proceeds on the site.

Many trees on site have sustained mechanical wounds due to earlier logging operations and other movement of heavy machinery within the site. Some trees in Area C have sustained moderate to severe crown damage as a result of these operations.

Figure 3 Crown damage from severe impact, Tree 436

Figure 4 Paperbarks most suitable for retention as a group. Trees 190-204

Species most suitable for retention on the site include Swamp Turpentine (*Lophostemon sauveolens*), Broadleaved Paperbark (*Melaleuca quinquenervia*), Black She Oak (*Allocasuarina littoralis)* and Red Ash (*Alphitonia excelsa*). They are desirable around buildings and other infrastructure and are not predisposed to sudden branch drop and generally don't mature into large trees.
These species are distributed widely in Areas A and B.

The trees in Area C are Dry Forest species with forest habits and heights of 20 metres or greater. Many of the Blackbutts (*Eucalyptus pilularis*) have heavy horizontal branches with medium to high volume dead wood and the species is recognised as being prone to sudden branch drop. This habit can make them unsuitable around infrastructure.

The Pink Bloodwoods (*Corymbia intermedia*), Red Bloodwoods (*Corymbia gummifera*), Red Mahogany's (*Eucalyptus resinifera*), Tallowoods (*Eucalyptus microcorys*), Brush Boxes (*Lophostemon confertus*) and Northern Grey Ironbarks (*Eucalyptus siderophloia*) though maturing into large trees should be selected for retention based on the Condition Rating in the TAS.

The Forest Red Gums (*Eucalyptus teriticornis*) should also be selected for retention on their Condition Rating.

Where possible any old growth trees selected for retention for environmental reasons (hollows providing habit). It would be wise to provide more than the recommended Root Protection Zone to ensure long term survival of these trees.

Figure 5 Blackbutts, 418, 419, 420 displaying forest habit in Area C

Figure 6 Typical mechanical wound, Tree 416,

Figure 7 Old growth Blackbutt, Tree 314

Trees that may impact on the proposed development that are located near the perimeter of the building footprint have been included in the TAS.

Of the 473 trees assessed:

- 13 were old growth trees, some containing hollows.
- 8 mature trees were assessed as having hollows.
- 11 were dead, some containing hollows.
- 289 had condition rating of 2.
- 26 trees had a condition rating of 4 and 5 being most suitable for retention as individual specimens.

Trees most worthy of retention with a condition rating 3 - 5 numbered 184. Many of these trees should be considered for retention as groups.

Any tree works should be performed in accordance with Australian Standard AS 4373 – 2007 Pruning of Amenity Trees. The arborist performing this work should be qualified to at least AQF Cert III Arboriculture.

Remedial pruning should be performed on the crowns of any adjacent trees that may incur damaged during this work.

If you have any questions regarding this report please do not hesitate in contacting me.

Nigel Smith Dip Hort, AQF Dip Arb MISAAC, MISA

ISA Certified Arborist AU-0279A

4 December 2009

9.0 ASSUMPTIONS AND LIMITATIONS

1. Any legal description provided to the consultant /appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

3. The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

4. Loss or alteration of any of this report invalidates the entire report.

5. Possession of this report or a copy thereof does not imply right of publication or use for any purposes by any other than the person to whom is addressed, without the prior expressed written or verbal consent on the consultant/appraiser.

6. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of the consultant/appraiser - particularly as to value conclusions, identity of the consultant/appraiser, or any reference to any professional society of institute or to any initialled designation conferred upon the consultant/appraiser as stated in his qualification.

7. This report and values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraisers/ fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event nor upon any finding to be reported.

8. Sketches diagrams, graphs, and photograph in this report, being intended as visual aides, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

9. Unless expressed otherwise: (1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

10.0 BIBLIOGRAPHY

Australian Standard *AS 4373-2007 Pruning of Amenity Trees*

Draper, Danny B and Richards, Peter A, 2009 *Dictionary for Managing Trees in Urban Environments*

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Harris Richard W., Clark James R., Matheny Nelda P.2004, *Arboriculture, Integrated Management of Landscape Trees, and Vines*. Prentice Hall

11.0 APPENDICES

APPENDIX 1 DEFINITIONS

APPENDIX 2 CONCEPT PLAN

APPENDIX 3 BLAIR LANSKY TREE SURVEY

APPENDIX 1 DEFINITIONS

# of Trunks: Considered to be multi- stemmed if they originate below .5m.
Lean: Corrected lean indicates tree has produced reaction wood to compensate for the lean. The apex of the tree has returned to vertical. Reaction wood formed on the lower or upper sides of a stem to counteract the stem. In broadleaves this forms on the upper side, tension wood and in conifers on the lower side, compression wood. The tolerance of a leaning tree is site and target specific.
Slight lean: 0-15 degrees off vertical.
Moderate Lean: 15-30 degrees off vertical.
Severe Lean: 30-45 degrees off vertical.
Critical lean: >45 degrees off vertical.

Codominant Stems: Trunks or stems equal in size. Also associated with 1st and 2nd order limbs in the crown.
Pest/Disease or Mechanical Damage: Borers, leaf eaters, Fungi, cankers etc. Or line trimmer, ,heavy machinery, nails, vehicle damage on surface roots are all examples.

New Growth Dieback: Progressive death of lower order branches from the apical growing points downwards. It can be caused by many factors including fungi, bacteria, drought, poor drainage and aeration, chemical toxicities or insect damage.

Pests, Diseases or Mechanical Damage: Signs and symptoms of pathogens or insect activity whether detrimental or beneficial. Damage caused by man or machinery often on surface roots and the lower stem area.

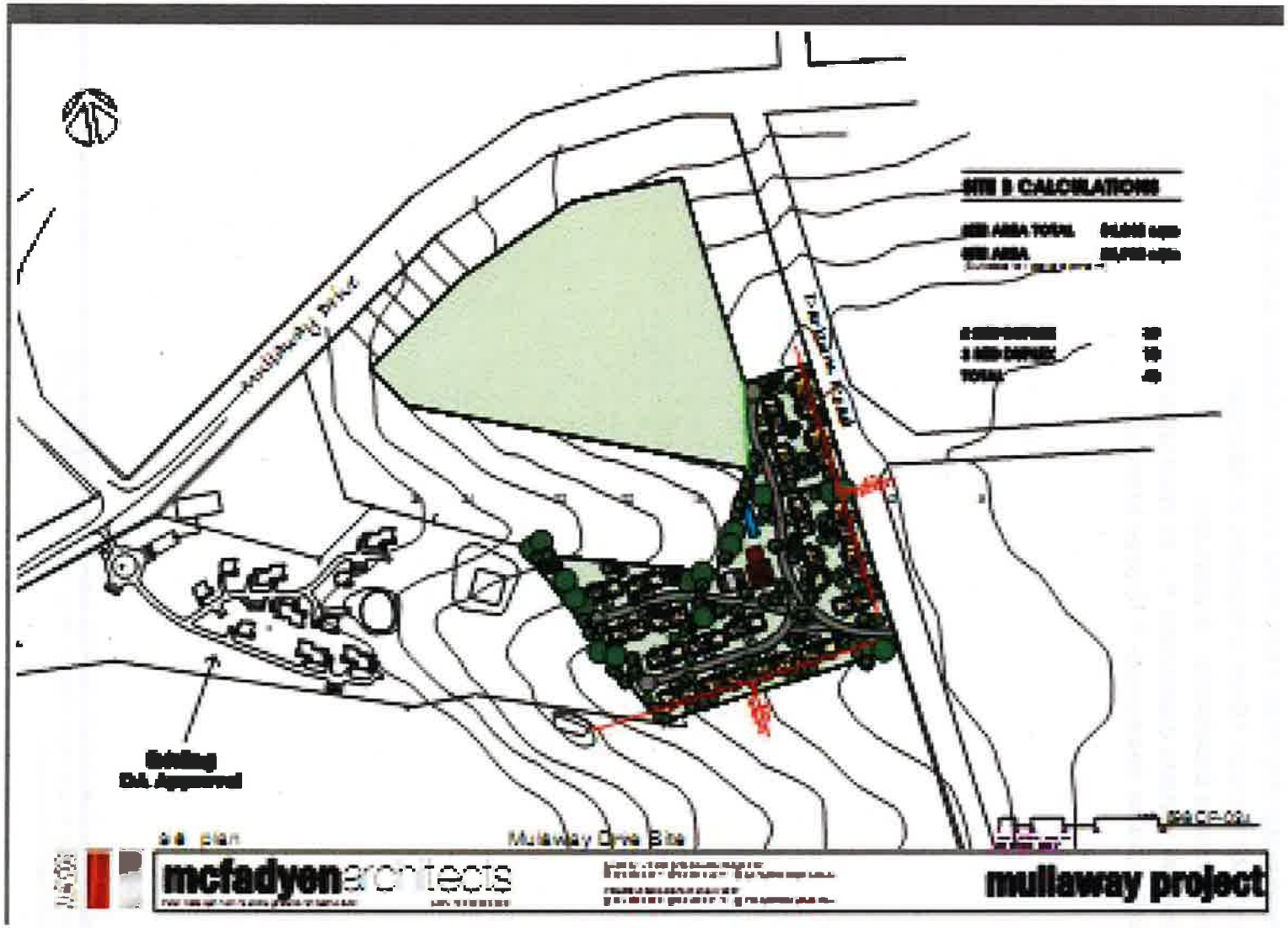
TREE DEFECTS
Root Condition: An indication of root restriction, damage, movement and other factors impacting first order and lower order roots.
Branch Tear: Often observed due to poor pruning technique.
Weather Event Damage: Damage incurred by previous storm.

Defects
Decay: An area of wood that is under going decomposition. (Decomposition of organic tissue by fungi or bacteria).
decay. This however is not always the case. Resistograph® testing can confirm the presence of decay.
Borers/Termites: Longicorn, coccid moth larvae etc. White Ants.
Nesting hole/ Bees: These can compromise structural integrity of a tree.

Bracket Fungi: The fruiting bodies of these fungi often indicate decay is present in their vicinity.
Heavy horizontal limbs: Limbs growing close to parallel to the ground, often having excessive end weight. Can be prone to failure.
Included Bark: Bark that becomes embedded in a crotch (union) between branch and trunk or between co dominant stems; causes a weak structure

Hanging limbs: Often the result of mechanical damage or a weather event.
Wounds: Any mechanical damage, limb failure scars or bark damage
Deadwood: Any dead limbs in the crown. Considered to be of significance if diameter exceeds 10mm or is prolific in the crown.
Low volume deadwood- <5 branches
Medium volume deadwood- 5 – 10 dead branches
High volume deadwood- > 10 dead branches

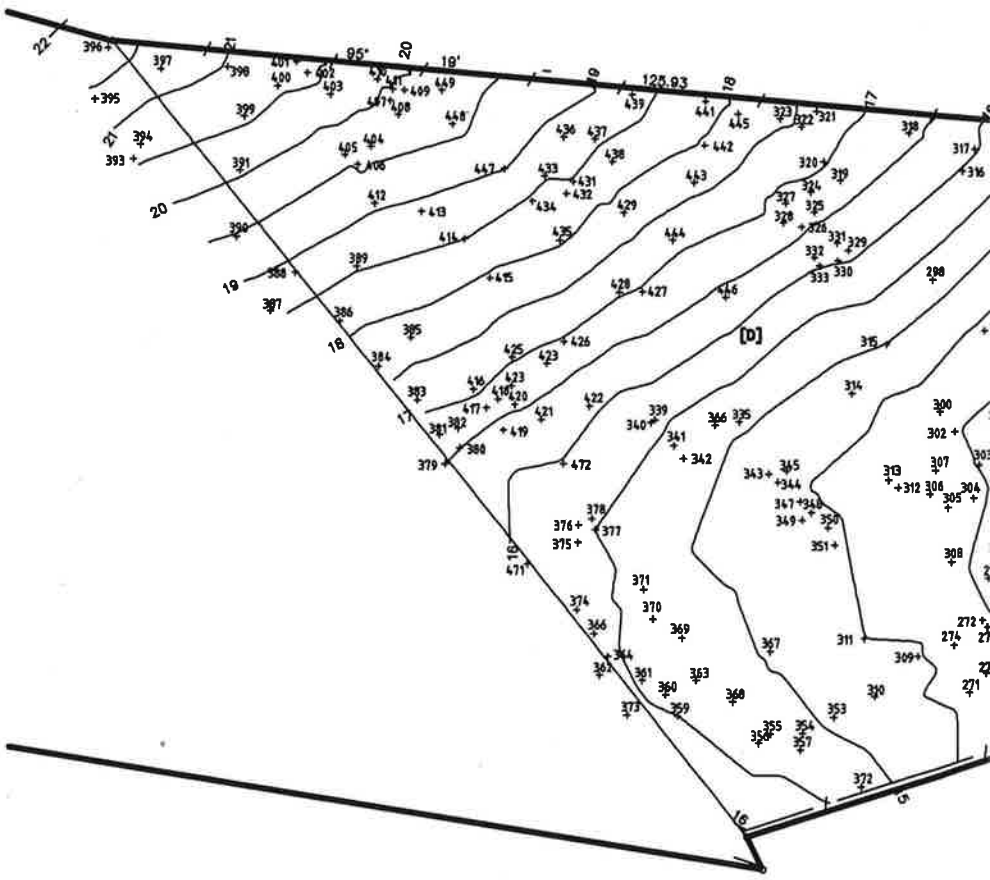
APPENDIX 2 CONCEPT PLAN



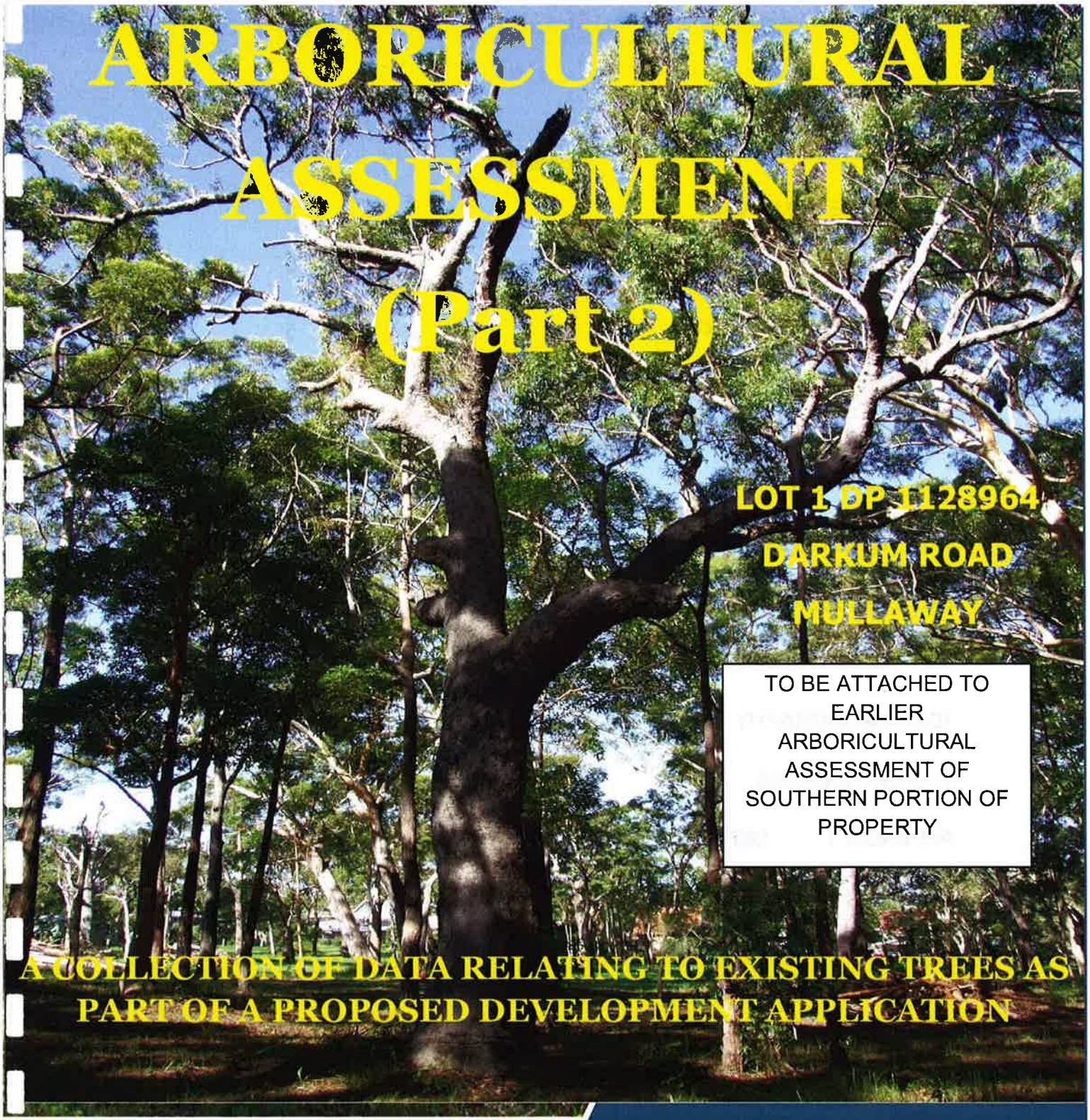
APPENDIX 3 BLAIR LANSKY TREE SURVEY

SPECIES WITHIN SURVEY AREA

BOTANICAL NAME	COMMON NAME
Casuarina glauca	Swamp Sheoak
Allocasuarina littoralis	Black Sheoak
Melaleuca quinquenervia	Broadleaved Paperbark
Alpitonia excelsa	Red Ash
Eucalyptus tereticornis	Forest Red Gum
Lophostemon suaveolens	Swamp Turpentine
Corymbia intermedia	Pink Bloodwood
Corymbia gummifera	Red Bloodwood
Eucalyptus siderophloia	Northern Grey Ironbark
Pinus elliottii	Slash pine
Glochidian ferdinandii	Cheese Tree
Eucalyptus acmenoides	White Mahogany
Lophostemon confertus	Brush Box
Eucalyptus resinifera	Red Mahogany
Eucalyptus microcorys	Tallowood



ARBORICULTURAL ASSESSMENT (Part 2)



LOT 1 DP 1128964

DARKUM ROAD

MULLAWAY

TO BE ATTACHED TO EARLIER ARBORICULTURAL ASSESSMENT OF SOUTHERN PORTION OF PROPERTY

A COLLECTION OF DATA RELATING TO EXISTING TREES AS PART OF A PROPOSED DEVELOPMENT APPLICATION

Arboreal Solutions
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FEBRUARY 2010

Contents

EXECUTIVE SUMMARY

The environment, in which these trees are growing on this northern portion of the site, is similar to the southern portion, as discussed in the original report.

Of the 517 trees assessed in this report:

- 23 had hollows present.
- 12 are old growth trees, some containing hollows.
- 8 mature trees were assessed as having hollows.
- 22 are dead, some containing hollows.
- 392 have a Condition Rating of 2.
- 65 trees had a Condition Rating of 3.
- 2 trees have a Condition Rating of 4 and 5 being most suitable for retention as individual specimens.

Please note some trees that are dead, old growth and mature also contain hollows.

Many of the trees with a rating of 3 will suitable for retention if retained in groups.

The pie chart below summarises the data collected for all the subject trees in both audits of this property

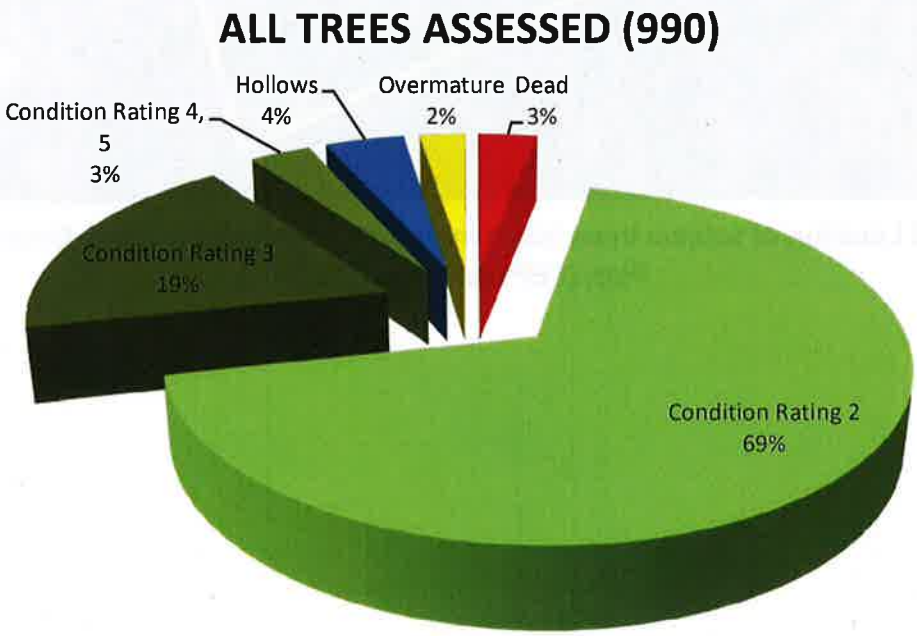

Figure 1 Overall assessment

1.0 INTRODUCTION

Following the completion of an arboricultural audit on the southern portion of Lot 1 DP 1128964, Darkum Road, Mullaway. GHD have requested a similar audit of the existing trees on the northern portion of the subject land.

The trees discussed in this report are located within the yellow border in Figure 1.

All constraints and other considerations cited in the original report apply to the trees discussed in this the second audit.

Figure 2 Location of subject trees taken from the Coffs Harbour Local Environment Plan (LEP) amended 2008

2.0 SCOPE OF REPORT

Data for the subject trees has been collected and entered in a Tree Assessment Schedule as in the first report.

This information has now been summarised in chart form, providing an overall percentage of the summary of the tree condition ratings, trees with hollows and over mature trees in the north and south portions of the land.

A third chart summarises these ratings for all trees assessed.

Figure 3 Typical trees on site displaying forest habit

3.0 SITE DESCRIPTION AND HISTORY

The land has a gentle overall slope to the east with a low area in the middle, also falling in an easterly direction. The north and south areas gently fall into this natural swale. At the time of the inspection surface water from recent rain was still draining through this area.

The higher areas are occupied by Blackbutt, Red Mahogany Brushbox and some Tallowood. The lower area at the eastern end of the subject land contained mainly Broad-leafed Paperbark.

The understorey consists predominantly of native and introduced grasses and appears to be regularly slashed.

There is a continuous canopy over most of the site except at the rear of the adjoining properties in the north and east.

Most trees display a forest habit, white many having mechanical wounds on their lower trunk areas.

There are piles of dead branches and other organic matter scattered throughout the site.

The subject trees are generally in good health with new growth dieback at a minimum. Deadwood is present in most trees in normal quantities with the exception of some of the over mature trees.

Figure 4 Piled dead matter to the north east

6.0 EXPLANATION OF TERMS IN THE TREE ASSESSMENT SCHEDULE

Common Botanical name

Botanical name given to *Genus* and *species* level only .Common name refers to non professional's ID of tree, e.g. Paperbark.

Tree No.: Relates to tree ID as found on attached Blair Lansky survey and aluminium tags attached to the subject trees.

Age

Young: Tree aged less than 20% of life expectancy.
Mature: Tree aged 20- 80% of life expectancy.
Over- mature: tree aged greater than 80% of life expectancy, with or without reduced vigour and declining gradually or rapidly but will ultimately end in the trees death.

DBH: Diameter at breast height measured at 1.4m off the ground

TREE HEALTH
Vigour
Overall health; capacity to grow and resist physiological stress.

Normal: A tree that can maintain and sustain its life processes. This is evident by the growth of leaves, branches, roots and trunk.
Low: Reduced ability to maintain and sustain life processes. Evident with the decline of leaf growth, branches, roots and trunk.
Abnormal: Accelerated growth due to artificial changes to its environment. E.g., water from a leaking pipe or nutrients from animal waste. Crown damage often results in this growth. May result in premature ageing.

Condition
A tree's crown form and growth habit.

Good: At the time of the inspection the tree was free from pests and diseases and appeared stable and of good form. It has space for future growth. Has a medium to

long-term useful life expectancy of 15 to 40 plus years, assuming the site around it is not greatly altered.

Fair: At the time of the inspection, observations were similar as above though the tree could be misshapen and impacted by pests and diseases or site modifications. Tree may recover with remedial works or may recover and adapt to changes in its new environment. Having a medium useful life expectancy of 15 to 40 years.

Poor: At the time of inspection the tree had poor form and was suppressed. It has also declined through pests and diseases and site alterations. It may have sustained weather event damage. Remedial works will not restore health. Requiring immediate removal or within five years.

Crown Class
Dominant: crown extending above the general stand canopy and not restricted by adjacent trees.
Co Dominant: Crown forming the bulk of the upper canopy layer but is crowded by adjacent trees.
Intermediate: Crown extends into the level of the dominants and co dominants but is quite crowded on all sides.
Suppressed: Trees which have been over topped and with crown development restricted from above.

Crown Spread: Spread of the crown and the compass direction where the crown is bias. No compass direction noted indicates some symmetry in the crown.

Lean: Corrected lean indicates tree has produced reaction wood to compensate for the lean. The apex of the tree has returned to vertical. Reaction wood formed on the lower or upper sides of a stem to counteract the stem. In broadleaves this forms on the upper side, tension wood and in conifers on the lower side, compression wood.
Slight lean: 0-15 degrees off vertical.
Moderate Lean: 15-30 degrees off vertical.
Severe Lean: 30-45 degrees off vertical.
Critical lean: >45 degrees off vertical.

Codominant Stems: Trunks or stems equal in size. Also associated with 1st and 2nd order limbs in the crown.

Tree Protection Zone (TPZ) From AS4970-2009 Protection of trees on development sites

The tree protection zone (TPZ) is the principal means of protecting trees on development sites.

The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The TPZ incorporates the structural root zone (SRZ). The area around the base of a tree required for the trees stability in the ground.

Determining the TPZ
The radius of the TPZ is calculated for each tree by multiplying its DBH × 12.
TPZ = DBH × 12
where
DBH = trunk diameter measured at 1.4 m above ground
Radius is measured from the centre of the stem at ground level.
A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

Variations to the TPZ
General
It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

Minor encroachment
If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

Variations must be made by the project arborist considering relevant factors listed in The figures in Appendix D demonstrate some examples of possible encroachment into the TPZ up to 10% of the area.

Major encroachment
If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable.

The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors.
RPZ for multi stemmed trees has been calculated combining the stem DBH and using this formula:

Total DBH = $\sqrt{(DBH1)^2 + (DBH2)^2 + (DBH3)^2}$

Condition Rating (as used in the TAS)

1: Dead trees. (Red rows in TAS)

2: Trees that are misshapen or have dieback, physical wounds or severe crown damage and are unable to adapt to changes and may decline further regardless of remedial works. May include trees with excessive forest growth habit and old growth trees.

Short Life Expectancy, 5 -15 years. In most cases not suitable for retention.

3: Trees that are not restricted for space or light and may recover with remedial works. These trees may require further assessment.

Medium Life Expectancy, 15- 40 years. Suitable for retention.

4: Trees of good form and structure that require minimal maintenance at the time of the inspection. May require remedial works. May include groups of trees.

Long Life Expectancy, 40+ years. More suitable for retention.

5: Trees of good form and structure that require no maintenance at the time of the inspection.

Long Life Expectancy, 40 + years. Most suitable for retention.

7.0 TREE ASSESSMENT SCHEDULE

Client: GHD **Assessed by:** Nigel Smith **Site:** Lot 1 DP1128964, Darkum Rd, Mullaway

Assessment date: .February 2010 **Trees tagged:** Yes **Weather:** Overcast, humid

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
474	**Blackbutt, *Eucalyptus pilularis***	Mature	530	25	Normal	Fair	Co dominant, 7S	Slightly crooked trunk, wound 1.3m, Forest habit	6.4	**2**
475	***Blackbutt, Eucalyptus pilularis***	Young	160	10	Normal	Poor	Supressed, 3S	Mod lean S, Forest habit	1.9	**2**
476	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	330, 200	20	Low	Fair	Co dominant, 5	FOB at 600mm narrow crotch, included bark	4.6	**2**
477	**Blackbutt, *Eucalyptus pilularis***	Mature	530	25	Normal	Poor	Co dominant, 6	mod. Crooked, forest habit	6.4	**2**
478	**Blackbutt, *Eucalyptus pilularis***	Mature	330	20	Normal	Poor	Co dominant,12S	Crown severely bias S	4	**2**
479	**Red Mahogany, *Eucalyptus resinifera***	Young	150	12	Low	Poor	Intermediate, 2S	Suppressed by adjacent trees	1.8	**2**
480	**Blackbutt, *Eucalyptus pilularis***	Mature	990	31	Normal	Fair	Dominant, 9	med vol. Deadwood, heavy horizontal branches	11.9	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
481	**Blackbutt, *Eucalyptus pilularis***	Mature	330	16	Abnormal	Poor	Intermediate, 5E	Suppressed by adjacent trees	4	**2**
482	**Blackbutt, *Eucalyptus pilularis***	Young	180	10	Low	Poor	Supressed, 4N	Stag headed	2.2	**2**
483	**Blackbutt, *Eucalyptus pilularis***	Mature	300	30	Normal	Fair	Co dominant, 3N	Forest Habit	3.6	**2**
484	**Blackbutt, *Eucalyptus pilularis***	Mature	530	31	Normal	Fair	Co dominant, 5	Forest Habit	6.4	**2**
485	**Blackbutt, *Eucalyptus pilularis***	Young	160	10	Low	Poor	Intermediate	Mod lean N	1.9	**2**
486	**Blackbutt, *Eucalyptus pilularis***	Mature	530	30	Normal	Fair	Co dominant, 5N	Forest Habit	6.4	**2**
487	**Blackbutt, *Eucalyptus pilularis***	Mature	600	31	Normal	Fair	Co dominant, 7E	Forest Habit, med. Vol.deadwood	7.2	**2**
488	**Blackbutt, *Eucalyptus pilularis***	Mature	360	29	Low	Poor	Co dominant, 5E	Severe dieback, high vol. Epicormic growth, basal cavity	4.3	**2**
489	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	310	16	Normal	Poor	Co dominant, 5N	Forest habit, moderate lean	3.7	**2**
490	**Blackbutt, *Eucalyptus pilularis***	Mature	280	20	Abnormal	Poor	Co dominant, 4NE	Forest Habit, High H/D ratio	3.4	**2**
491	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	990	18	Abnormal	Poor	Co dominant, 10E	co domiant trunks at 200mm, included bark	11.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
492	**Blackbutt, *Eucalyptus pilularis***	Over mature	995	29	Low	Poor	Dominant, 15N	First order root damage	11.9	**2**
493	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	590	16	Abnormal	Poor	Co dominant, 15NW	Suppressed by 492, high vol epicormic growth	7.1	**2**
494	**Blackbutt, *Eucalyptus pilularis***	Mature	660	28	Normal	Fair	Co dominant, 10N	Basal decay, possible regrowth from stump, med vol deadwood	7.9	**2**
495	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	150 160	6	Normal	Poor	Intermediate, 3N	Regrowth from stump	2.6	**2**
496	**Red Mahogany, *Eucalyptus resinifera***	Mature	210	25	Normal	Fair	Co dominant, 3	Forest habit	2.5	**2**
497	**Brushbox, *Lophostemon confertus***	Young	200	10	Normal	Good	Intermediate, 3		2.4	**4**
498	**Pink Bloodwood, *Corymbia intermedia***	Young	100 100 100	5	Normal	Poor	Suppressed, 2	Regrowth from stump	2	**2**
499	**Blackbutt, *Eucalyptus pilularis***	Mature	330	16	Normal	Fair	Co dominant, 5N	Self corrected lean, epicormic growth	4	**2**
500	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	150	9	Normal	Poor	Intermediate, 2S	Longitudinal wound with decay, GL to 2.5m	1.8	**2**
501	**Swamp Turpentine *Lophostemon suaveolens***	Young	150	6	Normal	Fair	Intermediate, 2	Longitudinal wound, ample wound wood	1.8	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
502	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	280	16	Normal	Poor	Intermediate, 6N	Suppressed by adjacent trees	3.4	**2**
503	**Blackbutt, *Eucalyptus pilularis***	Mature	580	29	Normal	Fair	Co dominant, 7E	Med vol. Deadwood, All FOB in E sector	7	**2**
504	**Red Mahogany, *Eucalyptus resinifera***	Mature	230	17	Normal	Poor	Intermediate, 4N	Suppressed by tree in adjoining property	2.8	**2**
505	**Blackbutt, *Eucalyptus pilularis***	Mature	900	30	Normal	Fair	Co dominant, 15NW	med vol deadwood, crown bias N	10.8	**3**
506	**Pink Bloodwood, *Corymbia intermedia***	Mature	160	10	Normal	Fair	Intermediate, 3N	Suppressed by adjacent trees	1.9	**2**
507	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	160	8	Low	Poor	Intermediate, 2	Self corrected lean	1.9	**2**
508	**Brushbox, *Lophostemon confertus***	Young	200	12	Normal	Fair	Co dominant, 3W	Minimal compression roots	2.4	**2**
509	**Brushbox, *Lophostemon confertus***	Young	170	12	Normal	Fair	Co dominant, 2E	Consider with 508 as a group	2	**2**
510	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	200	15	Low	Fair	Co dominant, 2	Forest habit	2.4	**2**
511	**Pink Bloodwood, *Corymbia intermedia***	Young	180	8	Normal	Poor	Intermediate, 2	Regrowth from stump	2.2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
512	**Red Mahogany, *Eucalyptus resinifera***	Young	190	8	Low	Poor	Intermediate, 3W	Suppressed	2.3	**2**
513	**Brushbox, *Lophostemon confertus***	Mature	180	16	Normal	Poor	Co dominant, 3S	1 stem remomoved, bias S	2.2	**2**
514	**Forest Red Gum, *Eucalyptus teriticornis***	Mature	590	**20**	Low	Poor	Co dominant	Upper crown failure, hangers, HV epicormic growth, HOLLOWS	7.1	**2**
515	**Blackbutt, *Eucalyptus pilularis***	Mature	650	20	Normal	Fair	Co dominant, 10	Hanger, wound 2m-5m	7.8	**2**
516	**Blackbutt, *Eucalyptus pilularis***	Mature	200	7	Low	Poor	Intemediate, 3W	longitudinal wound throughout trunk	2.4	**2**
517	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	210	7	Normal	Poor	Intermediate, 1	Stag headed	2.5	**2**
518	**Blackbutt, *Eucalyptus pilularis***	Mature	500	20	Normal	Fair	Co dominant, 10E	Slightly crooked trunk	6	**2**
519	**Pink Bloodwood, *Corymbia intermedia***	Mature	200	10	Normal	Fair	Intermediate, 5E	Mechanical wound 600mm, 50% bark removed	2.4	**2**
520	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	340	15	Abnormal	Poor	Co dominant, 8S	FOB failure upper crown	4.1	**2**
521	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Over mature	1090	20	Normal	Poor	Intermediate, 20N	Bracket fungi at base, FOB failure lower crown, HOLLOWS	13.1	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
522	**Blackbutt, *Eucalyptus pilularis***		710	25	Normal	Fair	Co dominate, 15SW	Slight lean, HHL	8.5	**2**
523	**Blackbutt, *Eucalyptus pilularis***	Mature	690	25	Normal	Poor	Co dominant, 15NW	Suppressed by 552, crown bias NW	8.3	**2**
524	**Blackbutt, *Eucalyptus pilularis***	Mature	25	10	Normal	Poor	Intermediate 5W,	Suppressed by 553, mod. Lean	0.3	**2**
525	**Forest Red Gum, *Eucalyptus teriticornis***	Mature	990	30	Normal	Poor	Co dominant 8W	Basal wound GL-4m, severe decay, HV deadwood, HOLLOWS	11.9	**2**
526	**Pink Bloodwood, *Corymbia intermedia***	Mature	200	8	Normal	Good	Intermediate 4	Suppressed by adjacent tree	2.4	**2**
527	**Blackbutt, *Eucalyptus pilularis***	Mature	360	19	Normal	Poor	Co dominant 8N	Crown bias N Canker 8m	4.3	**2**
528	**Blackbutt, *Eucalyptus pilularis***	Mature	660	27	Normal	Poor	Co dominant 10N	Crown bias N,Surface root damage	7.9	**2**
529	**Pink Bloodwood, *Corymbia intermedia***	Mature	330	10	Normal	Poor	Intermediate 8N	Severe lean	4	**2**
530	**Forest Oak, *Allocasuarina torulosa***	Mature	220	8	Low	Fair	Intermediate 3	CD stems at 2.5m	2.6	**2**
531	**Pink Bloodwood, *Corymbia intermedia***	Young	110	6	Normal	Poor	Intermediate 1	Stump regrowth	1.3	**2**
532	**Blackbutt, *Eucalyptus pilularis***	Mature	360	19	Normal	Poor	Co dominant 20NW	Crown bias N, canker 8m	4.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
533	**Blackbutt, *Eucalyptus pilularis***	Mature	690	30	Normal	Good	Co dominant 10N	LV deadwood	8.3	**3**
534	**Blackbutt, *Eucalyptus pilularis***	Dead	700	15				HOLLOWS		**1**
535	**Red Ash, *Alphitonia excelsa***	Mature	200	10	Normal	Fair	Intermediate 4	Group of 2	2.4	**3**
536	**Red Ash, *Alphitonia excelsa***	Mature	250	10	Normal	Fair	Intermediate 3N	Group of 2	3	**3**
537	**Blackbutt, *Eucalyptus pilularis***	Mature	330	20	Normal	Fair	Co dominant 5	Forest habit	4	**2**
538	**Brushbox, *Lophostemon confertus***	Mature	200 200 200	10	Normal	Fair	Co dominant 5	Further inspection of basal area required	4.1	**3**
539	**Red Mahogany, *Eucalyptus resinifera***	Young	1000	25	Normal	Fair	Co dominant 15N	Crown bias N, HOLLOWS, HV deadwood	12	**2**
540	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	100	8	Low	Poor	Intermediate 2N	Mod. Lean, wound 1m	1.2	**2**
541	**Blackbutt, *Eucalyptus pilularis***	Mature	250	18	Normal	Poor	Co dominant 4	Forest habit	3	**2**
542	**Blackbutt, *Eucalyptus pilularis***	Mature	380	25	Normal	Poor	Co dominant 4S	Forest habit, MV deadwood	4.6	**2**
543	**Blackbutt, *Eucalyptus pilularis***	Mature	1000	25	Normal	Fair	Co dominant 22NW	FOB failure upper crown, HV deadwood	12	**2**

544	**Blackbutt, *Eucalyptus pilularis***	Mature	660	25	Normal	Good	Co dominant 10NE	LV deadwood	7.9	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
545	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200 200 220 180	10	Low	Poor	Intermediate 5	4 in a group, forest habit	9.5	**2**
547	**Red Mahogany, *Eucalyptus resinifera***	Mature	250	8	Abnormal	Poor	Intermediate 1	Trunk failure 3m	3	**2**
548	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	330	25	Normal	Fair	Co dominant 9N	Crown bias N	4	**2**
549	**Red Mahogany, *Eucalyptus resinifera***	Mature	290	16	Normal	Poor	Intermediate 5E	wound 2m	3.5	**2**
550	**Blackbutt, *Eucalyptus pilularis***	Mature	630	29	Normal	Fair	Co dominant 12N	Forest habit bias N	7.6	**2**
551	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	530	16	Low	Poor	Co dominant 8S	Dieback upper crown	6.4	**2**
552	**Red Ash, *Alphitonia excelsa***	Mature	200	10	Normal	Fair	Intermediate 4	trunk wounds	2.4	**3**
553	**Red Mahogany, *Eucalyptus resinifera***	Mature	250	16	Normal	Fair	Co dominant 5N	Bias N	3	**2**
554	**Red Mahogany, *Eucalyptus resinifera***	Mature	300	18	Normal	Fair	Co dominant 6N	Bias N, forest habit	3.6	**2**
555	**Blackbutt, *Eucalyptus pilularis***	Mature	240	16	Normal	Poor	Intermediate 4N	Suppressed by adjacent trees	2.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
556	**Blackbutt, *Eucalyptus pilularis***	Mature	330	30	Normal	Poor	Co dominant 7N	Forest habit	4	**2**
557	**Blackbutt, *Eucalyptus pilularis***	Mature	530	27	Normal	Fair	Co dominant 6N	Forest habit	6.4	**2**
558	**Blackbutt, *Eucalyptus pilularis***	Mature	200 150	12	Normal	Poor	Intermediate 3	Suppressed by adjacent trees	2.7	**2**
559	**Blackbutt, *Eucalyptus pilularis***	Mature	580	26	Normal	Fair	Co dominant 10	CD stems at 6m	7	**2**
560	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	200	15	Low	Poor	Intermediate 5S	Bias S Forest habit	2.4	**2**
561	**Red Mahogany, *Eucalyptus resinifera***	Mature	480	25	Normal	Good	Co dominant 6W	LV deadwood	5.8	**3**
562	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	260	24	Normal	Fair	Co dominant 5W	Forest habit	3.1	**2**
563	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	240	16	Low	Poor	Intermediate 2N	Forest habit	2.9	**2**
564	**Red Mahogany, *Eucalyptus resinifera***	Mature	480	23	Normal	Fair	Co dominant 12NE	Forest habit	5.8	**2**
565	**Red Mahogany, *Eucalyptus resinifera***	Mature	530	18	Normal	Poor	Co dominant 10	FOB failure upper crown	6.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
566	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	8	Low	Poor	Co dominant 6W	Upper crown failure,HV deadwood	6.4	**2**
567	**Pink Bloodwood, *Corymbia intermedia***	Mature	200	10	Normal	Poor	Intermediate 3SE	Mechanical wound on trunk	2.4	**2**
568	**Red Mahogany, *Eucalyptus resinifera***	Mature	140	15	Normal	Poor	Intermediate 3	Forest habit	1.7	**2**
569	**Tallowood, *Eucalyptus microcorys***	Mature	260	16	Normal	Fair	Co dominant 5	MV deadwood	3.1	**3**
570	**Red Mahogany, *Eucalyptus resinifera***	Mature	330	25	Normal	Fair	Co dominant 6	Co domiant trunks at 12m, Forest habit	4	**2**
571	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	200	16	Normal	Fair	Intermediate 4	Forest habit	2.4	**2**
572	**Brushbox, *Lophostemon confertus***	Mature	910	29	Normal	Good	Co dominant 20N	MV deadwood	10.9	**3**
573	**Blackbutt, *Eucalyptus pilularis***	Mature	250	17	Normal	Fair	Co dominant 5		3	**1**
574	**Pink Bloodwood, *Corymbia intermedia***	Dead	900	6				HOLLOWS		**2**
575	**Red Mahogany, *Eucalyptus resinifera***	Mature	330	18	Normal	Poor	Co dominant 3	CD stems at 8m	4	**2**
576	**Pink Bloodwood, *Corymbia intermedia***	Mature	200	10	Low	Poor	Suppressed 5N	New growth dieback	2.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
577	**Blackbutt, *Eucalyptus pilularis***	Mature	200	25	Normal	Poor	Co dominant 4N	Forest habit	2.4	**2**
578	**Swamp Turpentine *Lophostemon suaveolens***	Mature	250	6	Normal	Fair	Intermediate 3		3	**3**
579	**Red Mahogany, *Eucalyptus resinifera***	Mature	660	28	Normal	Poor	Co dominant 15N	HV deadwood, Crown bias N	7.9	**2**
580	**Red Mahogany, *Eucalyptus resinifera***	Mature	860	28	Normal	Poor	Co dominant 12N	HV deadwood, HV epicormic growth	10.3	**2**
581	**Red Mahogany, *Eucalyptus resinifera***	Mature	200	16	Normal	Poor	Intermediate 2N	Forest habit	2.4	**2**
582	**Red Mahogany, *Eucalyptus resinifera***	Mature	220	20	Normal	Poor	Intermediate 3E	Forest habit	2.6	**2**
583	**Red Mahogany, *Eucalyptus resinifera***	Mature	290	30	Normal	Fair	Co dominant 3	Forest habit	3.5	**2**
584	**Red Mahogany, *Eucalyptus resinifera***	Mature	240	18	Normal	Poor	Co dominant 3	Forest habit	2.9	**2**
585	**Red Mahogany, *Eucalyptus resinifera***	Mature	200	15	Normal	Poor	Intermediate 2N	Forest habit	2.4	**2**
586	**Red Mahogany, *Eucalyptus resinifera***	Mature	300	18	Normal	Poor	Co dominant 10	Forest habit, CD at 7m	3.6	**2**
587	**Blackbutt, *Eucalyptus pilularis***	Mature	480	28	Normal	Poor	Co dominant 12NE	Forest habit, MV deadwood	5.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
588	**Blackbutt, *Eucalyptus pilularis***	Mature	660	28	Normal	Poor	Co dominant 9SE	HV deadwood, CD stems at 12m	7.9	**2**
589	**Swamp Turpentine *Lophostemon suaveolens***	Mature	100	6	Normal	Fair	Intermediate 2N	Mechanicl wound	1.2	**3**
590	**Red Mahogany, *Eucalyptus resinifera***	Mature	480	25	Normal	Fair	Co dominant 5N	Forest habit	5.8	**2**
591	**Red Mahogany, *Eucalyptus resinifera***	Mature	200	15	Normal	Poor	Co dominant 3S	Forest habit	2.4	**2**
592	**Red Mahogany, *Eucalyptus resinifera***	Mature	230	18	Normal	Poor	Co dominant 2	Forest habit	2.8	**2**
593	**Red Mahogany, *Eucalyptus resinifera***	Mature	240	17	Normal	Poor	Co dominant 2	Forest habit	2.9	**2**
594	**Blackbutt, *Eucalyptus pilularis***	Mature	160	15	Normal	Poor	Intermediate 2W	Forest habit	1.9	**2**
595	**Red Mahogany, *Eucalyptus resinifera***	Mature	690	31	Normal	Fair	Co dominant 15N	Forest habit	8.3	**2**
596	**Red Mahogany, *Eucalyptus resinifera***	Mature	330	26	Normal	Fair	Co dominant 7N	Forest habit	4	**2**
597	**Red Mahogany, *Eucalyptus resinifera***	Mature	200	17	Normal	Fair	Intermediate 4	Forest habit	2.4	**2**
598	**Blackbutt, *Eucalyptus pilularis***	Mature	760	28	Normal	Fair	Co dominant 15N	Mod lean, HV deadwood	9.1	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
599	**Red Mahogany, *Eucalyptus resinifera***	Mature	220	16	Normal	Poor	Intermediate 4	Forest habit	2.6	**2**
600	**Blackbutt, *Eucalyptus pilularis***	Mature	960	32	Normal	Good	Co dominant 18	HV deadwood	11.5	**3**
601	**Brushbox, *Lophostemon confertus***	Mature	290	9	Normal	Poor	Intermediate 4E	Vertcal wound GL-2.5m	3.5	**2**
602	**Unknown**	Dead	1200	10					14.4	**1**
603	**Red Ash, *Alphitonia excelsa***	Mature	200	9	Normal	Fair	Intermediate 4		2.4	**3**
604	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	660	26	Normal	Poor	Co dominant 15SE	Mod lean, raised root plate	7.9	**2**
605	**Brushbox, *Lophostemon confertus***	Mature	150	8	Normal	Fair	Intermediate 2	Forest habit	1.8	**2**
606	**Blackbutt, *Eucalyptus pilularis***	Mature	1000	31	Normal	Fair	Co dominant 20NE	Mod lean, Heavy horizontal branches, MV deadwood	12	**2**
607	**Pink Bloodwood, *Corymbia intermedia***	Mature	200	15	Normal	Poor	Intermediate 4S	Growth restricted by adjacent trees	2.4	**2**
608	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	15	Normal	Poor	Co dominant 5NE	Forest habit	4	**2**
609	**Brushbox, *Lophostemon confertus***	Mature	180	10	Normal	Fair	Intermediate 3E	Growth restricted by adjacent trees	2.2	**2**
610	**Blackbutt, *Eucalyptus pilularis***	Mature	250	26	Normal	Poor	Co dominant 4NE	Moderately crooked trunk	3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
611	**Pink Bloodwood, *Corymbia intermedia***	Over mature	1100	29	Low	Poor	Co dominant 20N	HV deadwood, HOLLOWS	13.2	**2**
612	**Blackbutt, *Eucalyptus pilularis***	Young	150	12	Low	Poor	Intermediate 3	Growth restricted by adjacent trees	1.8	**2**
613	**Blackbutt, *Eucalyptus pilularis***	Young	140	15	Low	Poor	Intermediate 3W	Growth restricted by adjacent trees	1.7	**2**
614	**Blackbutt, *Eucalyptus pilularis***	Mature	250	25	Normal	Poor	Co dominant 5SE	Forest habit	3	**2**
615	**Blackbutt, *Eucalyptus pilularis***	Mature	660	22	Normal	Poor	Co dominant 10W	Raised root plate, Mod. Lean	7.9	**2**
616	**Swamp Turpentine *Lophostemon suaveolens***	Over mature	580	16	Normal	Poor	Co dominant, 7N	Basal cavity, mod. Lean	7	**2**
617	**Tallowood, Eucalyptus microcorys**	Mature	250	16	Normal	Fair	Co dominant, 6NW	Forest habit	3	**2**
618	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	16	Normal	Poor	Co dominant 3S	Forest habit	2.4	**2**
619	**Brushbox, *Lophostemon confertus***	Mature	350, 150, 150	18	Normal	Fair	Co dominant, 5	Co domiant trunks at GL	4.9	**3**
620	**Red Mahogany, *Eucalyptus resinifera***	Mature	480	23	Normal	Fair	Co dominant 6S	Forest habit	5.8	**2**
621	**Red Mahogany, *Eucalyptus resinifera***	Mature	240	18	Normal	Fair	Co dominant, 3S	Forest habit	2.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
622	**Red Mahogany, *Eucalyptus resinifera***	Mature	140, 130	9	Low	Poor	Intermediate 2	Stag headed	2.4	**2**
623	**Red Mahogany, *Eucalyptus resinifera***	Mature	150	15	Low	Poor	Co dominant, 3	Forest habit	1.8	**2**
624	**Blackbutt, *Eucalyptus pilularis***	Mature	690	30	Normal	Fair	Co dominant 10N	Slight lean	8.3	**2**
625	**Tallowood, Eucalyptus microcorys**	Mature	250	24	Normal	Poor	Co dominant 10W	Forest habit	3	**2**
626	**Tallowood, Eucalyptus microcorys**	Mature	230	16	Normal	Poor	Co dominant 7N	Forest habit	2.8	**2**
627	**Pink Bloodwood, Corymbia intermedia**	Mature	230	20	Normal	Poor	Co dominant 3W	Mechanical woundGL-1.5m, Forest habit	2.8	**2**
628	**Pink Bloodwood, Corymbia intermedia**	Mature		15	Normal	Poor	Intermediate 4N	Forest habit, HV epicormic growth	0	**2**
629	**Red Mahogany, *Eucalyptus resinifera***	Dead	200	16						**1**
630	**Red Mahogany, *Eucalyptus resinifera***	Mature	200	17	Normal	Poor	Co dominant 3NW	Forest habit	2.4	**2**
631	**Red Mahogany, *Eucalyptus resinifera***	Mature	330, 300	25	Low	Poor	Co dominant 6NE	Forest habit, basal cavity and decay, CD stems at 6m	5.3	**2**
632	**Swamp Turpentine Lophostemon suaveolens**	Mature	200	16	Normal	Fair	Co dominant, 4	Mechanical wound GL-500mm	2.4	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
633	**Red Mahogany, *Eucalyptus resinifera***	Mature	350	26	Normal	Fair	Co dominant, 5NE	Forest habit	4.2	**2**
634	**Pink Bloodwood, Corymbia intermedia**	Mature	150	15	Normal	Fair	Intermediate 3E	Forest habit	1.8	**2**
635	**Blackbutt, *Eucalyptus pilularis***	Mature	235	15	Normal	Poor	Intermediate 3N	Forest habit	2.8	**2**
636	**Blackbutt, *Eucalyptus pilularis***	Mature	240	18	Normal	Poor	Co dominant 4E	Forest habit	2.9	**2**
637	**Blackbutt, *Eucalyptus pilularis***	Mature	630	30	Normal	Fair	Co dominant 12N	Forest habit, MV deadwood	7.6	**2**
638	**Swamp Turpentine Lophostemon suaveolens**	Mature	230	13	Normal	Fair	Intermediate 3		2.8	**3**
639	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	810	16	Low	Poor	Co dominant 8	HV deadwood, New growth dieback	9.7	**2**
640	**Tallowood, Eucalyptus microcorys**	Mature	150	8	Normal	Fair	Intermediate 3S		1.8	**2**
641	**Pink Bloodwood, Corymbia intermedia**	Mature	120	12	Normal	Fair	Intermediate 2	Forest habit	1.4	**2**
642	**Tallowood, Eucalyptus microcorys**	Mature	530	29	Normal	Fair	Co dominant, 5N	Forest habit, MV deadwood	6.4	**2**
643	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	320	18	Low	Fair	Co dominant, 4NE	Forest habit	3.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
644	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	200	16	Low	Fair	Co dominant, 3	Forest habit	2.4	**2**
645	**Blackbutt, *Eucalyptus pilularis***	Mature	300, 330, 250, 350	22	Normal	Fair	Co dominant, 6	Suface root damage, Branch rub	11.6	**3**
646	**Blackbutt, *Eucalyptus pilularis***	Young	140	10	Normal	Poor	Intermediate 4W	Forest habit, mod lean	1.7	**2**
647	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	330	24	Low	Poor	Co dominant, 5W	Moderately crooked trunk, moderate lean	4	**2**
648	**Tallowood, Eucalyptus microcorys**	Young	150	6	Normal	Poor	Intermediate 3S	Growth restricted by adjacent trees	1.8	**2**
649	**Tallowood, Eucalyptus microcorys**	Mature	150	10	Normal	Poor	Intermediate 5S	Growth restricted by adjacent trees	1.8	**2**
650	**Tallowood, Eucalyptus microcorys**	Mature	280	16	Normal	Poor	Intermediate 4	Growth restricted by adjacent trees	3.4	**2**
651	**Blackbutt, *Eucalyptus pilularis***	Mature	330	31	Normal	Fair	co dominant, 6	Forest habit	4	**2**
652	**Blackbutt, *Eucalyptus pilularis***	Mature	580	29	Normal	Fair	Co dominant, 7N	MV deadwood, Moderate lean	7	**2**
653	**Red Mahogany, *Eucalyptus resinifera***	Mature	330	29	Normal	Poor	Co dominant, 4NE	Epicormic growth on trunk, MV deadwood	4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
654	**Pink Bloodwood, Corymbia intermedia**	Mature	170	10	Normal	Poor	Suppressed 2N		2	**2**
655	**Unknown**	Dead	150	8						**1**
656	**Tallowood, Eucalyptus microcorys**	Mature	160	12	Normal	Poor	Intermediate 2n	Growth restricted by adjacent trees	1.9	**2**
657	**Blackbutt, *Eucalyptus pilularis***	Mature	760	30	Normal	Fair	Co dominant, 15N	Raised root plate, HV deadwood	9.1	**1**
658	**Tallowood, Eucalyptus microcorys**	Dead	250	15					3	**1**
659	**Blackbutt, *Eucalyptus pilularis***	Mature	200	16	Normal	Poor	Intermediate 3S	Forest habit	2.4	**2**
660	**Tallowood, Eucalyptus microcorys**	Mature	200	9	Normal	Poor	Intermediate 3S	Forest habit	2.4	**2**
661	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Young	130	9	Low	Poor	Intermediate 2S	Forest habit	1.6	**2**
662	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	250	16	Low	Poor	Co dominant 5S	Forest habit, MV deadwood	3	**2**
663	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	250	16	Normal	Fair	Co dominant, 4	Mechanical wound GL-5m, Moderate lean	3	**2**
664	**Swamp Sheoak, *Casuarina glauca***	Mature	150	16	Normal	Poor	Co dominant 1W	Forest habit	1.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
665	**Blackbutt, *Eucalyptus pilularis***	Mature	360	17	Normal	Poor	Intermediate 12E	Moderate lean, HV deadwood HV deadwood, New growth dieback	4.3	**2**
666	**Blackbutt, *Eucalyptus pilularis***	Mature	690	28	Normal	Fair	Co dominant, 15N	HV deadwood, Minimal tension roots	8.3	**2**
667	**unknown**	Dead	300	10						**1**
668	**Swamp Sheoak, *Casuarina glauca***	Mature	250	15	Normal	Poor	Co dominant, 2	Mechanical wound GL-2m	3	**1**
669	**Swamp Sheoak, *Casuarina glauca***	Mature	250	15	Normal	Poor	Co dominant, 3S	Mechanical wound GL-1.5m, Forest habit	3	**2**
670	**Swamp Sheoak, *Casuarina glauca***	Mature	220	15	Normal	Poor	Co dominant 2S	Forest habit	2.6	**2**
671	**Tallowood, Eucalyptus microcorys**	Mature	150	15	Normal	Fair	Intermediate 3N	Forest habit	1.8	**2**
672	**Swamp Sheoak, *Casuarina glauca***	Mature	120	15	Normal	Poor	Intermediate 2	Forest habit, Mechanical wound GL-1.5m	1.4	**2**
673	**Blackbutt, *Eucalyptus pilularis***	Mature	580	24	Normal	Poor	8NW	No compression roots	7	**2**
674	**Tallowood, Eucalyptus microcorys**	Mature	330	20	Normal	Fair	Co dominant, 5S	Mechanical wound 2-5m	4	**2**
675	**Swamp Sheoak, *Casuarina glauca***	Mature	200	16	Normal	Fair	Co dominant, 2	Forest habit	2.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
676	**Swamp Sheoak, *Casuarina glauca***	Mature	250	17	Normal	Fair	Co dominant, 2	Forest habit	3	**2**
677	**Swamp Sheoak, *Casuarina glauca***	Mature	200	15	Normal	Fair	Co dominant 2W	Forest habit	2.4	**2**
678	**Swamp Sheoak, *Casuarina glauca***	Mature	330	16	Normal	Poor	Co dominant, 4N	Moderate lean	4	**2**
679	**Turpentine, *Synncarpia glommulifera***	Mature	320	14	Normal	Fair	Co dominant, 4NW	CD stems at 4m	3.8	**3**
680	**Tallowood, Eucalyptus microcorys**	Mature	230	22	Normal	Fair	Co dominant, 3	Forest habit	2.8	**2**
681	**Tallowood, Eucalyptus microcorys**	Mature	250	26	Normal	Fair	Co dominant, 3	Forest habit	3	**2**
682	**Tallowood, Eucalyptus microcorys**	Mature	280	30	Normal	Fair	Co dominant	Forest habit	3.4	**2**
683	**Blackbutt, *Eucalyptus pilularis***	Mature	500	32	Normal	Fair	Co dominant, 8S	Forest habit, MV deadwood	6	**2**
684	**Pink Bloodwood, Corymbia intermedia**	Mature	150	8	Low	Poor	Intermediate 2	Growth restricted by adjacent trees	1.8	**2**
685	**Red Mahogany, Eucalyptus resinifera**	Mature	300	26	Normal	Fair	Co dominant, 4	Forest habit	3.6	**2**
686	**Tallowood, Eucalyptus microcorys**	Mature	150	15	Normal	Poor	Intermediate 3W	Forest habit	1.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
687	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	15	Normal	Poor	Intermediate 3SE	Forest habit	2.4	**2**
688	**Coral Tree, *Erythrina laurifolia***	Mature	150	8	Normal	Fair	Intermediate 3	Undesirable species in some situations	1.8	**2**
689	**Blackbutt, *Eucalyptus pilularis***	Mature	530	30	Normal	Fair	Co dominant, 6	Forest habit	6.4	**2**
690	**Tallowood, Eucalyptus microcorys**	Mature	150	15	Normal	Fair	Intermediate 2	Forest habit	1.8	**2**
691	**paperbark**	Mature	150	9	Normal	Poor	Intermediate 3	Forest habit, CD stems at 3m	1.8	**2**
692	**Blackbutt, *Eucalyptus pilularis***	Mature	480	27	Normal	Poor	Co dominant, 6N	Possible shear crack, mod. Lean	5.8	**2**
693	**Tallowood, Eucalyptus microcorys**	Mature	300	20	Normal	Poor	Co dominant, 4SW	Forest habit	3.6	**2**
694	**Tallowood, Eucalyptus microcorys**	Mature	340	30	Normal	Fair	Co dominant, 4N	Forest habit	4.1	**2**
695	**Swamp Turpentine *Lophostemon suaveolens***	Mature	330	16	Normal	Fair	Co dominant, 4	Forest habit	4	**3**
696	**Blackbutt, *Eucalyptus pilularis***	Mature	330	29	Normal	Poor	Co dominant, 6N	Forest habit, Moderate lean	4	**2**
697	**Tallowood, Eucalyptus microcorys**	Young	140	12	Normal	Poor	Intermediate 1	Forest habit	1.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
698	**Red Mahogany, *Eucalyptus resinifera***	Young	150	12	Normal	Poor	ntermediate, 2	Forest habit	1.8	**2**
699	**Red Mahogany, Eucalyptus resinifera**	Mature	330	26	Normal	Fair	Co dominant, 5	Forest habit	4	**2**
700	**Tallowood, Eucalyptus microcorys**	Mature	330	27	Normal	Fair	Co dominant, 6N	MV deadwood, Mechanical wound GL, hanger	4	**2**
701	**Blackbutt, *Eucalyptus pilularis***	Mature	510	27	Normal	Poor	Co dominant, 12N	Crown bias N, suppressed by 702	6.1	**2**
702	**Blackbutt, *Eucalyptus pilularis***	Dead	1570	20				HOLLOWS	18.8	**1**
703	**Blackbutt, *Eucalyptus pilularis***	Mature	360	25	Normal	Fair	Co dominant, 5	Forest habit	4.3	**2**
704	**Blackbutt, *Eucalyptus pilularis***	Mature	630	25	Normal	Fair	co dominant 7	Forest habit	7.6	**2**
705	**Tallowood, Eucalyptus microcorys**	Mature	300	15	Normal	Fair	Intermediate 4N		3.6	**2**
706	**Blackbutt, *Eucalyptus pilularis***	Young	150	9	Normal	Fair	Intermediate 2	Raised root plate, wound 200mm	1.8	**2**
707	**Tallowood, Eucalyptus microcorys**	Mature	200	16	Normal	Fair	Intermediate 3E	Forest habit	2.4	**2**
708	**Tallowood, Eucalyptus microcorys**	Mature	300	29	Normal	Fair	Co dominant, 4	Forest habit	3.6	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
709	**Blackbutt, *Eucalyptus pilularis***	Mature	480	30	Normal	Fair	Co-dominant, 5	Forest habit	5.8	**2**
710	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	330	29	Normal	Fair	Co dominant, 6NE	Forest habit	4	**2**
711	**Red Mahogany, *Eucalyptus resinifera***	Mature	290	27	Normal	Poor	Co dominant, 5SW	Forest habit, Mechanical wound GL	3.5	**2**
712	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	260	16	Normal	Poor	ntermediate, 7S	Growth restricted by adjacent trees, HV deadwood	3.1	**2**
713	**Red Mahogany, *Eucalyptus resinifera***	Mature	530	28	Normal	Fair	Co dominant, 8N	FOB arranged in NW sector	6.4	**2**
714	**Blackbutt, *Eucalyptus pilularis***	Mature	660	30	Normal	Fair	Co dominant, 8NW	Forest habit	7.9	**2**
715	**Red Mahogany, *Eucalyptus resinifera***	Mature	250	27	Normal	Fair	Co dominant, 2	Forest habit	3	**2**
716	**Blackbutt, *Eucalyptus pilularis***	Mature	530	32	Normal	Fair	Co dominant, 4	Forest habit	6.4	**2**
717	**Blackbutt, *Eucalyptus pilularis***	Mature	180	19	Normal	Poor	Intermediate 2N	Forest habit	2.2	**2**
718	**Red Bloodwood, *Corymbia gummifera***	Young	200	17	Normal	Poor	Intermediate 2	Forest habit	2.4	**2**
719	**unknown**	Dead	1520	15				HOLLOWS	18.2	**1**
720	**Blackbutt, *Eucalyptus pilularis***	Mature	430	26	Normal	Fair	Co dominant, 6	CD stems at 6m	5.2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
721	**Blackbutt, *Eucalyptus pilularis***	Mature	220 140 120 110 250	15	Normal	Fair	Intermediate 4	To be considered as a group	11.7	**2**
722	**Blackbutt, *Eucalyptus pilularis***	Mature	530	20	Low	Poor	Co dominant 5SE	Mechanical wound 1-6m,FOB failure upper crown	6.4	**2**
723	**blackbox**	Young	150	9	Normal	Fair	I, 3NE	FOB arranged in NE sector	1.8	**2**
724	**Red Mahogany, *Eucalyptus resinifera***	Mature	630	20	Normal	Poor	Co dominant, 10	New growth dieback, HV deadwood, HV epicormic growth	7.6	**2**
725	**blackbox**	Mature	160	5	Ab	Poor	Intermediate 1	Trunk failure at 5m, Epicormic growth on trunk	1.9	**2**
726	**Blackbutt, *Eucalyptus pilularis***	Mature	200	14	Normal	Fair	Co dominant, 2	Epicormic growth on trunk	2.4	**2**
727	**Pink Bloodwood, Corymbia intermedia**	Mature	330	7	Ab	Poor	Intermediate 3W	Trunk failure 7m	4	**2**
728	**Tallowood, Eucalyptus microcorys**	Over mature	660	17	Ab	Poor	Co dominant, 8NW	HOLLOWS, stag headed	7.9	**2**
729	**Blackbutt, *Eucalyptus pilularis***	Mature	370	20	Normal	Fair	Co dominant, 4NW	Mechanical wound 1-4m, Forest habit	4.4	**2**
730	**Red Bloodwood, *Corymbia gummifera***	Mature	230	15	Normal	Poor	Co dominant, 5N	New growth dieback	2.8	**2**
731	**Blackbutt, *Eucalyptus pilularis***	Dead	340	8					4.1	**1**

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732	**Tallowood, Eucalyptus microcorys**	Mature	330	10	Normal	Fair	Co dominant, 6NW	FOB arranged in N sector	4	**2**
733	**Red Mahogany, *Eucalyptus resinifera***	Mature	290	16	Normal	Fair	Co dominant, 4N	Mechanical wound 1-3m	3.5	**2**
734	**Red Mahogany, Eucalyptus resinifera**	Mature	330	15	Normal	Poor	Co dominant, 5W	New growth dieback	4	**2**
735	**Blackbutt, *Eucalyptus pilularis***	Mature	550	26	Normal	Fair	Co dominant 10N	MV deadwood	6.6	**2**
736	**Red Mahogany, *Eucalyptus resinifera***	Mature	680	29	Normal	Fair	Co dominant, 16N	Hangers, HV deadwood	8.2	**3**
737	**Blackbutt, *Eucalyptus pilularis***	Young	170	10	Ab	Poor	Intermediate 2	Stag headed	2	**2**
738	**Blackbutt, *Eucalyptus pilularis***	Over mature	1950	30	Normal	Fair	D, 20	HV deadwood, FOB failures , HOLLOWS	23.4	**2**
739	**Pink Bloodwood, Corymbia intermedia**	Mature	320	12	Normal	Poor	Co dominant, 4N	FOB failures, New growth dieback	3.8	**2**
740	**Pink Bloodwood, Corymbia intermedia**	Mature	180	9	Normal	Poor	Intermediate 3SE	Growth restricted by adjacent trees	2.2	**2**
741	**Blackbutt, *Eucalyptus pilularis***	Mature	520	17	Normal	Fair	Dominant 7	Infrastructure damageto neighboring property and overhang into the same.	6.2	**2**
742	**Red Bloodwood, *Corymbia gummifera***	Mature	200 170 180	9	Normal	Poor	ntermediate, 3	Co domiant trunks at GL, Branch rub	3.8	**2**

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743	**Brushbox, *Lophostemon confertus***	Mature	250	10	Normal	Fair	Intermediate 5N	Surface root damage	3	**3**
744	**Brushbox, *Lophostemon confertus***	Mature	180	15	Normal	Fair	Intermediate 4	Co dominant FOB at 8m, Forest habit	2.2	**2**
745	**Blackbutt, *Eucalyptus pilularis***	Dead	1320	18				HOLLOWS	15.8	**1**
746	**Tallowood, Eucalyptus microcorys**	Mature	250	12	Normal	Poor	I, 4		3	**2**
747	**Red Bloodwood, *Corymbia gummifera***	Mature	350	20	Normal	Poor	Co dominant, 6NW	Moderate lean	4.2	**2**
748	**Tallowood, Eucalyptus microcorys**	Mature	670	26	Normal	Fair	Co dominant 20E	Moderate lean, HV deadwood	8	**2**
749	**Tallowood, Eucalyptus microcorys**	Mature	660	28	Normal	Fair	Co dominant, 15E	HV deadwood	7.9	**3**
750	**Tallowood, Eucalyptus microcorys**	Mature	660	15	Normal	Poor	Co dominant, 20N	Moderate lean, stable	7.9	**2**
751	**Blackbutt, *Eucalyptus pilularis***	Mature	270	17	Normal	Fair	Co dominant, 6N	Forest habit	3.2	**2**
752	**Brushbox, *Lophostemon confertus***	Mature	350	16	Normal	Fair	Co dominant, 8	basal cavity and decay, No compression roots	4.2	**2**
753	**Blackbutt, *Eucalyptus pilularis***	Mature	570	29	Normal	Fair	Co dominant, 10	Mechanical wound 2-5m, Forest habit	6.8	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
754	**Blackbutt, *Eucalyptus pilularis***	Mature	300	17	Normal	Poor	Co dominant, 4SE	Forest habit, Mechanical wound 500-2m, hangers	3.6	**2**
755	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	210	16	Normal	Fair	Co dominant, 2	Forest habit	2.5	**2**
756	**Blackbutt, *Eucalyptus pilularis***	Mature	260	16	Normal	Poor	Co dominant, 6S	Moderate lean, Forest habit	3.1	**2**
757	**Blackbutt, *Eucalyptus pilularis***	Mature	330	20	Normal	Fair	Co dominant, 4NE	Forest habit	4	**2**
758	**Blackbutt, *Eucalyptus pilularis***	Mature	240	15	Normal	Fair	I, 3N	Forest habit	2.9	**2**
759	**Blackbutt, *Eucalyptus pilularis***	Mature	680	28	Normal	Fair	Co dominant, 10N	Forest habit	8.2	**2**
760	**Blackbutt, *Eucalyptus pilularis***	Mature	580	27	Normal	Poor	Co dominant, 12N	Hangers, FOB failures	7	**2**
761	**Tallowood, Eucalyptus microcorys**	Mature	330	19	Normal	Poor	Co dominant, 12N	FOB failures, Moderate lean, MV deadwood	4	**2**
762	**Blackbutt, *Eucalyptus pilularis***	Mature	1100	28	Normal	Fair	Co dominant, 20W	HV deadwood, Moderate lean	13.2	**2**
763	**Blackbutt, *Eucalyptus pilularis***	Young	150	9	Normal	Fair	ntermediate, 2N	Moderate lean	1.8	**2**
764	**Blackbutt, *Eucalyptus pilularis***	Mature	860	27	Normal	Fair	Co dominant, 20N	Crown bias NW, FOR damage, mod. Lean	10.3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
765	**Blackbutt, *Eucalyptus pilularis***	Mature	240, 330	26	Normal	Poor	Co dominant, 4	Stump regrowth	4.9	**2**
766	**Blackbutt, *Eucalyptus pilularis***	Mature	660	27	Normal	Fair	Co dominant, 1S	basal cavity and decay	7.9	**2**
767	**Pink Bloodwood, Corymbia intermedia**	Mature	630	24	Normal	Poor	Co dominant, 15S	HOLLOWS, upper crown failure	7.6	**2**
768	**Blackbutt, *Eucalyptus pilularis***	Mature	280	19	Normal	Poor	Co dominant, 9E	Forest habit, Moderate lean	3.4	**2**
769	**Brushbox, *Lophostemon confertus***	Mature	430	8	Normal	Poor	Intermediate 4	Vertical cavity GL-3m	5.2	**2**
770	**Brushbox, *Lophostemon confertus***	Young	170	12	Normal	Fair	Intermediate 2		2	**2**
771	**Blackbutt, *Eucalyptus pilularis***	Mature	550	28	Normal	Poor	Co dominant, 10NW	FOB arranged in NW sector, Moderate lean	6.6	**3**
772	**Blackbutt, *Eucalyptus pilularis***	Mature	680	29	Normal	Poor	Co dominant, 15N	Stag headed	8.2	**2**
773	**Blackbutt, Eucalyptus pilularis**	Mature	580	29	Normal	Fair	Co dominant, 8E	Forest habit	7	**2**
774	**Blackbutt, *Eucalyptus pilularis***	Mature	430	23	Normal	Poor	Co dominant, 12N		5.2	**2**
775	**Blackbutt, *Eucalyptus pilularis***	Mature	530	20	Normal	Poor	Co dominant, 12SE	Moderate lean	6.4	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
776	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	340	24	Normal	Poor	Co dominant, 9E	Moderate lean, crown entangled with 775	4.1	**2**
777	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	8	low	Fair	Intermediate 2		2.4	**3**
778	**Pink Bloodwood, Corymbia intermedia**	Mature	160	4	Ab	Poor	Intermediate 1	Trunk failure	1.9	**2**
779	**Pink Bloodwood, Corymbia intermedia**	Mature	250	15	Normal	Fair	Intermediate 4	Mechanical wound GL	3	**3**
780	**Blackbutt, *Eucalyptus pilularis***	Over mature	810	28	Normal	Fair	Dominant 20S	Basal wound, FOB failure lower crown, HOLLOWS	9.7	**2**
781	**Blackbutt, *Eucalyptus pilularis***	Over mature	990	20	Normal	Poor	Co dominant, 23N	Severe lean, HV deadwood, multiple failure events	11.9	**2**
782	**Blackbutt, *Eucalyptus pilularis***	Mature	660	20	Normal	Poor	Co dominant, 15SE	HV deadwood, severely crooked trunk	7.9	**2**
783	**Blackbutt, *Eucalyptus pilularis***	Mature	780	25	Normal	Poor	Co dominant, 16SE	HV deadwood, mod. Crooked trunk	9.4	**2**
784	**Red Bloodwood, *Corymbia gummifera***	Mature	280	8	low	Poor	Dominant 8N	Moderate lean	3.4	**2**
785	**Blackbutt, *Eucalyptus pilularis***	Mature	680	27	Normal	Fair	Co dominant, 12	HV deadwood, Minimal tension roots	8.2	**2**
786	**Red Bloodwood, *Corymbia gummifera***	Mature	600	15	Normal	Poor	Co dominant, 10N	HOLLOWS, HV deadwood	7.2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
787	**Tallowood, Eucalyptus microcorys**	Mature	1000	16	Normal	Poor	Co dominant, 20N	Crown bias N, HHB, HV deadwood	12	**2**
788	**Brushbox, *Lophostemon confertus***	Mature	200	10	Normal	Fair	Intermediate 4N	Forest habit	2.4	**2**
789	**Red Bloodwood, *Corymbia gummifera***	Mature	430	16	Normal	Poor	Co dominant, 10	Mod. Lean, growing at base of 787 and crown through the same	5.2	**2**
790	**Pink Bloodwood, Corymbia intermedia**	Mature	300	14	Normal	Poor	Intermediate 8N	New growth dieback, Growth restricted by adjacent trees	3.6	**2**
791	**Blackbutt, *Eucalyptus pilularis***	Mature	960	22	Normal	Fair	Dominant 20E	Moderate lean, over hanging neighbouring property	11.5	**2**
792	**Swamp Turpentine *Lophostemon suaveolens***	Mature	540	16	Normal	Fair	Co dominant, 8		6.5	**3**
793	**unknown**	Dead	990	25				HOLLOWS	11.9	**2**
794	**Pink Bloodwood, Corymbia intermedia**	Mature	270	15	low	Fair	Co dominant, 5		3.2	**3**
795	**Gadaghi, *Corymbia tolleriana***	Young	150	6			Intermediate 2	Environmental weed, Coffs Harbour LGA	1.8	**3**
796	**Red Bloodwood, *Corymbia gummifera***	Mature	640	19	low	Poor	Co dominant, 10W	Moderate lean, HV deadwood	7.7	**3**
797	**Queen Palm x3, *Syagrus romanzoffianum***	Mature	200	10	low	Fair	Co dominant 3	Environmental weed, Coffs Harbour LGA	2.4	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
798	**Blackbutt, *Eucalyptus pilularis***	Mature	530	15	low	Poor	Co dominant, 8E	FOB arranged in N sector	6.4	**3**
799	**Pink Bloodwood, Corymbia intermedia**	Mature	200	8	low	Fair	Co dominant, 5E		2.4	**2**
800	**Blackbutt, *Eucalyptus pilularis***	Mature	770	16	Normal	Fair	Co dominant, 8		9.2	**3**
801	**Swamp Turpentine *Lophostemon suaveolens***	Mature	160	9	Normal	Fair	Co dominant, 3		1.9	**3**
802	**Swamp Turpentine *Lophostemon suaveolens***	Mature	200	9	Normal	Fair	Co dominant, 3		2.4	**3**
803	**Cheese Tree, *Glochidion ferdinandi***	Mature	200	6	Normal	g	Intermediate 3		2.4	**3**
804	**Pink Bloodwood, Corymbia intermedia**	Mature	340	10	low	Poor	Co dominant, 6NE	Med. deadwood, New growth dieback	4.1	**2**
805	**Red Bloodwood, *Corymbia gummifera***	Mature	680	15	low	Poor	Co dominant, 6SW	HV deadwood, New growth dieback	8.2	**2**
806	**Blackbutt, *Eucalyptus pilularis***	Young	170	10	Normal	Poor	Co dominant, 2NE	Moderate lean, Forest habit	2	**2**
807	**Red Bloodwood, *Corymbia gummifera***	Mature	600	16	Normal	Poor	co dominant, 12N	Med. deadwood, New growth dieback, opper crown failure	7.2	**2**
808	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	12	Normal	Poor	Intermediate 4E	Growth restricted by adjacent trees	6.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
809	**Blackbutt, *Eucalyptus pilularis***	Mature	150	13	low	Poor	Intermediate 1	Forest habit	1.8	**2**
810	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	320	17	Normal	Poor	Co dominant, 3NE	Forest habit	3.8	**2**
811	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	15	Normal	Fair	Co dominant, 3S		4	**2**
812	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	190	12	Normal	Poor	Co dominant, 2NE		2.3	**2**
813	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	10	Normal	Fair	Co dominant, 3W	Moderate lean	4	**3**
814	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	10	Normal	Fair	Co dominant, 3N		3	**2**
815	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	15	Normal	Fair	Co dominant, 3S	Forest habit	3	**2**
816	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	230	15	low	Poor	Co dominant, 2N	Bracket fungi lower crown, Forest habit	2.8	**2**
817	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	10	Normal	Poor	Co dominant, 1	Part of a group of 5 smaller Paperbarks	2.4	**2**
818	**Blackbutt, *Eucalyptus pilularis***	Mature	250	16	Normal	Fair	Co dominant, 3	Forest habit	3	**2**
819	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	13	Normal	Poor	Co dominant, 7NE	Moderate lean	3	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
820	**Forest Red Gum,*Eucalyptus teriticornis***	Young	150	9	low	Poor	Co dominant, 1	Forest habit	1.8	**2**
821	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	12	Normal	Fair	Co dominant, 5		3	**3**
822	**Forest Red Gum,*Eucalyptus teriticornis***	Mature	360	16	Normal	Poor	Co dominant, 10N	Moderate lean	4.3	**2**
823	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	10	Normal	Poor	Intermediate 8N	Moderate lean	3.6	**2**
824	**Blackbutt, *Eucalyptus pilularis***	Young	190	12	Normal	Fair	Co dominant, 1	Forest habit	2.3	**2**
825	**Blackbutt, *Eucalyptus pilularis***	Mature	480	23	Normal	Fair	Co dominant, 4	Forest habit	5.8	**2**
826	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	280	12	Normal	Fair	I, 4N		3.4	**2**
827	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	660	17	low	Poor	Co dominant, 12E	Bracket fungi throughout crown, Moderate lean	7.9	**2**
828	**Swamp Turpentine *Lophostemon suaveolens***	Young	150	8	Normal	Fair	Co dominant, 2		1.8	**3**
829	**Blackbutt, *Eucalyptus pilularis***	Young	170	10	Normal	Poor	Co dominant, 3	Mod. Crooked	2	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
830	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	10	low	Poor	Intermediate 4	Stag headed	2.4	**2**
831	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	480	15	Normal	Fair	Co dominant, 4		5.8	**3**
832	**Forest Red Gum,*Eucalyptus teriticornis***	Mature	250	16	Normal	Fair	Co dominant, 3	Forest habit	3	**2**
833	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	6	Normal	Poor	Intermediate 4N	Wound 200mm, Moderate lean	2.4	**2**
834	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	360	14	low	Fair	Co dominant, 4NE	Forest habit	4.3	**2**
835	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	12	Normal	Poor	Co dominant, 5SE	Moderate lean	2.4	**2**
836	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	10	Normal	Poor	Co dominant, 3NE	Forest habit	2.4	**2**
837	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	10	Normal	Poor	Co dominant, 5NE	Moderate lean	3	**2**
838	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	10	Normal	Fair	Co dominant, 4E		3	**2**
839	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	16	Normal	Fair	Co dominant, 6N	Forest habit	3.6	**2**
840	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	10	Normal	Fair	Co dominant, 4S	Moderate lean	2.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
841	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	480	12	Normal	Poor	Co dominant, 6	HOLLOWS, included bark	5.8	**2**
842	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	240	9	Normal	Fair	Co dominant, 3W		2.9	**3**
843	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	6	Normal	Poor	Co dominant, 4W	Upper crown failure	3	**2**
844	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	160	4	Normal	Fair	Intermediate 3N		1.9	**3**
845	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	15	Normal	Fair	Co dominant, 2	Bracket fungi lower crown,	4	**2**
846	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	16	Normal	Fair	Co dominant, NE6		6.4	**2**
847	**Coral Tree, *Erythrina laurifolia***	Mature	140	5	Normal	Fair	Co dominant, 2		1.7	**3**
848	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	16	Normal	Fair	Co dominant, 10N		3	**2**
849	**Forest Red Gum,*Eucalyptus teriticornis***	Mature	480	20	Normal	Fair	Co dominant, 5W	HV deadwood	5.8	**2**
850	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Young	110	4	Normal	Fair	Intermediate 2		1.3	**3**
851	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Young	150	6	Normal	Fair	Intermediate 2N		1.8	**3**

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852	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	10	Normal	Fair	Co dominant, 4N		2.4	**2**
853	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	240	10	Normal	Fair	Co dominant, 4E		2.9	**2**
854	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	480	16	Normal	Fair	Co dominant, 6	*Parsonsia spp.* throughout crown	5.8	**2**
855	**Forest Red Gum, *Eucalyptus teriticornis***	Mature	660	27	Normal	Fair	Co dominant, 20NE	HV deadwood, Bracket fungi lower crown	7.9	**2**
856	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	10	low	Poor	Co dominant, 5SE	Moderate lean	4	**2**
857	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	10	low	Poor	Co dominant, 7SE	Moderate lean	3.6	**2**
858	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Dead	250	8					3	**1**
859	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	12	Normal	Fair	Co dominant, 2	Bracket fungi lower crown	3	**2**
860	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	290	6	Normal	Poor	Co dominant, 5S	Moderate lean	3.5	**2**
861	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	170	4	Normal	Poor	Co dominant, 6S	Severe lean	2	**2**
862	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	580	16	Normal	Fair	Co dominant, 4E	*Parsonsia spp. throughout crown*	7	**2**

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863	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	160	6	Normal	Poor	Intermediate 2E	Bracket fungi lower crown	1.9	**2**
864	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200 200	16	Normal	Poor	Intermediate 2E	Moderate lean	3.4	**2**
865	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Dead	150	4				DEAD		**1**
866	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	16	low	Poor	Co dominant, 3E	*Parsonsia spp. throughout crown,* Forest habit	3	**2**
867	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	3	Ab	Poor	Intermediate 2	Stump regrowth	3	**2**
868	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	15	Normal	Fair	Co dominant, 5S	Included bark 4m	6.4	**2**
869	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Young	150	5	Normal	Fair	Intermediate 2		1.8	**3**
870	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	280	17	Normal	Fair	Co dominant, 3S	Forest habit	3.4	**2**
871	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	340	15	Normal	Poor	Intermediate 3W	Hanger, Growth restricted by adjacent trees	4.1	**2**
872	**Forest Red Gum, *Eucalyptus teriticornis***	Mature	660	29	Normal	Fair	Co dominant, 20NE SW	HV deadwood	7.9	**2**
873	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	910	30	Normal	Fair	Co dominant, 20NE	Moderate lean	10.9	**2**

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874	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	260	10	Normal	Poor	Suppressed 6N	Bracket fungi lower crown	3.1	**2**
875	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	350	15	Normal	Poor	Intermediate 10NE	Moderate lean	4.2	**2**
876	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	12	Normal	Poor	Intermediate 10N	Suppressed by 873	3.6	**2**
877	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	6	Normal	Poor	Co dominant, 16W	Severe lean	4	**2**
878	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	230	10	Normal	Fair	Co dominant, 4W		2.8	**3**
879	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	630	15	Normal	Fair	Co dominant, 12N	Moderate lean	7.6	**2**
880	**Blackbutt, *Eucalyptus pilularis***	Mature	200	12	Normal	Poor	Co dominant, 4S		2.4	**2**
881	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	15	Normal	Fair	Co dominant, 4E	Bracket fungi lower crown	4	**2**
882	**Blackbutt, *Eucalyptus pilularis***	Mature	200	8	low	Fair	Co dominant, 4E		2.4	**2**
883	**Silky Oak, *Grevillea robusta***	Mature	330	9	Normal	Fair	Co dominant, 4		4	**3**
884	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	450	16	Normal	Poor	Co dominant, 5W	Growth restricted by adjacent trees	5.4	**2**

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885	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	16	Normal	Poor	Co dominant, 10W	Moderate lean	4	**2**
886	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	260	12	Normal	Poor	Co dominant, 6S	Moderate lean	3.1	**2**
887	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	150	8	Normal	Fair	Intermediate 2		1.8	**3**
888	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	15	Normal	Poor	Co dominant, 6S	Forest habit	3	**2**
889	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	15	Normal	Fair	Co dominant, 3E		3	**2**
890	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	590	17	Normal	Poor	Co dominant, 15	Moderate lean, Co dominant trunks	7.1	**2**
891	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	110 100 100	4	Ab	Poor	Intermediate 3	Stump regrowth	2	**2**
892	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	15	Normal	Poor	Co dominant, 10E	Medium Volume deadwood	6.4	**2**
893	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	360	15	Normal	Poor	Co dominant, 6S	Moderate lean	4.3	**2**
894	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	13	Normal	Fair	Co dominant, 6S		4	**2**
895	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	16	Normal	Fair	Co dominant, 5E	Forest habit	3.6	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
896	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	16	Normal	Fair	Co dominant, 10E	Forest habit	4	**2**
897	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	16	Normal	Poor	Co dominant, 10W	Forest habit, Moderate lean	3.6	**2**
898	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	17	Normal	Poor	Co dominant, 6N	Moderate lean	4	**2**
899	**Swamp Sheoak, *Casuarina glauca***	Young	100	6	Normal	Fair	Intermediate 2		1.2	**3**
900	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	350	16	Normal	Poor	Co dominant, 15N	Moderate lean	4.2	**2**
901	**Red Bloodwood, *Corymbia gummifera***	Over mature	995	15	Normal	Poor	Intermediate 10w	HOLLOWS, Mechanical wound 1-5m	11.9	**2**
902	**Blackbutt, *Eucalyptus pilularis***	Mature	900	27	Normal	Fair	Co dominant, 12N	Medium Volume deadwood, HOLLOWS	10.8	**2**
903	**Red Mahogany, *Eucalyptus resinifera***	Mature	560	26	low	Poor	Co dominant, 15N	New growth dieback	6.7	**2**
904	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	540	17	Normal	Poor	Co dominant, 15NE	Moderate lean	6.5	**2**
905	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	270	17	Normal	Poor	Co dominant, 8N	Bracket fungi Middle crown, Stag headed	3.2	**2**
906	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Dead	300	5					3.6	**1**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
907	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	16	Normal	Fair	Co dominant, 10E		4	**2**
908	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	290	10	Normal	Fair	Co dominant, 3W		3.5	**2**
909	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Dead	330	8					4	**1**
910	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	16	Normal	Poor	Co dominant, 4SE	Forest habit, Medium Volume deadwood	3	**2**
911	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	580	16	Normal	Poor	Co dominant, 15E	Moderate lean	7	**2**
912	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	300	16	Normal	Fair	Co dominant, N5	Moderate lean	3.6	**2**
913	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	4	Normal	Poor	Intermediate .8E	Severe lean	3	**2**
914	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	10	Normal	Poor	Co dominant, 10E	Moderate lean	4	**2**
915	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	160	5	Normal	Poor	Intermediate 5e	Moderate lean	1.9	**2**
916	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	15	Normal	Poor	Co dominant, 4E	Mod, crooked trunk	4	**2**
917	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	15	Normal	Poor	Co dominant, 4S	Forest habit	2.4	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
918	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	430	15	Normal	Poor	Co dominant, 6	Upper crown failure	5.2	**2**
919	**Swamp Mahogany, Eucalyptus robusta**	Mature	330	28	Normal	Fair	Co dominant, 6	Forest habit	4	**2**
920	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	330	19	Normal	Fair	Co dominant, 6SE	Forest habit	4	**2**
921	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	270	16	Normal	Fair	Co dominant, 3W		3.2	**2**
922	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	230	17	Normal	Poor	Co dominant, 2	Forest habit	2.8	**2**
923	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	530	19	Normal	Fair	Co dominant, 6N	Forest habit	6.4	**2**
924	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	5	Normal	Poor	Intermediate 12N	Severe lean	2.4	**2**
925	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	250	6	Normal	Poor	Intermediate 6N	Moderate lean	3	**2**
926	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	310	10	Normal	Fair	Co dominant, 6S		3.7	**2**
927	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Dead	250	10				DEAD	3	**1**
928	**Forest Red Gum, *Eucalyptus teriticornis***	Mature	430	17	Normal	Fair	Co dominant, 8W	Low Volume deadwood	5.2	**3**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
929	**Forest Red Gum,*Eucalyptus teriticornis***	Mature	480	22	Normal	Fair	Co dominant, 12	Medium Volume deadwood	5.8	**3**
930	**Coral Tree, *Erythrina laurifolia***	Mature	230, 150	6	Normal	Fair	co dominantr, 6S	Undesirable species in some situations	3.3	**2**
931	**Silky Oak, Grevillea robusta**	Mature	190, 150	10	Normal	Poor	Co dominant, 4	Co dominant stems at GL, included bark	2.9	**2**
932	**Coral Tree, *Erythrina laurifolia***	Mature	330, 300	7	Normal	Fair	Co dominant, 6	Undesirable species in some situations	5.4	**2**
933	**Coral Tree, *Erythrina laurifolia***	Mature	480	8	Normal	Fair	Co dominant, 7	Undesirable species in some situations	5.8	**2**
934	**Pink Bloodwood, Corymbia intermedia**	Mature	300	12	Normal	Fair	Co dominant, 10SE		3.6	**2**
935	**Blackbutt, *Eucalyptus pilularis***	Mature	360	20	Normal	Poor	Co dominant, 12	Wound 200mm-7m	4.3	**2**
936	**Blackbutt, *Eucalyptus pilularis***	Dead	760	10				HOLLOWS	9.1	**1**
937	**Blackbutt, *Eucalyptus pilularis***	Mature	770	30	Normal	Fair	Co dominant, 10W	New growth dieback, raised root plate	9.2	**2**
938	**Swamp Turpentine *Lophostemon suaveolens***	Mature	320	16	Normal	Fair	Co dominant, 5		3.8	**3**
939	**Red Mahogany, *Eucalyptus resinifera***	Mature	140	9	Ab	Poor	Intermediate 2W		1.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
940	**Blackbutt, *Eucalyptus pilularis***	Mature	660	28	Normal	Fair	co dominant, 8SE	Medium Volume deadwood	7.9	**2**
941	**Blackbutt, *Eucalyptus pilularis***	Mature	860	25	Normal	Poor	Co dominant, 12E	HV deadwood, HHB, Mod. Lean	10.3	**2**
942	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	600	17	Ab	Poor	Co dominant, 8W	Medium Volume deadwood, Moderate lean	7.2	**2**
943	**unknown**	dead	330	16					4	**1**
944	**Swamp Sheoak, *Casuarina glauca***	Mature	140	8	low	Poor	Co dominant, 2W	In spiral of decline	1.7	**2**
945	**Swamp Turpentine *Lophostemon suaveolens***	Mature	240	12	low	Poor	Co dominant, 4S		2.9	**2**
946	**Swamp Turpentine *Lophostemon suaveolens***	Mature	200 200 250	15	Ab	Poor	Co dominant, 3S	1 trunk has upper crown failure, 1 trunk failed at 3m	4.5	**2**
947	**Blackbutt, *Eucalyptus pilularis***	Over mature	1620	30	Normal	Poor	Dominant, 12N	HOLLOWS	19.4	**2**
948	**Blackbutt, *Eucalyptus pilularis***	Over mature	1000	30	Normal	Fair	Dominant 25W	HOLLOWS	12	**2**
949	**Brushbox, *Lophostemon confertus***	Mature	170	7	Normal	Fair	Intermediate 3		2	**2**
950	**Brushbox, *Lophostemon confertus***	Young	140	9	Normal	Fair	Intermediate 3		1.7	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
951	**Brushbox, *Lophostemon confertus***	Mature	250, 200, 160	16	Normal	fair	Co dominant, 5	Group of 3	3.5	**2**
952	**Swamp Sheoak, *Casuarina glauca***	dead	120	9				DEAD		**1**
953	**Pink Bloodwood, Corymbia intermedia**	Mature	140	10	low	Poor	Intermediate 2S		1.7	**2**
954	**Swamp Turpentine *Lophostemon suaveolens***	Mature	150-330	17	Normal	Fair	Co dominant, 12		4.2	**2**
955	**Swamp Turpentine *Lophostemon suaveolens***	Young	130	10	Normal	Poor	Intermediate 2		1.6	**2**
956	**Swamp Turpentine *Lophostemon suaveolens***	Young	150	16	Normal	Poor	Intermediate 3W		1.8	**2**
957	**Pink Bloodwood, Corymbia intermedia**	Young	150	6	Normal	Poor	Intermediate 2S		1.8	**2**
958	**Blackbutt, *Eucalyptus pilularis***	Mature	580	29	Normal	Fair	Co dominant, 12E		7	**3**
959	**Swamp Turpentine *Lophostemon suaveolens***	Mature	200	7	Normal	Fair	Intermediate 3		2.4	**3**
960	**Blackbutt, *Eucalyptus pilularis***	Young	160	6	Ab	Poor	Intermediate 3N		1.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
961	**Red Bloodwood, *Corymbia gummifera***	Mature	330	15	low	Poor	Co dominant, 6W	Moderate lean, HV deadwood	4	**2**
962	**Cheese Tree, *Glochidion ferdinandi***	Mature	170	8	Normal	Fair	Intermediate 4		2	**3**
963	**Blackbutt, *Eucalyptus pilularis***	Mature	330	18	Normal	Poor	Co dominant, 7W	Mod. crooked trunk	4	**2**
964	**Pink Bloodwood, Corymbia intermedia**	Mature	430	15	low	Poor	Co dominant, 5N	Mechanical wound 1m-4m	5.2	**2**
965	**Blackbutt, *Eucalyptus pilularis***	Mature	760	16	Ab	Poor	Co dominant, 8W	Upper crown failure	9.1	**2**
966	**Forest Oak, Allocasuarina torulosa**	Mature	110	4	low	Poor	Suppressed 4NE	Moderate lean	1.3	**2**
967	**Brushbox, *Lophostemon confertus***	Mature	230	15	Normal	Good	Intermediate 4		2.8	**3**
968	**Brushbox, *Lophostemon confertus***	Young	130	7	Normal	Fair	Intermediate 2N		1.6	**3**
969	**Brushbox, *Lophostemon confertus***	Mature	230	10	Normal	Fair	Intermediate 3E	Part of a group	2.8	**3**
970	**Blackbutt, *Eucalyptus pilularis***	Mature	480	20	Normal	Fair	Co dominant 8	Forest habit	5.8	**2**
971	**Blackbutt, *Eucalyptus pilularis***	Over mature	990	29	Normal	Poor	Co dominant, 15W	FOB at GL	11.9	**2**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
972	**Red Bloodwood, *Corymbia gummifera***	Mature	250, 200	12	Normal	Poor	Intermediate 5E	HOLLOWS, wound 600mm-5m	3.8	**2**
973	**Blackbutt, *Eucalyptus pilularis***	Over mature	900	29	Normal	Poor	Co dominant, 15W	HOLLOWS, wound 600mm-5m	10.8	**3**
974	**Swamp Turpentine *Lophostemon suaveolens***	Mature	250	13	low	Fair	Co dominant, 3N	New growth dieback	3	**2**
975	**Swamp Turpentine *Lophostemon suaveolens***	Mature	150	7	Normal	Good	Intermediate 2		1.8	**3**
976	**Forest Oak, *Allocasuarina torulosa***	Mature	160	3	Normal	Poor	Intermediate 3NE	Severe lean	1.9	**2**
977	**Blackbutt, *Eucalyptus pilularis***	Mature	480	25	Normal	Good	Co dominant 4NW	Forest habit	5.8	**2**
978	**Blackbutt, *Eucalyptus pilularis***	Mature	660	26	low	Fair	Co dominant, 4N	Mod. Lean, Med vol. Deadwood	7.9	**2**
979	**Tallowood, *Eucalyptus microcorys***	Mature	200	17	Normal	Fair	Co dominant, 4N	Forest habit	2.4	**2**
980	**Northern Grey Ironbark, *Eucalyptus siderophloia***	Mature	330	22	Normal	Poor	Co dominant, 8W	Co dominant trunks at GL, med. Vol. Deadwood	4	**2**
981	**Red Mahogany, *Eucalyptus resinifera***	Mature	140	16	Normal	Poor	Intermediate 3	Forest habit	1.7	**2**
982	**Lilly Pilly,*Syzigium australe***	Mature	200, 160	8	Normal	Fair	Dominant 4	Co dominant trunks at 1m	3	**4**

Tree No.	Common and Botanical name	Age Class	DBH (mm)	Height (m)	TREE HEALTH Vigour L,N,Ab	TREE HEALTH Condition G,F,P	Crown Class /Spread (m)	Comment	TPZ (m)	ConditionRating 5,4,3,2,1
983	**Pink Bloodwood, *Corymbia intermedia***	Mature	320	16	Normal	Poor	Co dominant, 4	Mech. Wound at 1m, FOB failure lower crown	3.8	**2**
984	**Swamp Sheoak, *Casuarina glauca***	Mature	330	16	Normal	Fair	Co dominant, 3	Forest habit	4	**2**
985	**Swamp Sheoak, *Casuarina glauca***	Dead	160	3					1.9	**1**
986	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	5	Normal	Poor	Intermediate, 6N	Severe lean	2.4	**2**
987	**Swamp Sheoak, *Casuarina glauca***	Mature	110	6	Normal	Poor	Intermediate, 6N	Severe lean	1.3	**2**
988	**Swamp Sheoak, *Casuarina glauca***	Mature	210	20	Normal	Fair	Co dominant, 2	Forest habit	2.5	**2**
989	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200	15	Normal	Fair	Co dominant, 2W	Forest habit	2.4	**2**
990	**Broad-leafed Paperbark, *Melaleuca quinquenervia***	Mature	200x3	9	Normal	Poor	Co dominant, 1	Forest habit	4	**2**

8.0 DISCUSSION

The environment, in which these trees are growing on this northern portion of the site, is similar to the southern portion, as discussed in the original report.

Of the 517 trees assessed:

- 23 had hollows present.
- 12 are old growth trees, some containing hollows.
- 8 mature trees were assessed as having hollows.
- 22 are dead, some containing hollows.
- 392 have a Condition Rating of 2.
- 65 trees had a Condition Rating of 3.
- 2 trees have a Condition Rating of 4 and 5 being most suitable for retention as individual specimens.

Many of the trees with a rating of 3 will suitable for retention if retained in groups.

The pie charts below summarise the data collected in the initial report and this report, part 2. All the subject trees are then summarised in the final chart.

Please note some trees that are dead, old growth and mature also contain hollows.

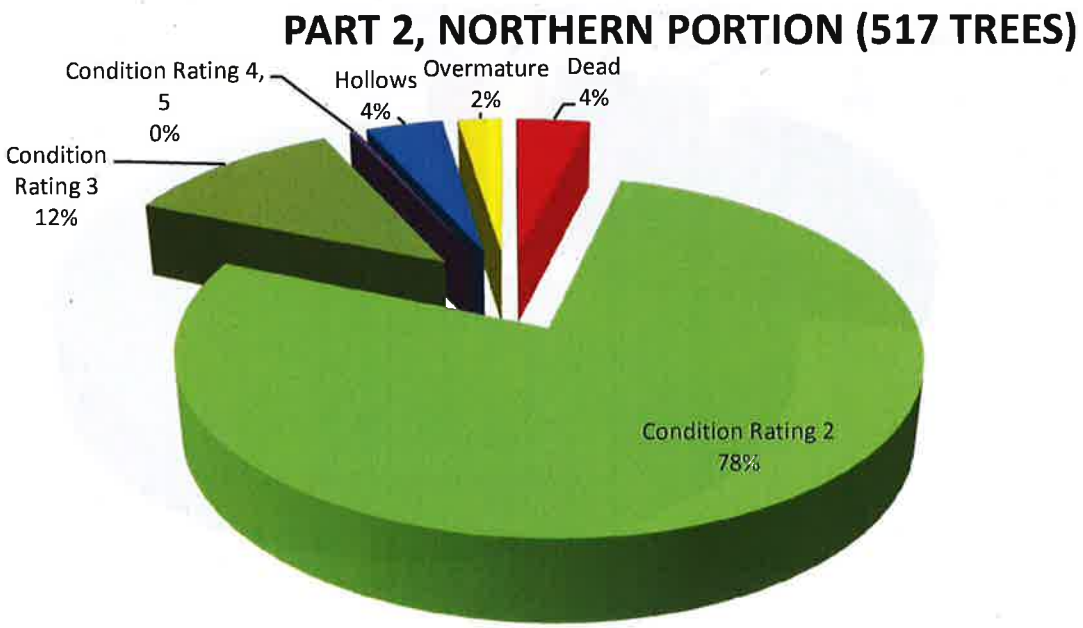

Figure 5 Summary of trees, this report

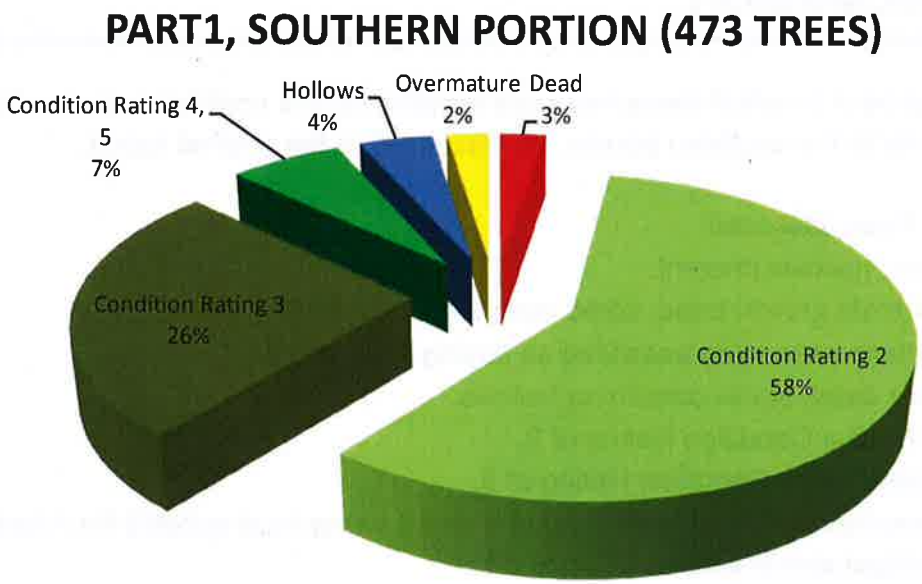

Figure 6 Summary of trees, initial report

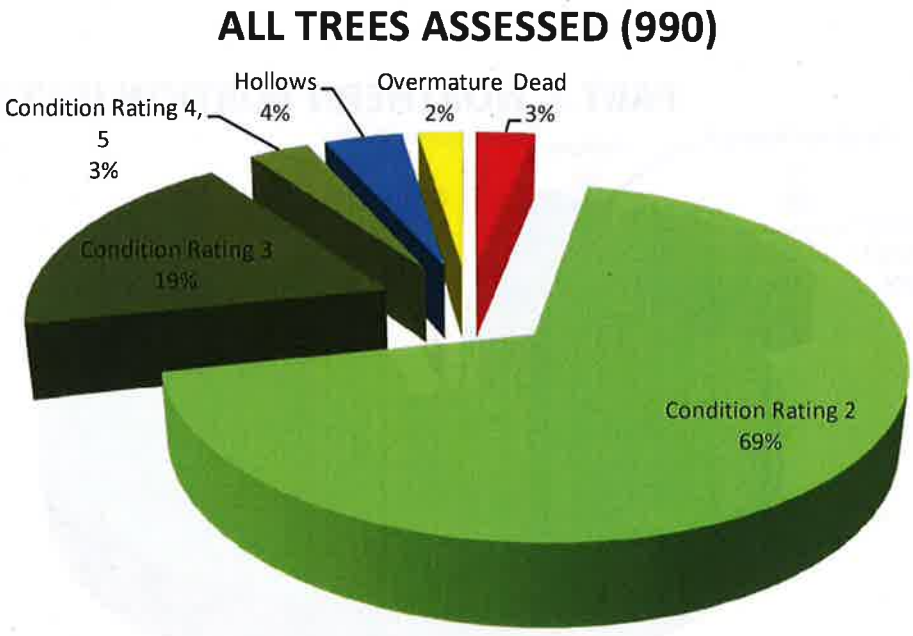

Figure 7 Summary of trees in both reports

This portion of the site contains a number of trees that should be considered for retention as groups in the final landscape plan for the development.

These will need to be identified by a consulting arborist prior to drafting the landscape plan.

Nigel Smith Dip Hort, AQF Dip Arb MISAAC, MISA

ISA Certified Arborist AU-0279A

24 February 2010

9.0 ASSUMPTIONS AND LIMITATIONS

1. Any legal description provided to the consultant /appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

3. The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

4. Loss or alteration of any of this report invalidates the entire report.

5. Possession of this report or a copy thereof does not imply right of publication or use for any purposes by any other than the person to whom is addressed, without the prior expressed written or verbal consent on the consultant/appraiser.

6. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of the consultant/appraiser - particularly as to value conclusions, identity of the consultant/appraiser, or any reference to any professional society of institute or to any initialled designation conferred upon the consultant/appraiser as stated in his qualification.

7. This report and values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraisers/ fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event nor upon any finding to be reported.

8. Sketches diagrams, graphs, and photograph in this report, being intended as visual aides, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

9. Unless expressed otherwise: (1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

10.0 BIBLIOGRAPHY

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11.0 APPENDICES

APPENDIX 1 DEFINITIONS

APPENDIX 2 BLAIR LANSKY TREE SURVEY

APPENDIX 1 DEFINITIONS

# of Trunks: Considered to be multi- stemmed if they originate below .5m.
Lean: Corrected lean indicates tree has produced reaction wood to compensate for the lean. The apex of the tree has returned to vertical. Reaction wood formed on the lower or upper sides of a stem to counteract the stem. In broadleaves this forms on the upper side, tension wood and in conifers on the lower side, compression wood. The tolerance of a leaning tree is site and target specific.
Slight lean: 0-15 degrees off vertical.
Moderate Lean: 15-30 degrees off vertical.
Severe Lean: 30-45 degrees off vertical.
Critical lean: >45 degrees off vertical.

Codominant Stems: Trunks or stems equal in size. Also associated with 1st and 2nd order limbs in the crown.
Pest/Disease or Mechanical Damage: Borers, leaf eaters, Fungi, cankers etc. Or line trimmer, ,heavy machinery, nails, vehicle damage on surface roots are all examples.

New Growth Dieback: Progressive death of lower order branches from the apical growing points downwards. It can be caused by many factors including fungi, bacteria, drought, poor drainage and aeration, chemical toxicities or insect damage.

Pests, Diseases or Mechanical Damage: Signs and symptoms of pathogens or insect activity whether detrimental or beneficial. Damage caused by man or machinery often on surface roots and the lower stem area.

TREE DEFECTS
Root Condition: An indication of root restriction, damage, movement and other factors impacting first order and lower order roots.
Branch Tear: Often observed due to poor pruning technique.
Weather Event Damage: Damage incurred by previous storm.

Defects
Decay: An area of wood that is under going decomposition. (Decomposition of organic tissue by fungi or bacteria).
decay. This however is not always the case. Resistograph® testing can confirm the presence of decay.
Borers/Termites: Longicorn, coccid moth larvae etc. White Ants.
Nesting hole/ Bees: These can compromise structural integrity of a tree.

Bracket Fungi: The fruiting bodies of these fungi often indicate decay is present in their vicinity.
Heavy horizontal limbs: Limbs growing close to parallel to the ground, often having excessive end weight. Can be prone to failure.
Included Bark: Bark that becomes embedded in a crotch (union) between branch and trunk or between co dominant stems; causes a weak structure

Hanging limbs: Often the result of mechanical damage or a weather event.
Wounds: Any mechanical damage, limb failure scars or bark damage
Deadwood: Any dead limbs in the crown. Considered to be of significance if diameter exceeds 10mm or is prolific in the crown.
Low volume deadwood- <5 branches
Medium volume deadwood- 5 – 10 dead branches
High volume deadwood- > 10 dead branches

APPENDIX 2 BLAIR LANSKY TREE SURVEY

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Issue	Amendment	Date
A	Client Issue	27-11-09
B	Alternative Concept Issue	12-04-10

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
site plan

Scale	Drawn	Date
1:1000 @A1	BD	April 2010

Drawing No **598.CP02** Issue B

Appendix E

Biobanking Assessment

CLIENTS | PEOPLE | PERFORMANCE

John Hannaford

Solitary Islands Retreat

BioBanking Assessment

July 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

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Appendices

1. Introduction

1.1 Overview

GHD Pty Ltd (GHD) has been engaged by John Hannaford to provide a BioBanking Assessment for a proposed Seniors Living Development (the 'proposed activity') referred to as the Solitary Islands Retreat located at Lot 1 DP 1128964, Mullaway Drive (See Figure 1). The purpose of the assessment is to determine the biobanking credit value of the extant ecosystems and species of the site. This report is to be submitted with the Development Application (DA) to Coffs Harbour City Council (CHCC).

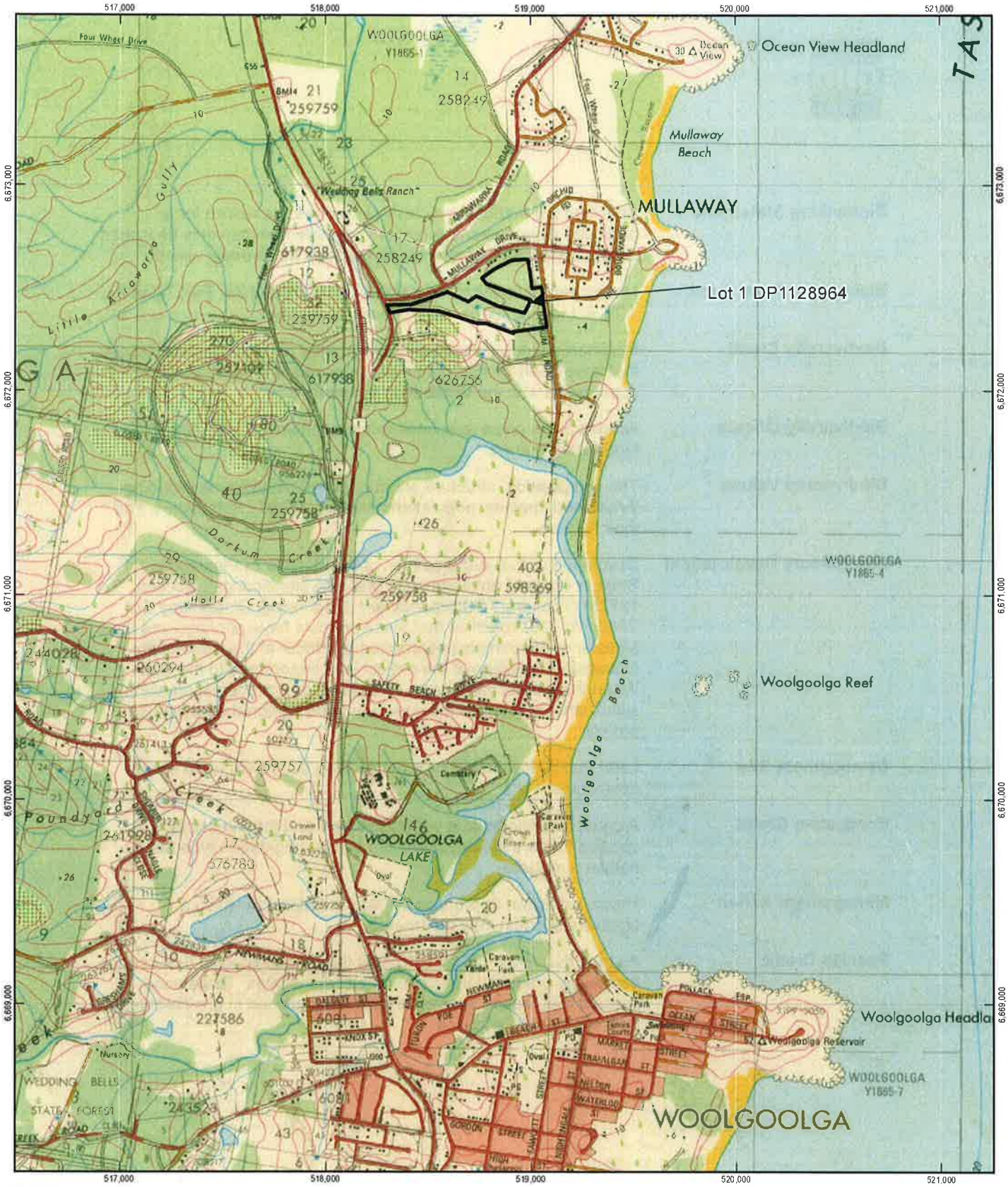
This report provides an overview of the biobanking scheme, details on the biobanking assessment methodology, the results of the site assessment and the calculation of biodiversity credits required to offset impacts of the proposed activity.

The GHD assessment has involved the following main stages:

- Preliminary assessment. This involved a review of prior vegetation mapping and a preliminary site investigation conducted by GHD ecologists in June 2010.
- Draft-run of the Biobanking Credit Calculator based on the preliminary assessment. performed by Ben Harrington (assessor accreditation number 0073) in June 2010.
- Modification of subdivision design, including the modification of Asset Protection Zones (APZ's).
- Detailed site survey, including refining vegetation mapping, collection of additional site value data and targeted surveys for threatened plants conducted by GHD ecologists in November 2010 and January 2011.
- Final-run of the Biobanking Credit Calculator v1.2 based on refined vegetation mapping and data collected during detailed site survey. Assessment performed by Ben Harrington (assessor accreditation number 0073). Additional assessment requirements generated by running the Biobanking Credit Calculator included Expert Reports and a Red Flag Variation Report. Glossary of Terms.

Biobank Site	Land that is designated by a biobanking agreement to be a biobank site.
BioBanking Agreement	An agreement entered into between the landowner and the Minister under Part 7A of the TSC Act for establishing a biobanking site.
BioBanking Assessment Methodology (the methodology)	The rules of the BioBanking Scheme established under the TSC Act that determine credits created, credits required and the circumstances that improve or maintain biodiversity values.
BioBanking Scheme (BioBanking; the scheme)	The biodiversity banking and offsets scheme established under Part 7A of the TSC Act.

Biobanking Statement	Specifies the number and class of credits to be retired for a particular development. A biobanking statement can only be issued in circumstances that improve or maintain biodiversity values.
Biobanking Trust Fund	Means the Biobanking Trust Fund established under Part 7A of the TSC Act to hold funds from the sale of credits.
Biodiversity Credit	Registered biodiversity credits are created for management actions that have been carried out or are proposed to be carried out, in accordance with the biobanking agreement.
Biodiversity Offsets	Actions put in place to counterbalance (offset) an impact on biodiversity values.
Biodiversity Values	The composition, structure and function of ecosystems including threatened species, populations and ecological communities, and their habitats.
Compulsory Development	Development that in the opinion of the Minister of Planning is "of State or regional environmental planning significance". Section 127ZM (7) of the *TSC Amendment (Biodiversity BioBanking Act 2006, No 125*) specifies that these projects have priorities and the Minister of Planning is not required to concur to the issue of the biobanking statement if the project is of importance to the State. When the project has a state or regional environmental planning significance it satisfies the condition to be declared as a part 3A project.
Development Site	Land that is designated by a BioBanking statement to be a development site.
Ecosystem Credit	A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
Management Action	Means an action or proposed action in respect of which a biodiversity credit may be created.
Species Credit	A credit that relates to an individual threatened species that cannot be reliably predicted based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database.



LEGEND

The Site

1:25,000 (at A4)

0 125 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

GHD

CLIENTS | PEOPLE | PERFORMANCE

Consulting and Aged Care Services
Mullaway Seniors Living Development Stage 1 BioBanking

Job Number 22-14828
Revision A
Date 01 Aug 2011

Site Location

Figure 1

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

G:\22\14828\GIS\Maps\22_14828_Z001_Sitelocation.mxd

Data Source: NSW Government: Woolgoolga 9537-4-N Topographic 1:25,000 Second Edition - 1985; NSW Government, Dept Lands: Cadastre - 2010. Created by: sdwoodger, cwilson

2. BioBanking

2.1 Overview of the BioBanking Scheme

The Biodiversity Banking and Offsets Scheme (BioBanking) was established by the New South Wales Department of Environment, Climate Change and Water (DECCW) (now the Office of Environment and Heritage (OEH)) as a method to address the loss of biodiversity and threatened species. The scheme attempts to create a market framework for the conservation of biodiversity values and the offsetting of development impacts. The scheme is currently voluntary.

To establish credits for a biobanking site a landholder must commit to enhancing and protecting biodiversity values over time. A BioBanking Agreement is entered into and registered on the title of the land, binding both the current and future landholders to maintaining biodiversity through the completion of a range of management actions on the site. Each biobank site may generate a number of different ecosystem credits and any of these credits may be sold separately or as a group.

Developers can also apply for a BioBanking Statement that specifies the number and class of credits that must be acquired. They can then use them to counterbalance or offset the impacts on biodiversity values that are likely to occur as a result of development. The scheme provides an alternative path to the threatened species (assessment of significance) process required under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The BioBanking Assessment Methodology sets out how biodiversity values will be assessed, establishes rules for calculating the number and class of credits, and determines the trading rules that will apply. The BioBanking Trust Fund ensures that landowners have the money needed to carry out the management actions required each year and provides a financial incentive to landowners to carry out those actions. The scheme is administered by OEH and ensures accountability and compliance through legislation, regular reporting requirements and financial measures.

Overall, it is anticipated the scheme will conserve areas with high biodiversity values by providing incentives for conservation and disincentives for loss.

2.2 Purposes of the BioBanking Scheme

BioBanking aims to encourage and secure investment in conservation and to provide financial incentives for the protection of biodiversity values by providing:

- A measurable, consistent, transparent, and robust framework for the assessment and management of biodiversity offsets.
- New opportunities for conservation on private land.
- Permanent security and management for biodiversity offsets.
- A secure mechanism for investment in biodiversity conservation.

2.3 Legislative Context

The BioBanking Scheme is established under Part 7A of the NSW *Threatened Species Conservation Act 1995* (TSC Act), which was enabled by the *Threatened Species Conservation Amendment (Biodiversity Banking) Bill 2006.* The *Threatened Species Conservation (Biodiversity Banking) Regulation 2008* provides additional rules for specific aspects of the scheme that are important for its operation.

Development defined under Part 4 of the EP&A Act may voluntarily engage in the BioBanking Scheme and in so doing bypass Section 5A of the EP&A Act (i.e. seven part test). Through the retirement of sufficient ecosystem and/or species credits, as defined by an approved BioBanking Statement, the development is deemed to have adequately resolved the impacts on biodiversity.

If a Biobanking Statement is refused, except in the case of compulsory development (as per Section 127ZM (7) of the TSC Amendment (*Biodiversity BioBanking Act 2006, No 125*)), developers will still be able to apply for development consent, and the normal threatened species assessment provisions will apply. There is provision for a merits appeal against the refusal of the Director General to issue a biobanking statement or the conditions of a BioBanking Statement, except in the case of compulsory development.

2.4 Staff Qualifications

This report, including all BioBanking credit calculations, was prepared by Daniel Williams, Ben Harrington and Mark Aitkens. The assessment was peer reviewed by Daniel Williams. Staff qualifications are presented in Table 1.

Table 1 GHD Ecology Personnel and Qualifications

Name	Position / Project Role	Qualifications	Relevant Experience
Ben Harrington	Ecologist / desktop assessment, credit calculations and reporting	BSc., MSc (Physical Geography) BioBanking Assessor Accreditation (0073)*	7+ years
Dan Williams	Principal Ecologist / peer review and planning	B. App. Sc. BioBanking Assessor Accreditation* (0082)*	13+ years
Mark Aitkens	Senior Ecologist / field surveys and draft report	BSc (Env Biology)	14+ years

* Refer to DECCW (2010c) list of accredited assessors.

3. Site Description

3.1 Background

The site comprises Lot 1 DP 1128964, Mullaway Drive, Mullaway, covering 15.5 ha of land to the north of Coffs Harbour NSW within the Coffs Harbour City Local Government Area (LGA). Mullaway Drive adjoins a portion of the northern boundary of the site and Darkum Road forms the eastern boundary.

The site is zoned Rural 1A Agriculture and contains native vegetation including the endangered ecological community (EEC) known as Subtropical Coastal Floodplain Forest (STCFF) of the New South Wales North Coast Bioregion listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). The vegetation type *Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast* (NR 161) is considered representative of this community for the purpose of this BioBanking assessment.

The western portion of Lot 1 is the subject of an existing development consent for a separate holiday cabin development and has not been considered further in this assessment.

3.1.1 Climate

The site has a subtropical, maritime climate. Based on data from the Coffs Harbour MO weather station the site has a mean annual rainfall of 1676 mm, mean daily maximum temperature of 23 degrees and mean daily minimum temperature of 14 degrees Celsius (BOM, 2010).

3.1.2 Surrounding Land Uses

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential properties and areas of recreation (i.e. golf course).

3.1.3 Hydrology

Site topography is generally flat (maximum grade 5-10%) with the majority of the area sloping east south east. Runoff from the site is via overland flow into two broad shallow east flowing open depressions of ephemeral character. A small dam constructed upslope of the site to the west, within the adjoining rural lands, impedes the majority of water movement through the site after rainfall events. Water leaves the site in an easterly direction where it flows through Darkum Road into swamp sclerophyll forests immediately south of the Mullaway Beach Van and Caravan Park prior to draining directly onto the beach immediately south of Mullaway Headland.

3.1.4 Landscape Context

The site is contained within the 'Brooms Head - Kempsey Coastal Ramp' Mitchell Landscape (DECC, 2008). This landscape includes hills and low ranges of the coastal fall on lower Devonian greywacke, slate phyllite and quartzite and Permian Phyllite and schistose sandstone at elevations of 50 to 450m with local relief of up to 300m (DECC, 2008). Soils consist of thin, stony gradational loam and sandy loam on the slopes grading to yellow-brown texture-contrast soils on lower slopes and in valleys (DECC, 2008).

3.1.5 Soil Landscapes

According to the Soil Landscapes of the Coffs Harbour 1:100,000 Map Sheet, the majority of the site is part of the Megan soil landscape, which consists of moderately deep to deep, well drained, structured red earths. These soils are typically strongly acidic and highly erodible with low subsoil fertility on the majority of the site.

3.1.6 Vegetation Description

Detailed surveys conducted as part of this assessment confirmed the identification and distribution of two vegetation communities (see Table 2). This identification is consistent with the nomenclature used by the DECCW Biobanking Vegetation Types Database for the Northern Rivers' Catchment Management Authority (CMA) region; the 'Coffs Coast & Escarpment' CMA sub-region; and the 'Brooms Head - Kempsey Coastal Ramp' Mitchell Landscape (DECC, 2008).

Table 2 Vegetation Type and Condition

Vegetation Type	ID	Conservation Significance	Description	Condition
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	NR119	Not listed	As per detailed description below.	Moderate
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	NR161	EEC	As per detailed description below.	Moderate

Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]

This vegetation type is primarily characterised by a tree canopy dominated by Blackbutt (*Eucalyptus pilularis*). The midstory is characterised by Red Ash (*Alphitonia excelsa*), Tuckeroo (*Cupaniopsis arachnoides*), Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*) although no specific species dominates. Species that characterise the groundcover stratum include Soft Bracken (*Calochlaena dubia*), Native Yam (*Dioscorea transversa*), *Oplismenus aemulus*, Water Vine (*Parsonsia straminea*), Native Rasberry (*Rubus parviflorus*), Indian Weed (*Sigesbeckia orientalis*), Smilax (*Smilax glyciphylla*), Snake Vine (*Stephania japonica*) and Native Violet (*Viola hederacea*). Less disturbed areas with an established understorey comprised Snake Vine (*Echinostephia aculeata*) and Trailing Guinea Flower (*Hibbertia dentata*). Weeds commonly observed within this community include Goatweed

(*Ageratum conyzoides* subsp. *conyzoides*[1]), Asparagus (*Asparagus aethiopicus**), *Baccharis halimifolia**, Moth Plant (*Gomphocarpus fruticosus**), Mickey Mouse Plant (*Ochna serrulata**), Paspalum (*Paspalum* sp*), Passiflora (*Passiflora suberosa**), Passiflora (*Passiflora subpeltata**) and Fireweed (*Senecio madagascariensis**).

On midslopes this vegetation type includes the tree canopy species Pink Bloodwood (*Corymbia intermedia*) and Grey Ironbark (*Eucalyptus siderophloia*). Infrequent occurrences of Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon confertus*) also occur particularly in moist ecotones with adjoining downslope vegetation. Moist upper slopes generally with south facing aspect where characterised by Wiregrass (*Aristida vagans*), *Brunoneilia australis*, *Goodenia hederacea*, *Hibbertia vestita*, *Hybanthus stellarioides*, *Lindsaea linearis*, *Morinda jasminoides*, *Patersonia sericea* and *Solenogyne bellioides*. Drier upper slopes and crests were characterised by Red-stemmed Wattle (*Acacia myrtifolia*), Poison Rock Fern (*Chielanthes sieberi*), Plume Grass (*Dichelacne micrantha*), Glycine (*Glycine tabacina*), Hardenbergia (*Hardebergia violaceae*), Dogwood (*Ozothamnus diosmifolia*), and Geebung (*Persoonia stradbrokensis*). Weed species included Smooth Catsear (*Hypochaeris glabra**), Catsear (*Hypochaeris radicata**) and *Lilium formosanum**.

Sheltered upper slopes where characterised by the canopy species Tallowwood (*Eucalyptus microcorys*), Brush Box (*Lophostemon confertus*) and Red Mahogany (*Eucalyptus resignifera*) in addition to Blackbutt and Pink Bloodwood. Forest Sheoak (*Allocasuarina torulosa*), Hopbush (*Dodonaea triquetra*), Native Olive (*Notelaea ovata*), Coffee Bush (*Breynia oblongifolia*) typically characterised the midstory. Groundcovers where typically characterised by an assemblage consisting of Apple Dumplings (*Billardiera scandens*), Centella (*Centella asiatica*), Barbed Wiregrass (*Cymbopogon refractus*), *Dianella caerulea*, Kidney Weed (*Dichondra repens*), *Dipodium variegatum*, Hedgehog Grass (*Echinopogon ovatus*), Broad-leaved Wiry Panic (*Entolasia marginata*), Wiry Panic (*Entolasia stricta*), *Geitonoplesium cymosum*, Glycine (*Glycine microphylla*), *Gonocarpus humilis*, Guinea Flower (*Hibbertia aspera*), Blady Grass (*Imperata cylindrica*), *Kennedia rubicundra*, Sword Sedge (*Lepidosperma laterale*), Matt Grass (*Lomandra longfolia*), Many-flowered matt Grass (*Lomandra multiflora*), Weeping Grass (*Microlaena stipoides*), Sour Sob (*Oxalis exilis*) and Forest Panic (*Panicum similie*). Weeds typically observed in these parts of the site include Cobblers Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Lantana (*Lantana camara**) and *Polygala paniculata**.

Occurring on the edges of ephemeral open drainages are the species Long-leaf Wattle (*Acacia longissima*), *Homalanthus populifolius*, Pale Grass Lilly (*Caesia parviflora* var *parviflora*), Small St Johns Wort (*Hypericum gramineum*), *Persoonia stradbrokensis*, Thyme Spurge (*Phyllanthus hirtellus*) and Hairy Bush Pea (*Pultenaea villosa*). Bangalay Palm (*Archontophoenix cunninghamiana*) was observed within the drainage line with species such as *Hakea eriantha*, Water Couch (*Paspalum distichium*) and various sedge species.

Transitional zones between the drier parts of the vegetation community and swamp sclerophyll forests include species such as *Polymeria calycina*, Elderberry Panx (Polyscias sambucifolia), Whiteroot (*Pratia purpurascens*), Bracken (*Pteridium esculentum*), Notched Bush Pea (Pultenaea retusa), Senna (*Senna pendula**), Gorse Bitter Pea (*Daviesia ulicifolia*) and Nodding Fringe Sedge (*Fimbistylis nutans*) and Kangaroo Grass (*Themeda australis*).

[1] * Denotes weed species

Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]

The tree canopy is mostly dominated by Broad-leaved paperbark (*Melaleuca quinquenvervia*). Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suaveolens*) form associate canopy species in varying densities, with their occurrence potentially affected by past land clearing events. Pink Bloodwood and Grey Ironbark also occur at the finges of this vegetation type where it grades into the upslope Blackbutt Tallowwood vegetation type.

Shrub species such as Cheese Tree and Wild Tobacco (*Solanum mauritianum**) occurred infrequently and were associated with the more disturbed parts of this community. Crofton Weed (*Ageratina adenophora**) was a commonly observed weed species within these parts of the site.

The understory is predominantly herbaceous consisting of sedges and herbs although a dense coverage of Paspalum (*Paspalum wettsteinei**) was commonly observed. Sedge species observed include *Lepidosperma quadrangulata*, *Schoenus apogon*, *Cyperus polystachyos*, *Fimbristylis dichotoma*, Spike Rush (*Eleocharis phillipensis*) and Giant Parramatta Grass (*Sporobolus fertilis**). Sedges restricted to the wetter areas include Twig Rush (*Baumea articulata*) and *Gahnia seiberiana* although these species were highly restricted and did not form dense thickets otherwise representative of semi-permanent to permanently wet areas.

Occurring at the base of more mature Forest Red Gum and Pink Bloodwood is a standard suite of herbs species including Native Violet (*Viola hederacea*), Pennywort (*Hydrocotyle pedunculata*) and *Cyperus gunnii*. Devils Twine (*Cassytha glabrella*) and Glycine (*Glycine clandestina*) also occur in close proximity to Eucalypt trees although their abundance is not notably high.

3.2 Proposed Land Use

The proposed activity that is the subject of this assessment consists of a Seniors Living Development on approximately 4.4 ha of Lot 1 DP 1128964. A summary of the facilities are provided below:

- 34 self care villas.
- Proposed club room.
- Associated facilities including car parking, footpaths, day beds and access roads.

4. BioBanking Assessment Methodology

Under the BioBanking Assessment Methodology (the methodology), biodiversity values are assessed and measured according to the two types of biodiversity credits that may be created or required.

1. Ecosystem credits are created or required for all impacts on biodiversity values. These credits automatically account for threatened species that can be reliably predicted by habitat surrogates (as determined by the methodology and assessment of vegetation type, condition etc).
2. Species credits are created or required for all impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogate (as per DECCW's Threatened Species Profile Database).

4.1 Assessment of Ecosystem Credits

4.1.1 Literature Review and Database Searches

A review of relevant available literature, background information and searches of databases was undertaken for threatened species, populations and ecological communities (including endangered ecological communities) recorded within the locality. The reviews and searches included:

- NSW Government's BioNet database of records from the collections of the Australian Museum, DECCW and NSW Department of Primary Industries (DPI) (including NSW Fisheries).
- Department of Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool for National Environmental Significance (NES) Matters listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- CHCC (2006) Amended 2006 vegetation mapping GIS shape files and the accompanying report, Fisher et. al. (1996) The Vegetation of the Coffs Harbour City Council LGA.
- Connell Wagner (2007) Coffs Harbour Highway Planning: Sapphire to Woolgoolga section. Report prepared for the NSW RTA, Grafton.
- DECC (2008a) NSW (Mitchell) Landscapes Version 3 (2008).
- DECC (2008b) Descriptions for NSW (Mitchell) Landscapes.
- Aerial photographs and satellite imagery of the study area.
- DECCW (2010a) Vegetation Types Database.
- DECCW (2010b) Threatened Species Profile Database.
- Existing ecological reports relating to the site.
  - GHD (2009) Proposed Seniors Living Development at Mullaway Preliminary Environmental Assessment.

- Idyll Spaces Environmental Consultants (2009) draft flora assessment of Proposed seniors living development Lot 1 DP 1128964 Darkum Road, Mullaway.
- Kendall and Kendall Ecological Services (2009) Draft Fauna Assessment of the Proposed Development of Lot 1 DP1128964 Darkum Road Mullaway.

4.1.2 Geographical Information System (GIS)

Prior to the field assessment, GIS mapping identified the following:

- The site boundary.
- Delineation of vegetation types across the site in accordance with the classifications from existing ecological reports relating to the site (detailed above in 4.1.1). The vegetation types are used as surrogates for biodiversity values.
- Patch size (including low condition vegetation). This refers to the area of moderate to good and low condition native vegetation of which the site is a part, which is less than 100 m from the next area of native vegetation. Patch size is utilised to provide landscape context to the site.
- The number of transects and plots required to be assessed within each vegetation type. This is calculated by the area of the vegetation zone, in accordance with minimum requirements set by the methodology.
- Assessment circles of 100 ha and 1,000 ha surrounding the site, in which native vegetation cover and condition is assessed to calculate credit profiles and landscape value scores.

Figure 2**Error! Reference source not found.** of Appendix C identifies the 100 ha and 1000 ha assessment circles used to facilitate the landscape score calculation.

4.1.3 Measurement and Assessment of Site

The initial desktop mapping was ground-truthed in the field and necessary adjustments to mapping made. Data was also collected regarding habitat features and to assist with determination of landscape values.

4.1.4 Vegetation Condition for Each Vegetation Zone

Plot and transect surveys of the site's vegetation type and condition were conducted in accordance with the procedures provided in the methodology and Credit Calculator Operational Manual (2008). The site value was determined by assessing ten site condition attributes against benchmark values in accordance with the methodology. Benchmarks are quantitative measures of the range of variability in condition in vegetation with relatively little evidence of alteration, disturbance or modification by humans since European settlement.

Biodiversity values were assessed and measured according to the type of biodiversity credits would be required for the development site; that is ecosystem credits and species credits.

4.2 Assessment and Measurement of Threatened Species

4.2.1 Survey Effort

Flora and fauna surveys of the site have been undertaken on the site by Kendall and Kendall (2010), Idyll Spaces Environmental Consultants (2009) and GHD in 2010 and 2011. The survey months include November, December, January and February. A total of 10 person days of flora survey effort and eight person days of fauna survey effort were undertaken on the site.

The survey effort and dates for the previous and current studies are listed in Table 3 below:

Table 3 Flora and Fauna Survey Effort

Report	Survey Effort	Dates	Survey Methods
Idyll Spaces Environmental Consultants (2009)	10 hrs	14 December to 15 December 2009	Flora transects and quadrats.
GHD (2010)	60 hrs	22 November to 24 November 2010	Flora quadrats and transects (BioBanking Assessment Methodology)
GHD (2011)	15 hrs	10 February 2011	Flora quadrats and transects (BioBanking Assessment Methodology)
Kendall and Kendall Ecological Services (2010)	~ 50 hrs	14 December to 20 December 2009 27 January 2010	Call Playback; Elliott B arboreal; Spotlighting; Diurnal searches and observations; Hair Tubes; Anabat and Harp Trap; Opportunistic observations; Stage watches; Cage traps.

4.2.2 Predicted Ecosystem Species

The BioBanking credit calculator includes those threatened species predicted to occur on site when determining ecosystem credits. These species are included in the assessment based on such things as:

- Known records in the locality.
- The vegetation types present on site.
- Habitat features of the site and surrounding locality.

The credit calculator included the threatened species shown in Table 4, below when determining the ecosystem credit requirements.

Table 4 Predicted Threatened Species

Scientific name	Common Name	BIO_TFACTOR
Bush-hen	*Amaurornis olivaceus*	0.9
Bush Stone-curlew	*Burhinus grallarius*	0.4
White-crowned Snake	*Cacophis harriettae*	0.68
Glossy Black-cockatoo	*Calyptorhynchus lathami*	0.55
Eastern Pygmy-possum	*Cercartetus nanus*	0.5
Hoary Wattled Bat	*Chalinolobus nigrogriseus*	0.48
Brown Treecreeper (eastern subspecies)	*Climacterls picumnus victoriae*	0.5
Brown Treecreeper (eastern subspecies)	*'Climacteris picumnus victoriae*	0.5
Barred Cuckoo-shrike	*Coracina lineata*	0.68
Spotted-tailed Quoll	*Dasyurus maculatus*	0.35
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	0.45
Little Lorikeet	*Glossopsitta pusilla*	0.58
Stephens' Banded Snake	*Hoplocephalus stephensii*	0.3
Swift Parrot	*Lathamus discolor*	0.75
Little Bentwing-bat	*Miniopterus australis*	0.75
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	0.75
Eastern Freetail-bat	*Mormopterus norfolkensis*	0.45
Large-footed Myotis	*Myotis macropus (formally Myotis adversus)*	0.4
Barking Owl	*Ninox connivens*	0.33
Powerful Owl	*Ninox strenua*	0.33
Yellow-bellied Glider	*Petaurus australis*	0.43
Squirrel Glider	*Petaurus norfolcensis*	0.45
Scarlet Robin	*Petroica boodang*	0.6
Flame Robin	*Petroica phoenicea*	0.6
Koala	*Phascolarctos cinereus*	0.83

Scientific name	Common Name	BIO_TFACTOR
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	0.75
Long-nosed Potoroo	*Potorous tridactylus*	0.75
Black Flying-fox	*Pteropus alecto*	0.93
Grey-headed Flying-fox	*Pteropus poliocephalus*	0.93
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	0.45
Greater Broad-nosed Bat	*Scoteanax rueppellii*	0.45
Diamond Firetail	*Stagonopleura guttata*	0.75
Masked Owl	*Tyto novaehollandiae*	0.33
Eastern Cave Bat	*Vespadelus troughtoni*	0.75
Regent Honeyeater	*Xanthomyza phrygia*	0.75
Hairy Jointgrass	*Arthraxon hispidus*	Adequate (Nov; Dec; Jan, Feb)

4.2.3 Targeted Threatened Fauna Species Surveys

The BioBanking credit calculator also identifies the potential presence of non-ecosystem predicted threatened species on the basis of specific habitat qualifiers associated with the site. These species are identified in Table 5.

Table 5 Non-ecosystem Type Predicted Species

Scientific name	Common Name	Survey Adequacy
Rufous Bettong	*Aepyprymnus rufescens*	Inadequate (not targeted in prior surveys)
Rusty Plum	*Amorphospermum whitei*	Adequate (Nov; Dec; Jan, Feb)
Hairy Jointgrass	*Arthraxon hispidus*	Adequate (Nov; Dec; Jan, Feb)
Trailing Woodruff	*Asperula asthenes*	Adequate (Nov; Dec; Jan, Feb)
Square-stemmed Spike-rush	*Eleocharis tetraquetra*	Adequate (Nov; Dec; Jan, Feb)
Slender Screw Fern	*Lindsaea incisa*	Adequate (Nov; Dec; Jan, Feb)
Green-thighed Frog	*Litoria brevipalmata*	Inadequate (prior surveys inadequate)
Square-tailed Kite	*Lophoictinia isura*	Inadequate (prior surveys inconclusive)
Milky Silkpod	*Parsonsia dorrigoensis*	Adequate (Nov; Dec; Jan, Feb)
Common Planigale	*Planigale maculata*	Inadequate (prior surveys inadequate)
Scant Pomaderris	*Pomaderris queenslandica*	Adequate (Nov; Dec; Jan, Feb)
Eastern Chestnut Mouse	*Pseudomys gracilicaudatus*	Inadequate (prior surveys inadequate)
Black Flying-fox	*Pteropus alecto*	No longer a listed a threatened species
Grey-headed Flying-fox (Breeding Habitat)	*Pteropus poliocephalus*	Adequate (Nov; Dec; Jan, Feb)

Five species were identified as having inadequate survey to determine their status within the site. For the purposes of this assessment one of these species has been assumed to occur within the site (i.e. Square-tailed Kite). A 3.5 ha polygon has been assigned to this species.

The remaining four species require an expert report to discuss their status within the site, these being the:

- Rufous Bettong (*Aepyprmnus rufescens*)
- Green-thighed Frog (*Litoria brevipalmata*)
- Common Planigale (*Planigale maculata*)
- Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)

The expert reports for these species are provided in Appendix D. (Note: the version of the BioBanking report submitted to council with the development application will not include the expert reports until they have been reviewed and approved by the OEH BioBanking Unit).

4.3 Vegetation Types

Two vegetation types were confirmed as occurring on site, as shown in Figure 3**Error! Reference source not found.** of Appendix C, these being:

- Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood) NR119.
- Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box) NR161.

4.4 Vegetation Zones

Table 6 shows the vegetation zones used to partition the site for the biobanking assessment.

Table 6 Vegetation Zones

Vegetation Zones	Area (hectares)	Number of Plots	EEC Present
Blackbutt – Tallowwood (NR119)	3.5	2	No
Forest Red Gum – Swamp Box (NR161)	0.5	1	Yes
Forest Red Gum – Swamp Box (NR161)	0.3	1	Yes
Total	4.3 ha	4	

The data in Table 7 was obtained from measurements of adjacent vegetation patch integrity and size. These values are used to calculate ecosystem credits.

Table 7 Landscape Value

Assessment Circle	Vegetation Cover before Development	Vegetation Cover after Development	Connectivity before Development	Connectivity after Development
1,000 ha	41-50%	41-50%	>5 m to 30 m	>5 m to 30 m
100 ha	61-70%	51-60%	>5 m to 30 m	>5 m to 30 m

4.5 Conditions

The following conditions have been adopted during the calculation of ecosystem and species credits for both the development and biobank sites.

- Woody vegetation types.
- Percent foliage cover of over storey at benchmark condition prior to and after development.
- Percent foliage cover of understorey at benchmark condition prior to and after development.

5. Results – Development Credit Requirements

The credit requirements were assessed using the Biobanking Credit Calculator v1.2 (the calculator). Data from the fieldwork and mapping was entered into the calculator to determine the number of credits required to offset the impacts of the development. The calculations account for impacts on site vegetation (i.e. complete clearing and partial clearing for bush fire APZs). Table 8 shows the number and type of ecosystem credits required to offset the proposed activity.

5.1 Ecosystem Credits

Appendix B contains the complete BioBanking Credit Report and the listing of CMA subregions that the following credits must be acquired from.

Table 8 Ecosystem Credits for the Site

Vegetation Zones	Surrounding Vegetation Cover in which the vegetation must be obtained	Minimum area of Contiguous vegetation in which credits must be obtained	Ecosystem Credits Required
Blackbutt – Tallowwood (NR119)	>30%	>100 ha	206
Forest Red Gum – Swamp Box (NR161)	>30%	>100 ha	37
		Total Ecosystem Credits Required	243

5.2 Species Credits

The BioBanking assessment has made the assumption that the development would have an impact on the habitat of the Square-tailed Kite *(Lophoictinia isura)*. The breakdown of the distribution and potential impact on this species is:

- 3.5 ha of potential habitat are *assumed* to be impacted by the development. This area excludes the lands being maintained as an Asset Protection Zone - Outer Protection Area.
- 47 species credits are required for the development.

5.3 Expert Reports

Section 4.2 identified the requirement for four expert reports due to the absence of adequate targeted field surveys for these species. The expert reports for these species are provided in Appendix DAppendix C.

These Expert Reports concluded that none of the species require an estimate of abundance or area of occupancy (i.e. threatened species polygon) to determine species credits. On this basis it is determined that the development does not require the retirement of any species credits for the following species:

- Rufous Bettong (*Aepyprmnus rufescens*)
- Green-thighed Frog (*Litoria brevipalmata*)
- Common Planigale (*Planigale maculata*)
- Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)

5.4 Red Flag Variation

The clearing of Forest Red Gum – Swamp Box [NR161] comprises an impact that constitutes a red flag by the calculator. Therefore the proponent requires a determination that '*impact on red flag areas can be regarded as improving or maintaining biodiversity values*' from the Director General of DECCW. This report is known as a 'red flag variation'. The Director General can only make that determination if satisfied that the criteria outlined in Section 2.3 of the methodology are met by the proposed development.

The proposed development will clear 0.8 ha of the vegetation type Forest Red Gum – Swamp Box [NR161], which is a vegetation type consistent with the TSC Act listing for STCFF EEC. The exact amount of its original extent is unknown but it is much less than 30% and is not in 'low condition'. Thus this vegetation is defined as a 'red flag area' under the Biobanking Assessment Methodology (see section 2.2).

Section 2.3 of the Biobanking Assessment Methodology states:

"Where a proposed development, or any part of it, is on land that is, or forms part of, a red flag area, the Director General may make a determination that it is possible for the development to be regarded as improving or maintaining biodiversity values. The Director General can only make that determination if satisfied that the following criteria are met:

- *Options to avoid impacts on red flag area(s) on the development site must be considered.*
- *Highly cleared vegetation types.*
- *Contribution to regional biodiversity values must be low.*
- *Viability must be low or not viable.*
- *Credits to offset the full impacts of the development must be retired.*
- *Other matters that may be considered."*

Note: Further details are provided in the methodology under each of the criteria.

The Red Flag Variation Report prepared to address the above criteria is provided in Appendix E of this report. (Note: the version of the BioBanking report submitted to council with the development application will not include the Red Flag Variation report until it has been reviewed and approved by the OEH BioBanking Unit).

6. Conclusions

Based on the credit requirement from the development site, the number of credits required for retirement to satisfy the BioBanking statement for the development will equate to:

- **206** ecosystem credits required for Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (NR119).
- **37** ecosystem credits required for Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (NR161).
- **47** species credits required for Square-tailed Kite (*Lophoictinia isura*).

It is proposed that ecosystem and species credits will be retired from an appropriate Biobank site that has been defined by a Biobanking Agreement approved by the Minister. The specific details of the Biobank site required to match the credit profile for the development site will be discussed in a separate report.

7. Disclaimer

This BioBanking Assessment ("Report"):

1. Has been prepared by GHD Pty Ltd ("GHD") for John Hannaford.
2. May only be used and relied on by John Hannaford.
3. Must not be copied to, used by, or relied on by any person other than without the prior written consent of GHD.
4. May only be used for the purpose of the approval process for the proposed Residential Care Facility, Darkum Road, Mullaway (and must not be used for any other purpose).

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To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- Were limited to those specifically detailed in Sections 4.1 and 4.2 of this Report.

The Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on for a period of 6 months, after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

8. References and Recommended Reading

Coffs Harbour City Council (CHCC) (2006) Veg Amended 2006 vegetation mapping GIS shape files and the accompanying report, Fisher et. al. (1996) The Vegetation of the Coffs Harbour City Council LGA.

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Appendix A

Biobanking Data Summary

Biobanking Data Summary

TS Sub Zone	Veg type	Quadrat	Proposed	Developed (Ha)
NR119_Moderate/Good_BBTW	NR119	20, 21	Development	3.5
NR161_Moderate/Good_STCFF_N	HR161	22	Development	0.5
NR161_Moderate/Good_STCFF_S	NR161	15	Development	0.3
Totals				4.3

Biobanking Data from Transects

Transect/Plot No.	15	20	21	22
Native plant species richness	51	59	66	40
Native over-storey cover %	46.5	62	52.5	23.5
Native mid-storey cover %	36	4	0	0
Native ground cover – grasses %	50	62	30	24
Native ground cover – shrubs %	8	0	4	0
Native ground cover – other %	40	16	0	0
Exotic plant cover	22	8	42	86
Number of trees with hollows	2	1	3	1
Over-storey regeneration	0.66	1	1	0.33
Total length of fallen logs (m)	0	3	0	0

Appendix B

Credit Report - Development Site

BioBanking
Biodiversity Banking and Offsets Scheme

Biobanking Credit Report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 22/07/2011 Time: 15:30 Tool Version: 1.2

Development Details

Proposal ID: 0082/2011/D006

Development Name: Mullaway Seniors Living
Development Location: Mullaway North
Development Address: Darkhum Road

Lot: 1 **Section:** **DP:** 112696

CMA: Northern Rivers

Proponent Name: Consulting and Aged Care Services
Proponent Address:
Proponent Phone:

Assessor Name: Daniel Williams
Assessor Address: 62 Clarence Street Port Macquarie
Assessor Phone: 0427660581
Assessor Accreditation Number: 0082

The following information is required to be submitted with this BioBanking Statement (where ticked)

☐ **Local reference data is required for the following vegetation zones**

☑ **An Expert Report for the following species**

Aepyprymnus rufescens	Rufous Bettong
Litoria brevipalmata	Green-thighed Frog
Lophoictinia isura	Square-tailed Kite
Pseudomys gracilicaudatus	Eastern Chestnut Mouse

☐ **The minimium number of plots were not entered for the following vegetation zones**

NSW GOVERNMENT Environment, Climate Change & Water

Improving or maintaining biodiversity value

An application for a red flag determination is required for the following red flag areas:

Red Flag	Reason
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast	Vegetation type contains an endangered ecological community;

The application for a red flag determination should address the criteria set out in section 2.3 of the BiobBanking Assessment Methodology. A BioBanking Statement cannot be issued unless the determination is approved.

Ecosystem Credits

Vegetation Type	Area (ha)	Credits Required	Red Flag
Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]	3.5	206	No
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]	0.5	29	Yes
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]	0.3	8	Yes

Credit Profiles

Group: 1 Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast

Ecosystem credits: 206 credits

Total area of vegetation(s): 3.5 ha

1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained. **Minimum percent cover: 30%**	Description: Minimum area of contiguous vegetation in which credits must be obtained. **Minimum area: 100 ha**

3. CMA subregion & vegetation types

Credits must be obtained in any one or more of the following CMA Sub-regions and vegetation types:

Northern Rivers

CMA Sub-Region(s)	Veg Type(s)
Clarence Lowlands	Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast (NR119)
Coffs Coast & Escarpment	

Group: 2 Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast

Ecosystem credits: 29 credits

Total area of vegetation(s): 0.45 ha

1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained. **Minimum percent cover: 30%**	Description: Minimum area of contiguous vegetation in which credits must be obtained. **Minimum area: 100 ha**

3. CMA subregion & vegetation types
Credits must be obtained in any one or more of the following CMA Sub-regions and vegetation types:

Northern Rivers

CMA Sub-Region(s)	Veg Type(s)
Clarence Lowlands	Cabbage Gum open forest or woodland of the North Coast and New England Tablelands (NR145)
Coffs Coast & Escarpment	Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast (NR161)

Group: 3 Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast

Ecosystem credits: 8 credits

Total area of vegetation(s): 0.25 ha

1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained.	Description: Minimum area of contiguous vegetation in which credits must be obtained.
Minimum percent cover: 30%	**Minimum area: 100 ha**

3. CMA subregion & vegetation types
Credits must be obtained in any one or more of the following CMA Sub-regions and vegetation types:

Northern Rivers

CMA Sub-Region(s)	Veg Type(s)
Clarence Lowlands	Cabbage Gum open forest or woodland of the North Coast and New England Tablelands (NR145)
Coffs Coast & Escarpment	Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast (NR161)

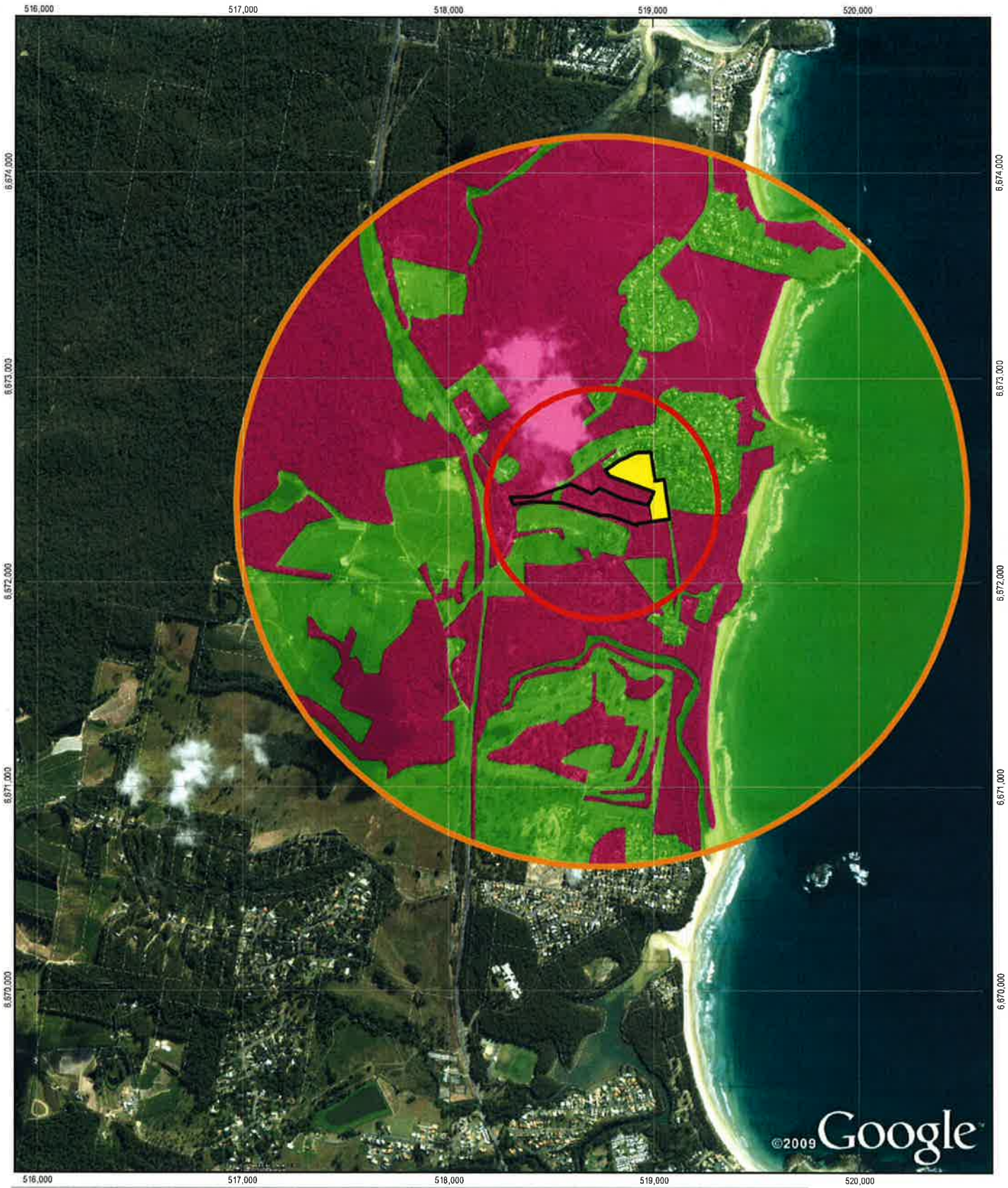
Species Credits

Species credits are required for 1 species:

Square-tailed Kite	Lophoictinia isura
Number of species credits required:	**47**
Extent of impact:	3.5 ha
Identification method:	Expert Report
Impact on red flag area?	No
Reason for red flag area:	

Appendix C

Figures



LEGEND

- 100ha Assessment Circle
- 1000ha Assessment Circle
- The Site
- Development Site
- Cleared
- Vegetation

1:25,000 (at A4)

0 100 200 400 600 800 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

GHD

CLIENTS | PEOPLE | PERFORMANCE

Consulting and Aged Care Services
Mullaway Seniors Living Development BioBanking

Job Number 22-14828
Revision A
Date 08 JUL 2010

Landscape Assessment Circles

Figure 2

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

G:\22\14828\GIS\Maps\22.14828.Z004_Figure4.mxd

Data Source: NSW Government, Dept Lands: Cadastre - 2010; Google Earth Pro: Google_Mullaway - 2009. Created by: sdwoodger

1:4,000 (at A4)

0 10 20 40 60 80 100

Meters

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

- Development Site
- Lot 1
- Orientation_plots
- Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast, moderate condition
- Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast, good condition

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Consulting and Aged Care Services
Mullaway Seniors Living Development BioBanking

Vegetation of the site

Job Number	22-14828
Revision	A
Date	14 Apr 2011

Figure 3

G:\22\14828\GIS\Maps\22_14828_Z012_Figure3_Vegetation of the Site.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data Source: NSW Department of Lands: Cadastre - Jan 2011; Geoscience Australia: 250k Data - Jan 2011. Created by: qjchung

Appendix D

Expert Report

CLIENTS | PEOPLE | PERFORMANCE

John Hannaford

Solitary Islands Retreat Biobanking Assessment

Expert Report – Rufous Bettong (*Aepyprymnus rufescens*)

July 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

This expert report ("Report"):

1. has been prepared by GHD Pty Ltd for Community and Aged Care Consulting Services;
2. may only be used and relied on by Community and Aged Care Consulting Services;
3. must not be copied to, used by, or relied on by any person other than Community and Aged Care Consulting Services without the prior written consent of GHD;
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The services undertaken by GHD in connection with preparing this Report:

- were limited to those specifically detailed in section 1.1 of this Report.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low.

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

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Contents

Table Index

Figure Index

1. Introduction

1.1 Background

GHD has been engaged by John Hannaford to undertake an assessment using the Biobanking assessment methodology as part of a proposed seniors living development, Solitary Islands Retreat, at Lot 1, DP 1128964, Mullaway Drive, Mullaway.

1.2 Reasons for the Expert Report

An expert report may be prepared under section 4.4 of the Biobanking assessment methodology instead of undertaking a threatened species survey at a development site. The Biobanking Operational Manual (DECC 2009) states that the "*use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low*".

The purposes of using an expert report instead of a survey are to determine whether:

- *The species is unlikely to be present at the development site; in this case no further assessment of the species is required. An expert report cannot determine that a species is unlikely to be present if the land is within an identified population for that species, unless the expert report is approved by the Director General.*
- *The species is likely to be present at the development site. In this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development (depending on whether the species is flora or fauna)…; and*
- *The species is likely to be present at the biobank site. In this case the expert report must provide an estimate of the number of individuals or area of habitat on the biobank site (depending on whether the species is flora or fauna)…"*

An expert report may only be used for those threatened species and populations to which species credits apply, not for any threatened species to which ecosystems apply.

In this case, an expert report has been provided in relation to the Rufous Bettong (*Aepyprymnus rufescens*) under the provision of the first point above, due to proposal constraints not allowing time for surveys to be undertaken during the recommended seasonal periods, and by virtue of the fact that it is a threatened species for which species credits apply.

1.3 Qualifications and Experience of Experts

The Biobanking Operational Manual states that:

"*The person who prepares an expert report must be accredited under 142B(1)(b) of the methodology or have the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values (in this case, threatened species) to which the expert report relates.*"

1.3.1 GHD Expert

Kirsten Crosby

Dr Kirsten Crosby is a Senior Ecologist with GHD's Ecology Service Line. Kirsten has over ten years' ecological survey experience including five years in commercial environmental consultancy. Kirsten provides a range of services including: flora and fauna surveys; threatened species assessments; environmental impact assessments; and opportunity and constraints analyses. Kirsten has a strong background in animal ecology and identification, and has field experience throughout NSW, ACT, and parts of QLD and VIC using a wide range of survey techniques, including Elliot trapping, cage trapping, harp netting, pitfalling, infra-red cameras, spotlighting and call playback.

Kirsten has experience with urban development (including subdivisions and land release masterplans), infrastructure projects (roads, water and electricity), and mining and energy (coal mines, sand quarries and wind farms). She has managed ecology teams to prepare comprehensive and detailed reports, including Part 3A Environmental Assessments and impact assessments under Part 4 and 5 (NSW EP&A Act), Species Impact Statements (NSW TSC Act), and Referrals (Commonwealth EPBC Act). Kirsten also has experience in preparing policy documents for the Commonwealth Department of the Environment, Heritage, Water and the Arts.

Kirsten undertook her PhD field research in north-west Queensland. While her research focused on the evolution and biogeography of brush-tailed possums and cuscuses, she carried out bird, frog, reptile and general mammal surveys as well. Kirsten has experience with the fauna of north-west Queensland, the Wet Tropics, and the Kingaroy-Murgon areas. Following completion of her PhD, Kirsten worked as a technical officer and occasional lecturer at the University of New South Wales. Kirsten managed student fauna surveys in the Sydney area (botany and marine studies), Smiths Lake on the NSW North Coast (mammal, bird and invertebrate surveys), and western New South Wales (bird and mammal surveys). Kirsten lectured undergraduate classes in Invertebrate Biology, Vertebrate Zoology, Life in Arid Lands, and Palaeontology.

2. Species Information

2.1 Life Cycle

The Rufous Bettong females reach maturity at 11 months, and males at 12-13 months of age. Breeding can occur throughout the year, as females have an oestrus cycle of three weeks. Gestation lasts 22-24 weeks and the female will give birth to a single young. The joey leaves the pouch after about 16 weeks, but remains with the mother for another seven weeks. Female young establish their home range close to their mothers, while male young will disperse at this time. A female can mate again within a few hours of birth, producing a quiescent blastocyst (Denis and Johnson, 2008).

2.2 Distribution and Abundance

The Rufous Bettong has the broadest current distribution of the rat-kangaroos, the range being discontinuous and probably determined by the availability of suitable food and shelter. It currently occurs in Queensland and northern NSW, but is extinct in southern NSW and Victoria (Denis and Johnson, 2008). The original range from Coen in north Queensland to central Victoria has been reduced to a patchy distribution along the Great Dividing Range from the coast and some distance west of Cooktown, Queensland, to north-eastern NSW as far south as Mt Royal National Park. In NSW it has largely vanished from inland areas but there have been sporadic, unconfirmed records from the Pilliga and Torrington districts (DEC 2005). A population around Barrington Tops in NSW is disjunct from the rest of the species' distribution.

Home ranges of a Rufous Bettong can be 75 – 110 ha for males and 45 – 60 ha for females. Animals can travel between 2-4.5 km in a night of foraging (Denis and Johnson, 2008). Extensive land clearance has reduced habitat availability, but the species is still found in reasonable numbers in partly wooded pastoral areas (Denis and Johnson, 2008). Their density is difficult to estimate because of their small size and cryptic habits but seems to be higher in the more tropical end of their range. Although Rufous Bettongs are primarily solitary, their home ranges often overlap with others, depending on food availability. In areas of good quality habitat, population densities can equal 1 to 7 individuals per hectare where they can form loose large groups coming together to feed communally (Mt Rothwell Biodiversity Interpretation Centre 2011).

2.3 Ecology and Habitat Requirements

Rufous Bettongs prefer forested habitats such as coastal eucalypt and tall wet sclerophyll forests through to dry, open woodland that have a good grassy understorey, particularly Blady Grass (*Imperata cylindrica*) and various species of *Poa*, rather than a dense shrub layer. They are generally found at low elevations on valley floors (alluvial flats). Nests are built in shallow excavations and are made of a dome of fibrous vegetation placed against a log, tree or grass clump, or on open ground (Denis and Johnson, 2008). Rufous Bettongs forage on herbs or grasses or dig for roots and tubers. They can eat entire plants as well as underground fungi and exudates from trees such as Woodland Paperbark (*Melaleuca nervosa*) (Denis and Johnson, 2008).

3. Description of the Site

3.1 Background

The site comprises Lot 1 DP 1128964, Mullaway Drive, Mullaway, covering approximately 4.4 ha of land to the north of Coffs Harbour NSW within the Coffs Harbour City Local Government Area (LGA). Mullaway Drive is located on the northern boundary of the site and Darkum Road forms the eastern boundary. The location of the site is illustrated in Figure 1.

3.2 Surrounding Land Uses

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential properties and areas of recreation (i.e. golf course).

3.3 Hydrology

Site topography is generally flat (maximum grade 5-10%) with the majority of the area sloping east south east. Runoff from the site is via overland flow into two broad shallow east flowing open depressions of ephemeral character. A small leaky dam constructed upslope of the site to the west within the adjoining rural lands impedes the majority of water movement through the site after rainfall events. Water leaves the site in an easterly direction where it flows across Darkum Road into swamp sclerophyll forests immediately south of the Mullaway Beach Caravan Park prior to draining directly onto the beach immediately south of Mullaway Headland.

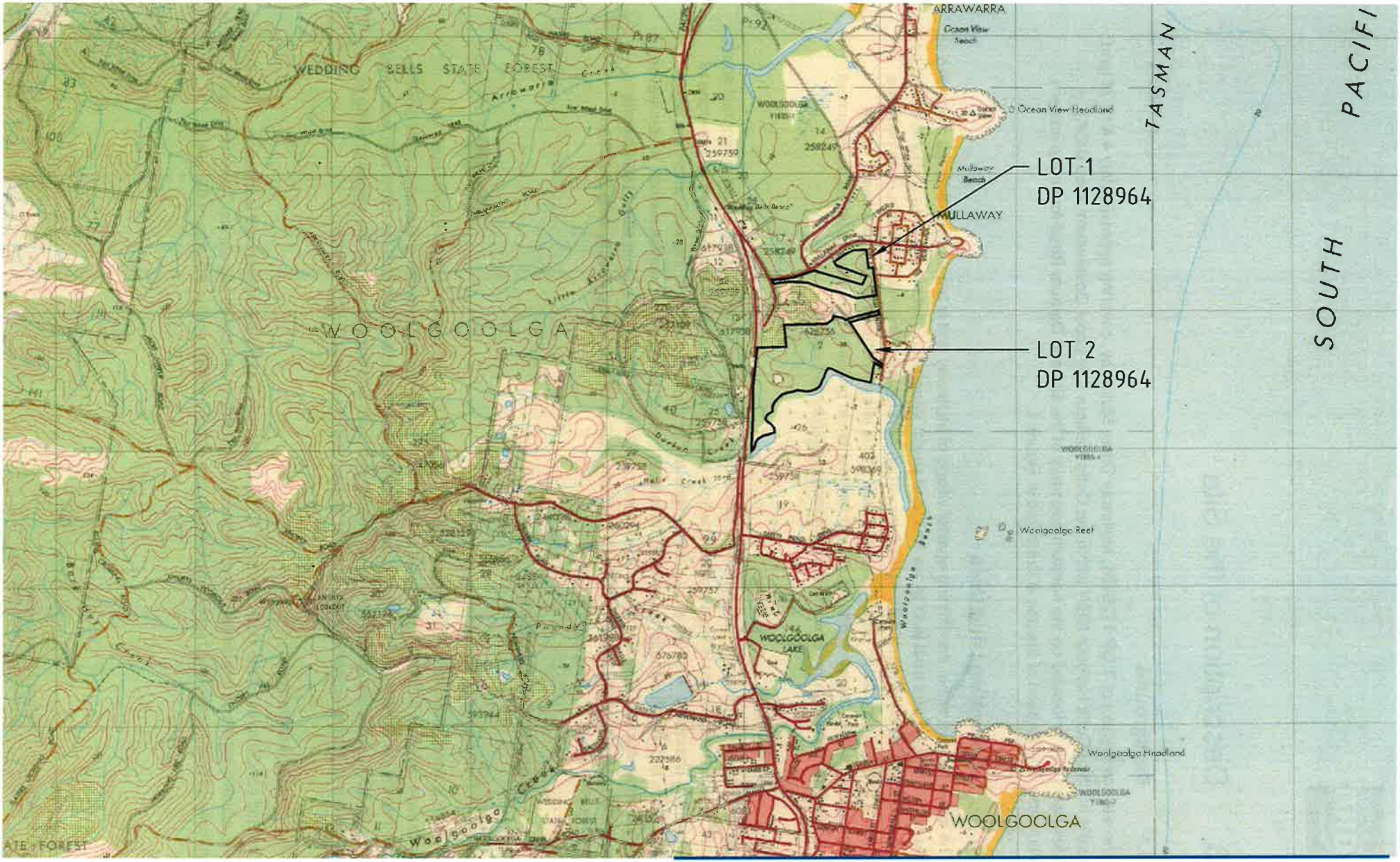
3.4 Landscape Context

3.4.1 Geology and Topography

The site is contained within the Brooms Head - Kempsey Coastal Ramp Mitchell Landscape. This landscape includes hills and low ranges of the coastal fall on lower Devonian greywacke, slate phyllite and quartzite and Permian Phyllite and schistose sandstone at elevations of 50 to 450m with local relief of up to 300m. Soils consist of thin, stony gradational loam and sandy loam on the slopes grading to yellow-brown texture-contrast soils on lower slopes and in valleys (DECC, 2008).

3.4.2 Soil Landscapes

The Soil Landscapes of the Coffs Harbour 1:100,000 Sheet identify the Megan soil landscape within the site, which consists of moderately deep to deep, well drained, structured red earths. These soils are typically strongly acidic and highly erodible with low subsoil fertility on the majority of the site.



GHD CLIENTS | PEOPLE | PERFORMANCE

COMMUNITY & AGED CARE CONSULTING SERVICES
PROPOSED AGED CARE FACILITY, MULLAWAY
SITE LOCATION

job no. | 22-14304
rev no. | A

Figure 01

scale | NTS for A4 date | JAN 2009

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 14 January, 2009 - 4:51 PM Cad File No: G:\22\14304\CADD\Drawings\22-14304-FIG 1.dwg

3.5 Vegetation Cover

Native vegetation of the site comprises open forest and swamp sclerophyll forest. There is evidence that the area has been subjected to a patchy fire regime within the previous 10 years or so, and more severe fires have occurred 50 or more years ago (Idyll Spaces, 2009).

The presence of mature and senescent trees indicates that the site has never been completely cleared of its pre-European eucalypt canopy cover; however the absence of mid-stratum vegetation, stumps and large woody debris indicates that it has been modified. Disturbance at the site includes thinning of the over storey, removal of most mature mid-stratum vegetation, disturbance of the ground layer in parts by grading and grazing and invasion of the remaining ground layer by exotic herbs and grasses (Idyll Spaces, 2009), which was confirmed during site investigations for this BioBanking assessment.

The vegetation types occupying the site are detailed in Table 1, below.

Table 1 Vegetation Type and Condition

Vegetation Type	ID	Conservation Significance	Description	Condition
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	NR119	Not listed.	As per detailed description below.	Moderate
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	NR161	EEC	As per detailed description below.	Moderate

Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]

This vegetation type is characterised by a tree canopy dominated by Blackbutt (*Eucalyptus pilularis*). The midstory is characterised by Red Ash (*Alphitonia excelsa*), Tuckeroo (*Cupaniopsis arachnoides*), Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*) although no specific species dominates. Species that characterise the groundcover stratum include Soft Bracken (*Calochlaena dubia*), Native Yam (*Dioscorea transversa*), *Oplismenus aemulus*, Water Vine (*Parsonsia straminea*), Native Rasberry (*Rubus parviflorus*), Indian Weed (*Sigesbeckia orientalis*), Smilax (*Smilax glyciphylla*), Snake Vine (*Stephania japonica*) and Native Violet (*Viola hederacea*). Less disturbed areas with an established understorey comprised Snake Vine (*Echinostephia aculeata*) and Trailing Guinea Flower (*Hibbertia dentata*). Weeds commonly observed within this community include Goatweed (*Ageratum conyzoides* subsp. *conyzoides**), Asparagus (*Asparagus aethiopicus**), *Baccharis halimifolia**, Moth Plant (*Gomphocarpus fruticosus**), Mickey Mouse Plant (*Ochna serrulata**), Paspalum (*Paspalum* sp*), Passiflora (*Passiflora suberosa**), Passiflora (*Passiflora subpeltata**) and Fireweed (*Senecio madagascariensis**).

On midslopes this vegetation type includes the tree canopy species Pink Bloodwood (*Corymbia intermedia*) and Grey Ironbark (*Eucalyptus siiderophloia*). Infrequent occurrences of Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon confertus*) also occur particularly in moist ecotones with adjoining downslope vegetation. Moist upper slopes generally with south facing aspect where characterised by Wiregrass (*Aristida vagans*), *Brunoneilia australis*, *Goodenia hederacea*, *Hibbertia vestita*, *Hybanthus stellarioides*, *Lindsaea linearis*, *Morinda jasminoides*, *Patersonia sericea*

and *Solenogyne bellioides*. Drier upper slopes and crests were characterised by Red-stemmed Wattle (*Acacia myrtifolia*), Poison Rock Fern (*Chielanthes sieberi*), Plume Grass (*Dichelacne micrantha*), Glycine (*Glycine tabacina*), Hardenbergia (*Hardebergia violaceae*), Dogwood (*Ozothamnus diosmifolia*), and Geebung (*Persoonia stradbrokensis*). Weed species included Smooth Catsear (*Hypochaeris glabra**), Catsear (*Hypochaeris radicata**) and *Lilium formosanum**.

Sheltered upper slopes where characterised by the canopy species Tallowwood (*Eucalyptus microcorys*), Brush Box (*Lophostemon confertus*) and Red Mahogany (*Eucalyptus resignifera*) in addition to Blackbutt and Pink Bloodwood. Forest Sheoak (*Allocasuarina torulosa*), Hopbush (*Dodonaea triquetra*), Native Olive (*Notelaea ovata*), Coffee Bush (*Breynia oblongifolia*) typically characterised the midstory. Groundcovers where typically characterised by an assemblage consisting of Apple Dumplings (*Billardiera scandens*), Centella (*Centella asiatica*), Barbed Wiregrass (*Cymbopogon refractus*), *Dianella caerulea*, Kidney Weed (*Dichondra repens*), *Dipodium variegatum*, Hedgehog Grass (*Echinopogon ovatus*), Broad-leaved Wiry Panic (*Entolasia marginata*), Wiry Panic (*Entolasia stricta*), *Geitonoplesium cymosum*, Glycine (*Glycine microphylla*), *Gonocarpus humilis*, Guinea Flower (*Hibbertia aspera*), Blady Grass (*Imperata cylindrica*), *Kennedia rubicundra*, Sword Sedge (*Lepidosperma laterale*), Matt Grass (*Lomandra longfolia*), Many-flowered matt Grass (*Lomandra multiflora*), Weeping Grass (*Microlaena stipoides*), Sour Sob (*Oxalis exilis*) and Forest Panic (*Panicum similie*). Weeds typically observed in these parts of the site include Cobblers Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Lantana (*Lantana camara**) and *Polygala paniculata**.

Occurring on the edges of ephemeral open drainages are the species Long-leaf Wattle (*Acacia longissima*), *Homalanthus populifolius*, Pale Grass Lilly (*Caesia parviflora* var *parviflora*), Small St Johns Wort (*Hypericum gramineum*), *Persoonia stradbrokensis*, Thyme Spurge (*Phyllanthus hirtellus*) and Hairy Bush Pea (*Pultenaea villosa*). Bangalay Palm (*Archontophoenix cunninghamiana*) was observed within the drainage line with species such as *Hakea eriantha*, Water Couch (*Paspalum distichium*) and various sedge species.

Transitional zones between the drier parts of the vegetation community and swamp sclerophyll forests include species such as *Polymeria calycina*, Elderberry Panx (Polyscias sambucifolia), Whiteroot (*Pratia purpurascens*), Bracken (*Pteridium esculentum*), Notched Bush Pea (Pultenaea retusa), Senna (*Senna pendula**), Gorse Bitter Pea (*Daviesia ulicifolia*) and Nodding Fringe Sedge (*Fimbistylis nutans*) and Kangaroo Grass (*Themeda australis*).

Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]

The tree canopy is mostly dominated by Broad-leaved paperbark (*Melaleuca quinquenvervia*). Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suaveolens*) form associate canopy species in varying densities, with their occurrence potentially affected by past land clearing events. Pink Bloodwood and Grey Ironbark also occur at the finges of this vegetation type where it grades into the upslope Blackbutt Tallowwood vegetation type.

Shrub species such as Cheese Tree and Wild Tobacco (*Solanum mauritianum**) occurred infrequently and were associated with the more disturbed parts of this community. Crofton Weed (*Ageratina adenophora**) was a commonly observed weed species within these parts of the site.

The understory is predominantly herbaceous consisting of sedges and herbs although a dense coverage of Paspalum (*Paspalum wettsteinei**) was commonly observed. Sedge species observed include *Lepidosperma quadrangulata*, *Schoenus apogon*, *Cyperus polystachyos*, *Fimbristylis dichotoma*, Spike Rush (*Eleocharis phillipensis*) and Giant Parramatta Grass (*Sporobolus fertilis**). Sedges restricted to the

wetter areas include Twig Rush (*Baumea articulata*) and *Gahnia seiberiana* although these species were highly restricted and did not form dense thickets otherwise representative of semi-permanent to permanently wet areas.

Occurring at the base of more mature Forest Red Gum and Pink Bloodwood is a standard suite of herbs species including Native Violet (*Viola hederacea*), Pennywort (*Hydrocotyle pedunculata*) and *Cyperus gunnii*. Devils Twine (*Cassytha glabrella*) and Glycine (*Glycine clandestina*) also occur in close proximity to Eucalypt trees although their abundance is not notably high.

3.6 Prior Field Surveys

Flora and fauna surveys of the site have been undertaken on the site by Kendall and Kendall (2010), Idyll Spaces Environmental Consultants (2009) and GHD in 2009, 2010 and 2011. Studies conducted by Kendall and Kendall (2010) are particularly relevant to this report. Targeted mammal surveys were conducted within the site including diurnal habitat searches and spotlighting. None of these surveys resulted in the detection of this species within the site.

4. Expert Assessment and Conclusion

4.1 Potential Habitat in the Site

The three vegetation types present in the site could support Rufous Bettongs as this species prefer forested habitats such as coastal eucalypt and tall wet sclerophyll forests through to dry, open woodland that have a good grassy understorey. Much of the shrub layer has been removed from the site, as have fallen timber and logs. The ground layer is also generally low across the site. Given the generally low cover of grasses, the site is considered to contain only low to moderate quality habitat for this species.

4.2 Local Records

There is one record of the Rufous Bettong within the locality, near Corindi Beach, approximately 7 km to the north of the site. There are three other records within 20 km (DECCW 2011). Given the low number of records in the locality, the large home range requirements of the species, and fragmentation of habitat in the locality, it is considered unlikely that the species would occur at the site.

4.3 Likelihood of Occurrence

Table 2 Potential Habitat for Rufous Bettong in the Site provides a summary of the sites Rufous Bettong habitat quality for each of the identified vegetation types.

Table 2 Potential Habitat for Rufous Bettong in the Site

Vegetation Type	Habitat Quality	Potential Occurrence
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	**Low to moderate.** Sparse cover of Bladey Grass (*Imperata cylindrica*) and herbs over a mid-dense cover of soft grasses and ferns present.	**Unlikely**
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	**Low to moderate.** Sparse cover of Bladey Grass (*Imperata cylindrica*) and herbs over a mid-dense cover of soft grasses and ferns present.	**Unlikely**

4.4 Conclusion

The Rufous Bettong is not likely to be present at the site as:

- There is only one record of the species in the locality;
- The species has large home range requirements;
- The grass layer at the site is generally low meaning there is a lack of shelter for this species; and
- Good quality habitat is likely to be highly fragmented in the locality.

A species polygon is not required for the Rufous Bettong as this species is considered unlikely to be present at the site. Species credits will not be generated for this species, and the proposal therefore does not require the retirement of species credits for the Rufous Bettong.

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	K.Crosby J. Walker	D Williams	*D Williams*	S Lawer		9-5-11
1	K.Crosby	D Williams		S Lawer		26-7-11

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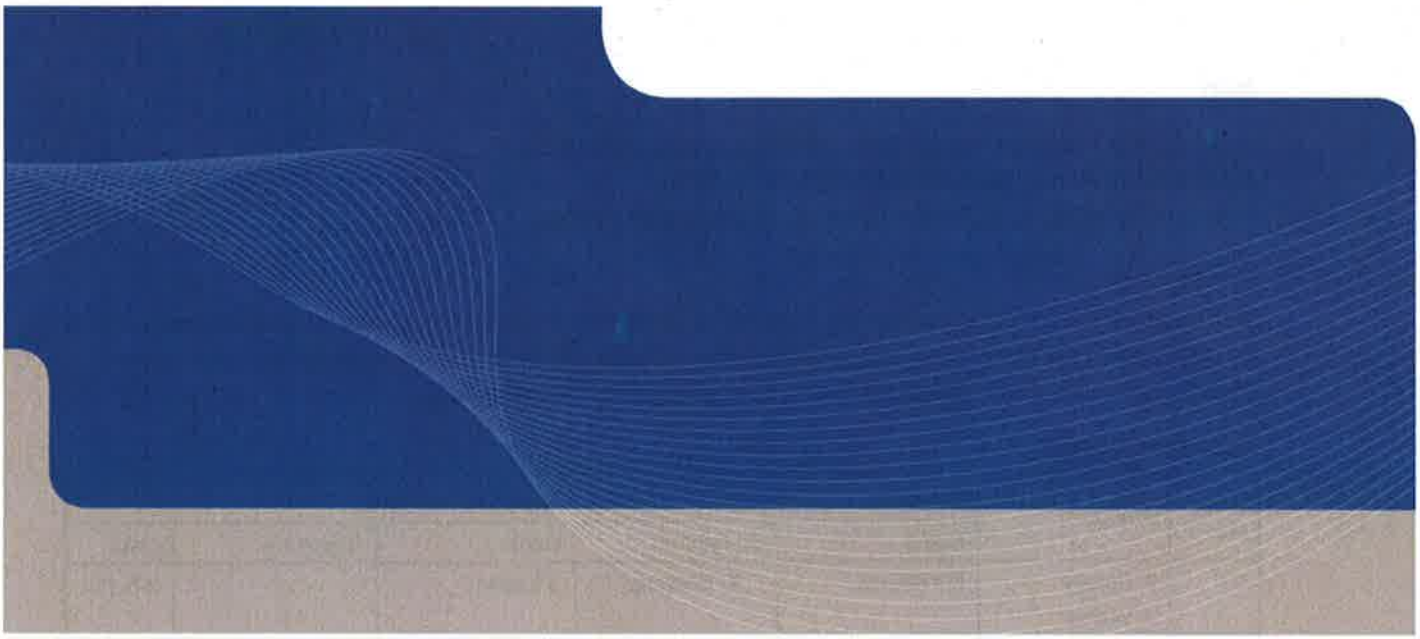
John Hannaford

Solitary Islands Retreat Biobanking Assessment

Expert Report – Green-thighed Frog (*Litoria brevipalmata*)

July 2011



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Background

GHD has been engaged by John Hannaford to undertake and complete an assessment using the Biobanking assessment methodology as part of a proposed seniors living development, Solitary Islands Retreat, at Lot 1, DP 1128964, Mullaway Drive, Mullaway.

1.2 Reasons for the Expert Report

An expert report may be prepared under section 4.4 of the Biobanking assessment methodology instead of undertaking a threatened species survey at a development site. The Biobanking Operational Manual (DECC 2009) states that the "*use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low*".

The purposes of using an expert report instead of a survey are to determine whether:

- *The species is unlikely to be present at the development site; in this case no further assessment of the species is required. An expert report cannot determine that a species is unlikely to be present if the land is within an identified population for that species, unless the expert report is approved by the Director General.*
- *The species is likely to be present at the development site. In this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development (depending on whether the species is flora or fauna)…; and*
- *The species is likely to be present at the biobank site. In this case the expert report must provide an estimate of the number of individuals or area of habitat on the biobank site (depending on whether the species is flora or fauna)…"*

An expert report may only be used for those threatened species and populations to which species credits apply, not for any threatened species to which ecosystems apply.

In this case, an expert report has been provided in relation to the Green-thighed Frog (*Litoria brevipalmata)* the provision of the first point above, due to proposal constraints not allowing time for surveys to be undertaken during the recommended seasonal periods, and by virtue of the fact that it is a threatened species for which species credits apply.

1.3 Qualifications and Experience of Experts

The Biobanking Operational Manual states that:

"*The person who prepares an expert report must be accredited under 142B(1)(b) of the methodology or have the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values (in this case, threatened species) to which the expert report relates.*"

1.3.1 GHD Expert

Mark Aitkens

Mark Aitkens is an Environmental Scientist / Ecologist of fourteen years consulting experience and has recently joined GHD in 2010 as a Senior Ecologist. Mark's consulting experience has involved the preparation of ecological impact assessments for small to State significant developments involving specialist skills in survey design/ implementation and data handling, analysis and interpretation. Mark's professional development has included training in spatial and remote sensing sciences (GIS), the use of statistical analysis, and BioBanking.

Mark has prepared ecological and environmental assessments under Part 3A, 4 and 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) throughout NSW. Mark has prepared Environmental Assessment reports, Environmental Impact Statements, Species Impact Statements, Review of Environmental Factors and Statement of Environmental Effects under the EP&A Act and Referrals/ Control Actions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Mark also routinely prepares environmental management plans, bush fire protection assessments and Ecological Impact Assessments compliant with Section 5A of the EP&A Act, Part 3A Major Projects and Part 3 Rezoning Applications.

As project ecologist Mark assessed the ecological impacts of Stages 1 and 2 of the Moolarben Coal Project at Ulan within a Part 3A context and Controlled Action under the EPBC Act, which involved an analysis of the projects impact on the critically endangered ecological community known as White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands and associated threatened woodland birds/ mammals. This role commanded high level research and analytical skills including a retrofitted use of the BioBanking Assessment Methodology combined with project and business management.

As a field assistant Mark has been involved in research investigating the lifecycles of the Giant Barred Frog (*Mixophyes iteratus*) at Bruxner Park and Thora, Stuttering Barred Frog (*Mixophyes balbus*) at Gloucester Tops and Ourimbah and Queensland Barred Frog (*Mixophyes fleayi*) at Lamington National Park. Mark also has field experience in the detection of other threatened frog species including the:

- Green and Golden Bell Frog *(Litoria aurea)* at North Avoca.
- Booroolong Frog *(Litoria booroolongensis)* and Tamworth.
- Red-crowned Toadlet *(Pseudophryne australis)* various sites in northwest Sydney.
- Giant Burrowing Frog *(Heleioporus australiacus)* at Berrilee.
- Glandular Frog *(Litoria subglandulosa)* in Kumbatine National Park.
- Loveridges Frog *(Philoria loveridgei)* in the Border Ranges National Park.
- Hip Pocket Frog (*Assa darlingtonii*) in the Border Ranges National Park.
- Sphagnum Frog *(Philoria sphagnicola)* near Dorrigo.
- Wallum Froglet (*Crinia tinnula*) at various sites from Newcastle to Kempsey.

2. Species Information

2.1 Life Cycle

Breeding for the Green-thighed Frog occurs following heavy rainfall in late spring and summer. Frogs aggregate around grassy semi-permanent ponds and flood-prone grassy areas (DEC, 2005). Males often call from the edges of temporary or semi-permanent water bodies in paddocks and clearing adjacent to rainforest to open woodland (Barker et. al. 1995; Anstis, 2002). Shelter habitat has not been described although it is described by DECCW (2011a) as "leaf litter or vegetation within 300m of breeding habitat".

Females deposit spawn in a single layer of poorly defined, cohering capsules at the surface loose clumps among water weed (Barker et. al. 1995; Anstis, 2002). Egg quantum varies between 366 and 582 (Anstis, 2002). Egg survival is largely dependent on subsequent rains (Anstis, 2002). Metamorphosis has been observed in December, March and April with timeframes ranging from six to 10 weeks (Anstis, 2002). Juveniles have been observed in April.

2.2 Abundance and Distribution

The Green-thighed Frog has a patchy distribution of known sites but along the east coast of Australia and ranges from the Hawkesbury River, approximately 60 km north of Sydney in New South Wales, to Cordalba State Forest in south-east Queensland (DEC, 2005). Populations are generally fragmented primarily due to the habitats they occupy although habitat loss and degradation is likely to have increase population fragmentation (Ehmann, 1997).

Populations are known in Ourimbah, the Central Coast of NSW but are severely fragmented. Numbers at this location have decreased but there have been no record of declines or disappearances elsewhere (Ehmann, 1997). No reliable population estimates exist for this species as this species is infrequently observed with detection largely restricted to breeding events (Ehmann, 1997).

Reported historical occurrences are from Border Ranges National Park, Whian Whian State Forest, Beaury State Forest, Wildcattle Creek State Forest, Landsowne State Forest, Coopernook State Forest, Bulahdelah State Forest, Olney State Forest, Watagan National Park and Ourimbah State Forest.

2.3 Ecology and Habitat Requirements

Green-thighed Frogs are found in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain (DEC, 2005). Prior records are generally restricted to an altitudinal range of 10 to 500 m within the following landforms: wider flat ridges, hills, slopes and valleys (Ehmann, 1997).

Barker et al (1995) describe habitat as paddocks (clearings) adjoining rainforest, woodland and wet sclerophyll forest. Cogger (2000) identifies habitat as wet sclerophyll forest along the northern coast of NSW and southeast Queensland. Griffiths (2006) describes habitat as wet forests of the coasts and ranges between Gosford and Brisbane.

Ehmann (1997) provides detailed accounts of known habitat for populations from the Queensland border to Ourimbah (near Gosford). Habitat characteristics described included repeated references to wet sclerophyll forest, rainforest and riparian forest nearby ecotones with dry sclerophyll forests in association with flooded depressions and temporary creek pools. Disturbance (partial clearing/ forestry)

is a feature of all known sites as is the proximity of smaller tracts of mesic vegetation or large tracts of sclerophyll native vegetation. The proximity of large tracts of undisturbed to moderately disturbed forests appears important (Ehmann, 1997).

Pools can be either natural (i.e. creek waterholes and closed depressions in floodways) to man made. The dimensions of these pools varied from large (500 to 600 m^2) to small (4-6 m^2) with water depth not recorded for these water bodies (Ehmann, 1997). Ehmann (1997) describes the water edge characteristics as extensive shallows of less than 20 cm that are exposed to sunlight. Metamorphosis timeframes suggest that temporary pools must persist for at least six weeks to allow the emergence of adults (Anstis, 2002).

2.4 BioMetric Vegetation Types

The Green-thighed Frog is predicted to be associated with "leaf litter or vegetation within 300m of breeding habitat" (DECCW, 2011a). It is also predicted to occur within most Northern Rivers BioMetric Vegetation Types including those associated with the following vegetation formations:

- Dry sclerophyll forests (shrub/grass sub-formation).
- Dry sclerophyll forests (shrubby sub-formation).
- Forested wetlands.
- Freshwater wetlands.
- Grassy woodlands.
- Heathlands.
- Miscellaneous ecosystems.
- Rainforests.
- Wet sclerophyll forests (grassy sub-formation).
- Wet sclerophyll forests (shrubby sub-formation).
- Northern Escarpment Wet Sclerophyll Forests.

The wide range of predicted vegetation formations and vegetation types, as defined by DECCW (2011a), is likely to be a function of the cryptic nature of this species (i.e. adoption of the precautionary principle due to limited knowledge on definitive habitat characteristics).

3. Description of the Site

3.1 Background

The site comprises Lot 1 DP 1128964, Mullaway Drive, Mullaway, covering approximately 4.4 ha of land to the north of Coffs Harbour NSW within the Coffs Harbour City Council (CHCC) Local Government Area (LGA). Mullaway Drive is located on the northern boundary of the site and Darkum Road forms the eastern boundary. The location of the site is illustrated in Figure 1.

3.2 Surrounding Land Uses

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential properties and areas of recreation (i.e. golf course).

3.3 Hydrology

Site topography is generally flat (maximum grade 5-10%) with the majority of the area sloping east south east. Runoff from the site is via overland flow into two broad shallow east flowing open depressions of ephemeral character. A small leaky dam constructed upslope of the site to the west within the adjoining rural lands impedes the majority of water movement through the site after rainfall events. Water leaves the site in an easterly direction where it flows across Darkum Road into swamp sclerophyll forests immediately south of the Mullaway Beach Van and Caravan Park prior to draining directly onto the beach immediately south of Mullaway Headland.

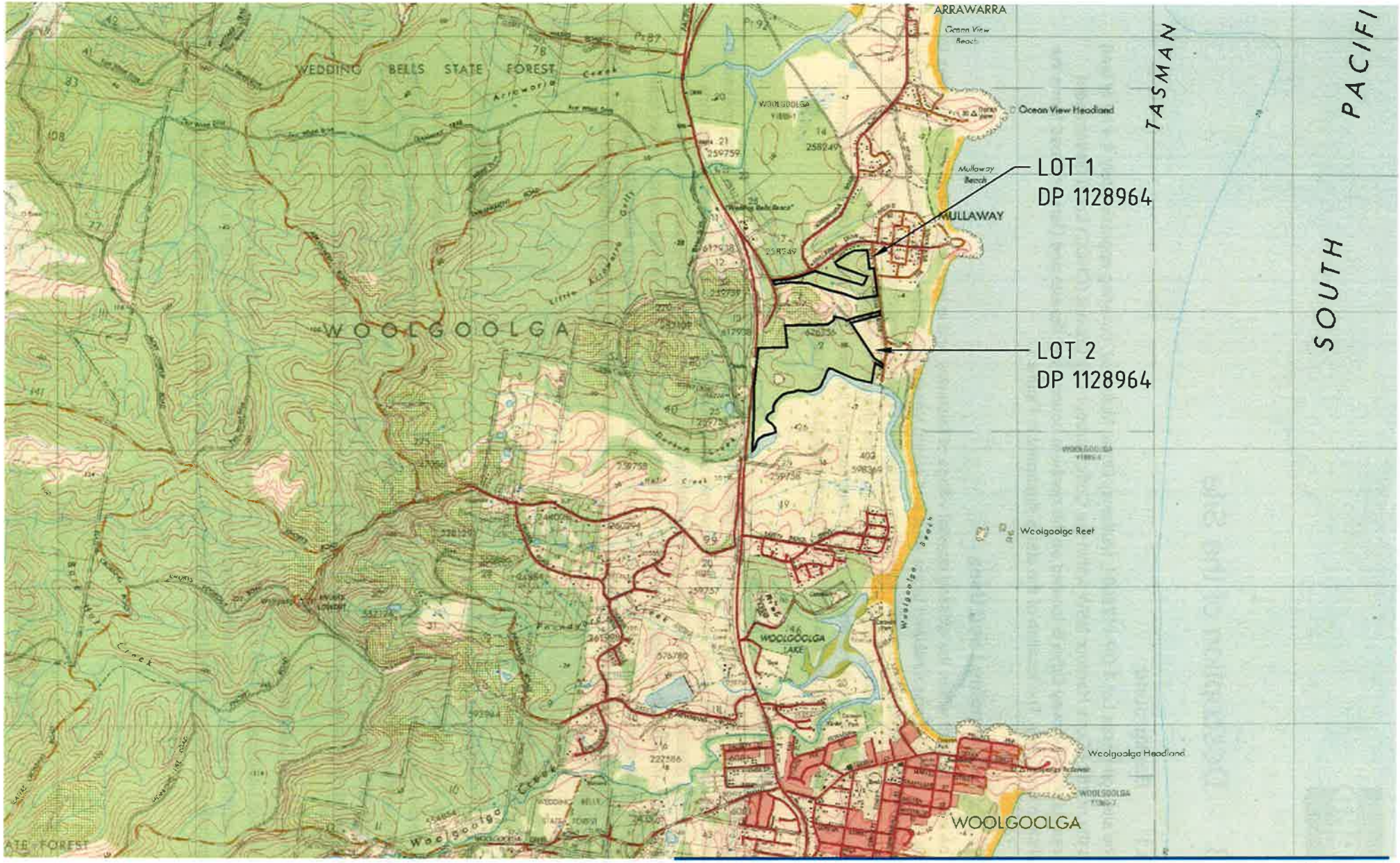
3.4 Landscape Context

3.4.1 Geology and Topography

The site is contained within the Brooms Head - Kempsey Coastal Ramp Mitchell Landscape. This landscape includes hills and low ranges of the coastal fall on lower Devonian greywacke, slate phyllite and quartzite and Permian Phyllite and schistose sandstone at elevations of 50 to 450m with local relief of up to 300m. Soils consist of thin, stony gradational loam and sandy loam on the slopes grading to yellow-brown texture-contrast soils on lower slopes and in valleys (DECC, 2008).

3.4.2 Soil Landscapes

The Soil Landscapes of the Coffs Harbour 1:100,000 Sheet identify the Megan soil landscape within the site, which consists of moderately deep to deep, well drained, structured red earths. These soils are typically strongly acidic and highly erodible with low subsoil fertility on the majority of the site.



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COMMUNITY & AGED CARE CONSULTING SERVICES
PROPOSED AGED CARE FACILITY, MULLAWAY
SITE LOCATION

job no. | 22-14304
rev no. | A

Figure 01

scale | NTS for A4 date | JAN 2009

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 14 January 2009 - 4:51 PM Cad File No: G:\22\14304\CADD\Drawings\22-14304-FIG 1.dwg

3.5 Vegetation Cover

Native vegetation of the site comprises open forest and swamp sclerophyll forest. There is evidence that the area has been subjected to a patchy fire regime within the previous 10 years or so, and more severe fires have occurred 50 or more years ago (Idyll Spaces, 2009).

The presence of mature and senescent trees indicates that the site has never been completely cleared of its pre-European eucalypt canopy cover; however the absence of mid-stratum vegetation, stumps and large woody debris indicates that it has been modified. Disturbance at the site includes thinning of the over storey, removal of most mature mid-stratum vegetation, disturbance of the ground layer in parts by grading and grazing and invasion of the remaining ground layer by exotic herbs and grasses (Idyll Spaces, 2009), which was confirmed during site investigations for this BioBanking assessment.

The vegetation types occupying the site are detailed in Table 1 below.

Table 1 Vegetation Type and Condition

Vegetation Type	ID	Conservation Significance	Description	Condition
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	NR119	Not listed.	As per detailed description below.	Moderate
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	NR161	EEC	As per detailed description below.	Moderate

Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]

This vegetation type is characterised by a tree canopy dominated by Blackbutt (*Eucalyptus pilularis*). The midstorey is characterised by Red Ash (*Alphitonia excelsa*), Tuckeroo (*Cupaniopsis arachnoides*), Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*) although no specific species dominates. Species that characterise the groundcover stratum include Soft Bracken (*Calochlaena dubia*), Native Yam (*Dioscorea transversa*), *Oplismenus aemulus*, Water Vine (*Parsonsia straminea*), Native Rasberry (*Rubus parviflorus*), Indian Weed (*Sigesbeckia orientalis*), Smilax (*Smilax glyciphylla*), Snake Vine (*Stephania japonica*) and Native Violet (*Viola hederacea*). Less disturbed areas with an established understorey comprised Snake Vine (*Echinostephia aculeata*) and Trailing Guinea Flower (*Hibbertia dentata*). Weeds commonly observed within this community include Goatweed (*Ageratum conyzoides* subsp. *conyzoides**), Asparagus (*Asparagus aethiopicus**), *Baccharis halimifolia**, Moth Plant (*Gomphocarpus fruticosus**), Mickey Mouse Plant (*Ochna serrulata**), Paspalum (*Paspalum* sp*), Passiflora (*Passiflora suberosa**), Passiflora (*Passiflora subpeltata**) and Fireweed (*Senecio madagascariensis**).

On midslopes this vegetation type includes the tree canopy species Pink Bloodwood (*Corymbia intermedia*) and Grey Ironbark (*Eucalyptus siiderophloia*). Infrequent occurrences of Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon confertus*) also occur particularly in moist ecotones with adjoining downslope vegetation. Moist upper slopes generally with south facing aspect where characterised by Wiregrass (*Aristida vagans*), *Brunoneilia australis*, *Goodenia hederacea*, *Hibbertia vestita*, *Hybanthus stellarioides*, *Lindsaea linearis*, *Morinda jasminoides*, *Patersonia sericea*

and *Solenogyne bellioides*. Drier upper slopes and crests were characterised by Red-stemmed Wattle (*Acacia myrtifolia*), Poison Rock Fern (*Chielanthes sieberi*), Plume Grass (*Dichelacne micrantha*), Glycine (*Glycine tabacina*), Hardenbergia (*Hardebergia violaceae*), Dogwood (*Ozothamnus diosmifolia*), and Geebung (*Persoonia stradbrokensis*). Weed species included Smooth Catsear (*Hypochaeris glabra**), Catsear (*Hypochaeris radicata**) and *Lilium formosanum**.

Sheltered upper slopes where characterised by the canopy species Tallowwood (*Eucalyptus microcorys*), Brush Box (*Lophostemon confertus*) and Red Mahogany (*Eucalyptus resignifera*) in addition to Blackbutt and Pink Bloodwood. Forest Sheoak (*Allocasuarina torulosa*), Hopbush (*Dodonaea triquetra*), Native Olive (*Notelaea ovata*), Coffee Bush (*Breynia oblongifolia*) typically characterised the midstorey. Groundcovers where typically characterised by an assemblage consisting of Apple Dumplings (*Billardiera scandens*), Centella (*Centella asiatica*), Barbed Wiregrass (*Cymbopogon refractus*), *Dianella caerulea*, Kidney Weed (*Dichondra repens*), *Dipodium variegatum*, Hedgehog Grass (*Echinopogon ovatus*), Broad-leaved Wiry Panic (*Entolasia marginata*), Wiry Panic (*Entolasia stricta*), *Geitonoplesium cymosum*, Glycine (*Glycine microphylla*), *Gonocarpus humilis*, Guinea Flower (*Hibbertia aspera*), Blady Grass (*Imperata cylindrica*), *Kennedia rubicundra*, Sword Sedge (*Lepidosperma laterale*), Matt Grass (*Lomandra longfolia*), Many-flowered matt Grass (*Lomandra multiflora*), Weeping Grass (*Microlaena stipoides*), Sour Sob (*Oxalis exilis*) and Forest Panic (*Panicum similie*). Weeds typically observed in these parts of the site include Cobblers Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Lantana (*Lantana camara**) and *Polygala paniculata**.

Occurring on the edges of ephemeral open drainages are the species Long-leaf Wattle (*Acacia longissima*), *Homalanthus populifolius*, Pale Grass Lilly (*Caesia parviflora* var *parviflora*), Small St Johns Wort (*Hypericum gramineum*), *Persoonia stradbrokensis*, Thyme Spurge (*Phyllanthus hirtellus*) and Hairy Bush Pea (*Pultenaea villosa*). Bangalay Palm (*Archontophoenix cunninghamiana*) was observed within the drainage line with species such as *Hakea eriantha*, Water Couch (*Paspalum distichium*) and various sedge species.

Transitional zones between the drier parts of the vegetation community and swamp sclerophyll forests include species such as *Polymeria calycina*, Elderberry Panx (Polyscias sambucifolia), Whiteroot (*Pratia purpurascens*), Bracken (*Pteridium esculentum*), Notched Bush Pea (Pultenaea retusa), Senna (*Senna pendula**), Gorse Bitter Pea (*Daviesia ulicifolia*) and Nodding Fringe Sedge (*Fimbistylis nutans*) and Kangaroo Grass (*Themeda australis*).

Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]

The tree canopy is mostly dominated by Broad-leaved paperbark (*Melaleuca quinquenvervia*). Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suaveolens*) form associate canopy species in varying densities, with their occurrence potentially affected by past land clearing events. Pink Bloodwood and Grey Ironbark also occur at the finges of this vegetation type where it grades into the upslope Blackbutt Tallowwood vegetation type.

Shrub species such as Cheese Tree and Wild Tobacco (*Solanum mauritianum**) occurred infrequently and were associated with the more disturbed parts of this community. Crofton Weed (*Ageratina adenophora**) was a commonly observed weed species within these parts of the site.

The understory is predominantly herbaceous consisting of sedges and herbs although a dense coverage of Paspalum (*Paspalum wettsteinei**) was commonly observed. Sedge species observed include *Lepidosperma quadrangulata*, *Schoenus apogon*, *Cyperus polystachyos*, *Fimbristylis dichotoma*, Spike Rush (*Eleocharis phillipensis*) and Giant Parramatta Grass (*Sporobolus fertilis**). Sedges restricted to the

wetter areas include Twig Rush (*Baumea articulata*) and *Gahnia seiberiana* although these species were highly restricted and did not form dense thickets otherwise representative of semi-permanent to permanently wet areas.

Occurring at the base of more mature Forest Red Gum and Pink Bloodwood is a standard suite of herbs species including Native Violet (*Viola hederacea*), Pennywort (*Hydrocotyle pedunculata*) and *Cyperus gunnii*. Devils Twine (*Cassytha glabrella*) and Glycine (*Glycine clandestina*) also occur in close proximity to Eucalypt trees although their abundance is not notably high.

3.6 Habitat

The site comprises a mix of hollow bearing trees within mesic and swamp sclerophyll forests. The shrub midstorey is predominantly absent owing to specific land uses practices although the groundcover stratum was found to be intact both in terms of floristic species richness and cover abundance. The sites connectivity with large undisturbed tracts of wet/ mesic/ dry/ swamp sclerophyll forests is restricted by urban development, roads and the effects of rural land uses (i.e. managed midstorey).

The geomorphic setting facilitates the movement of surface waters through the site from west to east. The formation of accumulated ephemeral water resources is restricted to the lower elevations near the sites eastern boundary. However, the longevity of these water accumulations is anticipated to be restricted to less than a few days following rain as there are no closed depressions capable of supporting longer term water retention.

3.7 Prior Field Surveys

Flora and fauna surveys of the site have been undertaken on the site by Kendall and Kendall (2010), Idyll Spaces Environmental Consultants (2009) and GHD in 2009, 2010 and 2011. Studies conducted by Kendall and Kendall (2010) are particularly relevant to this report. Targeted surveys for amphibian species identified the presence of the Perons Tree Frog (*Litoria peronii*), Tyler's Tree Frog (*Litoria tyleri*), Dwarf Green Tree Frog (*Litoria fallax*) and Dainty Green Tree Frog (*Litoria gracilenta*). Surveys were conducted over seven consecutive nights (14 to 20 December 2009) with 14 mm of rainfall falling three days prior to the survey and 16 mm of rainfall during the survey. Survey conditions were not ideal (i.e. less than 50 mm within 24 hrs), however there was sufficient rainfall during the survey period to invoke amphibian activity.

4. Expert Assessment and Conclusion

4.1 Potential Habitat

The two vegetation types present in the site have the potential to support the Green-thighed Frog. A description of the site's habitat values and how they relate to important lifecycle elements of the Green-thighed Frog is provided in the following sections.

4.1.1 Shelter Habitat

The site and adjoining landscape contains a high density of hollow bearing trees, these being the most likely shelter habitat feature used by the Green-thighed Frog. Leaf litter and vegetation (DECCW, 2011a) is also described as shelter habitat for this species, which are habitat features that have been modified by land use practices within the site (i.e. managed mid story and reduced leaf litter through grazing and/or slashing). Due to the presence of tree hollows within the site and midstorey/leaf litter on adjoining properties it is considered that there is limited restriction on the availability of potential shelter habitat within the site and adjoining areas.

4.1.2 Foraging Habitat

The literature indicates that the Green-thighed Frog is reliant on large tracts of native vegetation cover as part of the habitat values required to support a viable population of this species. Vegetation cover may consist of dry/ wet/ swamp sclerophyll forests and closed forest (i.e. rainforest and riparian forest) although closed forests and wet sclerophyll forests appear to be preferentially utilised by this species.

The site contains mesic to wet sclerophyll forests and swamp sclerophyll forest. The structural integrity of these vegetation formations is largely intact for the tree canopy strata, however, the midstorey stratum and groundcover has been substantially modified. The absence of an intact midstorey stratum is considered to adversely influence the quality of potential foraging habitat (i.e. reduced ecosystem roughness resulting in reduced foraging resources and increased risk of predation). This is exacerbated by disturbed vegetation cover in the adjoining properties and restricted connectivity with large tracts of undisturbed potential habitat.

4.1.3 Breeding Habitat

The literature indicates that the Green-thighed Frog is reliant on ephemeral water accumulations in preference to semi-permanent and permanent water bodies to facilitate breeding activity. These water accumulations may be natural formations (i.e. water holes within creek lines or closed depressions in floodouts) or manmade (i.e. closed roadside table drains and dams). The duration of the ephemeral water bodies is not known, however the 6-10 week metamorphosis period would infer the minimum time span for suitable water bodies.

Kendall and Kendall (2010) state the following in terms of the sites water resources:

"The study area does not contain gully lines and therefore would not contain pools of water in gullies after rain events however areas of surface water may occur in the low-lying areas after periods of heavy rain. The study area is currently grazed by horses however it does not contain dams, water is supplied in troughs for the horses."

Site investigations by GHD generally confirm these observations. There was no evidence of any prolonged ephemeral water accumulations within the site despite the presence of east flowing broad open drainage lines. The depth of observed water accumulations within the open drainages was generally less than 5 cm and was observed to be flowing. Impeded flows were a consequence of dense swards of sedge vegetation rather than geomorphic features conducive to water ponding (i.e. closed depressions). Substantial rainfall events occurring prior to the site investigations provided a high level of certainty in these conclusions.

4.2 Local records

There are no Wildlife Atlas database records of the Green-thighed Frog within a 10 km radius of the site (DECCW, 2011b). The nearest records of the Green-thighed Frog are at Moonee Beach (i.e. approximately 15 km to the south) and Nana Glen (i.e. approximately 15 km west-south-west).

Supporting the results of the Wildlife Atlas database query are the results of the extensive field surveys completed for the Sapphire to Woolgoolga Pacific Highway upgrade (Connell Wagner, 2007). Targeted surveys conducted by Connell Wagner (2007) identified a Green-thighed Frog population west of the approved Pacific Highway alignment in Orara East State Forest (Skinners Creek). Detailed targeted surveys of potential habitat in the Arrawarra area failed to detect this species.

4.3 Likelihood of Occurrence

Table 2 provides a summary of the sites Green-thighed Frog habitat quality for each of the identified vegetation types.

Table 2 Potential Habitat for the Green-thighed Frog in the Site

Vegetation Type	Habitat Quality	Potential Occurrence
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	**Low.** The absence of a midstorey stratum, restricted connectivity with large tracts of offsite potential habitat and unsuitable water resources of the site counters the potential shelter habitat (tree hollows) and intact tree canopy/ groundcover strata.	**Unlikely**
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	**Low.** The absence of a midstorey stratum, restricted connectivity with large tracts of offsite potential habitat and unsuitable water resources of the site counters the potential shelter habitat (tree hollows) and intact tree canopy/ groundcover strata.	**Unlikely**

Given the lack of records within the locality, the low quality of onsite habitat (absence of midstorey and suitable water resources), and fragmentation of habitat in the locality, it is considered unlikely that the species would occur at the site.

4.4 Conclusion

The Green-thighed Frog is not likely to be present within the site as:

- There are no records of the species in the locality (DECCW, 2011b; Connell Wagner, 2007; Kendall and Kendall, 2010);
- The sites habitat values are considered to be of low quality for the Green-thighed Frog due to the lack of suitable water resources and disturbed vegetation structure (i.e. absence of midstorey and modified leaf litter layer);
- There is restricted connectivity with larger tracts of offsite native vegetation cover containing higher quality foraging and breeding habitat.

A species polygon is not required for the Green-thighed Frog as this species is considered unlikely to be present at the site. Species credits will not be generated for this species, and the proposal therefore does not require the retirement of species credits for the Green-thighed Frog.

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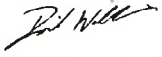
Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	K. Crosby J. Walker	D Williams	*D Williams*	S Lawer		9-5-11
1	K Crosby	D Williams		S Lawer		26-7-11

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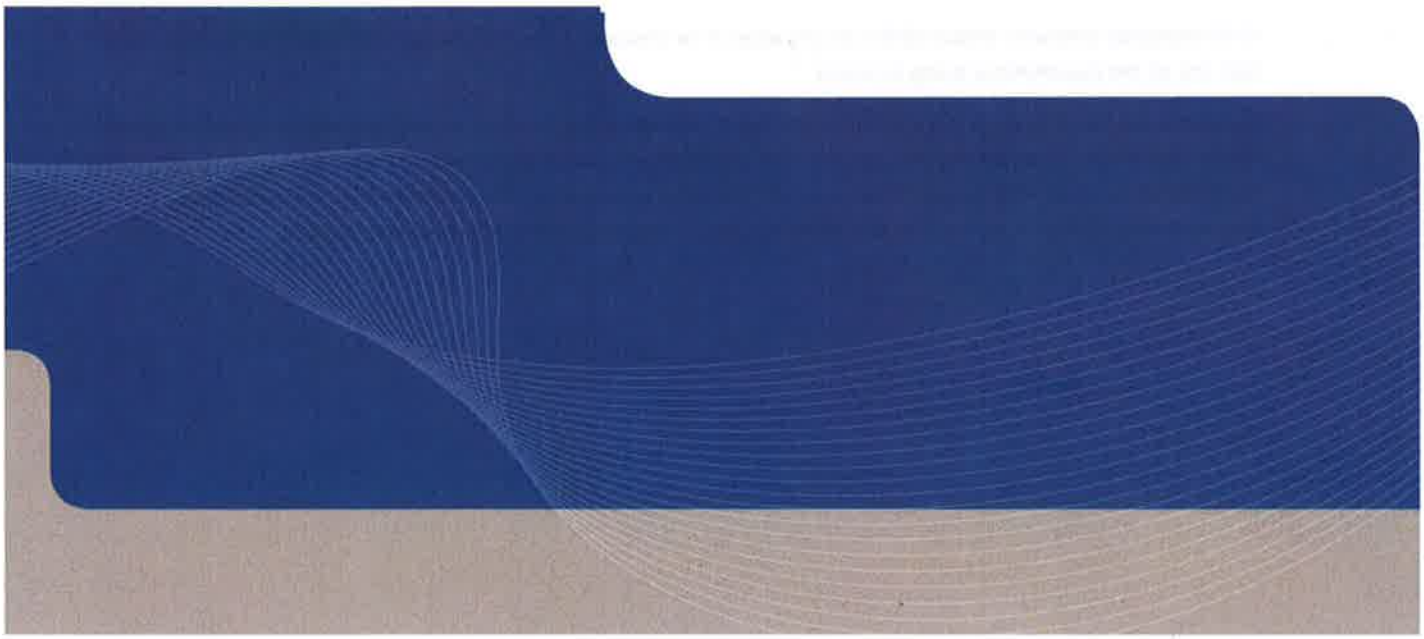
John Hannaford

Solitary Islands Retreat Biobanking Assessment

Expert Report – Common Planigale (*Planigale maculata*)

July 2011



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Background

GHD has been engaged by John Hannaford to undertake an assessment using the Biobanking assessment methodology as part of a proposed seniors living development, Solitary Islands Retreat, at Lot 1, DP 1128964, Mullaway Drive, Mullaway.

1.2 Reasons for the Expert Report

An expert report may be prepared under section 4.4 of the Biobanking assessment methodology instead of undertaking a threatened species survey at a development site. The Biobanking Operational Manual (DECC 2009) states that the "*use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low*".

The purposes of using an expert report instead of a survey are to determine whether:

- *The species is unlikely to be present at the development site; in this case no further assessment of the species is required. An expert report cannot determine that a species is unlikely to be present if the land is within an identified population for that species, unless the expert report is approved by the Director General.*
- *The species is likely to be present at the development site. In this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development (depending on whether the species is flora or fauna)…; and*
- *The species is likely to be present at the biobank site. In this case the expert report must provide an estimate of the number of individuals or area of habitat on the biobank site (depending on whether the species is flora or fauna)…"*

An expert report may only be used for those threatened species and populations to which species credits apply, not for any threatened species to which ecosystems apply.

In this case, an expert report has been provided in relation to the Common Planigale (*Planigale maculata*) under the provision of the second point above, due to proposal constraints not allowing time for surveys to be undertaken during the recommended seasonal periods, and by virtue of the fact that it is a threatened species for which species credits apply.

1.3 Qualifications and Experience of Experts

The Biobanking Operational Manual states that:

"*The person who prepares an expert report must be accredited under 142B(1)(b) of the methodology or have the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values (in this case, threatened species) to which the expert report relates.*"

1.3.1 GHD Expert

Kirsten Crosby

Dr Kirsten Crosby is a Senior Ecologist with GHD's Ecology Service Line. Kirsten has over ten years' ecological survey experience including five years in commercial environmental consultancy. Kirsten provides a range of services including: flora and fauna surveys; threatened species assessments; environmental impact assessments; and opportunity and constraints analyses. Kirsten has a strong background in animal ecology and identification, and has field experience throughout NSW, ACT, and parts of QLD and VIC using a wide range of survey techniques, including Elliot trapping, cage trapping, harp netting, pitfalling, infra-red cameras, spotlighting and call playback.

Kirsten has experience with urban development (including subdivisions and land release masterplans), infrastructure projects (roads, water and electricity), and mining and energy (coal mines, sand quarries and wind farms). She has managed ecology teams to prepare comprehensive and detailed reports, including Part 3A Environmental Assessments and impact assessments under Part 4 and 5 (NSW EP&A Act), Species Impact Statements (NSW TSC Act), and Referrals (Commonwealth EPBC Act). Kirsten also has experience in preparing policy documents for the Commonwealth Department of the Environment, Heritage, Water and the Arts.

Kirsten undertook her PhD field research in north-west Queensland. While her research focused on the evolution and biogeography of brush-tailed possums and cuscuses, she carried out bird, frog, reptile and general mammal surveys as well. Kirsten has experience with the fauna of north-west Queensland, the Wet Tropics, and the Kingaroy-Murgon areas. Following completion of her PhD, Kirsten worked as a technical officer and occasional lecturer at the University of New South Wales. Kirsten managed student fauna surveys in the Sydney area (botany and marine studies), Smiths Lake on the NSW North Coast (mammal, bird and invertebrate surveys), and western New South Wales (bird and mammal surveys). Kirsten lectured undergraduate classes in Invertebrate Biology, Vertebrate Zoology, Life in Arid Lands, and Palaeontology.

Kirsten has experience in the trapping and identification of small dasyurids, including the Common Planigale.

2. Species Information

2.1 Life Cycle

The Common Planigale breeds from spring to summer in the eastern parts of its range and all year in the Top End (Burnett, 2008). Females have two or more oestral cycles each breeding season and have two or more litters a year. The female constructs a saucer shaped nest of grass or *Eucalyptus* leaves beneath shredded bark or in hollow logs and, following a gestation period of 19-20 days; a litter of 4-12 (average 8) is born (Byron Shire Council, 2010).

2.2 Abundance and Distribution

The Common Planigale has a distribution through coastal north-eastern NSW, coastal east Queensland and Arnhem Land, in the Northern Territory. The confirmed southern distribution limit of the species is on the NSW lower north coast, however there are reports of sightings as far south as the central NSW coast in Gosford (DEC, 2005).

This species is intermittently recorded further west in a range of habitats of the hinterland foothills and ranges (for example Tooloom, Koreelah, Richmond, Snowy, Bushmans, Chichester ranges and Bulga Plateau). It has been suggested, however that this species' distribution could be confined to the 1000mm rainfall isohyet. This observation remains likely today with the majority of records located in coastal areas east of the 1000mm isohyet (Byron Shire Council, 2010).

It is most frequently recorded on warm, low elevated coastal plains and large river valleys and locations that have been subject to human occupation, development and agriculture. In these areas, habitat has been severely reduced and fragmented. It is likely that many sub-populations have become isolated and extremely vulnerable to on-going threatening processes (Byron Shire Council, 2010).

Very little is known regarding the Common Planigale. According to Burnett (2008), no new information was published on the species between 1983 and 2008, making an assessment of the species' abundance difficult, although it was noted that the species is relatively abundant within its range. The species has been found to be uncommon throughout outer Brisbane suburbs where it once occurred in low densities (Queensland Government, 2010). It is suspected they have largely fallen prey to domestic cats (Burnett, 2008).

2.3 Ecology and Habitat Requirements

Common Planigales occur in mountain rainforests, monsoonal floodplains and urban reserves (Burnett, 2008). It occupies rainforest, sclerophyll forests, and grasslands to marshlands and rocky areas usually close to water (DEC, 2005). The species prefers *Eucalyptus, Lophostemon* and *Casuarina* species for denning (Brisbane City Council, 2005). Habitat selection appears primarily dependent upon the availability of ground or shrub cover presumably for protection from predators (Byron Shire Council, 2010). It has been found sheltering under rocks, fallen timber, bark, human debris (eg sheet iron, railway sleepers) and in termite mounds (Burnett, 2008).

A local study in Byron Shire found that higher than average leaf litter cover and logs for shelter were important habitat variables for Common Planigales. Rocky crevices and human debris such as sheet iron

or railway sleepers have been found to be also used by the species for shelter (Byron Shire Council, 2010).

Common Planigales forage on the ground among leaf litter, in dense grass and in low vegetation. In captivity the species feeds readily on carrion, and consumes grasshoppers, spiders and small skinks (Burnett, 2008).

Little is known about the species movement capabilities but it is hypothesised that the species is more sedentary in north-east NSW due to more predictable habitat being available, but that remains to be clarified (Byron Shire Council, 2010).

3. Description of the Site

3.1 Background

The site comprises Lot 1 DP 1128964, Mullaway Drive, Mullaway, covering approximately 4.4 ha of land to the north of Coffs Harbour NSW within the Coffs Harbour City Local Government Area (LGA). Mullaway Drive is located on the northern boundary of the site and Darkum Road forms the eastern boundary. The location of the site is illustrated in Figure 1.

3.2 Surrounding Land Uses

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential properties and areas of recreation (i.e. golf course).

3.3 Hydrology

Site topography is generally flat (maximum grade 5-10%) with the majority of the area sloping east south east. Runoff from the site is via overland flow into two broad shallow east flowing open depressions of ephemeral character. A small leaky dam constructed upslope of the site to the west within the adjoining rural lands impedes the majority of water movement through the site after rainfall events. Water leaves the site in an easterly direction where it flows across Darkum Road into swamp sclerophyll forests immediately south of the Mullaway Beach Caravan Park prior to draining directly onto the beach immediately south of Mullaway Headland.

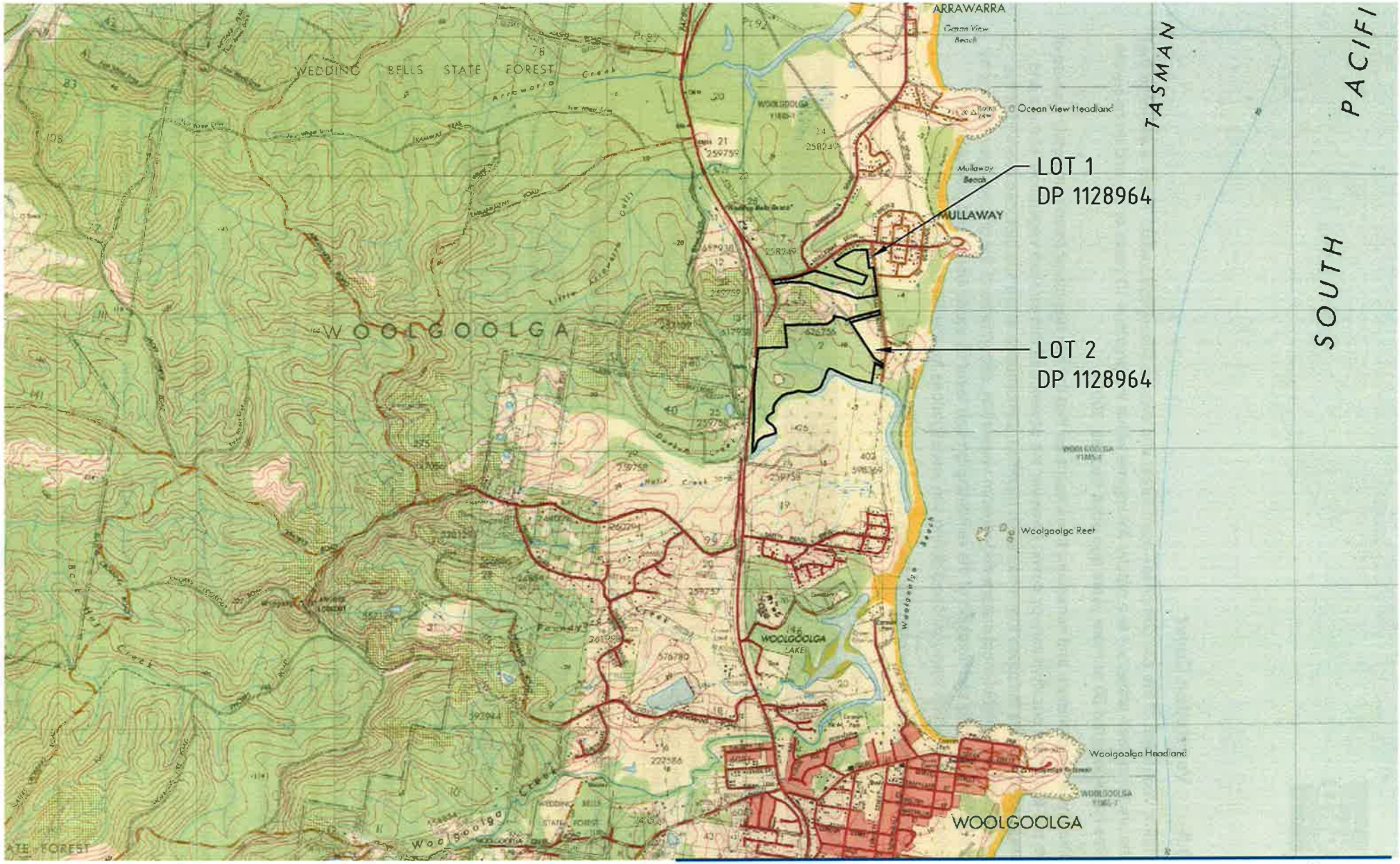
3.4 Landscape Context

3.4.1 Geology and Topography

The site is contained within the Brooms Head - Kempsey Coastal Ramp Mitchell Landscape. This landscape includes hills and low ranges of the coastal fall on lower Devonian greywacke, slate phyllite and quartzite and Permian Phyllite and schistose sandstone at elevations of 50 to 450m with local relief of up to 300m. Soils consist of thin, stony gradational loam and sandy loam on the slopes grading to yellow-brown texture-contrast soils on lower slopes and in valleys (DECC, 2008).

3.4.2 Soil Landscapes

The Soil Landscapes of the Coffs Harbour 1:100,000 Sheet identify the Megan soil landscape within the site, which consists of moderately deep to deep, well drained, structured red earths. These soils are typically strongly acidic and highly erodible with low subsoil fertility on the majority of the site.



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COMMUNITY & AGED CARE CONSULTING SERVICES
PROPOSED AGED CARE FACILITY, MULLAWAY
SITE LOCATION

job no. | 22-14304
rev no. | A

Figure 01

scale | NTS for A4 date | JAN 2009

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

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3.5 Vegetation Cover

Native vegetation of the site comprises open forest and swamp sclerophyll forest. There is evidence that the area has been subjected to a patchy fire regime within the previous 10 years or so, and more severe fires have occurred 50 or more years ago (Idyll Spaces, 2009).

The presence of mature and senescent trees indicates that the site has never been completely cleared of its pre-European eucalypt canopy cover; however the absence of mid-stratum vegetation, stumps and large woody debris indicates that it has been modified. Disturbance at the site includes thinning of the over storey, removal of most mature mid-stratum vegetation, disturbance of the ground layer in parts by grading and grazing and invasion of the remaining ground layer by exotic herbs and grasses (Idyll Spaces, 2009), which was confirmed during site investigations for this BioBanking assessment.

The vegetation types occupying the site are detailed in Table 1 below.

Table 1 Vegetation Type and Condition

Vegetation Type	ID	Conservation Significance	Description	Condition
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	NR119	Not listed.	As per detailed description below.	Moderate
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	NR161	EEC	As per detailed description below.	Moderate

Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]

This vegetation type is characterised by a tree canopy dominated by Blackbutt (*Eucalyptus pilularis*). The midstory is characterised by Red Ash (*Alphitonia excelsa*), Tuckeroo (*Cupaniopsis arachnoides*), Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*) although no specific species dominates. Species that characterise the groundcover stratum include Soft Bracken (*Calochlaena dubia*), Native Yam (*Dioscorea transversa*), *Oplismenus aemulus*, Water Vine (*Parsonsia straminea*), Native Rasberry (*Rubus parviflorus*), Indian Weed (*Sigesbeckia orientalis*), Smilax (*Smilax glyciphylla*), Snake Vine (*Stephania japonica*) and Native Violet (*Viola hederacea*). Less disturbed areas with an established understorey comprised Snake Vine (*Echinostephia aculeata*) and Trailing Guinea Flower (*Hibbertia dentata*). Weeds commonly observed within this community include Goatweed (*Ageratum conyzoides* subsp. *conyzoides**), Asparagus (*Asparagus aethiopicus**), *Baccharis halimifolia**, Moth Plant (*Gomphocarpus fruticosus**), Mickey Mouse Plant (*Ochna serrulata**), Paspalum (*Paspalum* sp*), Passiflora (*Passiflora suberosa**), Passiflora (*Passiflora subpeltata**) and Fireweed (*Senecio madagascariensis**).

On midslopes this vegetation type includes the tree canopy species Pink Bloodwood (*Corymbia intermedia*) and Grey Ironbark (*Eucalyptus siiderophloia*). Infrequent occurrences of Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon confertus*) also occur particularly in moist ecotones with adjoining downslope vegetation. Moist upper slopes generally with south facing aspect where characterised by Wiregrass (*Aristida vagans*), *Brunoneilia australis*, *Goodenia hederacea*, *Hibbertia vestita*, *Hybanthus stellarioides*, *Lindsaea linearis*, *Morinda jasminoides*, *Patersonia sericea*

and *Solenogyne bellioides*. Drier upper slopes and crests were characterised by Red-stemmed Wattle (*Acacia myrtifolia*), Poison Rock Fern (*Chielanthes sieberi*), Plume Grass (*Dichelacne micrantha*), Glycine (*Glycine tabacina*), Hardenbergia (*Hardebergia violaceae*), Dogwood (*Ozothamnus diosmifolia*), and Geebung (*Persoonia stradbrokensis*). Weed species included Smooth Catsear (*Hypochaeris glabra**), Catsear (*Hypochaeris radicata**) and *Lilium formosanum**.

Sheltered upper slopes where characterised by the canopy species Tallowwood (*Eucalyptus microcorys*), Brush Box (*Lophostemon confertus*) and Red Mahogany (*Eucalyptus resignifera*) in addition to Blackbutt and Pink Bloodwood. Forest Sheoak (*Allocasuarina torulosa*), Hopbush (*Dodonaea triquetra*), Native Olive (*Notelaea ovata*), Coffee Bush (*Breynia oblongifolia*) typically characterised the midstory. Groundcovers where typically characterised by an assemblage consisting of Apple Dumplings (*Billardiera scandens*), Centella (*Centella asiatica*), Barbed Wiregrass (*Cymbopogon refractus*), *Dianella caerulea*, Kidney Weed (*Dichondra repens*), *Dipodium variegatum*, Hedgehog Grass (*Echinopogon ovatus*), Broad-leaved Wiry Panic (*Entolasia marginata*), Wiry Panic (*Entolasia stricta*), *Geitonoplesium cymosum*, Glycine (*Glycine microphylla*), *Gonocarpus humilis*, Guinea Flower (*Hibbertia aspera*), Blady Grass (*Imperata cylindrica*), *Kennedia rubicundra*, Sword Sedge (*Lepidosperma laterale*), Matt Grass (*Lomandra longfolia*), Many-flowered matt Grass (*Lomandra multiflora*), Weeping Grass (*Microlaena stipoides*), Sour Sob (*Oxalis exilis*) and Forest Panic (*Panicum similie*). Weeds typically observed in these parts of the site include Cobblers Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Lantana (*Lantana camara**) and *Polygala paniculata**.

Occurring on the edges of ephemeral open drainages are the species Long-leaf Wattle (*Acacia longissima*), *Homalanthus populifolius*, Pale Grass Lilly (*Caesia parviflora* var *parviflora*), Small St Johns Wort (*Hypericum gramineum*), *Persoonia stradbrokensis*, Thyme Spurge (*Phyllanthus hirtellus*) and Hairy Bush Pea (*Pultenaea villosa*). Bangalay Palm (*Archontophoenix cunninghamiana*) was observed within the drainage line with species such as *Hakea eriantha*, Water Couch (*Paspalum distichium*) and various sedge species.

Transitional zones between the drier parts of the vegetation community and swamp sclerophyll forests include species such as *Polymeria calycina*, Elderberry Panx (Polyscias sambucifolia), Whiteroot (*Pratia purpurascens*), Bracken (*Pteridium esculentum*), Notched Bush Pea (Pultenaea retusa), Senna (*Senna pendula**), Gorse Bitter Pea (*Daviesia ulicifolia*) and Nodding Fringe Sedge (*Fimbistylis nutans*) and Kangaroo Grass (*Themeda australis*).

Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]

The tree canopy is mostly dominated by Broad-leaved paperbark (*Melaleuca quinquenvervia*). Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suaveolens*) form associate canopy species in varying densities, with their occurrence potentially affected by past land clearing events. Pink Bloodwood and Grey Ironbark also occur at the finges of this vegetation type where it grades into the upslope Blackbutt Tallowwood vegetation type.

Shrub species such as Cheese Tree and Wild Tobacco (*Solanum mauritianum**) occurred infrequently and were associated with the more disturbed parts of this community. Crofton Weed (*Ageratina adenophora**) was a commonly observed weed species within these parts of the site.

The understory is predominantly herbaceous consisting of sedges and herbs although a dense coverage of Paspalum (*Paspalum wettsteinei**) was commonly observed. Sedge species observed include *Lepidosperma quadrangulata*, *Schoenus apogon*, *Cyperus polystachyos*, *Fimbristylis dichotoma*, Spike Rush (*Eleocharis phillipensis*) and Giant Parramatta Grass (*Sporobolus fertilis**). Sedges restricted to the

wetter areas include Twig Rush (*Baumea articulata*) and *Gahnia seiberiana* although these species were highly restricted and did not form dense thickets otherwise representative of semi-permanent to permanently wet areas.

Occurring at the base of more mature Forest Red Gum and Pink Bloodwood is a standard suite of herbs species including Native Violet (*Viola hederacea*), Pennywort (*Hydrocotyle pedunculata*) and *Cyperus gunnii*. Devils Twine (*Cassytha glabrella*) and Glycine (*Glycine clandestina*) also occur in close proximity to Eucalypt trees although their abundance is not notably high.

3.6 Prior Field Surveys

Flora and fauna surveys of the site have been undertaken on the site by Kendall and Kendall (2010), Idyll Spaces Environmental Consultants (2009) and GHD in 2009, 2010 and 2011. Studies conducted by Kendall and Kendall (2010) are particularly relevant to this report. Targeted surveys for mammal species were conducted using hair tubes. No Common Planigales were detected within the site during the survey.

4. Expert Assessment and Conclusion

4.1 Potential Habitat in the Site

The two vegetation types present in the site could support the Common Planigale as the species is known to occur in a wide variety of habitat types. Habitat quality varies depending on the level of shrub density present, as this species requires ground or shrub cover for protection. Much of the shrub layer has been removed from the site, as have fallen timber and logs. The ground layer is also generally low across the site.

4.2 Local records

There is one record of the Common Planigale within the locality, approximately 9 km to the south of the site near Emerald Beach. There are two additional records from approximately 15 km to the south of the site (DECCW 2011). Given the low number of records, the low quality of habitat, and fragmentation of habitat in the locality, it is considered unlikely that the species would occur at the site.

4.3 Likelihood of Occurrence

Table 2 provides a summary of the sites habitat quality and potential occurrence for the Common Planigale within each of the identified vegetation types.

Table 2 Potential Habitat for Common Planigale in the Site

Vegetation Type	Habitat Quality	Potential Occurrence
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	**Low.** Moderate availability of ground layer, shrub cover largely absent, little woody debris.	**Unlikely**
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	**Low.** Moderate availability of ground layer, shrub cover largely absent, little woody debris.	**Unlikely**

4.4 Conclusion

The Common Planigale is not likely to be present at the site as:

- There is only one record of the species in the locality;
- Habitat at the site is generally of a low quality due to the lack of a woody debris and moderate ground layer and largely absent shrub cover; and
- Good quality habitat is likely to be highly fragmented in the locality.

A species polygon is not required for the Common Planigale as this species is considered unlikely to be present at the site. Species credits will not be generated for this species, and the proposal therefore does not require the retirement of species credits for the Common Planigale.

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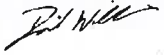
Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	K.Crosby J. Walker	D Williams	*D Williams*	S Lawer		9-5-11
1	K.Crosby	D Williams		S Lawer		26-7-11

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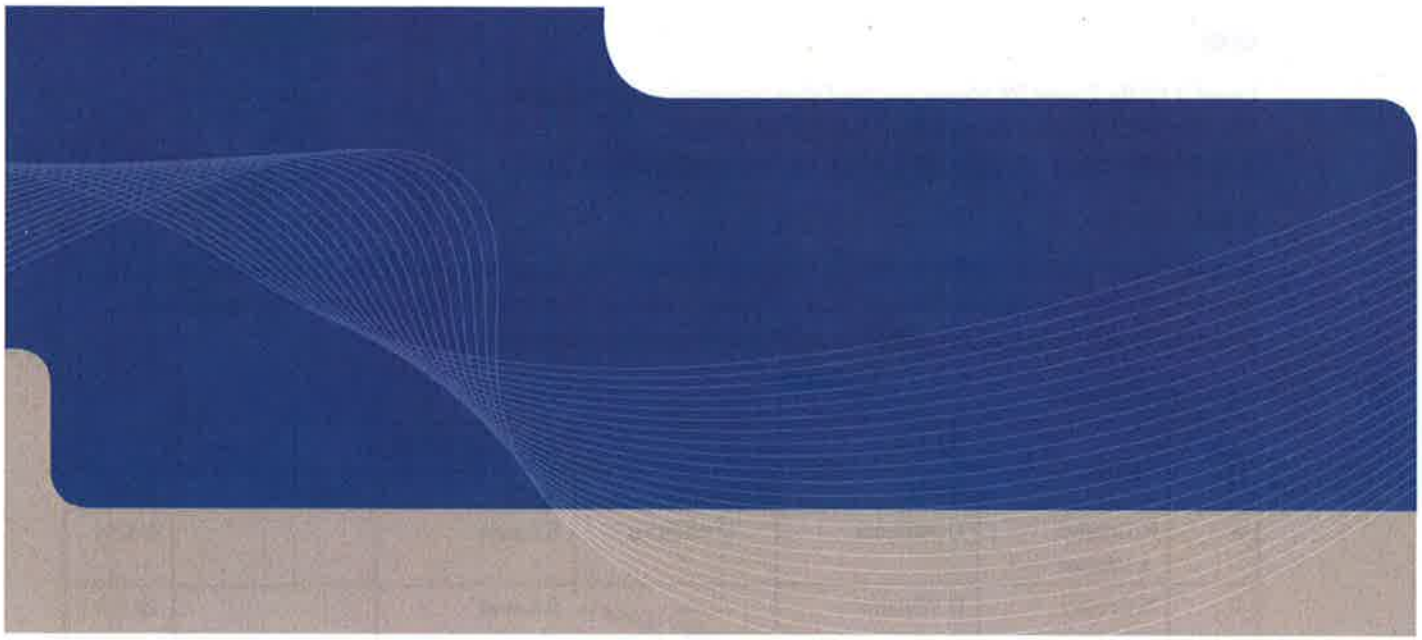
John Hannaford

Solitary Islands Retreat Biobanking Assessment

Expert Report – Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)

July 2011



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Contents

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Figure Index

1. Introduction

1.1 Background

GHD has been engaged by John Hannaford to undertake and complete an assessment using the Biobanking assessment methodology as part of a proposed seniors living development, Solitary Islands Retreat, at Lot 1, DP 1128964, Mullaway Drive, Mullaway.

1.2 Reasons for the Expert Report

An expert report may be prepared under section 4.4 of the Biobanking assessment methodology instead of undertaking a threatened species survey at a development site. The Biobanking Operational Manual (DECC 2009) states that the "*use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low*".

The purposes of using an expert report instead of a survey are to determine whether:

- *The species is unlikely to be present at the development site; in this case no further assessment of the species is required. An expert report cannot determine that a species is unlikely to be present if the land is within an identified population for that species, unless the expert report is approved by the Director General.*
- *The species is likely to be present at the development site. In this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development (depending on whether the species is flora or fauna)…; and*
- *The species is likely to be present at the biobank site. In this case the expert report must provide an estimate of the number of individuals or area of habitat on the biobank site (depending on whether the species is flora or fauna)…"*

An expert report may only be used for those threatened species and populations to which species credits apply, not for any threatened species to which ecosystems apply.

In this case, an expert report has been provided in relation to the Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*) under the provision of the first point above, due to proposal constraints not allowing time for surveys to be undertaken during the recommended seasonal periods, and by virtue of the fact that it is a threatened species for which species credits apply.

1.3 Qualifications and Experience of Experts

The Biobanking Operational Manual states that:

"*The person who prepares an expert report must be accredited under 142B(1)(b) of the methodology or have the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values (in this case, threatened species) to which the expert report relates.*"

1.3.1 GHD Expert

Kirsten Crosby

Dr Kirsten Crosby is a Senior Ecologist with GHD's Ecology Service Line. Kirsten has over ten years' ecological survey experience including five years in commercial environmental consultancy. Kirsten provides a range of services including: flora and fauna surveys; threatened species assessments; environmental impact assessments; and opportunity and constraints analyses. Kirsten has a strong background in animal ecology and identification, and has field experience throughout NSW, ACT, and parts of QLD and VIC using a wide range of survey techniques, including Elliot trapping, cage trapping, harp netting, pitfalling, infra-red cameras, spotlighting and call playback.

Kirsten has experience with urban development (including subdivisions and land release masterplans), infrastructure projects (roads, water and electricity), and mining and energy (coal mines, sand quarries and wind farms). She has managed ecology teams to prepare comprehensive and detailed reports, including Part 3A Environmental Assessments and impact assessments under Part 4 and 5 (NSW EP&A Act), Species Impact Statements (NSW TSC Act), and Referrals (Commonwealth EPBC Act). Kirsten also has experience in preparing policy documents for the Commonwealth Department of the Environment, Heritage, Water and the Arts.

Kirsten undertook her PhD field research in north-west Queensland. While her research focused on the evolution and biogeography of brush-tailed possums and cuscuses, she carried out bird, frog, reptile and general mammal surveys as well. Kirsten has experience with the fauna of north-west Queensland, the Wet Tropics, and the Kingaroy-Murgon areas. Following completion of her PhD, Kirsten worked as a technical officer and occasional lecturer at the University of New South Wales. Kirsten managed student fauna surveys in the Sydney area (botany and marine studies), Smiths Lake on the NSW North Coast (mammal, bird and invertebrate surveys), and western New South Wales (bird and mammal surveys). Kirsten lectured undergraduate classes in Invertebrate Biology, Vertebrate Zoology, Life in Arid Lands, and Palaeontology.

Kirsten has experience in the trapping and identification of small mammals, including the Eastern Chestnut Mouse.

2. Species Information

2.1 Life Cycle

The Eastern Chestnut Mouse has an oestrous cycle of 7-8 days and gestation takes about 27 days, where a litter of 1-5 (commonly 3) is then born. The species is a prolific breeder, with up to three litters produced in the breeding season, which, in NSW, extends from September to March. The nest is constructed either of grass above ground or is part of a burrow complex and the young is weaned at four weeks and are fully grown at six months old. The rapid early development is thought to favour survival of juveniles of the species (Fox, 2008).

2.2 Abundance and Distribution

The current distribution of the Eastern Chestnut Mouse is patchy and ranges from Cooktown in the North, to Emerald in the West and to Jervis Bay in the south (Fox, 2008; Meek & Triggs 1996). Fossil records indicate that this species once occurred as far south as the Grampians and the basalt plains in Victoria (Meek & Triggs 1996).

The Eastern Chestnut Mouse is generally recorded in low densities, although higher densities may occur in the two years after wildfire, in response to changes in vegetation density. Although some individuals have been observed to move up to 250 metres, most show a strong attachment to sites and have home ranges of less than 0.5 ha (Fox, 2008).

2.3 Ecology and Habitat Requirements

The Eastern Chestnut Mouse has been recorded from open woodland with a grassy understorey but is more often found in heathland and is most common in dense wet heath and swampy areas (DEC, 2005). In northern NSW, habitats include tall, open, wet sclerophyll forest with grassy ground layers such as Blady Grass (*Imperata cylindrica*). To the south it is more often recorded in heathland, dense wet heath and swampy areas (Fox, 2008).

Being a fire specialist, studies have shown that the Eastern Chestnut thrives in vegetation that is regenerating after wildfire. It is usually reported in low densities in mature vegetation, but after fire, habitat that has been burnt from 18 months to four years previously have exhibited increased Eastern Chestnut Mouse densities of up to six-fold in some areas (Fox, 2008). By the time the heath is mature, the larger Swamp Rat becomes dominant, and Eastern Chestnut Mouse numbers decrease dramatically (Meek & Triggs, 1996).

The species feeds at night via runways through the grassy and sedge understorey (Fox, 2008) and has a broad diet of grass stems, invertebrates, fungi and seeds, with the relative significance of each component varying seasonally (Luo *et al.* 1994; Luo and Fox, 1994. Very limited daytime activities have been observed (Fox, 2008).

3. Description of the Site

3.1 Background

The site comprises Lot 1 DP 1128964, Mullaway Drive, Mullaway, covering approximately 4.4 ha of land to the north of Coffs Harbour NSW within the Coffs Harbour City Local Government Area (LGA). Mullaway Drive is located on the northern boundary of the site and Darkum Road forms the eastern boundary. The location of the site is illustrated in Figure 1.

3.2 Surrounding Land Uses

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential properties and areas of recreation (i.e. golf course).

3.3 Hydrology

Site topography is generally flat (maximum grade 5-10%) with the majority of the area sloping east south east. Runoff from the site is via overland flow into two broad shallow east flowing open depressions of ephemeral character. A small leaky dam constructed upslope of the site to the west within the adjoining rural lands impedes the majority of water movement through the site after rainfall events. Water leaves the site in an easterly direction where it flows across Darkum Road into swamp sclerophyll forests immediately south of the Mullaway Beach Caravan Park prior to draining directly onto the beach immediately south of Mullaway Headland.

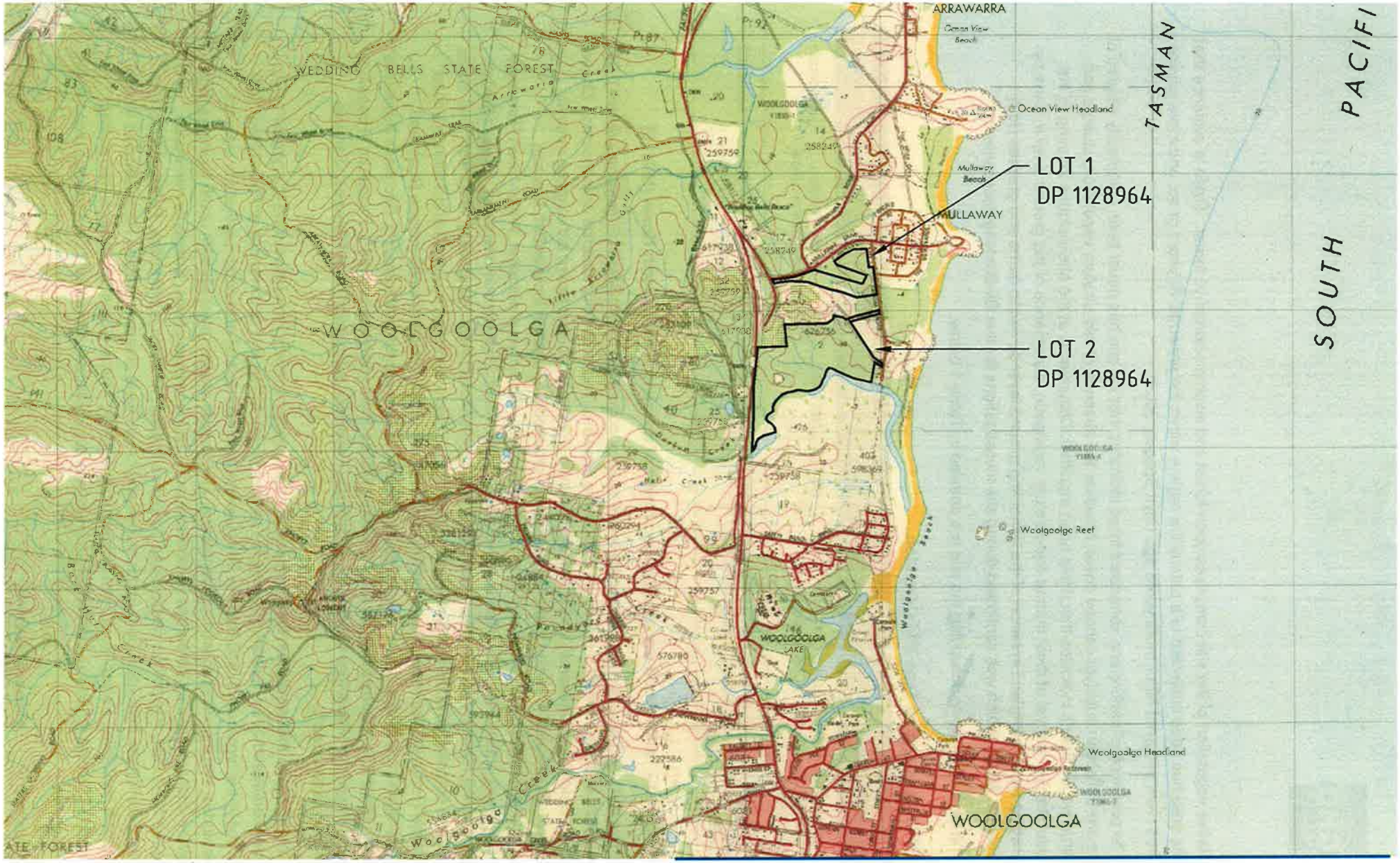
3.4 Landscape Context

3.4.1 Geology and Topography

The site is contained within the Brooms Head - Kempsey Coastal Ramp Mitchell Landscape. This landscape includes hills and low ranges of the coastal fall on lower Devonian greywacke, slate phyllite and quartzite and Permian Phyllite and schistose sandstone at elevations of 50 to 450m with local relief of up to 300m. Soils consist of thin, stony gradational loam and sandy loam on the slopes grading to yellow-brown texture-contrast soils on lower slopes and in valleys (DECC, 2008).

3.4.2 Soil Landscapes

The Soil Landscapes of the Coffs Harbour 1:100,000 Sheet identify the Megan soil landscape within the site, which consists of moderately deep to deep, well drained, structured red earths. These soils are typically strongly acidic and highly erodible with low subsoil fertility on the majority of the site.



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COMMUNITY & AGED CARE CONSULTING SERVICES
PROPOSED AGED CARE FACILITY, MULLAWAY
SITE LOCATION

job no. | 22-14304
rev no. | A

Figure 01

scale | NTS for A4 date | JAN 2009

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 14 January, 2009 - 4:51 PM Cad File No: G:\22\14304\CADD\Drawings\22-14304-FIG 1.dwg

Native vegetation of the site comprises open forest and swamp sclerophyll forest. There is evidence that the area has been subjected to a patchy fire regime within the previous 10 years or so, and more severe fires have occurred 50 or more years ago (Idyll Spaces, 2009).

The presence of mature and senescent trees indicates that the site has never been completely cleared of its pre-European eucalypt canopy cover; however the absence of mid-stratum vegetation, stumps and large woody debris indicates that it has been modified. Disturbance at the site includes thinning of the over storey, removal of most mature mid-stratum vegetation, disturbance of the ground layer in parts by grading and grazing and invasion of the remaining ground layer by exotic herbs and grasses (Idyll Spaces, 2009), which was confirmed during site investigations for this BioBanking assessment.

The vegetation types occupying the site are detailed in Table 1 below.

Table 1 Vegetation Type and Condition

Vegetation Type	ID	Conservation Significance	Description	Condition
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	NR119	Not listed.	As per detailed description below.	Moderate
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	NR161	EEC	As per detailed description below.	Moderate

Blackbutt - Tallowwood dry grassy open forest of the central parts North Coast [NR119]

This vegetation type is characterised by a tree canopy dominated by Blackbutt (*Eucalyptus pilularis*). The midstory is characterised by Red Ash (*Alphitonia excelsa*), Tuckeroo (*Cupaniopsis arachnoides*), Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*) although no specific species dominates. Species that characterise the groundcover stratum include Soft Bracken (*Calochlaena dubia*), Native Yam (*Dioscorea transversa*), *Oplismenus aemulus*, Water Vine (*Parsonsia straminea*), Native Rasberry (*Rubus parviflorus*), Indian Weed (*Sigesbeckia orientalis*), Smilax (*Smilax glyciphylla*), Snake Vine (*Stephania japonica*) and Native Violet (*Viola hederacea*). Less disturbed areas with an established understorey comprised Snake Vine (*Echinostephia aculeata*) and Trailing Guinea Flower (*Hibbertia dentata*). Weeds commonly observed within this community include Goatweed (*Ageratum conyzoides* subsp. *conyzoides**), Asparagus (*Asparagus aethiopicus**), *Baccharis halimifolia**, Moth Plant (*Gomphocarpus fruticosus**), Mickey Mouse Plant (*Ochna serrulata**), Paspalum (*Paspalum* sp*), Passiflora (*Passiflora suberosa**), Passiflora (*Passiflora subpeltata**) and Fireweed (*Senecio madagascariensis**).

On midslopes this vegetation type includes the tree canopy species Pink Bloodwood (*Corymbia intermedia*) and Grey Ironbark (*Eucalyptus siiderophloia*). Infrequent occurrences of Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon confertus*) also occur particularly in moist ecotones with adjoining downslope vegetation. Moist upper slopes generally with south facing aspect where characterised by Wiregrass (*Aristida vagans*), *Brunoneilia australis*, *Goodenia hederacea*, *Hibbertia vestita*, *Hybanthus stellarioides*, *Lindsaea linearis*, *Morinda jasminoides*, *Patersonia sericea* and *Solenogyne bellioides*. Drier upper slopes and crests were characterised by Red-stemmed Wattle (*Acacia myrtifolia*), Poison Rock Fern (*Chielanthes sieberi*), Plume Grass (*Dichelacne micrantha*), Glycine (*Glycine tabacina*), Hardenbergia (*Hardebergia violaceae*), Dogwood (*Ozothamnus diosmifolia*),

and Geebung (*Persoonia stradbrokensis*). Weed species included Smooth Catsear (*Hypochaeris glabra**), Catsear (*Hypochaeris radicata**) and *Lilium formosanum**.

Sheltered upper slopes where characterised by the canopy species Tallowwood (*Eucalyptus microcorys*), Brush Box (*Lophostemon confertus*) and Red Mahogany (*Eucalyptus resignifera*) in addition to Blackbutt and Pink Bloodwood. Forest Sheoak (*Allocasuarina torulosa*), Hopbush (*Dodonaea triquetra*), Native Olive (*Notelaea ovata*), Coffee Bush (*Breynia oblongifolia*) typically characterised the midstory. Groundcovers where typically characterised by an assemblage consisting of Apple Dumplings (*Billardiera scandens*), Centella (*Centella asiatica*), Barbed Wiregrass (*Cymbopogon refractus*), *Dianella caerulea*, Kidney Weed (*Dichondra repens*), *Dipodium variegatum*, Hedgehog Grass (*Echinopogon ovatus*), Broad-leaved Wiry Panic (*Entolasia marginata*), Wiry Panic (*Entolasia stricta*), *Geitonoplesium cymosum*, Glycine (*Glycine microphylla*), *Gonocarpus humilis*, Guinea Flower (*Hibbertia aspera*), Blady Grass (*Imperata cylindrica*), *Kennedia rubicundra*, Sword Sedge (*Lepidosperma laterale*), Matt Grass (*Lomandra longfolia*), Many-flowered matt Grass (*Lomandra multiflora*), Weeping Grass (*Microlaena stipoides*), Sour Sob (*Oxalis exilis*) and Forest Panic (*Panicum similie*). Weeds typically observed in these parts of the site include Cobblers Pegs (*Bidens pilosa**), Fleabane (*Conyza bonariensis**), Lantana (*Lantana camara**) and *Polygala paniculata**.

Occurring on the edges of ephemeral open drainages are the species Long-leaf Wattle (*Acacia longissima*), *Homalanthus populifolius*, Pale Grass Lilly (*Caesia parviflora* var *parviflora*), Small St Johns Wort (*Hypericum gramineum*), *Persoonia stradbrokensis*, Thyme Spurge (*Phyllanthus hirtellus*) and Hairy Bush Pea (*Pultenaea villosa*). Bangalay Palm (*Archontophoenix cunninghamiana*) was observed within the drainage line with species such as *Hakea eriantha*, Water Couch (*Paspalum distichium*) and various sedge species.

Transitional zones between the drier parts of the vegetation community and swamp sclerophyll forests include species such as *Polymeria calycina*, Elderberry Panx (Polyscias sambucifolia), Whiteroot (*Pratia purpurascens*), Bracken (*Pteridium esculentum*), Notched Bush Pea (Pultenaea retusa), Senna (*Senna pendula**), Gorse Bitter Pea (*Daviesia ulicifolia*) and Nodding Fringe Sedge (*Fimbistylis nutans*) and Kangaroo Grass (*Themeda australis*).

Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast [NR161]

The tree canopy is mostly dominated by Broad-leaved paperbark (*Melaleuca quinquenervia*). Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suaveolens*) form associate canopy species in varying densities, with their occurrence potentially affected by past land clearing events. Pink Bloodwood and Grey Ironbark also occur at the finges of this vegetation type where it grades into the upslope Blackbutt Tallowwood vegetation type.

Shrub species such as Cheese Tree and Wild Tobacco (*Solanum mauritianum**) occurred infrequently and were associated with the more disturbed parts of this community. Crofton Weed (*Ageratina adenophora**) was a commonly observed weed species within these parts of the site.

The understory is predominantly herbaceous consisting of sedges and herbs although a dense coverage of Paspalum (*Paspalum wettsteinei**) was commonly observed. Sedge species observed include *Lepidosperma quadrangulata*, *Schoenus apogon*, *Cyperus polystachyos*, *Fimbristylis dichotoma*, Spike Rush (*Eleocharis phillipensis*) and Giant Parramatta Grass (*Sporobolus fertilis**). Sedges restricted to the wetter areas include Twig Rush (*Baumea articulata*) and *Gahnia seiberiana* although these species were highly restricted and did not form dense thickets otherwise representative of semi-permanent to permanently wet areas.

Occurring at the base of more mature Forest Red Gum and Pink Bloodwood is a standard suite of herbs species including Native Violet (*Viola hederacea*), Pennywort (*Hydrocotyle pedunculata*) and *Cyperus gunnii*. Devils Twine (*Cassytha glabrella*) and Glycine (*Glycine clandestina*) also occur in close proximity to Eucalypt trees although their abundance is not notably high.

3.5 Prior Field Surveys

Flora and fauna surveys of the site have been undertaken on the site by Kendall and Kendall (2010), Idyll Spaces Environmental Consultants (2009) and GHD in 2009, 2010 and 2011. Studies conducted by Kendall and Kendall (2010) are particularly relevant to this report. Targeted surveys for the Eastern Chestnut Mouse via the use of hair tubes failed to detect this species within the site.

4. Expert Assessment and Conclusion

4.1 Potential Habitat in the Site

The two vegetation types present in the site could support the Eastern Chestnut Mouse, however, the cover of the ground layer is generally not dense enough for this species. Much of the shrub layer has been removed from the site, as have fallen timber and logs. The ground layer is also generally low across the site. Areas of Paperbark swamp forest with a dense cover of Sword Sedge do, however, provide low to moderate potential habitat for this species, which forages in runways through the grassy and sedge understorey.

4.2 Local Records

There are no records of the Eastern Chestnut Mouse within the locality (10 km radius of the site). There are also no records of the Eastern Chestnut Mouse on either the Moonee Beach or the Woolgoolga 1:25000 map sheets, or from the Coffs Coast and Escarpment subregion of the Northern Rivers Catchment Management Authority. Given the lack of records, the low to moderate quality of habitat on site (general lack of dense ground cover), and fragmentation of habitat in the locality, it is considered unlikely that the species would occur at the site.

4.3 Likelihood of Occurrence

Table 2 provides a summary of the sites habitat quality and potential occurrence for the Eastern Chestnut Mouse within each of the identified vegetation types.

Table 2 Habitat Quality and Potential Occurrence for the Eastern Chestnut Mouse in the Site

Vegetation Type	Habitat Quality	Potential Occurrence
Blackbutt – Tallowwood dry grassy open forest of the central parts North Coast (Blackbutt – Tallowwood)	**Low.** Ground layer vegetation consists of sparse cover of Blady Grass (*Imperata cylindrica*) and herbs over a mid-dense cover of soft grasses and ferns.	**Unlikely**
Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast (Forest Red Gum – Swamp Box)	**Low to Moderate.** Ground layer vegetation ranges from sparse grass in the more elevated areas to dense cover of Sword Sedge (*Lepidosperma quadrangulatum*).	**Possible**

4.4 Conclusion

The Eastern Chestnut Mouse is not likely to be present at the site as:

- There are no records of the species in the locality;

- There are no records of the species from the Coffs Coast and Escarpment subregion of the Northern Rivers Catchment Management Authority;
- Habitat at the site is generally of a low quality due to the lack of a dense groundcover;
- There has only been patchy fire in the last 10 years and no recent wildfire; and
- Good quality habitat is likely to be highly fragmented in the locality.

A species polygon is not required for the Eastern Chestnut Mouse as this species is considered unlikely to be present at the site. Species credits will not be generated for this species, and the proposal therefore does not require the retirement of species credits for the Eastern Chestnut Mouse.

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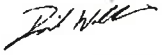
Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	K.Crosby J. Walker	D Williams	*D Williams*	S Lawer		9-5-11
1	K.Crosby	D Williams		S Lawer		26-7-11

Appendix E

Red Flag Variation Report

1. Red Flag Variation

Clearing of the TSC Act listed Endangered Ecological Community Subtropical Coastal Floodplain Forest (STCFF) (referred to as Forest Red Gum – Swamp Box [NR161] in the BioBanking methodology) comprises an impact on a red flag area as defined in the BioBanking Assessment Methodology (DECCW, 2009). NR161 is considered a 'red flag' because it is a vegetation type conforming to the description of STCFF and is in 'moderate to good' condition, not because it is an 'over cleared' or 'highly cleared' vegetation type according to the methodology. Therefore the proponent requires a determination that "impact on red flag areas can be regarded as improving or maintaining biodiversity values' from the Director General of DECCW (a 'red flag variation').

The Director General can only make that determination if satisfied that the criteria outlined in Section 2.3 of the BioBanking Assessment Methodology (DECCW, 2009) are met by the proposed development. An assessment of the Section 2.3 criteria as they relate to the clearing of NR161 at the site is presented below.

1.1 Consideration of Options to Avoid Impacts on the Red Flag Area

1.1.1 Avoidance and mitigation of adverse impacts on the red flag area

The proposed development is expected to have an impact on 0.8 ha of STCFF EEC. The development proposed has considered the following during project design phases:

- The built form has been reduced, while maintaining project viability, to minimise impacts to biodiversity.
- The design has incorporated managed bush fire asset protection zones which will include native vegetation. The proposed OPA would be managed to maintain a discontinuous canopy, groundcovers with a maximum 25% of the middle storey maintained. The inclusion of a managed OPA has the affect of:
- Further minimising impacts on STCFF (0.5 ha to be managed as an OPA rather than being cleared); and
- Avoiding hollow bearing tree resources.
- The development will include a Tree Management Plan allowing for protection and management of significant trees throughout the development.

1.1.2 Measures to improve the viability of the red flag area

The STCFF on the site is currently in moderate / good condition. Of the 0.8 ha of STCFF on the development site, 0.5 ha will be retained within a bush fire OPA. This area will be managed as an OPA, which would involve the retention of a representative tree canopy cover (connectivity and foraging habitat for mammals and birds) adjacent to remnant native vegetation (acting as a buffer between development and areas of offsite native vegetation). Reduction of exotic plant cover in preference for native sedge/ herb alternative and placement of fallen logs in a manner that is consistent with the Planning for Bush Fire Protection 2006 guidelines would also be undertaken within the OPA area

1.2 Consideration of highly cleared vegetation types

The site does not include vegetation that 'fits' the description of a highly cleared vegetation type as per the BioBanking methodology. The current distribution of STCFF is estimated to be 'less than 30% of its original range' (DECC, 2004). Current estimates for NR161 indicate it has experienced a 60% contraction in its pre-European extant coverage (DECC, 2008).

1.3 Contribution to Regional Biodiversity Values

For this criterion, region is defined as both the CMA subregion where the red flag area is located and the adjoining CMA subregions.

1.3.1 Relative Abundance

STCFF has a distribution, from Karuah/Manning right through to Richmond/Tweed. NR161 is more limited in distribution from the Richmond to the Manning with more dominant stands between the Clarence and the Macleay. It is estimated that 40% (see Section 1.3.2 below) remains in these areas.

1.3.2 Percent Remaining.

According to the NSW Vegetation Types Database the vegetation type NR161 is estimated to be 60% cleared (or 40% remaining) in the Northern Rivers CMA region (DECC 2008). Therefore, NR161 is not considered a 'highly cleared' or 'over cleared' vegetation type by the methodology. The percent cleared in the Coffs Coast Escarpment CMA subregion, as provided from the BioBanking calculator is also estimated to be 60% cleared. Therefore the percent remaining is not 'high' as defined in Section 2.3 (DECCW, 2009).

1.3.3 Percent Native Vegetation Remaining

The 1000 ha circle used for the landscape assessment component of this assessment was estimated to have 41 to 50% native vegetation cover. There is an even higher percentage (estimate 80%) of native vegetation remaining in the Coffs Coast and Escarpment CMA subregion. Additionally, 80-90% of ecosystems are contained within the reserve system. (DECC 2009).

1.3.4 Condition of native vegetation in the region

The vegetation mapped in the region by NPWS (2003) and DECCW (2009) varies from large, relatively intact patches to vegetation influenced by agriculture and clearing for urban development. Vegetation associated with agriculture and urban development exhibit the usual 'edge effects' such as weed invasion, increased nutrient runoff etc. The large areas of intact forests, including National Parks and State Forests are generally in good condition, aside from edge effects. Further DECCW (2009) mapped large areas of vegetation in the region as having 'moderate to very high' conservation values and NPWS (2003) mapped large areas of the region as having 'intermediate to high' quality fauna habitat.

1.3.5 Relative abundance of threatened Species and habitat on site

N/A – the red flag area does not pertain to a threatened species.

1.4 Viability of the Red Flag Area

1.4.1 Current known or future use of surrounding areas

The site is located within the existing coastal village of Mullaway and is bound by residential properties to the north and east and rural land to the west and south. Vegetation cover in the area is characterised by a network of cleared land used for agriculture, urban development and major infrastructure corridors within a forested landscape (Idyll Spaces, 2009). Aerial imagery shows large expanses of native vegetation cover to the north and south with fragmentation primarily attributed to urban development including residential precincts and areas of recreation (i.e. golf course). It is anticipated that much of this land use character would remain consistent through time.

1.4.2 Size and connectivity

The development site contains a total of approximately 4.4 ha of native vegetation, of which 0.8 ha is STCFF.

The STCFF to be cleared on the site has been partially isolated by surrounding roads, past agricultural activities and residential development (i.e. variegated landscape). However, the development site has connectivity to offsite vegetation to the east and south, and to a higher conservation value *Category 1 – National Parks and Nature Reserves* corridor that is located further east along the coastal dune system. STCFF on site is also not the only occurrence of STCFF in the locality. As such, the proposed development will not significantly change the connectivity of the vegetation on site to adjoining patches.

1.4.3 Condition of the red flag area

The STCFF on the site is generally in moderate / good condition although is in a modified state as a consequence of past disturbances associated with livestock grazing and periodic understory management (slashing), resulting in a reduced canopy and a groundcover with high exotic plant cover. The patch has experienced severance by roads, past agricultural activities and residential development that surround the site. The site is exposed to edge effects and without active management these impacts would degrade vegetation condition over time.

1.5 References

DECC NSW 2009, Draft Northern Rivers Regional Biodiversity Management Plan, Sydney

DECC NSW 2008, Biometric Vegetation Types Database

Scotts, D., 2003, Key habitats and Corridors for Forest Fauna – A Landscape Franmework for Conservation in North-east NSW. NPWS Sydney

GHD

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
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0	M Aitkens	D Williams		S Lawer		26-7-11

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	M Aitkens	D Williams		S Lawer		01/08/2011

Appendix F

Ryan Bus Services Letter

RyansBusService
COFFS HARBOUR - WOOLGOOLGA - GRAFTON

9 Hurley Drive Coffs Harbour NSW 2450 **p:** 02 6652 3201 **f:** 02 6651 9000
19-21 Hawke Drive Woolgoolga NSW 2456 **p:** 02 6654 1063 **f:** 02 66540177
www.ryansbusservice.com.au
Established 1943

26 November 2010.

Mr D Smith
Director
Community and Aged Care Consulting Services
327 Forest Road
Bexley NSW 2207

Dear David,

Provision of Bus Services and Stop to Proposed Residential Care Facility Lot 2 DP 1128964 Darkum Road, Mullaway.

We refer to our telephone discussions and the copy of the Facility design plan provided to us which shows the anticipated location of the proposed facility adjacent to the existing houses at the Southern end of Darkum Road, Mullaway.

Ryans Bus Service would consider the provision of a bus service to the site if a Bus Stop were to be provided on the site near to the facility. This will allow us to pick up and set down staff, visitors and residents on our service routes to and from Coffs Harbour and Grafton. The provision of such a service would need to be considered by our company and are dependent on several factors, including timetabling issues and patronage – please note, that this letter is not a commitment by our company to provide a service into Darkum Road, but a letter of consideration.

Construction of the Bus Stop will be subject to the approval of Coffs Harbour City Council and the design would need to meet Council's conditions and terms for bus shelters.

Should you require any additional support or assistance, please call me on (02) 6652 3201.

Yours Sincerely,

Nigel Tooth
Operations Manager
Ryans Bus Service

Appendix G

Ryan Bus Service Timetable

COFFS HARBOUR - WOOLGOOLGA - GRAFTON

MONDAY TO FRIDAY SERVICES												SATURDAY	
Departs	AM	AM	AM	AM	AM	AM	PM	PM	PM	PM	PM	AM	PM
Coffs Hbr Park Ave Carpark	6.55 No service from Coffs to Red Rock	7.30 No service Coffs to Red Rock	8.00	-	9.30	10.15	1.00	3.20 No service for south of Woolg.	3.30	4.15	5.30	8.30	1.00
Park Beach Plaza	-	-	-	-	9.35	10.20	1.05	3.35	3.35	4.20	5.35	-	1.05
Korora Bridge	7.02	7.37	8.07	-	9.37	10.25	1.15	-	3.45	4.30	5.40	8.35	1.10
Sapphire - Hway	7.05	7.40	8.10	-	9.40	10.28	1.20	-	3.50	4.35	5.43	8.40	1.20
Moonee Beach	-	-	8.15	-	-	-	1.25 O/R for Coffs pax	-	3.55 O/R for Coffs pax	4.40	5.48 O/R for Coffs pax	-	O/R for Coffs Pax
Moonee - Highway	7.05	7.42	-	-	9.45	10.32	1.25	-	3.55	4.35 . For nth bound pax	5.48	8.45	1.25
Emerald Beach	-	-	-	-	9.50	-	1.35	-	4.05	4.45	5.53 O/R for Coffs pax	-	1.30
Emerald - Highway	7.10	7.45	8.20	-	-	10.37	-	-	-	-	5.53	8.47	-
Sandy Beach	-	7.50	-	-	10.00 full loop	-	1.45 full loop	-	4.10	4.55	O/R for Coffs pax	8.50	1.40
Raj Mahal	7.25	8.05 Nth Bound Only	8.40	9.22	10.10	-	1.50	4.05	4.15	5.05	-	-	-
Woolgoolga Oval Beach St	7.22	8.00 i	8.55	9.20	10.25 i	10.45	2.10 i	4.00	4.30 i	5.05	6.15	8.55	1.50
Safety Beach	7.26 *	8.06*	-	9.23*	O/R	-	O/R	-	O/R	O/R	-	-	-
Mullaway Store	7.28*	8.08*	-	9.24*	O/R	-	O/R	4.10*	O/R	O/R	-	-	-
Arrawarra Headland	7.29*	8.09*	-	9.25*	O/R	-	O/R	4.11*	O/R	O/R	-	-	-
Arrawarra Beach Rd	7.30*	8.10*	-	9.26*	O/R	-	O/R	4.12*	O/R	O/R	-	-	-
Darlington Park	7.33	8.13*	-	9.27*	O/R	-	O/R	4.25	O/R	O/R	-	-	-
Corindi Beach	7.35 i	8.15	-	9.30	O/R	-	O/R	4.30 i	4.45	O/R	-	-	-
Red Rock	7.25 i	7.35	-	9.35	O/R	-	3.50	4.35	O/R	-	-	-	-
Kungala Rd	7.49	8.30	-	-	-	-	-	4.55	5.10	-	-	-	-
South Grafton - Bi-Lo	8.10	8.50	-	-	-	-	-	5.15	5.30	-	-	-	-
Grafton - Prince St	8.40	9.00	-	-	-	-	-	5.25	5.35	-	-	-	-

GRAFTON - WOOLGOOLGA - COFFS HARBOUR

MONDAY TO FRIDAY SERVICES											SATURDAY	
Departs	AM	AM	AM	AM	AM	AM	PM	PM	PM	PM	AM	PM
Grafton - Prince St Market Sq	6.55	6.55	-	-	-	-	-	3.20	3.30	-	-	-
South Grafton Skyline Car Care	7.00	7.00	-	-	-	-	-	3.40	3.40	-	-	-
Kungala Rd	7.20	7.20	-	-	-	-	-	4.05	4.00	-	-	-
Red Rock	-	7.35	-	7.25	-	9.35	-	-	-	-	-	-
Corindi Beach	7.35 i	7.42	-	7.30	-	9.50	-	4.25 i	4.18	-	-	-
Darlington Park	7.40	7.45	-	-	-	9.55	-	4.30*	4.20*	-	-	-
Arrawarra Beach Rd	7.41	7.46*	-	-	-	-	-	4.30*	4.20*	-	-	-
Arrawarra Headland	-	7.47*	-	7.40	-	10.05	-	4.35*	4.25*	-	-	-
Mullaway Store	7.43 *	7.47*	-	7.45	-	10.10	-	4.35*	4.25*	-	-	-
Safety Beach	7.45 *	7.48*	-	7.50	-	10.15	-	4.40*	4.28*	-	-	-
BP Service Station Woolgoolga	7.55	7.50	-	7.55 i	-	10.16	-	4.40	4.28	-	-	-
Raj Mahal	-	-	-	-	-	10.10	1.50	-	4.10	-	-	-
Woolgoolga Oval Beach St	-	8.00 i	7.35	8.00	9.00	10.30 i	2.00	4.30	4.30 i	6.15	9.00	2.00
Sandy Beach	-	-	7.40	-	9.10	-	2.10 full loop	-	O/R for Woolg Pax	-	-	-
Emerald Beach	-	8.10	7.52	8.10	9.20	10.40	2.20	-	O/R for Woolg Pax	-	9.10	-
Emerald - Highway	-	-	-	-	-	-	-	4.40	4.40	6.25	-	2.08
Moonee Beach	-	-	7.55	-	-	10.50	-	-	-	-	9.20	-
Moonee Roundabout	-	8.15	-	8.15*	9.25	-	2.25	4.45*	4.45	6.30	-	2.10
Sapphire - Highway	-	8.20		8.20	9.30	10.57	2.27	4.49	4.49	6.34	9.25	2.23
Korora Bridge	8.10 i for Park Ave	8.25	8.10 i	8.25	9.35	11.00	2.30	4.52	4.52	6.37	9.30	2.25
Park Beach Plaza	8.20	8.35	-	8.35*	9.40	11.10	2.35	4.55	4.55	-	9.40	2.30
Coffs Hbr Park Ave Carpark	8.25	8.40	8.30	8.45	9.45	11.20	2.40	5.00	5.00	6.40	9.45	2.35

RyansBusService
COFFS HARBOUR - WOOLGOOLGA - GRAFTON

Due to Pacific Highway Upgrade from 2010-2013, times may vary due to delays

HOW TO USE THIS GUIDE

1) Please check the colour coded times on the timetable. We use three different colours for our services.

Black is for bus services all year round.

Green is for school days only.

Red is for school holidays only.

2) Please check any notes on the times listed in the timetable.
An * means that there is Highway Pick up only.
An i means that you will be required to interchange buses—please check with the driver in this case.
O/R means On Request. Please check with driver or office on these occasions.
O/R for Coffs Pax means the service will only enter the area at the request from a passenger boarding at Coffs Harbour.
O/R for Woolg Pax means the service will only enter the area at the request from a passenger boarding at Woolgoolga.
Full Loop means service runs the full loop around Ironbark Avenue in Sandy Beach. All other services within Sandy Beach, the bus will loop around Acacia Avenue.

Please note: If you wish to catch the 3.20pm service from Coffs Harbour to travel north of Woolgoolga and you are boarding north of the Plaza, you will need to contact our office prior to 2.30pm to organise this request.

Appendix H

Bushfire Hazard Assessment

CLIENTS PEOPLE PERFORMANCE

John Hannaford

Proposed Solitary Island Retreat at Lot 1 DP 1128964, Darkum Road, Mullaway

Bushfire Hazard Assessment

August 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

Appendices

1. Introduction

GHD Pty Ltd (GHD) has been engaged by John Hannaford to undertake a Bushfire Hazard Assessment for the proposed Solitary Island Retreat, Seniors Living Development at Darkum Road, Mullaway.

Coffs Harbour City Council (CHCC) has identified the site as being bushfire prone land. The development would be considered 'Special Fire Protection Purposes' (SFPP).

This report has been prepared to address s.100B of the *Rural Fires Act 1997*, cl.44 of the *Rural Fires Regulation 2008* and *Planning for Bushfire Protection* (PBP 2006) (NSWRFS, 2006).

In particular it addresses the matters listed in Appendix 4 of PBP 2006 *Submission Requirements for DAs on bush fire prone land* (NSWRFS, 2006 p.67).

2. Site Description

2.1 Site Location

The subject site is Lot 1 DP 1128964, Darkum Road, Mullaway and encompasses an area of approximately 15.5 hectares. It is located approximately 25 km north of Coffs Harbour and is in the Coffs Harbour City Council (CHCC) Local Government Area, as shown in Figure 1, Appendix A.

2.2 Site Description

The subject site is located immediately to the west of the existing coastal village of Mullaway and is bounded by small rural properties and residential development to the north, environmental protection land and residential development to the east, rural properties to the south and west.

As shown on Figure 2, Appendix A, the site is almost completely vegetated with two endangered ecological communities (EEC) that are listed under the NSW *Threatened Species Conservation Act 1995* (*TSC Act*). The EEC's are Subtropical Eucalypt Forest on Coastal Floodplains (SEFCF) EEC and Swamp Sclerophyll Forest on Coastal Floodplains (SSFCF) EEC. This vegetation is also classified as Secondary Koala Habitat on CHCC's Koala Habitat Maps.

The subject land has been substantially modified from its natural state by previous land use activities including slashing, cattle grazing and fencing undertaken by the landholder.

A dwelling has been constructed along the northern boundary of the subject site, adjacent to Mullaway Drive. No other development or major capital improvements exist on the land. A valid development consent granted by CHCC exists for fifteen (15) holiday cabins and associated development in the centre of the site.

The land is currently serviced with reticulated water, sewer, electricity and telephone services.

2.3 Proposal

The proposed development includes:

- the construction of thirty four (34), one (1) storey multi-dwelling buildings containing of twenty six (26) two (2) and eight (8) three (3) bedroom self-contained dwellings for seniors or people with a disability;
- thirty four (34) garages, one per dwelling;
- surface visitor car parking for eight (8) vehicles;
- a one storey development for a central administration and care facility; and
- a one storey maintenance/ garbage recycling shed;
- the removal of trees, earthworks and landscaping.

The layout of the development is shown in Figure 3, Appendix A.

3. Bushfire Threat Assessment

3.1 Desktop Review

CHCC bushfire prone land maps were reviewed to determine whether the subject site was mapped as bushfire prone land before conducting the site visit. The review revealed that the site contains Category 1 bushfire prone land, as shown in Figure 4, Appendix A.

3.2 Field Investigations

A site inspection of the site was conducted by GHD on 26 November 2009. The site inspection assessed slope and vegetation types at the location of the proposed development in accordance with the PBP 2006.

Six 140 m transects were surveyed at the location of the proposal as shown on Figure 2, Appendix A. Along each transect, slope and vegetation type (if any) or residential development were measured and recorded at locations where significant change occurred. Photographs were also taken of the vegetation or residential development along each transect as shown in Appendix B.

Slope was measured using a clinometer.

Vegetation type was assessed based on the formation descriptions of Keith (2004) provided in PBP 2006.

3.3 Analysis

Field data was assessed in accordance with the PBP 2006 to determine the bushfire hazard and Asset Protection Zones (APZ) necessary to meet PBP 2006 requirements. Information collected during the site inspection was entered into the RFS online APZ Calculator to determine the required APZs.

3.4 Results

A summary of the results of the bushfire hazard assessment at the site is provided in Table 1. An aerial photograph depicting the site and its vegetation is provided in Figure 2, Appendix A and photographs displaying the vegetation associated with each transect is provided in Appendix B.

Table 1 Summary of Fire Hazards for the Proposed Development

Transect	Predominant Vegetation	Effective Slope
1	Forest	2° Upslope
2	Forest	2° Upslope
3	Forest	1° Downslope
4	Forest	3° Upslope
5	Forest	2° Upslope
6	Residential	1° Upslope
7	Residential	Flat
8	Residential	4° Downslope

4. Compliance with PBP 2006

As the proposed development is considered SFPP, the specific objectives are to:

- *"provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.*
- *provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats.*

  During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bush fire is imminent".

To achieve the above objectives, Section 4.2.7 of PBP 2006 outlines the intent and various performance criteria and acceptable solutions. The following sections demonstrate how the proposal complies with these requirements.

4.1 Asset Protection Zones

"Intent of measures: to provide sufficient space for firefighters and other emergency services personnel, ensuring radiant heat levels permit operations under critical conditions of radiant heat smoke and embers, while supporting or evacuating occupants"

To satisfy the performance criteria relating to asset protection zones (APZ), a variable APZ will be provided for the proposal. The APZs required for the proposal, are shown in Table 2 below and Figure 2, Appendix A. The APZs were determined using the RFS APZ Calculator, the reports from the RFS APZ Calculator are provided in Appendix C. As shown on Figure 3, Appendix A, the external wall and entrances of most of the proposed dwellings are located outside the APZ. One dwelling has a small corner of the building inside the APZ, as are two of the decks and two garages but this is considered to be acceptable because:

- It is only a very small section of the dwelling that would be exposed;
- The decks would be constructed of non-combustible materials;
- The hazard, in relation to the decks and corner of the dwelling, is a relatively small (2 ha), narrow (70m) finger that penetrates the site which is upslope and has been largely cleared for agricultural purposes.
- The hazard is generally upslope from the proposed development;
- The hazard has been significantly thinned to accommodate agricultural activities;
- The hazard, in relation to the garages that are within the APZ, is separated by Darkum Road and the caravan park which would limit the threat from this hazard;
- The exits of all the dwellings are outside the APZ, as required by Section 4.2.7 PBP 2006;
- This development would significantly reduce the bushfire risk to the existing neighbouring residential development along Darkum Road and Mullaway Drive.

Table 2 Proposed Asset Protection Zones (SFPP)

Transect	Vegetation Class	Slope	Asset Protection Zone[1]			
			APZ	IPA (m)	OPA (m)	Comment
1	Forest	2° Upslope	50	31	19	Wet sclerophyll
2	Forest	3° Upslope	48	29	19	Scattered eucalyptus
3	Forest	2° Upslope	50	31	19	Scattered eucalyptus
4	Residential	1° Upslope	-	-	-	Not considered a hazard[2]
5	Residential	Flat	-	-	-	Not considered a hazard[2]
6	Residential	4° Downslope	-	-	-	Not considered a hazard[2]

[1] *Asset Protection Zones, refer to Section 4.1.1 and 4.1.2*

[2] *PBP 2006 does not consider buildings and residential areas to be a hazard, as follows:*

"For the purposes of assessments, the following are not considered a hazard or as a predominant vegetation class/ formation and can be included within an asset protection zone:

a. *Non-vegetated areas including roads, footpaths, cycleways, waterways, buildings, rocky outcrops and the like; and*
b. *Reduced vegetation including maintained lawns, golf course fairways, playgrounds or sport fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries."*

4.1.1 Inner Protection Area (IPA)

As shown on the landscape plan (Figure 5, Appendix A), the IPA for the development is to be managed to the following specification as defined by PBP 2006 (RFS 2006 p.51):

> *"An IPA should provide a tree canopy of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground"*

4.1.2 Outer Protection Area (OPA)

Figure 5, Appendix A also shows that the OPA for the development is to be managed to the following specification as defined by PBP 2006 (RFS 2006 p.51):

> *"An OPA should provide a tree canopy cover of less than 30% and should have an understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September)""*

Further details on the management and maintenance of Asset Protection Zones is provided in section 4.1.3 of this report.

4.1.3 Asset Protection Zone Maintenance

To ensure that the development is not exposed to bushfire hazard from the non-maintenance of fuels, vegetation within the APZs is to be managed in accordance with Standards for Asset Protection Zones (NSW RFS 2006), *i.e.:*

Raking or manual removal of fine fuels:

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter), and bark should be removed on a regular basis.

Mowing of grass:

Grass needs to be kept short and where possible, green.

Removal or pruning of trees, shrubs and understorey:

Prune or remove trees so that there is no continuous canopy leading from the hazard to the asset. Separate tree crowns by at least two to five metres or in accordance with IPA and OPA specifications. A canopy should not overhang within two to five metres of a building.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

The vegetation is also to be managed in accordance with Appendix 5 of PBP 2006 to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters.

4.2 Internal Roads

Intent of measures: "to provide safe operational access for emergency services personnel in suppressing a bushfire while residents are accessing or egressing an area."

The internal roads would enable safe access for emergency services and allow crews to work with equipment about the vehicle by the provision of:

- internal roads that are two-wheel drive, sealed, and all-weather
- the perimeter road between the dwellings and the hazard would provide at least two-traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions. In the absence of a perimeter road, a path would be provided between the dwellings and hazard that would be suitable for emergency service vehicles;
- all dead end roads are less than 320 m from the nearest public road and this is considered acceptable because:
  - Each dead end has a driveway that would act as a turning bay for emergency vehicles. The roads would also be clearly sign posted as a dead end.
  - The bushfire hazard, in relation to the development, is a relatively small (2 ha), narrow (70m) finger that penetrates the site which is upslope and has been largely cleared for agricultural purposes.
  - This development would significantly reduce the bushfire risk to the existing neighbouring residential development along Darkum Road and Mullaway Drive.
- traffic management devices are constructed to facilitate access by emergency services vehicles.
- a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.
- curves that have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- access roads with a minimum distance between inner and outer curves is six metres

- access roads where maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees and crossfall of the pavement is not more than 10 degrees.
- roads that do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge)
- roads that would be clearly sign-posted and bridges clearly indicate load ratings
- road surfaces and bridges that would have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

4.3 Water, Gas and Electricity

"Intent of measures : to provide adequate water services for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to buildings."

The proposed development would have access to reticulated water services. Access points for reticulated water supply would incorporate a ring main system for all internal roads. Fire hydrant spacing, sizing and pressures are assumed to comply with AS 2419.1 – 2005.

Electrical transmission lines are located along Darkum Road and are overhead, however vegetation is regularly maintained in this urban area, therefore it is unlikely to contribute to the risk of fire to a building. All new electrical transmission lines within the proposed development will be underground.

No mains gas services are provided in the area.

4.4 Emergency and Evacuation Planning

"Intent of measure: to provide suitable emergency and evacuation (and relocation) arrangements for occupants of special fire protection purpose developments."

An Emergency and Evacuation Management Plan would be developed by an Emergency Planning Committee that complies with the RFS Guidelines for the 'Preparation of Emergency/Evacuation Plan', AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces for residential accommodation' and AS 4083-1997 'Planning for emergencies for health care facilities'.

The Emergency and Evacuation Management Plan would be provided to the relevant fire authority for approval prior to occupation of the development.

4.5 Environmental Impact

The APZ would involve some clearing of an endangered ecological community (EEC). The impact of the clearing has been considered in a Biobanking Assessment (GHD, 2011). This acknowledges the proposal, including the APZ, would impact the ecology of the site but identifies the credits required to compensate for this impact.

5. Conclusion

GHD has undertaken a Bushfire Hazard Assessment for the proposed Solitary Island Retreat, Seniors Living Development at Darkum Road, Mullaway. The *Bushfire Hazard Assessment* was conducted in accordance with PBP 2006.

The bushfire protection provisions proposed for the development, as well as accompanying recommendations outlined in this report, generally comply with the *"Acceptable Solutions"* for each Protection Measure contained within Section 4.2.7 of PBP 2006. Where the proposal does not comply with the requirements, the non-conformance is considered marginal and the intent is achieved. The proposal and associated bushfire protection measures are therefore considered to achieve the intent of PBP 2006 and s.100B of the *Rural Fires Act 1997*. The proposal also reduces the bushfire risk to the existing neighbouring development.

This report is based on the conditions at the site during the field investigation, and the location of the proposed development as indicated on the plans accompanying this report. It is recommended that if any additional development occur at this location, such development should be accompanied by a specific assessment based on site conditions at the time and the type and location of the development.

6. References

GHD (2011). *Biobanking Assessment*. GHD

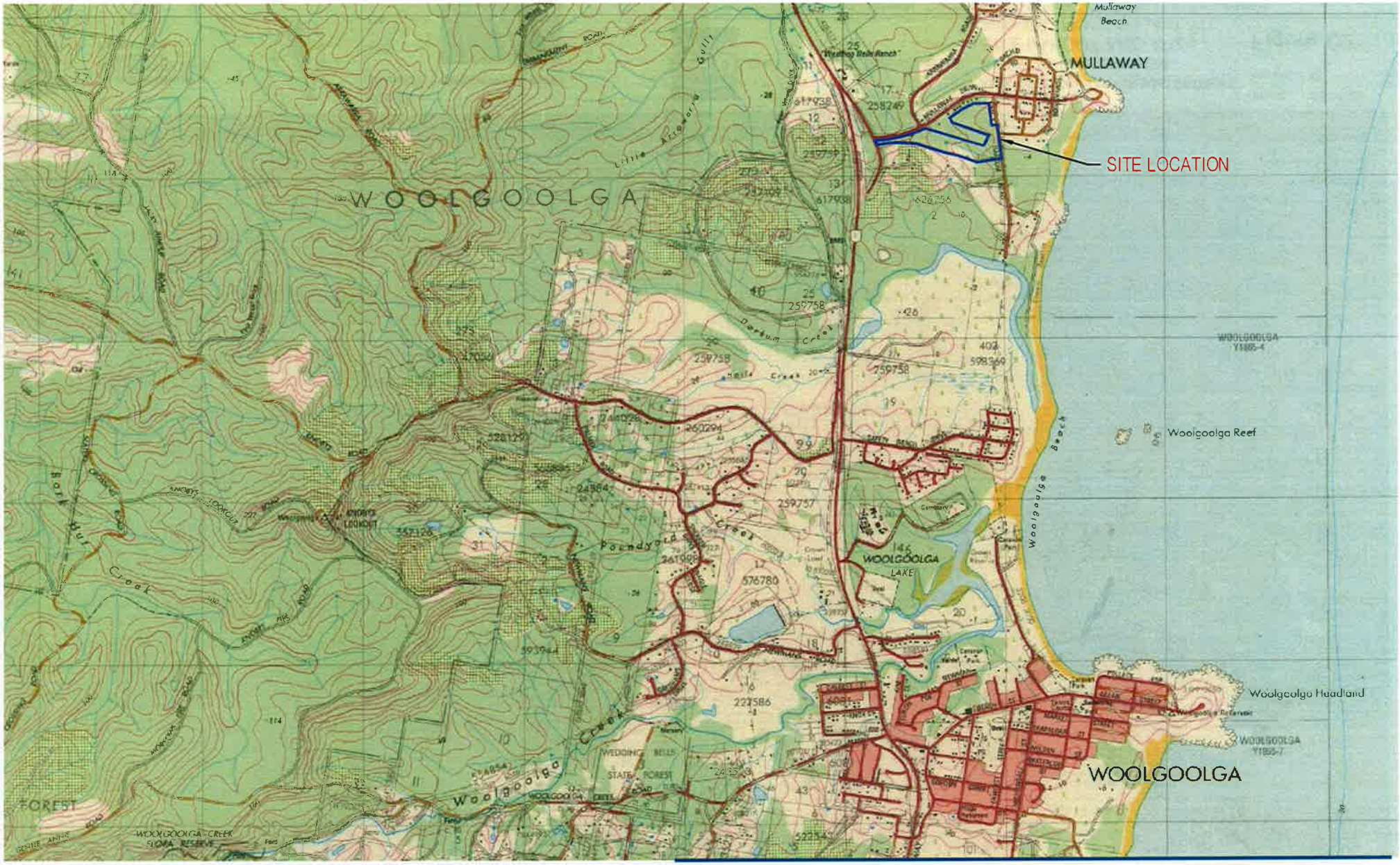
Keith, D. (2004). *Ocean Shores to Desert Dunes*. Department of Environment and Conservation, Sydney.

RFS (NSW Rural Fire Service) 2005. *Standards for Asset Protection Zones.*

RFS (NSW Rural Fire Service) 2006. *Planning for Bush Fire Protection: A guide for Councils, Planners, Fire Authorities and Developers.* Prepared by NSW Rural Fires Service in cooperation with the Department of Planning.

Appendix A

Figures



GHD CLIENTS | PEOPLE | PERFORMANCE

JOHN HANNAFORD
PROPOSED SOLITARY ISLAND RETREAT,
MULLAWAY, LOT 1 DP 1128964

REGIONAL LOCATION

scale | NTS for A4 date | JULY 2011

job no. | 22-14828
rev no. | B

Figure 01

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 28 July, 2011 - 1:16 PM Cad File No: G:\22\14828\CADD\Drawings\22-14828-FIG 1.dwg

This map compiled by
Coffs Harbour City Council
GIS Section-jks
December 2008

LEGEND

TRANSECT

OPA

IPA

GHD CLIENTS | PEOPLE | PERFORMANCE

JOHN HANNAFORD
PROPOSED SOLITARY ISLAND RETREAT,
MULLAWAY, LOT 1 DP 1128964

SITE LAYOUT AND APZ's

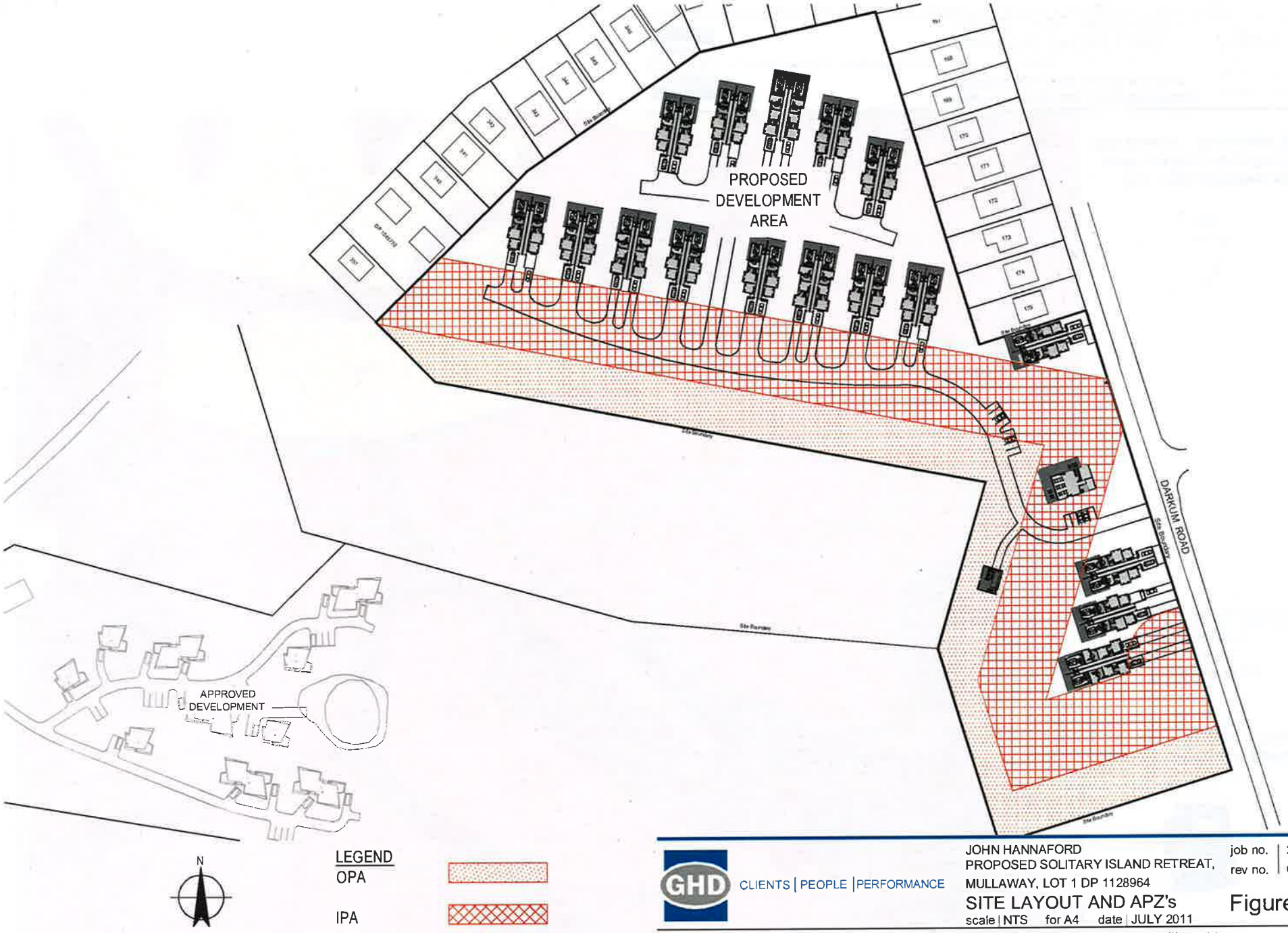
scale | NTS for A4 date | JULY 2011

job no. | 22-14828
rev no. | C

Figure 02

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 29 July 2011 - 10:28 AM Cad File No: G:\22\14828\CADD\Drawings\22-14828-FIG 02.dwg



GHD CLIENTS | PEOPLE | PERFORMANCE

JOHN HANNAFORD
PROPOSED SOLITARY ISLAND RETREAT,
MULLAWAY, LOT 1 DP 1128964

job no. | 22-14828
rev no. | C

SITE LAYOUT AND APZ's

scale | NTS for A4 date | JULY 2011

Figure 03

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 29 July, 2011 - 10:23 AM Cad File No: G:\22\14828\CADD\Drawings\22-14828-FIG 03.dwg

Bush Fire Prone Lands
Coffs Harbour LGA

Bush Fire Prone Land
- Vegetation Category 1
- Vegetation Category 2
- Vegetation Buffers - 100m & 30m

N

This map compiled by
Coffs Harbour City Council
GIS Section - December 2008

GHD CLIENTS | PEOPLE | PERFORMANCE

COMMUNITY & AGED CARE CONSULTING SERVICES
PROPOSED AGED CARE FACILITY, MULLAWAY
LOT 1 DP 1128964
BUSHFIRE PRONE LAND
scale | NTS for A4 date | FEB.2010

job no. | 22-14828
rev no. | A

Figure 04

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 24 February, 2010 - 1:12 PM Cad File No: G:\22\14828\CADD\Drawings\22-14828-FIG 4.dwg

GHD CLIENTS | PEOPLE | PERFORMANCE

JOHN HANNAFORD
PROPOSED SOLITARY ISLAND RETREAT,
MULLAWAY, LOT 1 DP 1128964

LANDSCAPE PLAN

scale | NTS for A4 date | JULY 2011

job no. | 22-14828
rev no. | A

Figure 05

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 29 July, 2011 - 10:37 AM Cad File No: G:\22\14828\CADD\Drawings\22-14828-FIG.05.dwg

Appendix B
Photographs

Photographs

Transect 1

Transect 2

Transect 3

Transect 4

Transect 5

Transect 6

Appendix C

APZ Calculator Report

ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Mullaway**
Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Special Fire Protection**

Local Government Area: **Coffs Harbour**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **1** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **79** (determined by the built-in algorithm)

Flame Temperature (K) : **1200**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **80** (Fire Weather Area: North Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **7.06** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **56** (IPA=35m, OPA=21m)

Rate of Fire Spread (km/h): **2.06** (Noble et al., 1980)

Fire Intensity (kW/m): **26572**

Transmissivity: **0.773** (Fuss and Hammins, 2002)

Flame Length (m): **16.37** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m^2)**: 10**

Assessment Date: **19/2/2010** Modelled By: **GHD**

ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Mullaway**
Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Special Fire Protection**

Local Government Area: **Coffs Harbour**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **2** (upslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **81** (determined by the built-in algorithm)

Flame Temperature (K) : **1200**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **80** (Fire Weather Area: North Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **5.11** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **50** (IPA=31m, OPA=19m)

Rate of Fire Spread (km/h): **1.67** (Noble et al., 1980)

Fire Intensity (kW/m): **21603**

Transmissivity: **0.78** (Fuss and Hammins, 2002)

Flame Length (m): **13.87** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m^2)**: 10**

Assessment Date: **19/2/2010** Modelled By: **GHD**

ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Mullaway**
Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Special Fire Protection**

Local Government Area: **Coffs Harbour**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (upslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **82** (determined by the built-in algorithm)

Flame Temperature (K) : **1200**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **80** (Fire Weather Area: North Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **4** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **48** (IPA=29m, OPA=19m)

Rate of Fire Spread (km/h): **1.56** (Noble et al., 1980)

Fire Intensity (kW/m): **20163**

Transmissivity: **0.783** (Fuss and Hammins, 2002)

Flame Length (m): **13.15** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m^2)**: 10**

Assessment Date: **19/2/2010** Modelled By: **GHD**

GHD

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Coffs Harbour NSW 2450
T: (02) 6650 5600 F: (02) 6650 5601 E: cfsmail@ghd.com.au

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	B Luffman	G Young	*G Young*	S Lawer	*S Lawer*	Aug 11

Appendix I

Traffic Impact Assessment

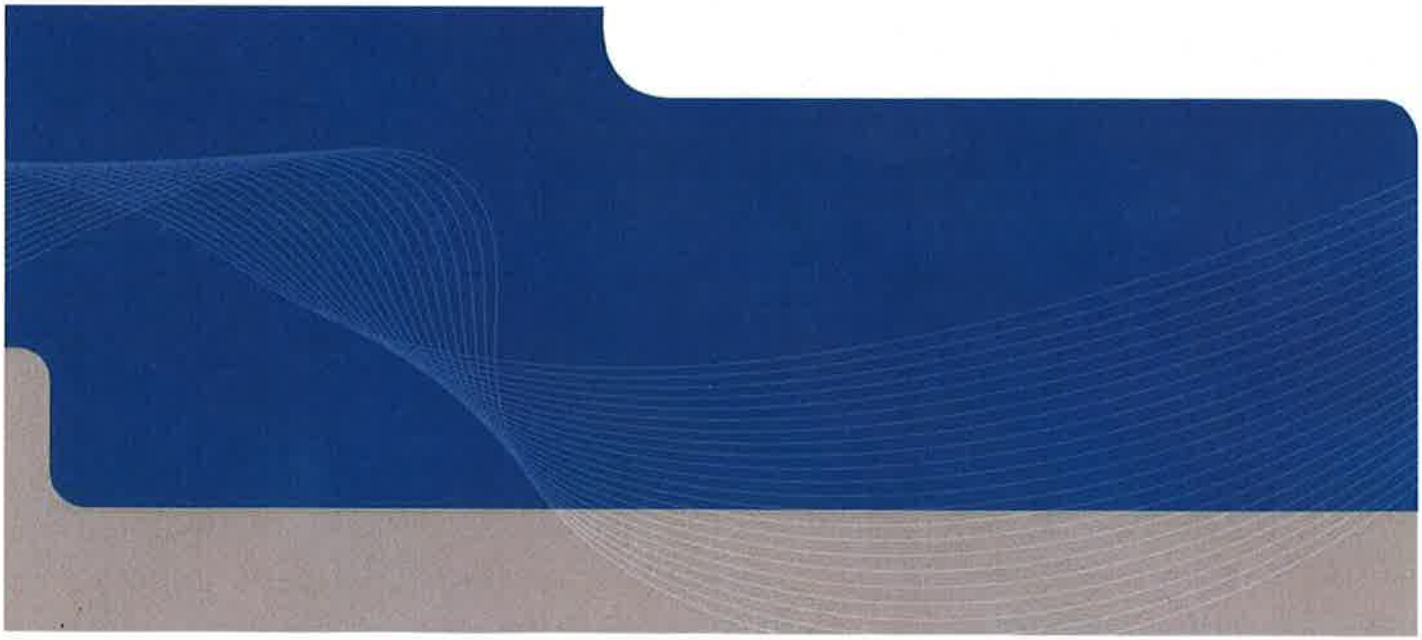
CLIENTS | PEOPLE | PERFORMANCE

John Hannaford

Proposed Seniors Housing Development at Mullaway

Traffic Impact Assessment

August 2011



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

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A Development Plans

B RTA Crash Data

C Ryans Bus Service Timetable

1. Introduction

This report has been prepared by GHD Pty Ltd (GHD) to accompany a development application to Coffs Harbour City Council (CCHC) for the construction of a 34 unit seniors housing development at Mullaway.

The location of the site in a regional context is shown in Figure 1-1 below.

Figure 1-1 Location Plan

The site of the development is contained in the eastern part of Lot 1 DP 1128964. The development area is bounded by existing housing fronting Mullaway Drive on the northern side. On the eastern side the site has frontage to Darkum Road and is also located to the west of 9 residential lots fronting Darkum Road. The southern and western boundaries of the site are adjacent to rural lands.

The purpose of this report is to examine the access, traffic and parking impacts of the proposed development in the form of a Traffic Impact Assessment (TIA), which will be part of a development application to Coffs Harbour City Council (CHCC).

In recognition of the current upgrading of Pacific Highway, this report contains details from the traffic investigations completed for the highway planning and investigations.

2. Existing Conditions

2.1 Location and Access to Facilities

The subject site is located on the eastern side of Pacific Highway approximately 1 km east of Pacific Highway and 6 km north of the commercial centre of Woolgoolga.

The site is presently not developed and is on the southwestern fringe of the Mullaway residential village area within rural zoned land. Vehicular access to Woolgoolga will be via Darkum Road, then Mullaway Drive and southwards to Woolgoolga via Pacific Highway.

The adjoining locality is generally a mixture of low density residential development with some agriculture and undeveloped rural land.

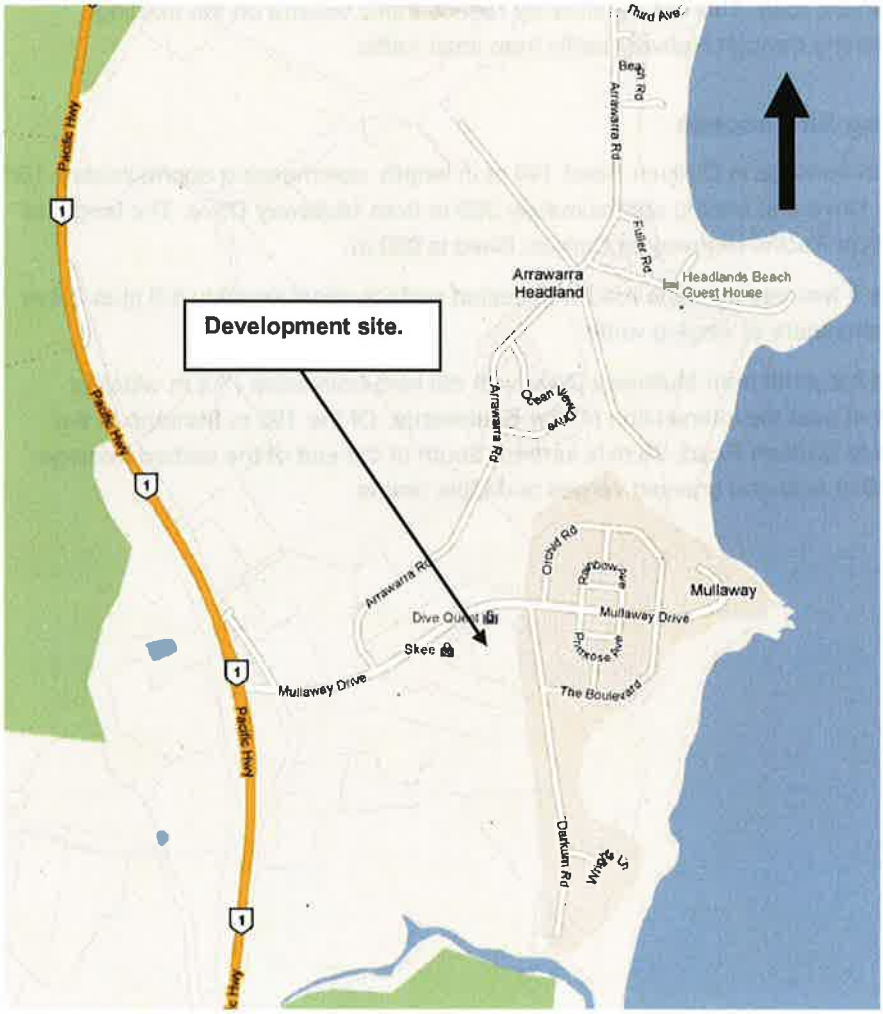


Figure 2-1 Local road network.

2.2 Existing Road Network

Pacific Highway is a classified State Road fulfilling a role as a major inter-regional link between Sydney and the north coast of NSW, and into Queensland, including regional

townships and provides access to local communities along its length. At Mullaway Drive the highway has an undivided carriageway with one northbound lane and a right turn lane and two southbound lanes plus a southbound left turn lane.

Currently, Mullaway Drive intersects Pacific Highway within a 100 km/h speed zone. The intersection is constructed as a Type CHR Rural Intersection with painted medians on Pacific Highway, a sheltered right turn bay and a long deceleration and left turn lane for southbound vehicles turning into Mullaway Drive to minimise delay to following southbound traffic.

It is pertinent to note that upgrading of Pacific Highway to divided carriageway freeway standard with grade separated interchanges from Sapphire to Arrawarra is currently under construction. The existing 2 lane highway from Woolgoolga to Arrawarra will be bypassed and will become part of the local access road network at this location and will operate as a two way undivided service road. This will significantly reduce traffic volume on the existing highway by separating through highway traffic from local traffic.

2.3 Existing Site access

The site has direct frontage to Darkum Road 196 m in length, commencing approximately 190 m from Mullaway Drive and ending approximately 380 m from Mullaway Drive. The length of Mullaway Drive from Pacific Highway to Darkum Road is 950 m.

Mullaway Drive is a two way two lane road with sealed surface approximately 5.9 m to 7.4 m wide and gravel shoulders of varying width.

Darkum is sealed full width from Mullaway Drive with roll kerb both sides (7.5 m wide) to approximately 24 m past the intersection of The Boulevarde. Of the 190 m frontage of the development site to Darkum Road, 76 m is kerbed. South of the end of the kerbed frontage the road has a 5.9 m seal and grassed verges and table drains.

Figure 2-2 View south along Darkum Rd with The Boulevarde LHS in background.

2.3.1 Pacific Highway Intersection with Mullaway Drive

The intersection of Pacific Highway with Mullaway Drive is constructed as a rural type CHR intersection. The highway has a single northbound lane and dual lanes southbound, plus a separate right turn lane sheltered by a painted median, a short left turn southbound acceleration taper and a southbound deceleration and left turn lane.

- The right turn lane has a deceleration and storage length of 170 m.
- The auxiliary left turn lane has a length of 135 m.
- The left turn acceleration taper has a length of 45 m.

2.3.2 Sight distance

The adequacy of the existing sight distance at intersections and along the route from Pacific Highway to the site access in Darkum Road is fundamental to the assessment of traffic safety for the access route. The specific sight distance criteria used in the report has been extracted from the Austroads Publication "Guide to Road Design – Part 4A Unsignalised and Signalised Intersections" (2009) which specifies the following:

Approach Sight Distance (ASD)

This is the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection.

Figure 2-3 Drivers sight line from Mullaway Dr north along Pacific Hwy.

Figure 2-4 Drivers sight line from Mullaway Dr south along Pacific Hwy.

It is also desirable on the major road approaches to an intersection so that the driver of a vehicle has adequate distance to observe the road layout, including pavement markings, kerbs, islands, etc, in sufficient time to react and stop if necessary before entering the conflict area. Approach Sight Distance is measured from driver eye height (1.1m) to 0.0m (i.e. the road surface).

*It is the same as **Stopping Sight Distance** (SSD) except that SSD is measured from 1.1 m to 0.2m being a nominal object height.*

Safe Intersection Sight Distance (SISD)

SISD provides sufficient sight distance for a driver of a vehicle on the major road to observe a vehicle from the minor road approach moving into a collision situation (eg in the worst case stalling across the traffic lanes), and to decelerate to stop before reaching the collision point. Safe Intersection Sight Distance is measured from the driver eye height (1.1 m) to a car height of 1.25m.

The whole of Mullaway from the intersection with Pacific Highway is a designated urban zone with a speed limit of 50 km/h. Pacific Highway at this location has a posted speed limit of 100 km/h.

A comparison of the required and available ASD and SISD for vehicles approaching and departing the proposed access driveway in Darkum Road, the intersection of Darkum Road with Mullaway Drive and the intersection of Mullaway Drive with Pacific Highway is set out in Table 2-1 for a vehicle speed of 100 km/h on the highway and 50km/h in the urban zone.

Table 2-1 Sight Distance

Location	ASD (desirable requirement)		SISD (minimum requirement)	
	Desirable	Measured	Required	Measured
Pacific Highway Northbound at Mullaway Drive	221 m	150 m	262 m	>300 m
Pacific Highway Southbound at Mullaway Drive	221 m	165 m	262 m	>300 m
Mullaway Drive Eastbound at Darkum Road.	55 m	125 m	97 m	125 m
Mullaway Drive Westbound at Darkum Road.	55 m	>160 m	97 m	>160 m
Internal driveway access to Darkum Road.***	NA	NA	45 to 69 m	>100 m
Individual garage driveways access to Darkum Road.***	NA	NA	40 m	>100 m

* Limiting distance to Pacific Highway

*** Per AS2890.1:2004 Fig. 3.2 1.15 m to 1.15 m.

2.4 Existing Traffic Management Controls

The proposed private access road into the site will form a T-junction with Darkum Road. Traffic travelling along Darkum Road will be subject to the T-junction rule at the intersection with Mullaway Drive.

Signal Control

- There is no signal control.

Give-Way Control

- There is no Give-Way control currently signposted, at the intersection of Mullaway Drive and Pacific Highway though the intersection is subject to the T-junction rule.

Priority Control

- Darkum Road access to Mullaway Drive and Mullaway Drive access to Pacific Highway;

Sign-Posted Speed Limits

- 100 km/hr speed limit along Pacific Highway;
- 50 km/h urban area speed limit for the whole of the Mullaway area;

2.5 Existing Traffic Volumes

2.5.1 Existing Daily Traffic Volumes

Associated with the Pacific Highway Upgrade – Sapphire to Woolgoolga, the Roads and Traffic Authority (RTA) commissioned Connell Wagner Pty Ltd to undertake a "Detailed Traffic and Transport Assessment". The report was published on 9 August 2007 and is accessible via the RTA's website for Pacific Highway Upgrade information at

http://www.rta.nsw.gov.au/roadprojects/projects/pac_hwy/coffs_harbour_ballina/sapphire_woolgoolga/documents/evironmental_assessment/appendix_f_working_paper_1_traffic_and_transport.pdf. [1]

The predicted annual average daily traffic (AADT) volumes and average daily heavy traffic volumes for the Base Case scenario for the opening year (2011) and 20 years after opening (2031) north of Mullaway Drive are presented in Table 2-2 below.

Table 2-2 Predicted Daily Traffic Volumes – Base Case (Ref: Table 4.4 RTA Traffic and Transport Study 2007)

Location	2011 AADT	2031 AADT
North of Mullaway Drive	13,402 (16%HV)	23,369 (16%HV)

The predicted future traffic volume is indicative of an average growth rate of 2.8% pa.

2.6 Existing Road and Intersection Performance

The performance of Mullaway Drive has been assessed in terms of Level of Service (LOS). The LOS criteria has been based on peak hour flows per direction for urban roads and peak hour flows on two (2) lane two way roads (with design speed of 100 km/h) for rural roads as defined in RTA's Guide to Traffic Generating Developments and detailed in Table 2-3 and Table 2-4 respectively.

The LOS is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays and freedom to manoeuvre

[1] Detailed Traffic and Transport Assessment Pacific Highway Upgrade – Sapphire to Woolgoolga; Connell Wagner Pty Ltd 9 August 2007 Reference 1093-16 Revision 4.

experienced by motorists. There are six levels of service (LOS), as described below, from AUSTROADS *Guide to Traffic Engineering Practice - Part 2: Roadway Capacity*, (1988).

Level of Service A.

The top level is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.

Level of Service B.

This level is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is little less than that of the level of Service A.

Level of Service C.

This service level is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.

Level of Service D.

This level is close to the limit of stable flow but is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.

Level of Service E.

This occurs when traffic volumes are at or close to capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause a traffic-jam.

Level of Service F.

This service level is in the zone of forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs and queuing and delays result.

Table 2-3 Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)
A	200
B	380
C	600
D	900
E	1400

Source: RTA Guide to Traffic Generating Developments, October 2002, Version 2.2 Table 4.4.

Table 2-4 Peak hour flow on two (2) lane rural road and level terrain (veh/hr)

Level of Service	Veh/hr (5% HV)	Veh/hr (10% HV)	Veh/hr (15% HV)
B	590	560	530
C	970	920	870
D	1550	1480	1410
E	2500	2390	2290

Source: RTA Gulde to Traffic Generating Developments, October 2002, Version 2.2 Table 4.5

The LOS criteria in Table 2-4 is based on the following assumptions:

- Design speed of 100 kph;
- Terrain level with 20% no overtaking;
- 3.7 metre traffic lane widths; and
- 60/40 directional split of traffic.

Assuming that the peak hourly two way flow is 10% of the AADT then it is clear that current traffic density is well short of the hourly counts in the two tables above.

The existing intersection of Mullaway Drive with Pacific Highway has been modelled in the RTA traffic study. The modelled base case peak hour volumes are presented below.

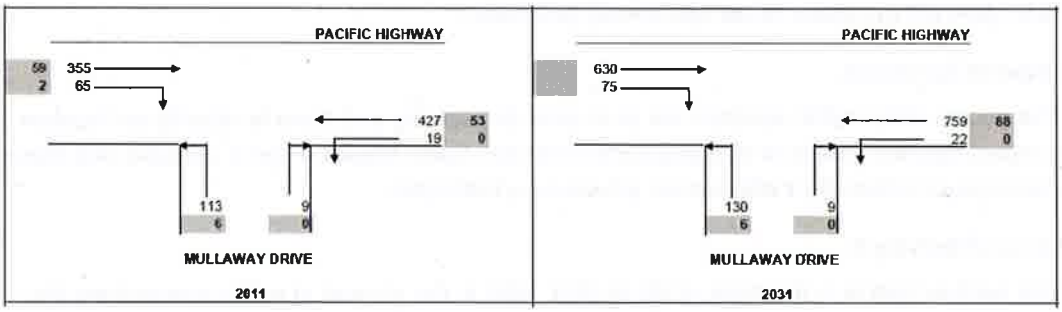


Figure 2-5 RTA modelled Intersection Volumes AM peak (Source: Ref 1)

A traffic count was undertaken at the intersection of Mullaway Drive and Pacific Highway during the morning peak of Friday 1 July 2011. The table below compares the count volumes with the Pacific Highway modelling.

Table 2-5 Traffic Flows

	Count 1/7/2011 (vph)	Pacific Highway modelling 2011 (vph)
Pacific Highway northbound	301	355
Pacific Highway southbound	321	427
Right turn to Mullaway Drive.	64	65
Left turn to Mullaway Drive.	8	19
Right turn from Mullaway Drive	20	9
Left turn from Mullaway Drive	115	113

The total count volume is approximately 17% less than the total volume for the highway modelling south of the intersection. In Mullaway Drive the total hourly count is 207 vph and the model predicted 206 vph. Overall the count confirmed the robustness of the modelling.

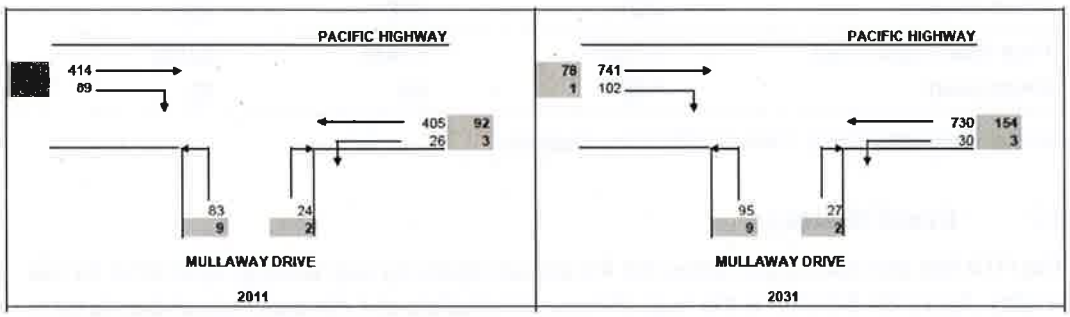


Figure 2-6 RTA modelled Intersection Volumes PM peak (Source: Ref 1)

Table 2-6 Traffic Flows

	Estimated Traffic 2011 (vph)	Estimated Traffic 2031 (vph)
Mullaway Drive am peak	214	244
Mullaway Drive pm peak	237	269

For both the am and pm peak hour traffic volumes the two way, two lane total traffic volume is less than 400 vph which is the maximum urban flow volume achievable with LOS A per Table 2-3 above.

Intersection performance modelling was carried out for the 2002 traffic study which indicated that the intersection of Mullaway Drive with Pacific Highway would operate at Level of Service (LOS) A based on the base case of 2006 traffic volumes and no bypass.

2.6.1 Intersection Capacity

It is anticipated that Mullaway would contribute say 60% of the total volume in Mullaway Drive and Arrawarra 40%. Darkum Road could also contribute approximately 20% of the total and Mullaway Drive at Darkum Road approximately 25%. If it is assumed that the 2021 traffic volume is 252 vph (mean of 2011 and 2031 pm peak) then this corresponds to 252 vph. The corresponding volumes in Darkum Road and Mullaway Drive are 50 vph and 63 vph. These volumes are well below the threshold volumes noted in Table 2-7 below.

For these low combinations of flows, the busier streets can comfortably absorb the minor road traffic at a good level of service. These combinations of flows are below the threshold values where intersection capacity analysis is normally required as shown below.

Table 2-7 Intersection Volumes below which Capacity Analysis is Unnecessary

Type of Road	Light Cross & Turning Volumes Maximum Design Hour Volumes vehicles per hour (twoway)		
Two lane major road	400	500	650
Cross road	250	200	100
Four lane major road	1,000	1,500	2,000
Cross road	100	50	25

Source: Austroads Part 2, Table 8.1 Roadway Capacity

2.7 Crash History

The RTA has provided crash history for the period beginning July 2005 to June 2010 for the locality. Appendix B includes the map of recorded crashes and the crash report details for a total of 8 crashes in the locality.

There was one crash at the Mullaway Drive intersection with Pacific Highway. The crash involved a northbound vehicle veering left into the path of a B-double truck. There were no injuries. The crash characteristics do not point toward a deficiency in the layout or operation of the intersection.

One crash was recorded on Mullaway Drive 50 m west of Arrawarra Road. The crash involved a single motorcycle proceeding east, late at night which lost control. One injury resulted and speed and alcohol were identified as causative factors.

Of the remaining six crashes, one occurred 400 m south of Mullaway Drive on Pacific Highway and one on Arrawarra Road near Ocean View Road and there was a cluster of four crashes in the vicinity of the service station about 200 m north of Mullaway Drive on Pacific Highway.

Therefore, the review of the available crash data indicated no obvious anomalies or details which would warrant further investigation of the crash data or that may point to particular road characteristics that would warrant further attention or corrective actions.

2.8 Public Transport

Ryans Bus Service operates regular weekday services along the Pacific Highway past Mullaway between Coffs Harbour and Woolgoolga. On weekly school days there are 4 daily northbound services which call into the shop at Mullaway, located at the corner of Primrose Avenue and Mullaway Drive, and 6 southbound. A further 4 northbound services are available to call at Mullaway "on request".

Currently the bus service circulates through Mullaway in a clockwise direction via Mullaway Drive from the west, then Rainbow Avenue and turning right into Mullaway Drive to stop at the bus stop located on the southern side of Mullaway Drive adjacent to the local convenience store.

During school holidays the service operates only once per day in each direction with an additional northbound "on request" call into Mullaway, and on weekends there are no services.

These services stop at the Raj Mahal on Pacific Highway Woolgoolga and also circulate through the Beach Street commercial centre. A bus stop with shelter shed is located in Beach Street immediately west of Fawcett Street and in close proximity to the commercial centre of Woolgoolga. A copy of the bus service timetable is included in Appendix C.

Non scheduled transport would be limited to taxi services called from Woolgoolga.

Greyhound and Premier Coaches run intercity services along Pacify Highway which would pick up and drop off at Woolgoolga. Typically Greyhound operates 3 services north and south daily and Premier operates 2 services in each direction daily.

2.9 Pedestrians and Cyclists

The primary access routes are east to west along Mullaway Drive and along Darkum Road to the development site.

Between Mullaway Public School and Arrawarra Road a concrete footpath is located on the northern side of the road reserve. East of Arrawarra Road the footpath becomes an on road cyclepath which finishes past Darkum Road at Orchid Road.

A concrete footpath is constructed on the eastern side of Darkum Road from Mullaway Drive to The Boulevarde. There is no constructed footpath from the corner of Mullaway Drive and Darkum Road to the local convenience store or the adjacent bus shelter.

In Woolgoolga accessible pathways are constructed throughout the commercial centre linking the bus stop with the Post Office, doctor's surgeries, banks and grocery stores.

Figure 2-7 Footpath adjacent to Public School in Mullaway Dr.

Figure 2-8 On road cycle path in Mullaway Dr.

Figure 2-9 Footpath 2m wide on eastern side of Darkum Rd.

3. Pacific Highway Upgrade

3.1 General Description

The proposal consists of the upgrade of approximately 25 km of Pacific Highway from Campbell Close, Sapphire to Upper Corindi Road, Arrawarra to a Class M (Motorway) standard. From Sapphire to Arrawarra, the upgrade entails the duplication of the existing highway to a four lane dual carriageway, controlled-access highway. The proposed upgrade includes local access roads along the whole length of the highway. At the southern approach to the upgrade there would be two at-grade intersections, one a left in-left out intersection into Campbell Close and a right-in / left-out intersection with the eastern local access road (the existing highway). All other access onto and off the highway would only be provided through grade-separated interchanges. The interchanges would be located at:

- Gaudrons Road/Split Solitary Road, Sapphire;
- Moonee Beach Road/Hoys Road, Moonee Beach;
- Fiddaman Road/Graham Drive South,
- Graham Drive North, Woolgoolga Bypass interchange; and
- Arrawarra Beach interchange.

From south Woolgoolga to Arrawarra the upgrade comprises of a new bypass to the west of Woolgoolga constructed to a four lane dual carriageway standard, with the existing highway becoming the local access road. Two interchanges, one at south Woolgoolga (at Graham Drive North as mentioned above) and the other at Arrawarra (at Arrawarra Beach Road) would provide access onto the bypass. The bypass would deviate from the existing highway just north of Graham Drive North, and pass through rural and rural residential land as well as forestry land to the west of Woolgoolga before rejoining the existing highway at Arrawarra.

The northern interchange at Arrawarra, as well as providing access to the highway, would connect Arrawarra to Upper Corindi in the north and Woolgoolga in the south. The interchange would also house a rest area for light and heavy vehicles.

The upgrade would provide a dual carriageway highway with a 110 km/h design speed. The posted speed limit of the upgraded highway would be up to 110 km/h, while the posted speed limit of the local access roads and bypassed section of the existing highway would generally be between 60 and 80 km/h.

The overall layout of the bypass in the vicinity of Mullaway is shown in Figure 3-1 below.

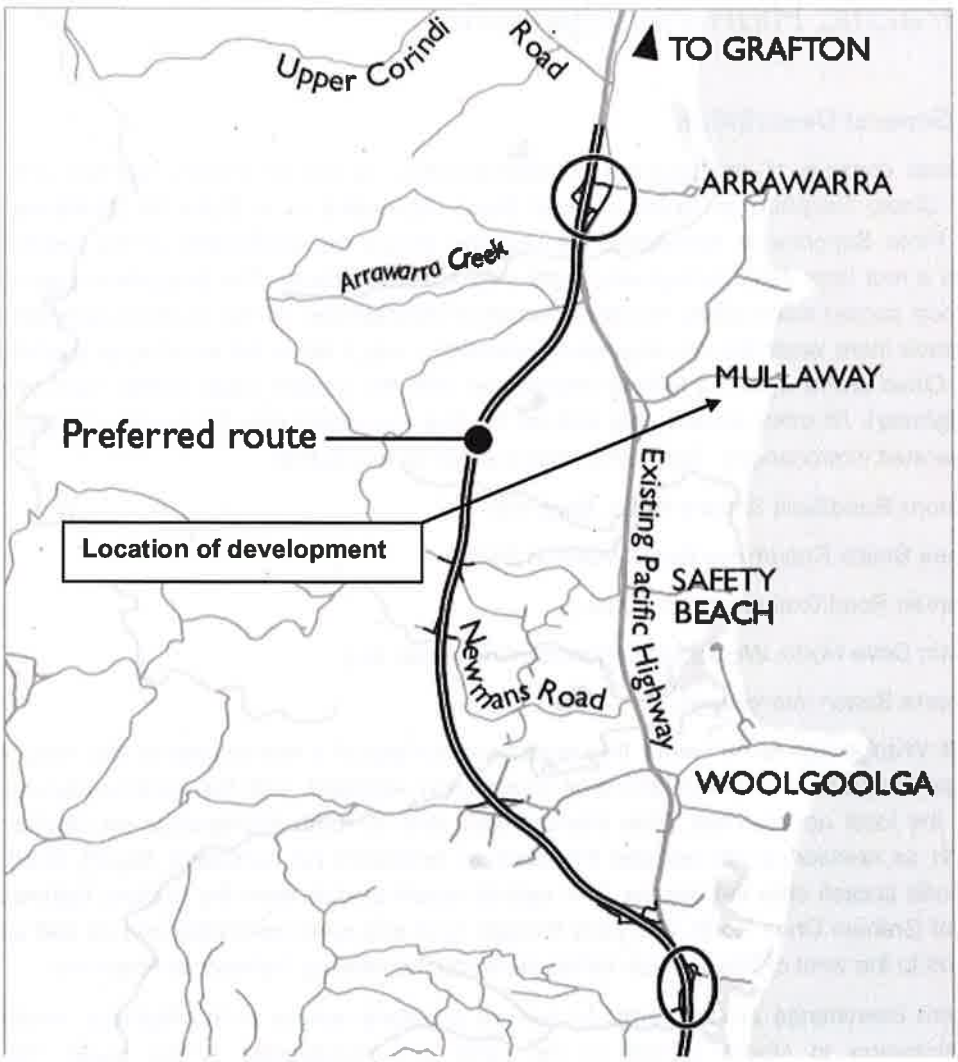


Figure 3-1 Pacific Hwy Realignment near Mullaway (Source RTA Community Update Feb 09).

3.2 Projected Traffic Growth

The RTA transport study included provision for land releases between Coffs Harbour and Corindi / Red Rock up to 2031. The traffic generation rates adopted by the study are shown in Table 3-1 below.

Table 3-1 Traffic Generation Rates for Proposed Land Use Developments

Zone	Daily Traffic Generation Rates (per dwelling) - veh/day	Peak Hour Traffic Generation Rates (per dwelling) - veh/hr
Village (7A)	9	0.85
Detached Dwellings (1A, 2A)	9	0.85
Townhouses (2B)	6.5	0.65
Units (2C, 2D, 2E)	5	0.5

3.3 Future Traffic Flows

The RTA transport study traffic analysis carried out traffic counts and projections on the following basis;

- The count year of 2006;
- The base year of 2011 being the expected year of construction; and
- The future projected year of 2031 being 20 years after the base case.

It is normal to project future traffic flows 10 years on top of the base year for traffic impact assessments. The following figures represent the modelling of the intersection of Mullaway Drive with the bypassed Pacific Highway.

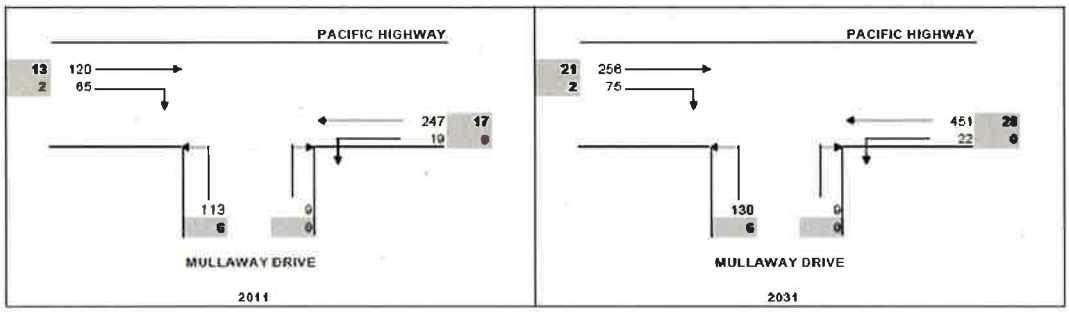


Figure 3-2 RTA modelled Intersection Volumes AM peak (Source: Ref 1)

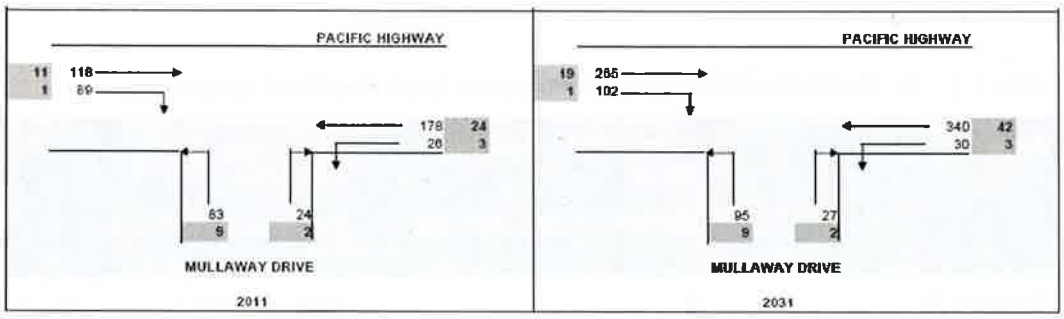


Figure 3-3 RTA modelled Intersection Volumes PM peak (Source: Ref 1)

The traffic study published by the RTA in 2002 [2] indicated that the 2001 estimated Average Daily Traffic Volume (ADT) north of Mullaway Drive would be 8,159. A compound growth rate of 3% per annum was adopted and accounting for the Woolgoolga to Arrawarra bypass the anticipated ADT north of Mullaway Drive would drop to 6,762 in 2021.

Intersection modelling of Mullaway Drive with Pacific Highway (without the bypass) would result in an ADT of 17,049 in 2021 and the intersection would continue to operate at LOS A.

[2] Coffs Harbour Highway Planning Sapphire to Woolgoolga Working Paper No 8 Traffic and Transport Assessment – Connell Wagner November 2002.

4. Development Standards

4.1 Existing Development Controls

Development controls, including Development Control Plans (DCP), which are relevant to the proposed development include:

- State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Seniors SEPP); and
- CHCC Parking DCP.

4.1.1 Seniors SEPP

The Seniors SEPP was amended by the gazettal of Amendment No 2 on 28 September 2007. Clause 50 (h) requires that the following minimum parking be provided:

- 0.5 car spaces for each bedroom where the development application is made by a person other than a social housing provider, or
- 1 car space for each 5 dwellings where the development application is made by, or is made by a person jointly with, a social housing provider.

Schedule 3 paragraph 5 also specifies the following minimum standards for private car accommodation;

- car parking spaces must comply with the requirements for parking for persons with a disability set out in AS 2890, and
- 5% of the total number of car parking spaces (or at least one space if there are fewer than 20 spaces) must be designed to enable the width of the spaces to be increased to 3.8 metres, and
- any garage must have a power-operated door, or there must be a power point and an area for motor or control rods to enable a power-operated door to be installed at a later date.

4.1.2 Coffs Harbour City Council Parking DCP

The Coffs Harbour City Council Parking DCP defines parking requirements for seniors living as follows for self contained units:

- 1 public parking space per 5 units;
- 0.5 space per small housing unit less than 55 m^2;
- 0.85 space per medium housing unit less than 85 m^2; and
- 1 space per large unit greater than 85 m^2.

The CHCC DCP is consistent with the Seniors SEPP if it is assumed that a small housing unit is not more than one bedroom and a large unit is no more than 2 bedrooms. The requirement for 0.85 space for a unit between 55 and 85 m2 floor area is not consistent with the SEPP.

As the Seniors SEPP pre dates the current version of AS 2890.6 (2009) "Parking facilities Part 6: Off-street parking for people with disabilities" it is assumed that disabled parking facilities compliant with AS 2890.1 (1993) will be satisfactory.

4.2 Access to Facilities

The Seniors SEPP requires that either the development be located within 400 m of the facilities noted in paragraph 4.2.1 below via an accessible pathway, or that a transport service be available which can be accessed via an accessible pathway both from the development and from the drop off point to the facilities.

4.2.1 Facilities

Facilities for the provision of:

- Shops, banking, retail and commercial services;
- Community services and recreational facilities; and
- A medical general practitioner.

4.2.2 Accessible Pathway

Facilities are to be located at a distance of not more than 400 m from the site of the proposed development and that the access to the facilities be by an accessible pathway with an average overall gradient of no more than 1:14, although the following gradients along the pathway are also acceptable:

- A gradient of no more than 1:12 for slopes for a maximum of 15 metres at a time;
- A gradient of no more than 1:10 for a maximum length of 5 metres at a time; and
- A gradient of no more than 1:8 for distances of no more than 1.5 metres at a time.

OR

4.2.3 Transport Service

For a proposed development that is to be located in the Coffs Harbour LGA there is to be a transport service available to residents of the development:

- That is located at a distance of not more than 400 metres from the site of the proposed development and the distance is accessible by means of a suitable access pathway; and
- That will take those residents to a place that is located at a distance of not more than 400 metres from the facilities and services referred to above; and
- That is available both to and from the proposed development during daylight hours at least once each day from Monday to Friday (both days inclusive), and
- The gradient along the pathway from the site to the public transport services (and from the transport services to the facilities and services referred to in paragraph 4.2.1 above that complies with paragraph 4.2.2.

5. Proposed Development

5.1 General Description

The development site has an area of 15.5 hectares and is irregular in shape. It has frontage to three (3) roads. Approximately 40 m to Whitton Close, 300 m to Mullaway Drive and 190 m to Darkum Road. The seniors living development will have access to Darkum Road only. The new development comprises thirty four (34) single storey residential units and associated facilities as follows:

- A cluster of 13 single storey duplex units comprising 20 x 2 bed units and 6 x 3 bed units located internally in the northeastern corner of the lot and behind existing residential lots fronting Darkum Road and Mullaway Drive;
- 4 single storey, duplex units comprising 6 x 2 bed units and 2 x 3 bed units each with direct access to Darkum Road;
- A Club Room located centrally along the Darkum Road frontage with access from the internal access road;
- A maintenance and garbage recycling enclosure located centrally to the Darkum Road frontage and to the rear of the residential units;
- Each residential unit has a single lock up garage (34);
- A two way internal access road 5.5 m wide provides access from the 26 internal units to Darkum Road;
- 13 parking and visitor spaces separate to parking on unit driveways and garages;
- Access footpaths;

The internal access road will be connected to Darkum Road via a two way access footpath crossing south of the intersection with The Boulevarde. Plans of the development are included in Appendix A.

5.2 Site Traffic Generation

New internal access roads are 5.5 m wide two way. Turning heads are provided at the end of blind aisles. Traffic generation details are noted in Section 6.1.

5.3 Parking, Servicing and Public Transport

Proposed off-street parking area and access arrangements in the proposed development will be designed in accordance with the requirements of *AS2890.1 – 2004 Parking Facilities Part 1: Off-Street Car Parking.* Required parking facilities for disabled drivers will be provided in accordance with *AS2890.6 – 2009 Parking Facilities Part 1: Off-street parking for people with disabilities.*

A central garbage storage area is provided on site in the proposed maintenance and garbage shed. It is proposed each dwelling will have their own garbage bins and the site manager will regularly collect the bins for disposal in the dedicated skip bins in the shed. The skip bins will be serviced by a commercial contractor.

Existing public transport services are detailed in Section 2.8. It is not proposed to provide an on site mini bus for the use of residents. The existing public bus service provided by Ryans Bus Service would be a

suitable service to meet the requirements of the Seniors SEPP noted in Section 4.2.3. The bus service has offered to consider re-routing the current circulation by turning right into Darkum Road to stop at a new bus stop and shelter to be provided on the eastern side before the intersection with The Boulevarde, then to travel via The Boulevarde to the bus stop in Mullaway Drive near the convenience store. Services would be in accordance with existing timetables.

5.4 Proposed Parking and Access Provision

The details below show the requirements for parking and parking proposed.

Table 5-1 Parking and Construction Details

34 Units	CHCC Parking DCP	Seniors SEPP	Proposed	Comment
Resident Parking	34	38	34	Complies
Visitor Parking	0	0	13	Complies
Disabled Parking	-No requirement	5% (2)	34	Complies
Total Required	34	38	47	Exceeds Requirements

Each of the residential garages is 4.0 m wide internally and approximately 6 m long. The requirement for a disabled space is 3.2 m wide and 5.4 m long. Therefore, the garages comply as disabled parking spaces.

No dimensions have been provided for visitor parking spaces however, disabled parking spaces can be readily provided at the Construction Certificate stage in accordance with Council's requirements. All spaces will be constructed in accordance with AS 2890.1.

5.5 Access to Darkum Road

Two duplex units will have double driveways and 2 duplex units will have 4 single driveways to Darkum Road. For a 50 km/h speed zone the minimum sight distance from the residential driveway is 40 m. More than 100 m sight distance would be available from each driveway.

An open stormwater channel runs within the road reserve abutting the boundary from the northern corner abutting No 20, to the pipe culvert drainage structure approximately 20 m south. The duplex unit proposed adjacent to the open drain will require a structure to cross the open drain to gain access to the roadway.

The internal access driveway has a desirable minimum sight distance requirement of 69 m. The available sight distance is greater than this. The location of the internal access driveway and its intersection with the Darkum Road kerbline has been assessed in relation to Figure 3.1 of AS 2890.1:2004 regarding its proximity to The Boulevarde intersection. It was found that the northern side of the footpath crossing would be 11 m from the prolongation of the road reserve boundary of The Boulevarde which exceeds the minimum setback of 6 m.

6. Future Impacts of the Development

6.1 Projected Traffic Generation

Traffic generation potential of a proposed development is normally based on rates provided in the Roads and Traffic Authorities "Guide to Traffic Generating Developments" (2002). The referenced RTA Traffic Study indicates that 1 to 2 trips per dwelling per day are expected from housing for aged and disabled persons. The evening peak hour vehicle trips is in the range of 0.1 to 0.2 per dwelling.

The higher trip generation rates are applicable to private vehicles associated with resident funded developments.

Utilisation of the existing public bus service for the demand from the development will result in no additional trips attributable to the development.

For 34 residential units:

- 34 to 68 trips per day; and
- 4 to 7 trips in the evening peak hour.

This is equivalent to the development of less than 8 standard residential lots in terms of maximum daily traffic generation.

6.2 Traffic Assignment

It is assumed that all trips will be to and from Woolgoolga to the site.

6.3 Traffic Safety

The low incidence of traffic crashes in the vicinity of the development is not expected to be impacted by the low volume of traffic to be generated from the development.

6.3.1 Pedestrian Safety

It is assumed that most residents will commute by car or bus and that there will be no significant impact on pedestrians due to the development. The development will provide accessible pathways within the site and along Darkum Road for the length of the site frontage.

In Woolgoolga existing accessible pathways will be utilised between the bus stop and the facilities required to be accessed.

7. Conclusions and Recommendations

Road Network

Traffic generation from the facility will increase evening peak hour volume in 2011 in Mullaway Drive from 235 to 242 vph, an increase of 3% and in 2021 from 252 to 259 vph, an increase of 2.8%.

The opening of the Coffs Harbour to Woolgoolga Pacific Highway bypass will reduce Pacific Highway AADT north of Mullaway Drive intersection from 13,402 in 2011 to 6762 in 2021, a reduction of 50%.

The intersection of Mullaway Drive and Pacific Highway currently operates at LOS A. With the development included, the projected LOS in 2021 is anticipated to continue at LOS A.

Without the highway bypass the impact of the development is very minor. After the opening of the bypass highway volumes will drop to 50% of current levels so the impact of the development will not be noticeable.

Site Frontage

The site has frontage to Darkum Road which is suitable for the development with sight distance for vehicular access well in excess of the minimum requirements. An accessible footpath will be required either along the road reserve or within the property to link the units fronting the road with the site facilities and for access to the proposed bus stop. The path is to be constructed in accordance with AS 1428.

Vehicular access to garages fronting Darkum Road will be designed and constructed to suit integration with accessible pathways and driveway grading in accordance with AS 2890.1.

The sight distance from individual access driveways to garages will comply with the requirements of Fig 3.2 AS 2890.1.

Site Access and Parking

The internal access road will be constructed as a two way road 5.5 m wide from Darkum Road to the internal residential units.

The full length of the internal access road will be designed to suit access and parking for resident vehicles and medium rigid vehicle for access by removalists and similar service vehicles.

Conclusion

Overall the impact of the development in the local area will be barely noticeable on overall traffic volumes and the site is compatible with the proposed use.

8. References

Standards Australia, 2004, *Australian / New Zealand Standard (AS 2890.1—2004) – Parking Facilities, Part 1: Off-street car parking.*

Austroads, 2009, *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections.*

Roads and Traffic Authority of NSW, 2002, *Guide to Traffic Generating Developments.*

Coffs Harbour City Council, 2002 *Off Street Car Parking Development Control Plan.*

Detailed Traffic and Transport Assessment Pacific Highway Upgrade – Sapphire to Woolgoolga; Connell Wagner Pty Ltd 9 August 2007 Reference 1093-16 Revision 4.

RTA Traffic Volume Data for Hunter and Northern Regions 2004.

Appendix A

Development Plans

figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

lifestyle alternatives environment health sustainability



DARKUM ROAD **MULLAWAY**
Proposed aged care retreat @ Darkum Road MULLAWAY NSW

Development Application JULY 2011

DRAWING SCHEDULE

Issue	Amendment	Date
A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	19.06.11

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

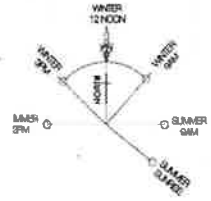
Drawing Title
Cover Page

Scale	Date	Drawn	Checked
NTS	18.05.11	BD	PM

Drawing No.
598DA_A_000

Issue
A

Figured dimensions to be taken only. Do not scale off drawings. Any queries to be verified on site.



A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	18.06.11
Issue	Amendment	Date

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title: Site Analysis Plan

Scale:	Date:	Drawn:	Checked:
NTS	18.05.11	BD	PMc

Drawing No: 598DA_A_001

Issue: A

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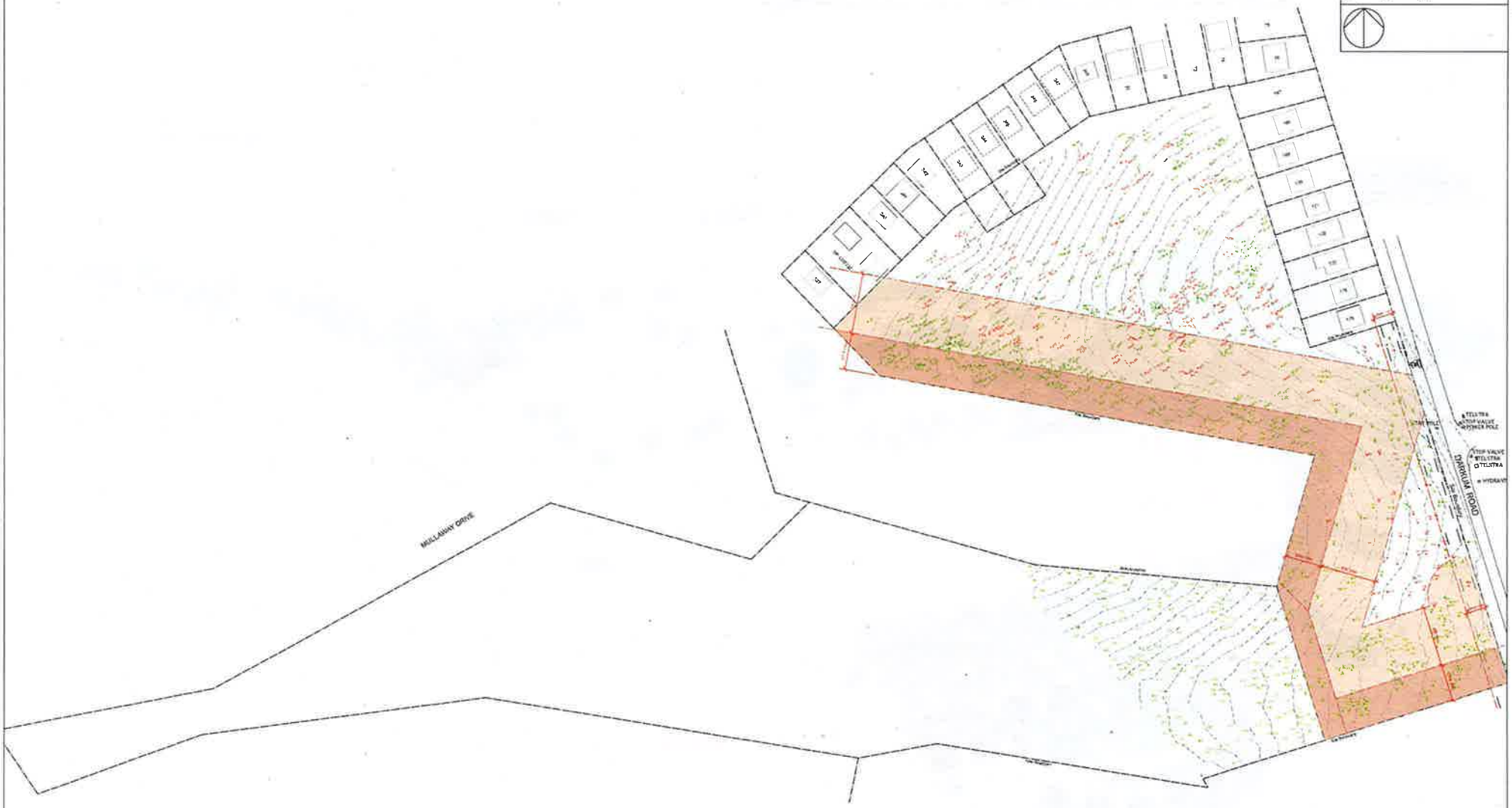

Survey Plan

Scale 1 : 1000

A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	18.06.11

Scale: 1:1000 | Date: 18.05.11 | Drawn: BD | Checked: PMc

Drawing No: 598DA_A_002 | Issue: A

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Survey Plan

Site Development Plan

Scale 1:1000

NOTES

Pedestrian pathways proposed leading from each dwelling to bus stop and letterboxes. All pathways to comply with SEPP (Housing for Seniors or People with a Disability) 2004

Issue	Amendment	Date
A	Development Application issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	16.06.11

Architect: **mcfadyen**architects pty limited

Project: **solitary islands retreat mullaway**
proposed aged care retreat at darkham road, mullaway NSW

Drawing title: Site Development Plan

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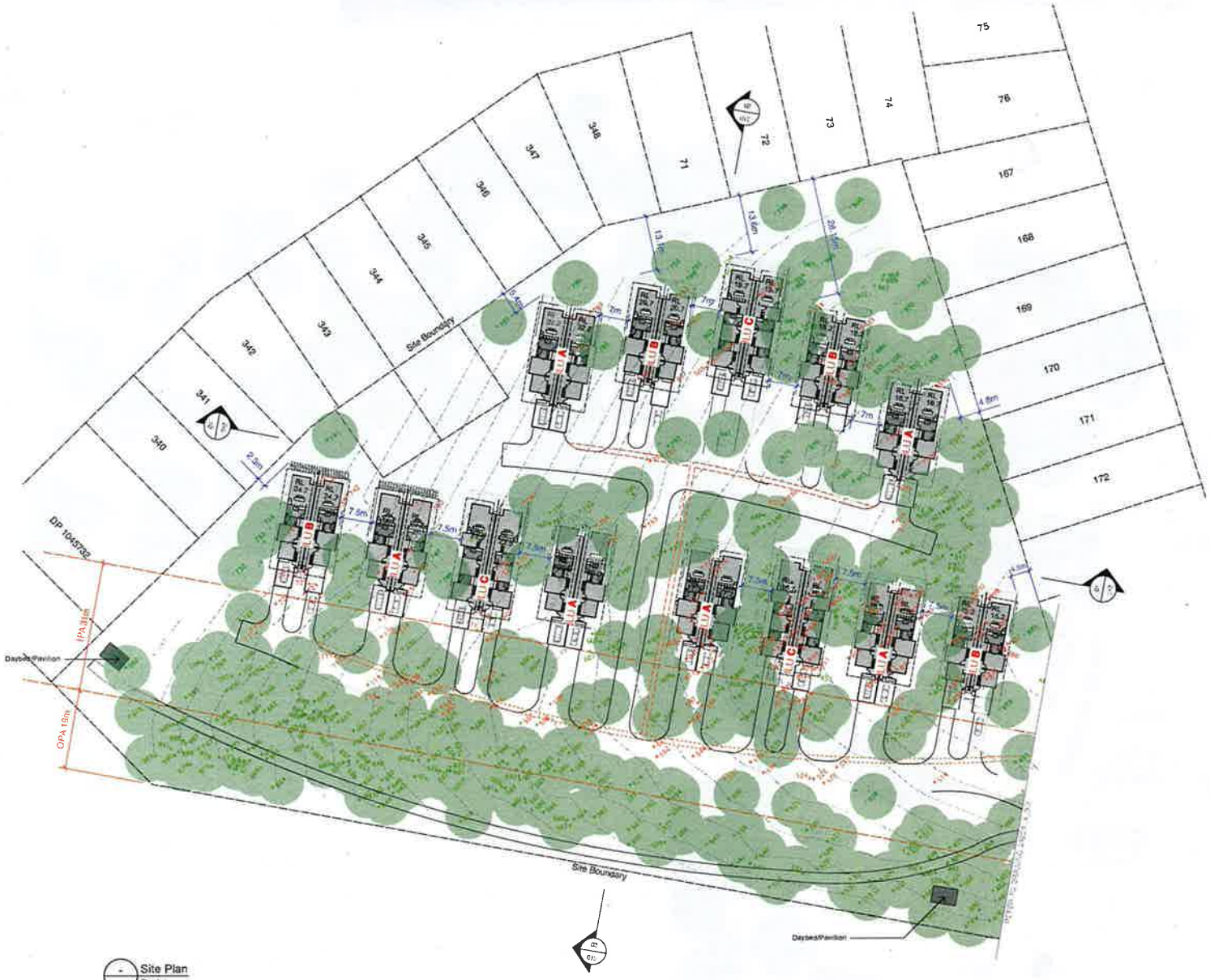
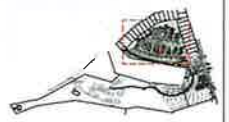
Drawing No: 598DA_A_003

Issue: A



Site Plan
Part 1



KEY PLAN

figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

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A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	10.06.11
Issue	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Site Plan
Part 1

Scale	Date	Drawn	Checked
1:500	02.06.11	BD	PAL

Drawing No.
598DA_A_004

Issue
A

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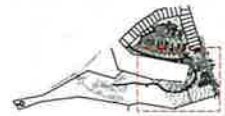

KEY PLAN

175

Site Boundary

LU A

Bus Shelter

STAY POLE

TELSTRA
STOP VALVE
POWER POLE

STOP VALVE
TELSTRA
TELSTRA

HYDRANT

DARKUM ROAD

Clubroom

Site Boundary

LU A

LU B

LU C

TELSTRA

HYDRANT

SRM MARKER

POWER POLE

Site Boundary

Site Boundary

Site Boundary

Site Plan
Part 2

A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	15.06.11

Architect:
mcfadyenarchitects pty limited

Project:
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title:
Site Plan
Part 2

Scale: 1:500 | Date: 02.06.11 | Drawn: BD | Checked: PMc

Drawing No: 598DA_A_005

Issue: A

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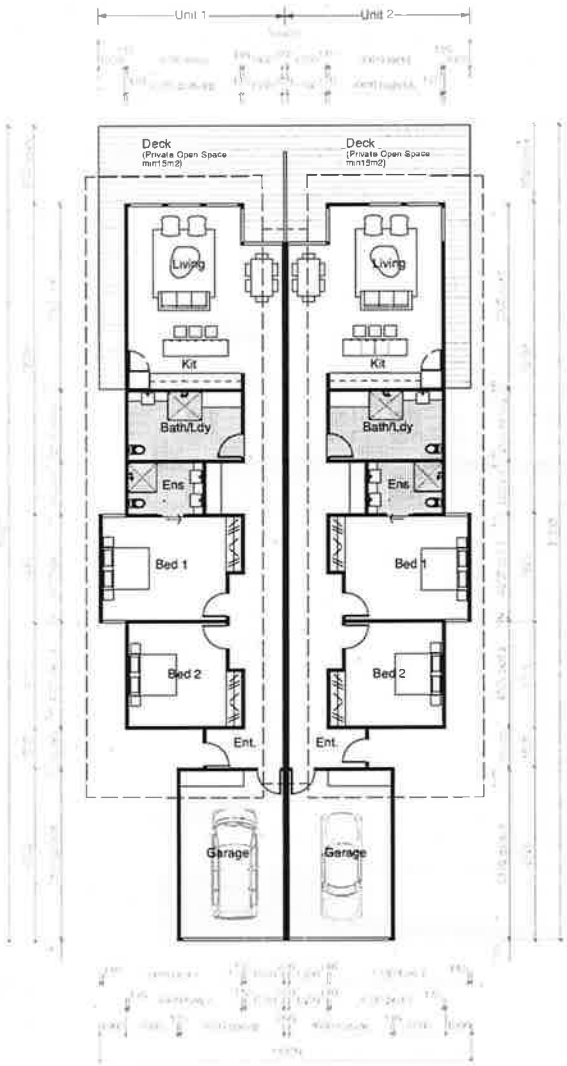
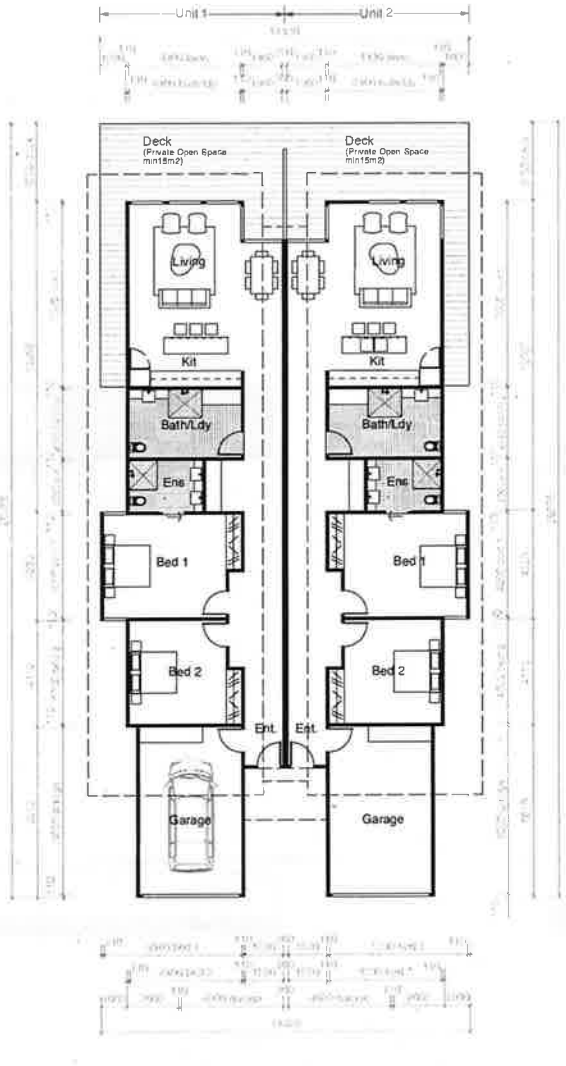


01 Floor Plan - 2 bed
Type A (265sqm)
Scale 1 : 100



02 Floor Plan - 2 bed
Type B (265sqm)
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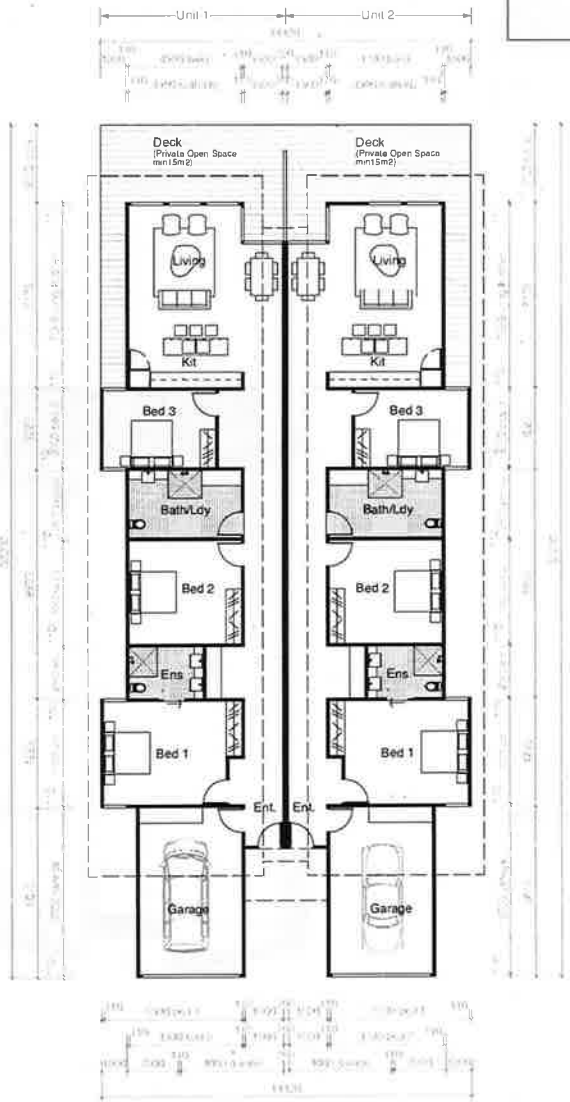


03 Floor Plan - 3 bed
Type C (305sqm)
Scale 1 : 100

Issue	Amendment	Date
A	Development Application Issue	27.07.11
P3	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	16.06.11

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Floor Plans
Independent Living Units

Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PMc

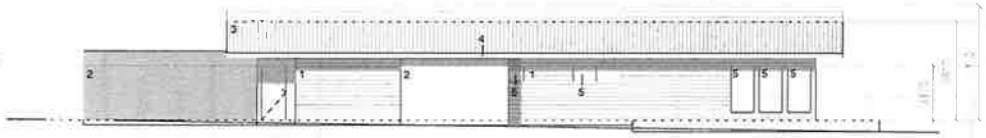
Drawing No.
598DA_A_006

Issue
A

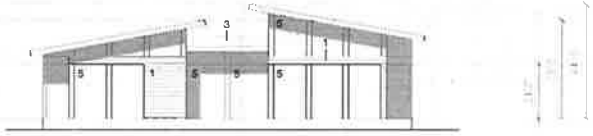
Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

0 1 2 4 6m

top of upper roof level
top of lower roof level
window/door head level
floor level



01 Side Elevation
Type A
Scale 1:100

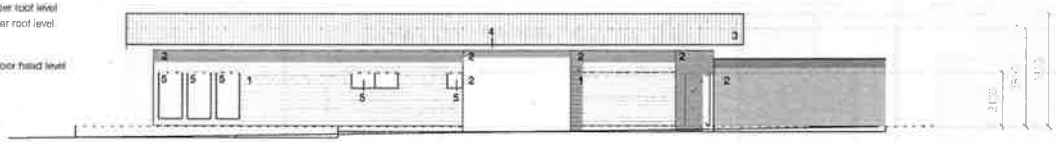


02 Rear Elevation
Type A
Scale 1:100

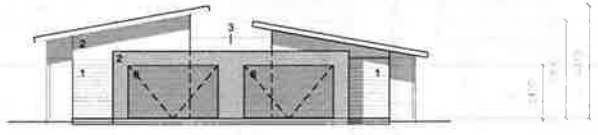
MATERIALS LEGEND:

1. Fibre Cement Render Panel
2. Pre-primed Render Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

top of upper roof level
top of lower roof level
window/door head level
floor level



03 Side Elevation
Type A
Scale 1:100



04 Front Elevation
Type A
Scale 1:100

Issue	Amendment	Date
A	Development Application Issue	27.05.11
P3	Advanced Copy Issue	22.05.11
P2	Advanced Copy Issue	27.04.11
P1	Advanced Copy Issue	19.04.11

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
ILU Elevations
Type A

Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

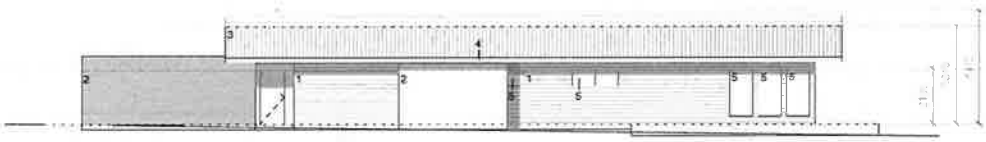
Drawing No
598DA_A_007

Issue
A

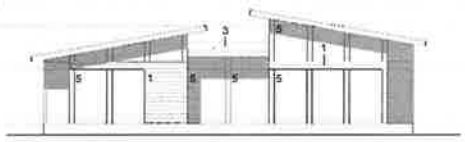
Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

0 1 2 4 6m

top of upper roof level
top of lower roof level
window/door head level
floor level



01 Side Elevation
Type B
Scale 1 : 100

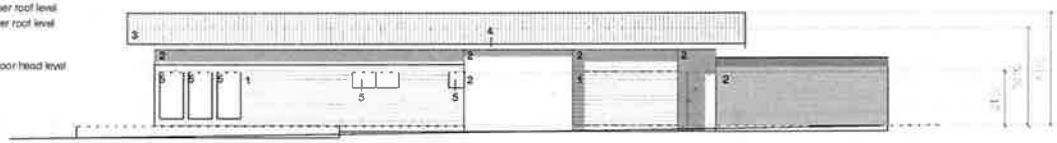


02 Rear Elevation
Type B
Scale 1 : 100

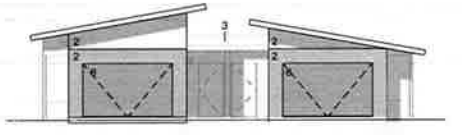
MATERIALS LEGEND:

1. Fibre Cement Facade Panel
2. Pre-painted Render Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door

top of upper roof level
top of lower roof level
window/door head level
floor level



03 Side Elevation
Type B
Scale 1 : 100



04 Front Elevation
Type B
Scale 1 : 100

A	Development Application Issue	27.07.11
P1	Advanced Copy Issue	22.07.11
P2	Advanced Copy Issue	27.04.11
P1	Advanced Copy Issue	15.06.11

Issue Amendment Date

Architect:
mcfadyenarchitects pty limited

Project:
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title:
ILU Elevations
Type B

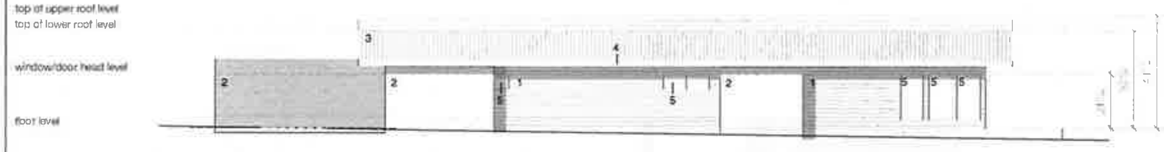
Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

Drawing No.
598DA_A_008

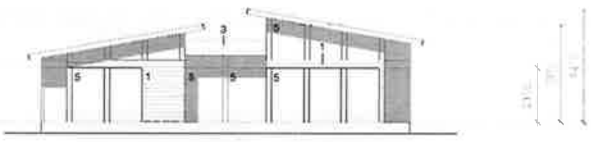
Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

0 1 2 4 8m



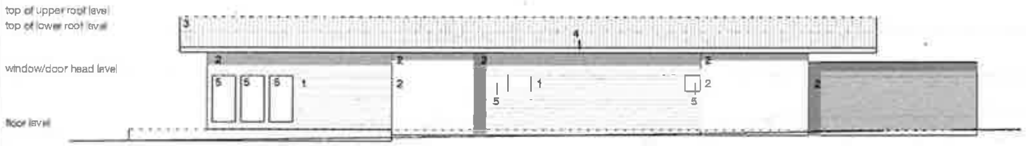
01 Side Elevation
Type C
Scale 1:100



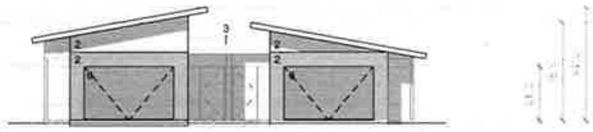
02 Rear Elevation
Type C
Scale 1:100

MATERIALS LEGEND:

1. Fibre Cement Facade Panel
2. Pre-primed Facade Panel - Painted
3. Colorbond Corrugated Roof Sheeting
4. Colorbond Gutter
5. Powder Coated Aluminium Window/Door Frames
6. Panel Lift Garage Door



03 Side Elevation
Type C
Scale 1:100



04 Front Elevation
Type C
Scale 1:100

Issue	Amendment	Date
A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	22.07.11
P1	Advanced Copy Issue	15.06.11

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

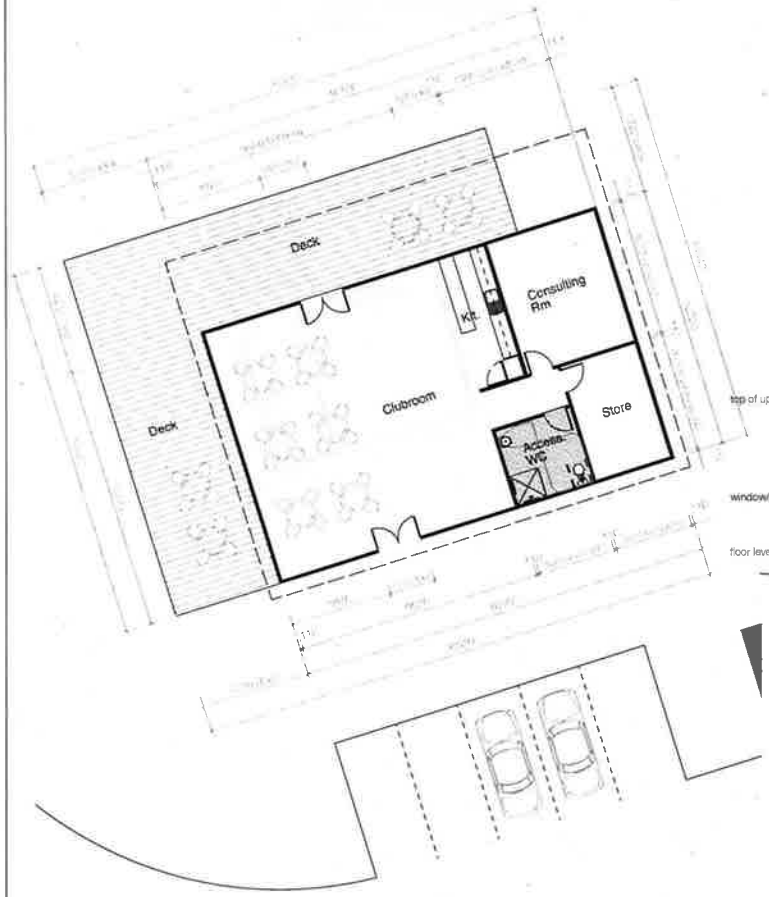
Drawing Title: ILU Elevations
Type C

Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

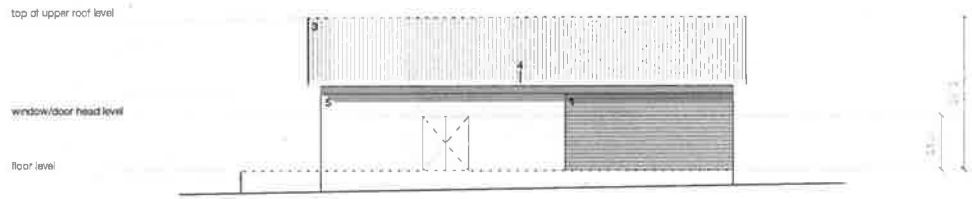
Drawing No	Issue
598DA_A_009	A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site.

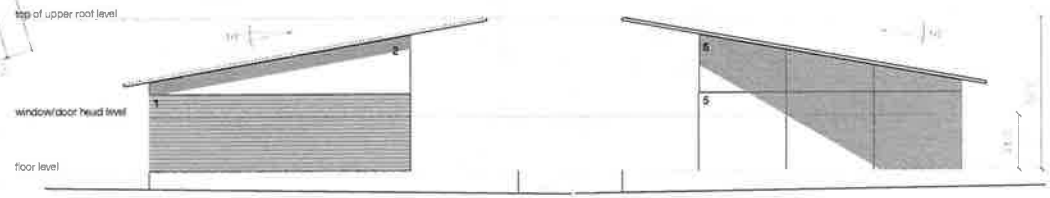
0 1 2 4 8m



01 Floor Plan
Clubroom
Scale 1 100

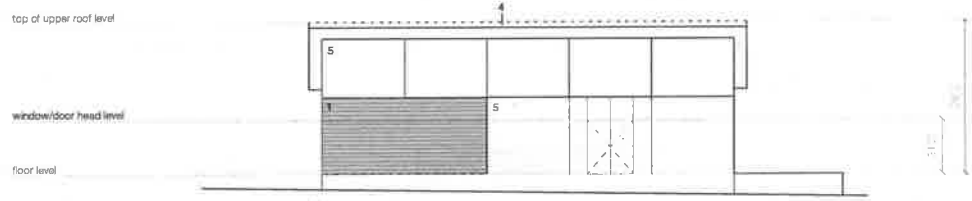


02 South Elevation
Clubroom
Scale 1 100



03 East Elevation
Clubroom
Scale 1 100

04 West Elevation
Clubroom
Scale 1 100



05 North Elevation
Clubroom
Scale 1 100

MATERIALS LEGEND:

4 Fibre Cement Recess Panel
5 Pre-primed Recess Panel - Painted
6 Colorbond Corrugated Roof Sheeting
7 Colorbond Gutter
8 Powder Coated Aluminium Window/Door Frames
9 Panel Lift Garage Door

K	Development Application Issue	27.07.11
Pg	Advanced Copy Issue	27.04.11
Ps	Advanced Copy Issue	10.03.11
Issue	Amendment	Date

Architect
mcfadyenarchitects pty limited

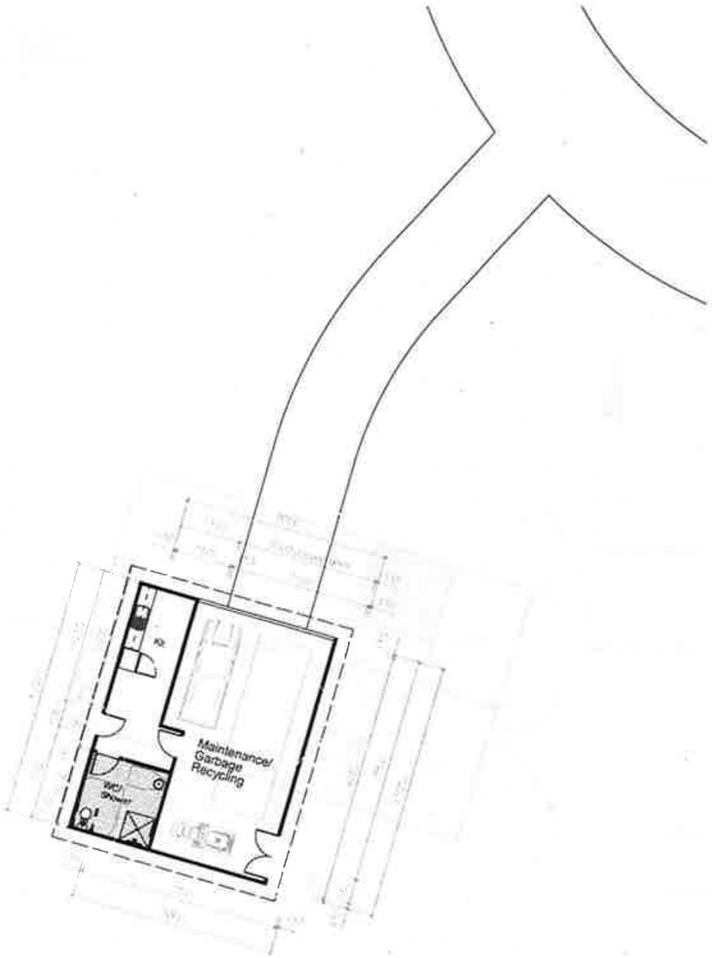
Project
solitary islands retreat
mullaway
proposed aged care retreat at
darkham road, mullaway NSW

Drawing Title
Plans/Elevations/Section
Clubroom

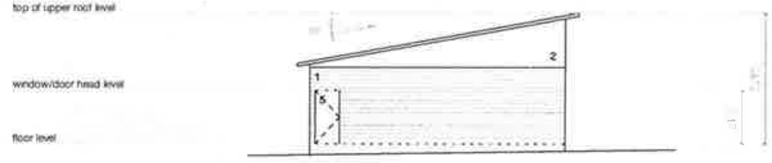
Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PMc

Drawing No.
598DA_A_010

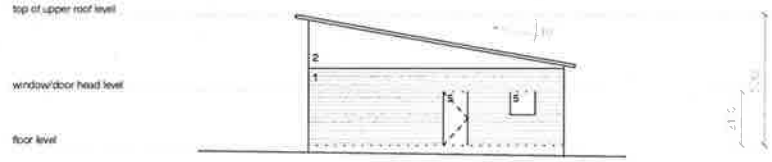
Issue
A



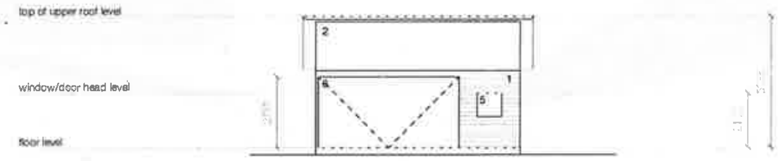
01 Floor Plan
Maintanence/Garbage Recycl Store
Scale 1 : 100



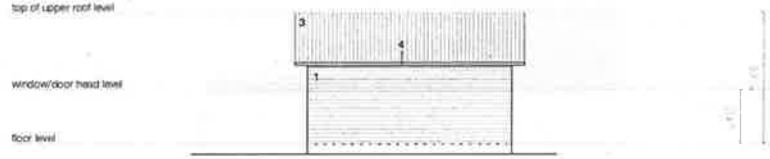
02 East Elevation
Maintenance/Garbage Recycl Store
Scale 1 : 100



03 West Elevation
Maintenance/Garbage Recycl Store
Scale 1 : 100

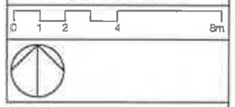


04 North Elevation
Maintenance/Garbage Recycl Store
Scale 1 : 100



05 South Elevation
Maintenance/Garbage Recycl Store
Scale 1 : 100

MATERIALS LEGEND



A	Development Application Issue	
P2	Advanced Copy Issue	
P1	Advanced Copy Issue	
Issue	Amendment	Date

Architect: **mcfadyen**architects pty limited

Project: solitary islands retreat **mullaway**
proposed aged care retreat at darkham road, mullaway NSW

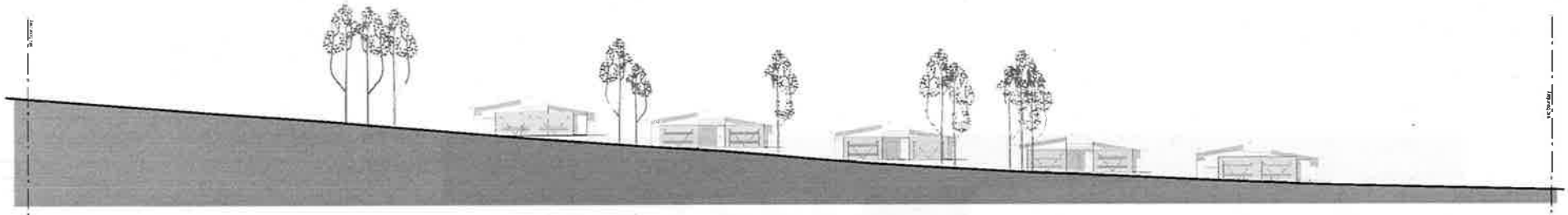
Drawing Title: Plan/Elevations
Maintenance/Recycling/Garbage Store

Scale	Date	Drawn	Checked
1:100	18.05.11	BD	PMc

Drawing No: 598DA_A_011 Issue: A

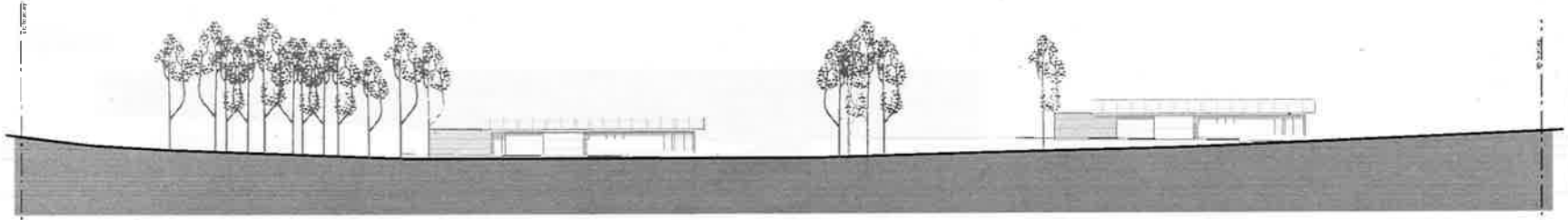
Figured dimensions to be used only. Do not scale off drawings. Any quantities to be verified on site

0 5 10 20m



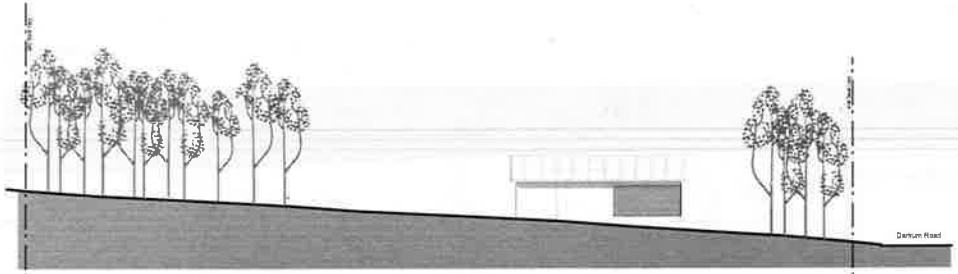
01 Site Section

Scale 1 : 250



02 Site Section

Scale 1 : 250



02 Site Section

Scale 1 : 250

A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	10.06.11
Issue	Amendment	Date

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Site Sections

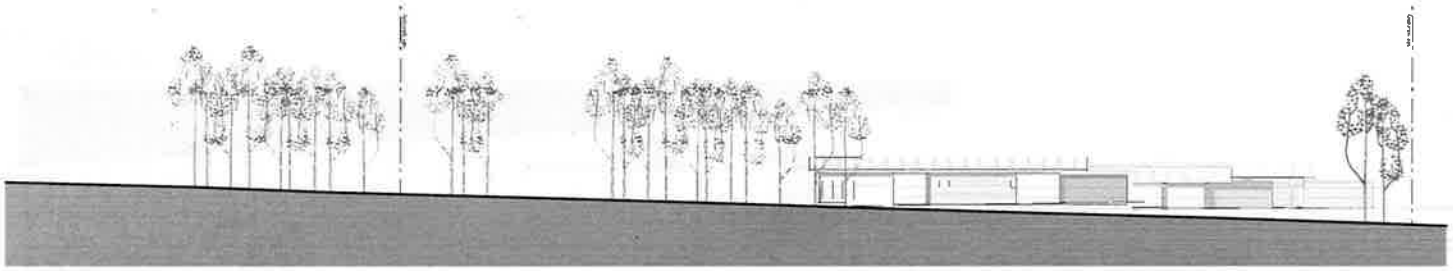
Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PAL

Drawing No.
598DA_A_012

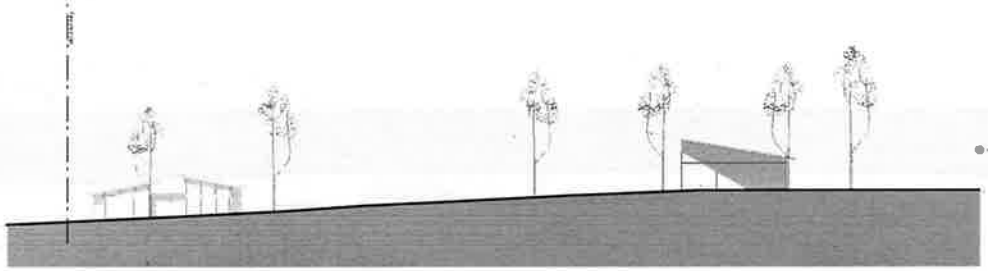
Issue
A

Figured dimensions to be used only. Do not scale off drawings. Any queries to be verified on site

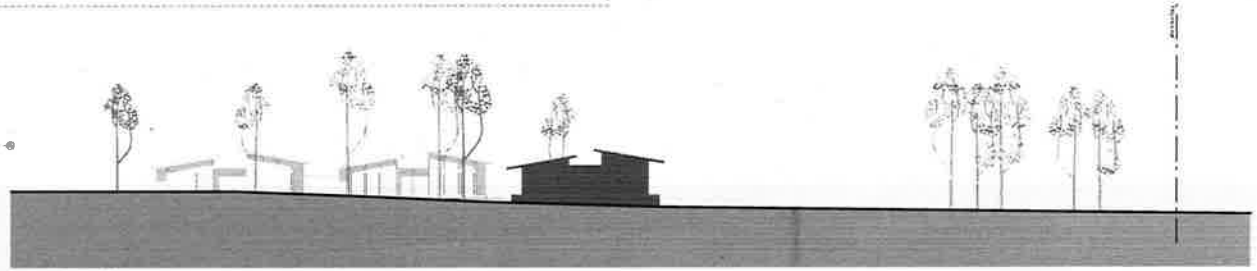
0 5 10 20m



01 Site Section



02 Site Section



A	Development Application Issue	27.07.11
P2	Advanced Copy Issue	27.06.11
P1	Advanced Copy Issue	16.06.11
Issue	Amendment	Chkd

Architect
mcfadyenarchitects pty limited

Project
solitary islands retreat
mullaway
proposed aged care retreat at darkham road, mullaway NSW

Drawing Title
Site Sections

Scale	Date	Drawn	Checked
1:100	31.05.11	BD	PMc

Drawing No.
598DA_A_013

Issue
A

Appendix B

RTA Crash Data

Brief Crash Report

RTA

Crash No	Date	Day	Time	Dist		ID Feature	Loc	Alg	Lgt	Wth	Sfc	SL	DCA	Tus	TU1	S1	D	Manoeuvre1	TU2	S2	D	Manoeuvre2	K	I	Fac S	Fac F	Fac A
Northern Region																											
Coffs Harbour City LGA																											
Arrawarra																											
Pacific Hwy																											
553253	16/01/2007	Tue	13:30		at	MULLAWAY DR	TJN	STR	Off	Fine	Dry	100	307	2	WAG	1	N	Veering left	BDBL	1	N	Proceeding in lane	0	0			
616629	17/03/2008	Mon	12:10	200 m	N	MULLAWAY DR	2WY	STR	Nil	Fine	Dry	60	301	2	LOR	1	S	Proceeding in lane	CAR	1	S	Proceeding in lane	0	1			
Arrawarra Head																											
Arrawarra Rd																											
637470	07/09/2008	Sun	00:20	50 m	N	OCEAN VIEW RD	2WY	CRV	On	Fine	Dry	50	803	L 1	CAR	1	S	Proceeding in lane					0	0	S		
Mullaway																											
Mullaway Dr																											
632870	03/08/2008	Sun	01:00	50 m	W	ARRAWARRA RD	2WY	STR	Nil	Fine	Dry	50	705	1	M/C	1	E	Proceeding in lane					0	1	S		A
Pacific Hwy																											
688829	14/11/2009	Sat	13:24	230 m	N	MULLAWAY DR	2WY	CRV	Nil	Fine	Dry	100	803	L 2	WAG	1	S	Proceeding in lane	LOR	1	S	Parked other	0	0	S		
561983	03/03/2007	Sat	13:45	10 m	N	UNITED SERVICE SN	2WY	STR	Off	Fine	Dry	100	304	2	4WD	1	N	Perform U-turn	TRK	1	N	Proceeding in lane	0	0			
Woolgoolga																											
Pacific Hwy																											
537832	30/09/2006	Sat	13:00	200 m	N	MULLAWAY DR	2WY	CRV	Nil	Fine	Dry	100	803	R 1	CAR	1	S	Proceeding in lane					0	0		F	
703468	08/03/2010	Mon	05:40	400 m	S	MULLAWAY DR	2WY	CRV	Off	Fine	Dry	100	609	1	M/C	1	N	Proceeding in lane					0	1			

Report Totals: Crashes: 8 Fatal Crashes: 0 Injury Crashes: 3 Non-Casualty Crashes: 5 Traffic Units: 12 Killed: 0 Injured: 3

Crashid dataset Mullaway Crash Data 1/7/2005 to 30/6/2010

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Northern Region
Shire of Coffs Harbour
Mullaway

Crash Data Period
1/7/2005 to 30/6/2010

Crash Summary

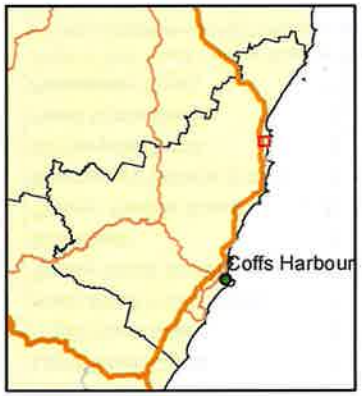
Fatal: 0

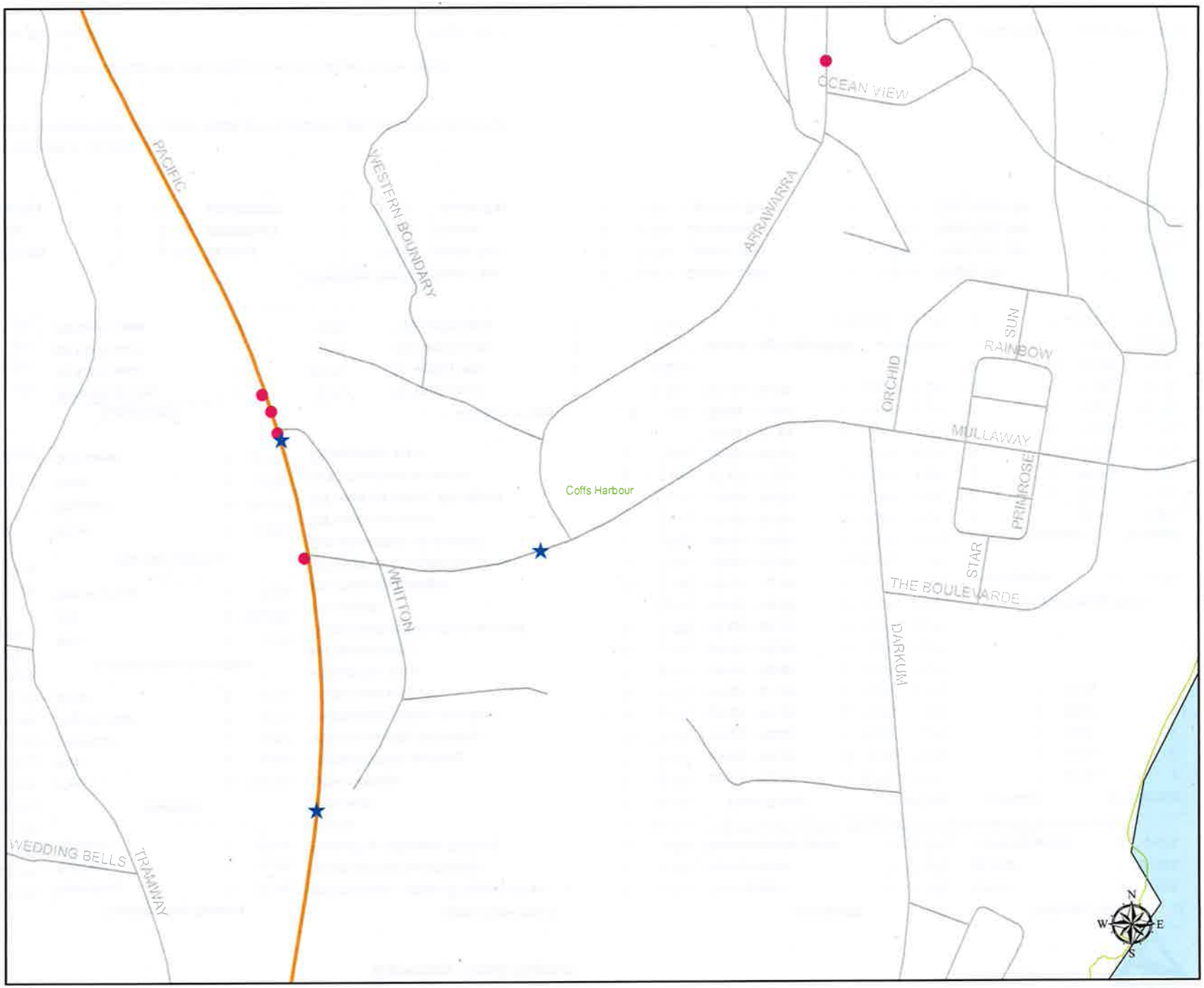
Injury: 3

Non Injury: 5

Legend

- Fatal
- Injury
- Non Injury
- State
- Regional





Prepared By: Jim Synott

Date : 14/2/2011

Summary Crash Report

# Crash Type		
Car Crash	6	75.0%
Light Truck Crash	1	12.5%
Rigid Truck Crash	2	25.0%
Articulated Truck Crash	1	12.5%
'Heavy Truck Crash	(3)	(37.5%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(3)	(37.5%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	2	25.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	1	12.5%
Non intersection	7	87.5%

* Up to 10 metres from an intersection
~ 07:30-09:30 or 14:30-17:00 on school days

Collision Type		
Single Vehicle	4	50.0%
Multi Vehicle	4	50.0%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	6	75.0%
Other Classified Road	0	0.0%
Unclassified Road	2	25.0%

Contributing Factors		
Speeding	3	37.5%
Fatigue	1	12.5%
Alcohol	1	12.5%

Weather		
Fine	8	100.0%
Rain	0	0.0%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	0	0.0%
Dry	8	100.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	5	62.5%
Dusk	0	0.0%
Darkness	3	37.5%

Crash Movement		
Intersection, adjacent approaches	0	0.0%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	0	0.0%
U-turn	1	12.5%
Rear-end	1	12.5%
Lane change	1	12.5%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	1	12.5%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	1	12.5%
Off road, on curve	0	0.0%
Off road on curve, hit object	3	37.5%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit				
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	2	25.0%	90 km/h zone	0	0.0%
60 km/h zone	1	12.5%	100 km/h zone	5	62.5%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 40km/h or less 0 0.0%

CRASHES	8	
Fatal crash	0	0.0%
Injury crash	3	37.5%
Non-casualty crash	5	62.5%

CASUALTIES	3	
Killed	0	0.0%
Injured	3	100.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Time Group		% of Day	
00:01 - 02:59	2	25.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	1	12.5%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	1	12.5%	4.2%
13:00 - 13:59	4	50.0%	4.2%
14:00 - 14:59	0	0.0%	4.2%
15:00 - 15:59	0	0.0%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting	Off/Nil	% of Dark
2 of	3 in Dark	66.7%

Crashes		Casualties
1	2010	1
1	2009	0
3	2008	2
2	2007	0
1	2006	0

~ School Travel Time		
Involvement	0	0.0%

McLean Periods			% Week
A	1	12.5%	17.9%
B	0	0.0%	7.1%
C	2	25.0%	17.9%
D	3	37.5%	3.5%
E	0	0.0%	3.6%
F	0	0.0%	10.7%
G	0	0.0%	7.1%
H	0	0.0%	7.1%
I	0	0.0%	12.5%
J	2	25.0%	10.7%

Day of the Week						# Holiday Periods		
Monday	2	25.0%	Thursday	0	0.0%	Sunday	2	25.0%
Tuesday	1	12.5%	Friday	0	0.0%	WEEKDAY	3	37.5%
Wednesday	0	0.0%	Saturday	3	37.5%	WEEKEND	5	62.5%

New Year	0	0.0%	Queen's BD	0	0.0%	Easter SH	0	0.0%
Aust. Day	0	0.0%	Labour Day	1	12.5%	June/July SH	0	0.0%
Easter	0	0.0%	Christmas	0	0.0%	Sept./Oct. SH	1	12.5%
Anzac Day	0	0.0%	January SH	1	12.5%	December SH	0	0.0%

Crashid dataset Mullaway Crash Data 1/7/2005 to 30/6/2010
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Appendix C

Ryans Bus Service Timetable

COFFS HARBOUR - WOOLGOOLGA - GRAFTON

MONDAY TO FRIDAY SERVICES												SATURDAY	
Departs	AM	AM	AM	AM	AM	AM	PM	PM	PM	PM	PM	AM	PM
Coffs Hbr Park Ave Carpark	6.55 No service from Coffs to Red Rock	7.30 No service Coffs to Red Rock	8.00	-	9.30	10.15	1.00	3.20 No service for south of Woolg	3.30	4.15	5.30	8.30	1.00
Park Beach Plaza	-	-	-	-	9.35	10.20	1.05	3.35	3.35	4.20	5.35	-	1.05
Korora Bridge	7.02	7.37	8.07	-	9.37	10.25	1.15	-	3.45	4.30	5.40	8.35	1.10
Sapphire - Hway	7.05	7.40	8.10	-	9.40	10.28	1.20	-	3.50	4.35	5.43	8.40	1.20
Moonee Beach	-	-	8.15	-	-	-	1.25 O/R for Coffs pax	-	3.55 O/R for Coffs pax	4.40	5.48 O/R for Coffs pax	-	O/R for Coffs Pax
Moonee - Highway	7.05	7.42	-	-	9.45	10.32	1.25	-	3.55	4.35 For nth bound pax	5.48	8.45	1.25
Emerald Beach	-	-	-	-	9.50	-	1.35	-	4.05	4.45	5.53 O/R for Coffs pax	-	1.30
Emerald - Highway	7.10	7.45	8.20	-	-	10.37	-	-	-	-	5.53	8.47	-
Sandy Beach	-	7.50	-	-	10.00 full loop	-	1.45 full loop	-	4.10	4.55	O/R for Coffs pax	8.50	1.40
Raj Mahal	7.25	8.05 Nth Bound Only	8.40	9.22	10.10	-	1.50	4.05	4.15	5.05	-	-	-
Woolgoolga Oval Beach St	7.22	8.00 i	8.55	9.20	10.25 i	10.45	2.10 i	4.00	4.30 i	5.05	6.15	8.55	1.50
Safety Beach	7.26 *	8.06*	-	9.23*	O/R	-	O/R	-	O/R	O/R	-	-	-
Mullaway Store	7.28*	8.08*	-	9.24*	O/R	-	O/R	4.10*	O/R	O/R	-	-	-
Arrawarra Headland	7.29*	8.09*	-	9.25*	O/R	-	O/R	4.11*	O/R	O/R	-	-	-
Arrawarra Beach Rd	7.30*	8.10*	-	9.26*	O/R	-	O/R	4.12*	O/R	O/R	-	-	-
Darlington Park	7.33	8.13*	-	9.27*	O/R	-	O/R	4.25	O/R	O/R	-	-	-
Corindi Beach	7.35 i	8.15	-	9.30	O/R	-	O/R	4.30 i	4.45	O/R	-	-	-
Red Rock	7.25 i	7.35	-	9.35	O/R	-	3.50	4.35	O/R	-	-	-	-
Kungala Rd	7.49	8.30	-	-	-	-	-	4.55	5.10	-	-	-	-
South Grafton - Bi-Lo	8.10	8.50	-	-	-	-	-	5.15	5.30	-	-	-	-
Grafton - Prince St	8.40	9.00	-	-	-	-	-	5.25	5.35	-	-	-	-

GRAFTON - WOOLGOOLGA - COFFS HARBOUR

MONDAY TO FRIDAY SERVICES											SATURDAY	
Departs	AM	AM	AM	AM	AM	AM	PM	PM	PM	PM	AM	PM
Grafton - Prince St Market Sq	6.55	6.55	-	-	-	-	-	3.20	3.30	-	-	-
South Grafton Skyline Car Care	7.00	7.00	-	-	-	-	-	3.40	3.40	-	-	-
Kungala Rd	7.20	7.20	-	-	-	-	-	4.05	4.00	-	-	-
Red Rock	-	7.35	-	7.25	-	9.35	-	-	-	-	-	-
Corindi Beach	7.35 i	7.42	-	7.30	-	9.50	-	4.25 i	4.18	-	-	-
Darlington Park	7.40	7.45	-	-	-	9.55	-	4.30*	4.20*	-	-	-
Arrawarra Beach Rd	7.41	7.46*	-	-	-	-	-	4.30*	4.20*	-	-	-
Arrawarra Headland	-	7.47*	-	7.40	-	10.05	-	4.35*	4.25*	-	-	-
Mullaway Store	7.43 *	7.47*	-	7.45	-	10.10	-	4.35*	4.25*	-	-	-
Safety Beach	7.45 *	7.48*	-	7.50	-	10.15	-	4.40*	4.28*	-	-	-
BP Service Station Woolgoolga	7.55	7.50	-	7.55 i	-	10.16	-	4.40	4.28	-	-	-
Raj Mahal	-	-	-	-	-	10.10	1.50	-	4.10	-	-	-
Woolgoolga Oval Beach St	-	8.00 i	7.35	8.00	9.00	10.30 i	2.00	4.30	4.30 i	6.15	9.00	2.00
Sandy Beach	-	-	7.40	-	9.10	-	2.10 full loop	-	O/R for Woolg Pax	-	-	-
Emerald Beach	-	8.10	7.52	8.10	9.20	10.40	2.20	-	O/R for Woolg Pax	-	9.10	-
Emerald - Highway	-	-	-	-	-	-	-	4.40	4.40	6.25	-	2.08
Moonee Beach	-	-	7.55	-	-	10.50	-	-	-	-	9.20	-
Moonee Roundabout	-	8.15	-	8.15*	9.25	-	2.25	4.45*	4.45	6.30	-	2.10
Sapphire - Highway	-	8.20		8.20	9.30	10.57	2.27	4.49	4.49	6.34	9.25	2.23
Korora Bridge	8.10 i for Park Ave	8.25	8.10 i	8.25	9.35	11.00	2.30	4.52	4.52	6.37	9.30	2.25
Park Beach Plaza	8.20	8.35	-	8.35*	9.40	11.10	2.35	4.55	4.55	-	9.40	2.30
Coffs Hbr Park Ave Carpark	8.25	8.40	8.30	8.45	9.45	11.20	2.40	5.00	5.00	6.40	9.45	2.35

RyansBusService
COFFS HARBOUR - WOOLGOOLGA - GRAFTON

Due to Pacific Highway Upgrade from 2010-2013, times may vary due to delays

HOW TO USE THIS GUIDE

1) Please check the colour coded times on the timetable. We use three different colours for our services.

Black is for bus services all year round.

Green is for school days only.

Red is for school holidays only.

2) Please check any notes on the times listed in the timetable.
An * means that there is Highway Pick up only.
An i means that you will be required to interchange buses—please check with the driver in this case.
O/R means On Request. Please check with driver or office on these occasions.
O/R for Coffs Pax means the service will only enter the area at the request from a passenger boarding at Coffs Harbour.
O/R for Woolg Pax means the service will only enter the area at the request from a passenger boarding at Woolgoolga.
Full Loop means service runs the full loop around Ironbark Avenue in Sandy Beach. All other services within Sandy Beach, the bus will loop around Acacia Avenue.

Please note: If you wish to catch the 3.20pm service from Coffs Harbour to travel north of Woolgoolga and you are boarding north of the Plaza, you will need to contact our office prior to 2.30pm to organise this request.

GHD

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	C Weavers	M Lyons		Shaun Lawer		28.7.2011